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, April 6, 2023**
Meeting Time: **10:30 AM**

1. 10:30 AM - 11:15 AM: Site Review for Cooperative Alliance for Seacoast Transportation, (Assessor's Map H, Lot 35-C-4, located at 42 Sumner Drive. (Proposal is to build a 28,700 s.f vehicle storage building and 17,000 s.f. administration, operations and maintenance building.) (SITE-2023-0002).

2. 11:15 AM – 12:00 PM: Site Review for Brady Sullivan Properties (Owners: 655 South Willow Dover, LLC,) Assessor's Map H, Lot 41-P, located at 25-26 Karolina Drive. (Proposal is to add a 4,600 s.f. building with outdoor patio, walkways, and parking restriping to add ADA spaces.) (SITE-2023-0001).

City of Dover, New Hampshire
SITE REVIEW APPLICATION

[Revision Date: July 1, 2021]

Office Use Only	Project #: SITE-2023-0002	Date Received:
	Amount Paid:	Time Received:

APPLICANT AND OWNER INFORMATION

Name of Applicant: Rad Nichols Telephone # 603-743-5777

Address of Applicant: 42 Sumner Drive

E-Mail Address: RNichols@coastbus.org

Name of Property Owner (*if different from applicant*): _____ Telephone #_____

Address of Property Owner: _____

PROPERTY INFORMATION

Address of Property: 42 Sumner Drive

Assessor's Map # _____ Lot(s) # _____

Zoning District(s) H0035-C00004 Overlay District(s) _____

Size of Parcel: _____sq. ft. 6.39 ac. Property Deed: Book 2200 Page: 264

Existing Use of Property: Operations, maintenance, and vehicle storage for COAST.

SITE PLAN INFORMATION

Describe Proposed Use: Proposed use will match existing use - operations, maintenance, and vehicle storage for COAST.

Area of Parcel to be Developed: 211,000 sq. ft.

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

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

Number of Parking Spaces: Existing 51 Proposed 73

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

Number of Employees Total: _____ In Maximum Shift: _____

Disposition of Parcel:

Building Footprint Vehicle storage: 28,700 Office: 18,000 sq. ft.

Total Building Area _____ sq. ft.

Paved Area 112,559 sq. ft.

Building Setbacks:

Front Yard 150 ft.

Rear Yard 36 ft.

Side Yard: Right 117 ft. Left 178 ft.

City Water? X Yes ___ No How far is city water from the property? Currently connected - 0 ft

City Sewer? X Yes ___ No How far is city sewer from the property? Currently connected - 0 ft

TRANSFER OF DEVELOPMENT RIGHTS INFORMATION

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

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

Relief sought (Check All That Apply):

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

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

_____

_____

_____

BUILDING INFORMATION

Type of Building to be Built: Two buildings - a vehicle storage facility and an administration, office, and maintenance building.

Height of Building: Vehicle storage: 30' 8" Office: 26' Finished Floor Elevation: Vehicle storage: 101.0' Office: 101.5'

Number of Seats (where applicable) _____

Estimated value of construction: $16,220,000 Refuse removal: Public/Private (circle one)

WAIVER REQUESTS

Site Review Regulations section(s) to be waived: _____

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

_____

_____

_____

_____

_____

_____

_____

SURVEYOR INFORMATION

Name of Surveyor and Company (Licensed in N.H.) William Doucet, LLS - Doucet Survey, LLC

Address 102 Kent Place, Newmarket, NH 03857 Telephone #: 603-659-6560

Professional License #: 824 E-mail address: bill@doucetsurvey.com

ENGINEER INFORMATION

Name of Engineer and Company (Licensed in N.H.) Benjamin Clark, PE - CMA Engineers, Inc.

Address 35 Bow Street, Portsmouth, NH 03801 Telephone #: 603-431-6196

Professional License #: 15219 E-mail address: bclark@cmaengineers.com

ARCHITECT INFORMATION

Name of Architect and Company (Licensed in N.H.) Robert E Doyle, RA

Address 35 Cushing Street, Dover, NH 03820 Telephone #: 603-738-2872

Professional License #: 3839 E-mail address: rdoylepera@gmail.com

LANDSCAPE ARCHITECT INFORMATION

Name of Landscape Architect and Company (Licensed in N.H.) _____

Address _____ Telephone #: _____

Professional License #: _____ E-mail address: _____

SOIL SCIENTIST INFORMATION

Name of Soil Scientist and Company (Licensed in N.H.) _____

Address _____ Telephone #: _____

Professional License #: _____ E-mail address: _____

CONSERVATION EASEMENT HOLDER

Name of Easement Holder: _____ Telephone #_____

Address Easement Holder: _____

SIGNATURES

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

Signature of Property Owner: _____ Date: _____

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: _____

AUTHORIZATION TO COMPLETE THE PROJECT ON SUBJECT PROPERTY

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

Signature of Property Owner: _____ Date: _____

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: _____

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

CMA ENGINEERS, INC.

CIVIL | ENVIRONMENTAL | STRUCTURAL

35 Bow Street
Portsmouth, New Hampshire
03801-3819

P: 603|431|6196
www.cmaengineers.com

March 16, 2023

Donna Benton, AICP
Director of Planning and Community Development
City of Dover New Hampshire
288 Central Avenue
Dover, New Hampshire 03820

RE: COAST Bus Facility
CMA #1250

Dear Ms. Benton:

On behalf of the Cooperative Alliance for Seacoast Transportation (COAST), CMA Engineers, Inc. submits for TRC review site plans and calculations in support of two proposed buildings at COAST's current location, 42 Sumner Drive. This letter describes the history of the site and the circumstances that lead to its construction.

The property located at 42 Sumner Drive in Dover, New Hampshire is owned by COAST who purchased the 6.39-acre parcel (Tax Map H, Block 35, Lot C-4) from C&J Bus Lines in 2000. Access to the site off Sumner Drive is through the intersection of Knox Marsh Road and Sumner Drive. Abutting properties include 10 Sumner Drive (2.36 acres) which is owned by 10 Sumner Drive LLC; 99 Knox Marsh Road (20.46 acres) owned by Ry Development LLC; and 30 Littleworth Road (50.50 acres) owned by Sousane Ruth K & Quinina Nancy K. A 30' wide utility access easement is shown throughout the property that depicts access to the property at 99 Knox Marsh Road. The site has 188' of frontage on Sumner Drive and is within the City's Commercial Manufacturing zoning district.

The site is currently comprised primarily of impervious areas surrounded by grass. The impervious areas are comprised of asphalt parking lots used as bus storage and COAST's current bus maintenance facility. This facility is nearing its end of life stage and therefore COAST is proposing the construction of a new facility of operations, maintenance, and vehicle storage. The proposed design consists of two different structures, a vehicle storage building that is 28,700 ft^2 and a separate administration, office and maintenance building that is 18,000 ft^2. Along with the two structures the design consists of an outside concrete patio for staff, and general site improvements to utilities, stormwater management, and vehicle circulation. The project will expand the impervious area by approximately half an acre and will improve existing stormwater management. The topography and overall groundcover conditions will be very similar to predevelopment conditions.

The proposed stormwater management system will be a combination of closed and open drainage where runoff will be captured with catch basins. Sediment forebays will be utilized for pretreatment and gravel wetlands for treatment and flow attenuation. These upgrades will reduce peak flow and volume of stormwater and will provide adequate erosion and sedimentation control during construction. The stormwater management infrastructure has been designed in accordance with City of Dover and NHDES Alteration of Terrain standards.

If you have any questions, please do not hesitate to ask.

Very truly yours,



Benjamin Clark, P.E.
Senior Project Manager
CMA Engineers, Inc.

BCC

cc: Rad Nichols, COAST

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: Rad Nichols

Signature(s) of Property Owner(s): _____ Date: 2023-03-16

Signature of Applicant: _____ Date: 2023-03-16
if different from owner

AUTHORIZATION TO ENTER SUBJECT PROPERTY

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

Property Owner Name: Rad Nichols

Signature(s) of Property Owner(s): _____ Date: 2023-03-16

Signature of Applicant: _____ Date: 2023-03-16
if different from owner

IF SIGN PERMIT, SIGN PERMIT APPLICATION INFORMATION

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

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

Address of Sign Location: _____

Sign Permit Application Type:
(check one)

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

CMA ENGINEERS, INC.

CIVIL | ENVIRONMENTAL | STRUCTURAL

35 Bow Street
Portsmouth, New Hampshire
03801-3819

P: 603|431|6196
www.cmaengineers.com

March 16, 2023

Donna Benton, AICP
Director of Planning and Community Development
City of Dover New Hampshire
288 Central Avenue
Dover, New Hampshire 03820

RE: **COAST Bus Facility**
Environmental Conditional Use Permit Application
CMA #1250

Dear Ms. Benton:

This letter is to inform you of our intent to submit a Conditional Use Permit application on behalf of COAST. The application will be submitted separately using the City's online permitting system.

Respectfully,



Benjamin Clark, P.E.
Senior Project Manager
CMA Engineers, Inc.

BCC

cc: Rad Nichols, COAST

MEMORANDUM

TO: City of Dover, Planning Department

FROM: Chris Chiaramonte, EIT, CMA Engineers, Inc.

RE: COAST, Proposed Operation and Maintenance Facility
Traffic Memorandum
CMA #1250

DATE: March 16, 2023

Introduction

The Cooperative Alliance for Seacoast Transportation (COAST) is proposing to redevelop the existing site to construct a new facility for administration, operations, maintenance, and vehicle storage on the property located at 42 Sumner Drive. The proposed design consists of two different structures, a vehicle storage building that is 28,700 ft^2 and a separate administration, operations, and maintenance building that is 18,000 ft^2. Currently the COAST's administrative operations are located at 6 Sumner Drive and will be moved to 42 Sumner Drive, approximately 4-6 employees. In addition to moving the administrative staff, the existing bus stop at 6 Sumner Drive will move to 42 Sumer Drive. This report supplements the Site Plan Application and summarizes traffic issues including adjacent land uses, traffic circulation, sight distances, potential traffic impacts, area roadway facilities and pedestrian facilities.

Site Description

The proposed redevelopment project primarily consists of the previously disturbed area of parcel H-35-C-4 and continued to be accessed from the existing driveway location on Sumner Drive. The driveway is located off the cul-de-sac at the end of Sumner Drive. The proposed access driveway consists of a 66' wide curb cut, which has a two-way 24' wide aisle for entering busses and passenger vehicles and exiting passenger vehicles, and another 24' wide one-way aisle for exiting busses.

The 73 proposed parking spaces would accommodate the existing staff at 42 Sumner Drive and the additional staff migrating from 6 Sumner Drive. COAST's bus fleet will be parked inside the vehicle storage building and not stored in the open paved parking area. The proposed number of parking spaces meets Dover's requirements for maximum allowed off-street parking spaces.

The existing bus stop at 6 Sumner Drive is primarily utilized by COAST and abutting business staff, and pedestrians visiting COAST's administrative building to purchase bus passes. The relocation of this bus stop will not change the current bus schedule.

Sumner Drive is a local road with two 15-foot travel lanes separated by a striped double yellow line and 3-foot gravel shoulders with no speed limit sign posted near the site. Sumner Drive intersects Route 153/Knox Marsh Road approximately 900 feet from the site driveway. The intersection is unsignalized and has left turning lanes coming from the eastbound and westbound directions. Knox Marsh Road has access to Route 9 and Route 16/Spaulding Turnpike approximately three quarters of a mile east from the Sumner Drive and Knox Marsh Road intersection.

Site Generated Traffic

As currently planned, the site would be redeveloped with a new administrative and operations building, and a vehicle storage building. Typically, we would estimate new trips generated by the site by referring to the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* and the appropriate Land Use Code.

Although additional employees are being relocated to 42 Sumner Drive from 6 Sumner Drive, increasing trips generated from the site, the Sumner Drive at Knox Marsh Road intersection will experience the same amount of daily traffic entering and exiting the business park. Employee schedules are not expected to change, which would not affect the AM and PM peak hour trips from the site.

The land use surrounding the site primarily consists of commercial and industrial uses, and residential development on the southern side of Knox Marsh Road. East of the Knox Marsh Road at Sumner Drive intersection and in the vicinity of the Route 9 and Route 16 intersections, the annual average daily traffic (AADT) volume for Knox Marsh is 15,597 AADT. West of the Sumner Drive intersection the AADT decreases to 11,900.

Sight Distance

In the existing condition, the driveway runs parallel with Sumner Drive. Exiting vehicles have a clear line of site for approximately 350 feet, until the road bends to the south. This would meet AASHTO's recommended intersection sight distance for a 35-mph road. The overall driveway geometry will not change in the proposed condition.

Conclusions

The proposed redevelopment of the COAST Bus Facility will provide adequate parking and proper onsite circulation for the building users and emergency vehicles. No additional trips will

be generated by the redevelopment, as both existing COAST facilities are located on Sumner Drive already. There will be no impact on the Knox March Road at Sumner Drive intersection as a result of this project.

Drainage Report
Cooperative Alliance for Seacoast Transportation
Operations and Maintenance Facility
Dover, New Hampshire

March 2023

Submitted to:

City of Dover – Planning Department
288 Central Ave
Dover, New Hampshire 03820

Submitted by:

CMA Engineers, Inc.
Civil and Environmental Engineers
35 Bow Street
Portsmouth, New Hampshire 03801

Prepared by:

Civil and Environmental Engineers
35 Bow Street
Portsmouth, New Hampshire 03801

Drainage Report
Cooperative Alliance for Seacoast Transportation
Operations and Maintenance Facility
Dover, New Hampshire

March 2023

TABLE OF CONTENTS

Stormwater Management Report Page

PROJECT DESCRIPTION 1
PRE-DEVELOPMENT CONDITIONS 5
POST-DEVELOPMENT CONDITIONS 5
EROSION CONTROL DURING CONSTRUCTION 5
CONCLUSIONS 6

Construction Drawings (34”x22”)

APPENDICES

A. Aerial Photograph
B. Web GIS Map-Surface Water Impairments
C. Web GIS Map-AoT Screening
D. FEMA Flood Insurance Rate Map
E. Environmental Documents
F. NRCS Soil Report
G. Project Photographs
H. Extreme Precipitation
I. Drainage Analysis
    I.1 Pre-Development Drainage Analysis
        i. Drainage Diagram
        ii. 2-YR, 10-YR, 25-YR, and 50-YR Node Summaries
        iii. 10-Year, 24 Hour Storm Calculations
    I.2 Post-Development Drainage Analysis
        i. Drainage Diagram
        ii. NHDES Best Management Practice Worksheets
        iii. 2-YR, 10-YR, 25-YR, and 50-YR Node Summaries
        iv. 10-Year, 24 Hour Storm Calculations
J. Reduced-Size Design Drawings (8.5x11)
K. Tax Maps and Zoning Maps
L. Inspection and Maintenance Plan

PROJECT DESCRIPTION

The Cooperative Alliance for Seacoast Transportation (COAST) is proposing the construction of a new facility for operations, maintenance, and vehicle storage on the property located at 42 Sumner Drive in Dover, New Hampshire. The property is owned by COAST who purchased the 6.39-acre parcel (Tax Map H, Block 35, Lot C-4) from C &J Bus Lines in 2000. Access to the site off Summer Drive is through the intersection of Knox Marsh Road and Summer Drive. Abutting properties include 10 Sumner Drive (2.36 acres) which is owned 10 Sumner Drive LLC, 99 Knox Marsh Road (20.46 acres) owned by Ry Development LLC, and 30 Littleworth Road (50.50 acers) owned by Sousane Ruth K & Quinian Nancy K. A 30' wide utility access easement is shown throughout the property that depicts access to the property at 99 Knox Marsh Road. The site has 188' of frontage on Sumner Drive, and the boundary limits of the main 6.39-acre parcel are depicted on the Existing Conditions Plans. The survey included boundary and topographical information of the entire site. The property is within the City's Commercial Manufacturing zoning district. The property tax map and zoning maps are provided in Appendix L. The project is expected to be constructed during the 2024 season.

The proposed design consists of two different structures, a vehicle storage building that is 28,700 ft^2 and a separate administration, office and maintenance building that is 18,000 ft^2. Along with the two structures the design consists of an outside concrete patio for staff, and general site improvements to utilities, stormwater management, and vehicle circulation. The new facility will be located on flat terrain with slopes ranging from 0 to 5% and elevations ranging from 202 to 208 feet. This project is being permitted concurrently with the Town of Dover Planning Board for Site Plan Approval, and with the NHDES for an Alteration of Terrain Review.

Site survey and wetlands delineation were completed by Doucet Survey LLC of Newmarket, New Hampshire and West Environmental of Nottingham, New Hampshire respectively. The wetlands were delineated in June 2020 and the site survey was completed in June 2020.

The site is currently comprised primarily impervious areas surrounded by grass. The northern portion consisted of wooded wetlands (See Existing Conditions Plan [Sheet 5]). The City of Dover requires that a 50-foot buffer be maintained between wetlands and proposed development, which has been maintained and is depicted on the plans. The project will expand the impervious area by approximately half an acre.

An EPA Construction General Permit (CGP) will be required for this project since there will be greater than one acre of ground disturbance. The CGP includes provisions for actively managing sediment and erosion during construction. Proposed erosion control methods include silt sock, erosion matting for steep slopes (greater than 3H:1V), stabilized construction entrance, stone check dams, and inlet protection for catch basins. Locations for proposed erosion controls are depicted on the enclosed Erosion Control Plan (Sheet 10) and Site Details (Sheet 12).

NHDES Web GIS Screening

A search of the NHDES Onestop Web GIS Data Mapper database was completed for this project including a review of surface water impairments and AoT screening layers. Figures for each are provided in Appendices B and C, respectively. The site is not near any designated river quarter mile buffer. No surface water impairments were identified on the property. The screening map shows the site is located within a wellhead protection area and is considered a Coastal Community. Extreme precipitation depths were increased by 15%. It is also noted that four remediation sites showed up in the proximity of the site including the BioPure Corporation site (Hazardous Waste Generation), the existing COAST Administrative Offices (Oil Spills/Releases), the SWIFT Independent Packing Co. (Leaking Underground Storage Tank) and the Dover Circle K. (Initially response spill site/leaking underground storage tank).

New Hampshire Natural Heritage Bureau (NHB) Search

A review of the New Hampshire Natural Heritage Bureau (NHB) database was completed for this project on November 15, 2022, to identify any rare species and exemplary natural communities in the project area. The review indicated that several recorded occurrences are near the project area, including the Spotted Turtle, New England Cottontail, Northern Black Racer, and plat species greater fringed-gentian. A copy of the NHB report is provided in Appendix E. Correspondence with NHB regarding the threatened plant species has been included with this report. Correspondence with Fish and Game is ongoing. The report is valid for a period of 1 year after the search date.

FEMA Flood Plain

A copy of the FEMA Flood Insurance Rate Map is provided in Appendix D. The project is outside the limits of the depicted 500-year flood plain, and located within Zone X.

Stormwater Analysis

The peak stormwater runoff flows were calculated for the 2-year, 10-year, 25-year, and 50-year Type III, 24-hour storm events and are summarized in this report. The method used for all analyses was SCS TR-55: Urban Hydrology for Small Watersheds and performed with HydroCAD® stormwater modeling software. Pre- and post-development drainage analysis results are presented in Appendix I.

Precipitation values for each 24-hour storm event are obtained from the Extreme Precipitation Estimates published by the Northeast Regional Climate Center (see Appendix I). The results of the analyses are summarized in the following sections.

NRCS mapping and reports are provided in Appendix F. A waiver was requested to allow NRCS soil mapping in place of Site Specific Soils mapping. Borings were conducted by John Turner Consulting and Geotechnical Services, Inc. Results showed a marine clay layer with varying depths across the site. In areas where impervious cover is being expanded, HSG A was used in the pre-development condition to artificially increase runoff and take a conservative approach. The location of the soil groups at the site are depicted on the pre- and post-development drainage diagrams and color coded-soil diagrams (Appendix I).

There are four points of analysis in the stormwater model for drainage areas that discharge to abutting properties or a public right-of-way. The total area modeled in the analysis is 6.384 acres, which encompasses the area of proposed improvements and the tree maintenance area. Peak flow rates are reduced in the post-development condition through the development of the stormwater pond.

A summary of peak off-site flows for the pre-development and post-development conditions at the site is presented below:

	Pre-Development (cfs)			
	2-year	10-year	25-year	50-year
POI-1 (H-31-0-0)	1.42	2.87	4.09	5.23
POI-2 (H-34-0-0)	3.20	7.59	10.41	13.04
POI-3 (Sumner Dr Row)	0.81	1.30	1.69	2.04
POI-4 (H-35-C-4)	6.51	10.51	13.69	16.63
TOTAL	**11.94**	**22.27**	**29.88**	**36.94**

	Post-Development (cfs)			
	2-year	10-year	25-year	50-year
POI-1 (H-31-0-0)	1.23	2.58	3.73	4.82
POI-2 (H-34-0-0)	2.74	6.97	10.09	13.01
POI-3 (Sumner Dr Row)	0.73	1.12	1.42	1.69
POI-4 (H-35-C-4)	2.44	8.70	12.22	15.09
TOTAL	**7.56**	**19.75**	**27.56**	**34.65**

A summary of off-site flow volume for the pre-development and post-development conditions at the site is presented below:

	Pre-Development (af)			
	2-year	10-year	25-year	50-year
POI-1 (H-31-0-0)	**0.182**	**0.362**	**0.515**	**0.663**
POI-2 (H-34-0-0)	**0.417**	**0.741**	**1.010**	**1.267**
POI-3 (Sumner Dr Row)	**0.061**	**0.101**	**0.132**	**0.162**
POI-4 (H-35-C-4)	**0.364**	**0.694**	**0.958**	**1.205**

	Post-Development (af)			
	2-year	10-year	25-year	50-year
POI-1 (H-31-0-0)	**0.160**	**0.326**	**0.470**	**0.609**
POI-2 (H-34-0-0)	**0.574**	**0.905**	**1.173**	**1.426**
POI-3 (Sumner Dr Row)	**0.069**	**0.107**	**0.137**	**0.165**
POI-4 (H-35-C-4)	**0.204**	**0.548**	**0.829**	**1.092**

PRE-DEVELOPMENT CONDITIONS

The pre-development conditions of the site consist primarily of impervious surfaces surrounded by grassed areas and a wooded area to the north. There is minimal grade change throughout the paved areas with slopes ranging from 0.5% to 3%. The site sits over Hydrologic Group A and D soils comprising of smaller watersheds totaling to 6.384 acres in the analysis.

Existing stormwater management consists of closed and open drainage systems. Catch basins are utilized to capture site runoff, and infiltration/detention basins for treatment and flow attenuation. However, these treatment practices do not mean the current design standards.

POST-DEVELOPMENT CONDITIONS

The general topography and overall groundcover conditions will be very similar to pre-development conditions. The redevelopment project proposes to expand the pave areas by approximately half an acre. The proposed stormwater management system will be a combination of closed and open drainage. Similarly, to the pre-development conditions, runoff will be captured with catch basins. Forebays will be utilized for pretreatment and gravel wetlands for treatment and flow attenuation. Gravel wetlands were selected as the treatment practice due to the seasonal high-water table being very shallow. The stormwater management systems were designed in accordance with City of Dover and NHDES Alteration of Terrain standards.

EROSION CONTROL DURING CONSTRUCTION

The proposed construction of the operations and maintenance facility will include the installation of temporary erosion control devices until the site is fully stabilized. The erosion control devices include:

- Silt sock around the perimeter of the site
- Bark and Hay mulch for ground cover stabilization
- Stabilized stone construction entrance
- Erosion control matting for berms and swales.

A Notice of Intent (NOI) for coverage under the CGP will be prepared and submitted prior to construction since greater than one acre of land will be disturbed. A copy of the document will be kept on-site for the duration of the project and all stormwater pollution

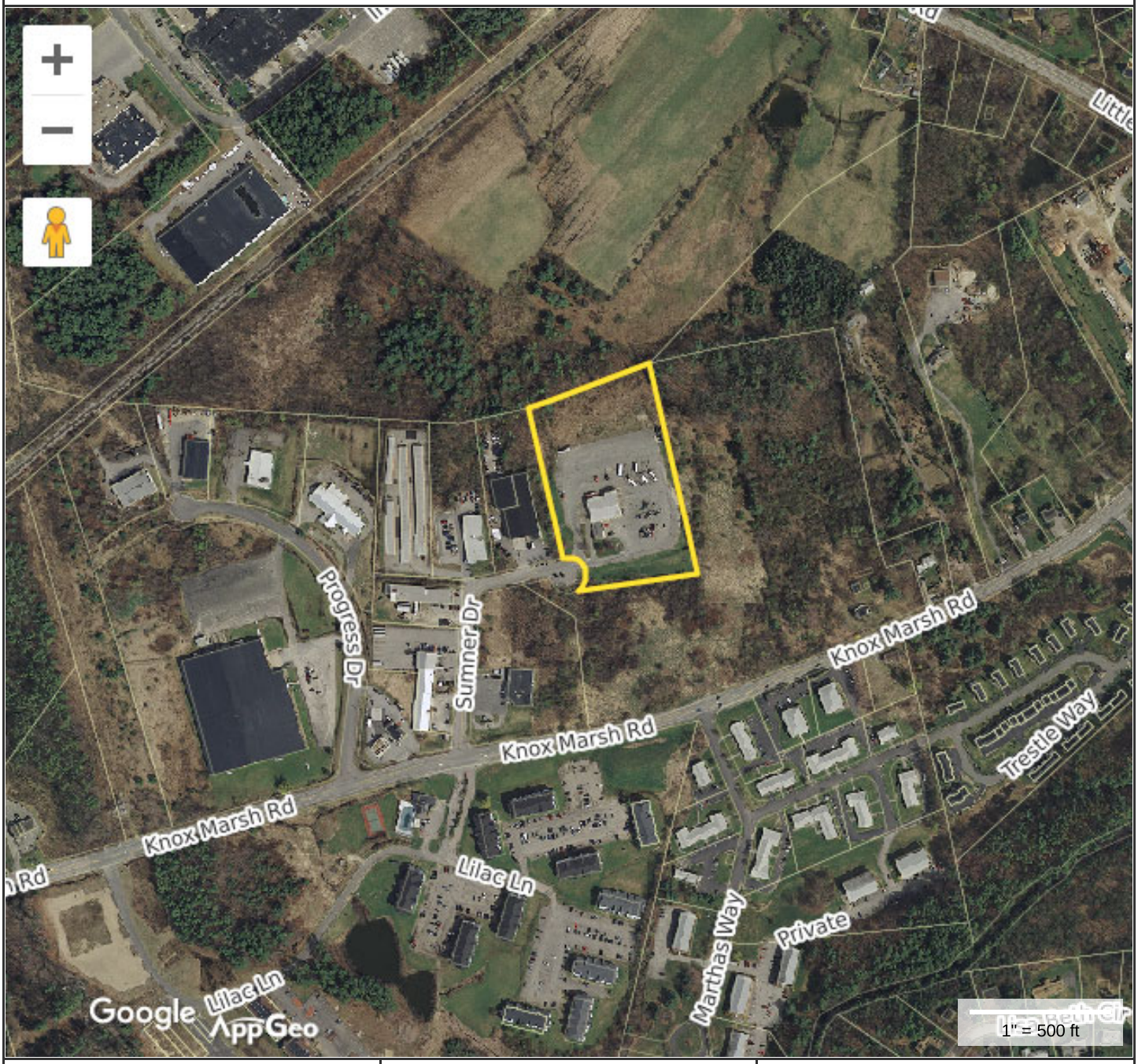
prevention plan (SWPPP) related inspections and maintenance will be performed by qualified personnel.

CONCLUSIONS

Peak flow and volume are reduced with the proposed development of the site. These overall reductions are attributed to the addition of the new stormwater management systems. The proposed drainage system and erosion control measures depicted on the Design Drawings and described herein will provide adequate erosion and sedimentation control during construction. The pretreatment practices have been designed in accordance with City of Dover and NHDES Alteration of Terrain standards. The project will require an EPA Construction General Permit, which will require frequent inspections of erosion control devices, including after major storm events.

Appendix A

Aerial Photograph



Property Information

Property ID	H0035-C00004
Location	42 SUMNER DR
Owner	COOPERATIVE ALLIANCE FOR
Land Use	910
Zoning Code	CM

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Dover, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

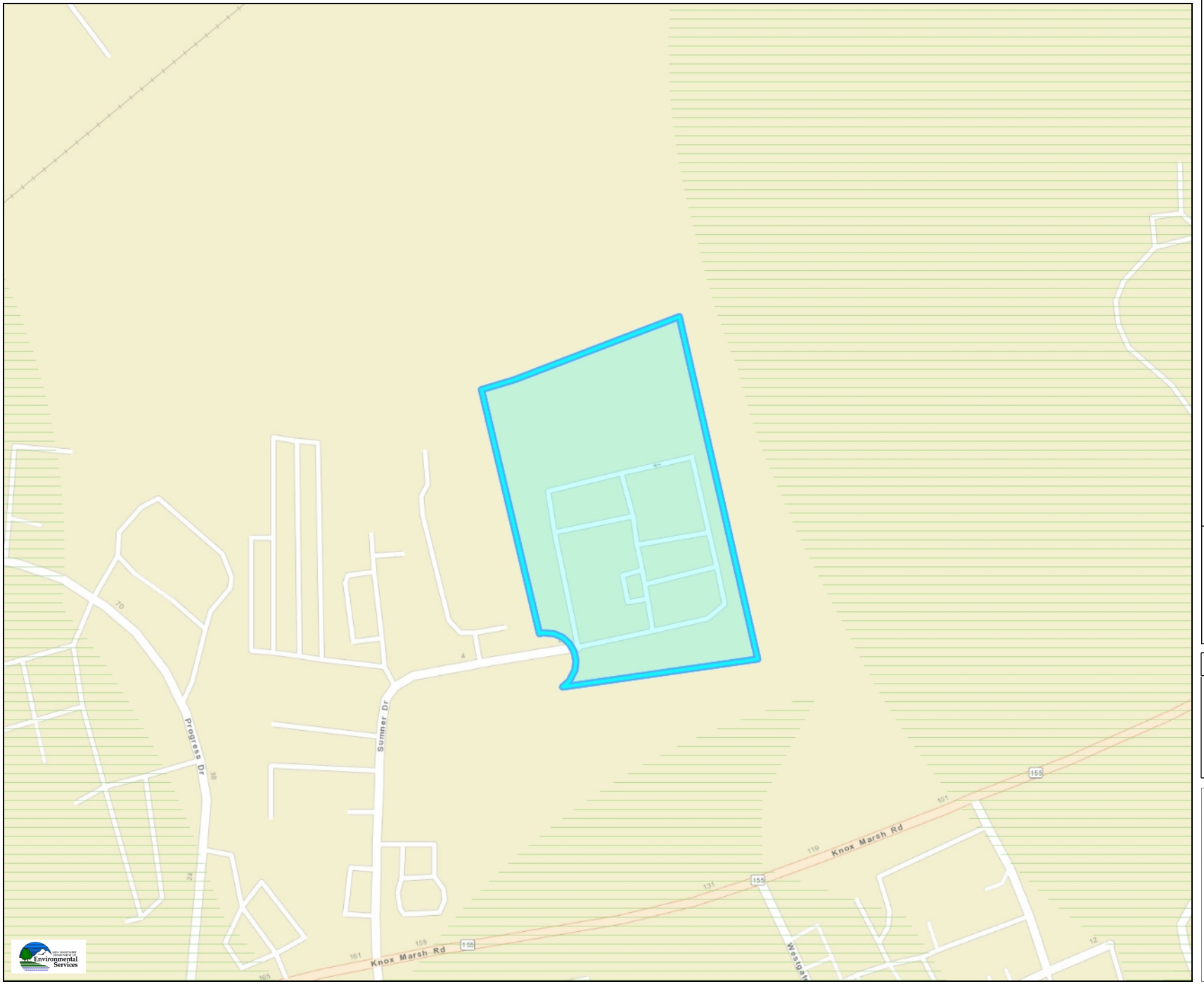
Geometry updated 5/3/2021
Data updated Daily

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

Appendix B

Web GIS Map – Surface Water Impairments

Surface Water Impairments



Legend

Surface Waters with Impairn
2016 with Quarter Mile Buffe

Map Scale

1: 3,247

© NH DES, http://des.nh.gov

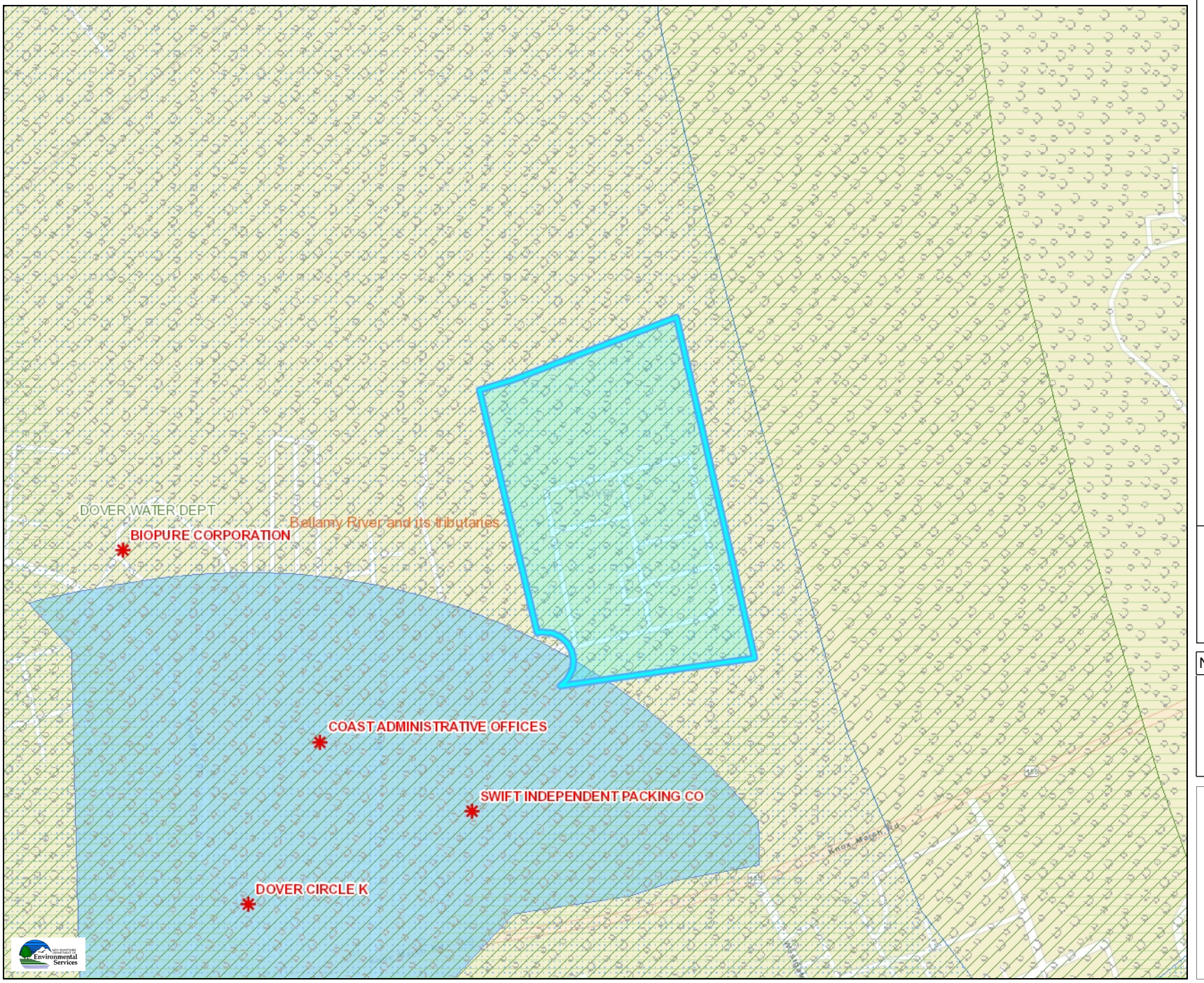
Map Generated: 10/20/2022

Notes

Appendix C

Web GIS Map – AoT Screening

AoT Screening Layers



Legend

- Surface Waters with Impairn 2016 with Quarter Mile Buffe
- Remediation Sites
- Coastal and Great Bay Regi Communities
- Designated Rivers Quarterm Buffer
- Public Water Supply Wells
- Groundwater Classification / GA1
- Groundwater Classification / GA2
- Water Supply Intake Protect Areas
- Wellhead Protection Areas
- Class A Lakes with a Quarte Buffer
- Class A - All Features
- All Lakes, with a Quarter Mil Buffer
- Outstanding Resource Wate Watersheds
- Watersheds with Chloride Impairments 2016

Map Scale

1: 3,247

© NH DES, http://des.nh.gov

Map Generated: 10/20/2022

Notes

Appendix D

FEMA Flood Insurance Rate Map

National Flood Hazard Layer FIRMette

FEMA

70°54'16"W 43°11'6"N



70°53'39"W 43°10'40"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/12/2022 at 10:23 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix E

Environmental Documents

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

To: Max Huynh, CMA Engineers
35 Bow Street
Portsmouth, NH 03801

From: NHB Review, NH Natural Heritage Bureau
Date: 11/15/2022 (valid until 11/15/2023)
Re: Review by NH Natural Heritage Bureau
Permits: NHDES - Alteration of Terrain Permit

NHB ID: **NHB22-3536** Town: Dover Location: 42 Sumner Drive
Description: COAST is proposing to expand their existing site to accommodate a larger facility of their current bus maintenance center. We plan to expand the pavement North, North West to accommodate the needs for this project.
cc: NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments **NHB: NHB requests representative photos during the growing season of potential impact areas. Please provide exisiting and proposed site plans.**
F&G: Please refer to NHFG consultation requirements below.

Plant species	**State[1]**	**Federal**	**Notes**
greater fringed-gentian (*Gentianopsis crinita*)	T	--	Vulnerable to shading by invading trees and to disturbances that destroy plants or impede their ability to reproduce (such as mowing in the mid-summer while the plants are in bloom).

Vertebrate species	**State[1]**	**Federal**	**Notes**
New England Cottontail (*Sylvilagus transitionalis*)	E	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (*Coluber constrictor constrictor*)	T	--	Contact the NH Fish & Game Dept (see below).
Spotted Turtle (*Clemmys guttata*)	T	--	Contact the NH Fish & Game Dept (see below).

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://wildlife.state.nh.us/wildlife/environmental-review.html. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB Datacheck results letter number and "Fis 1004 consultation request" in the subject line.**

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule)*, coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle *kim.tuttle@wildlife.nh.gov* with a copy to NHFGreview@wildlife.nh.gov, and include the NHB Datacheck results letter number and "review request" in the email subject line.

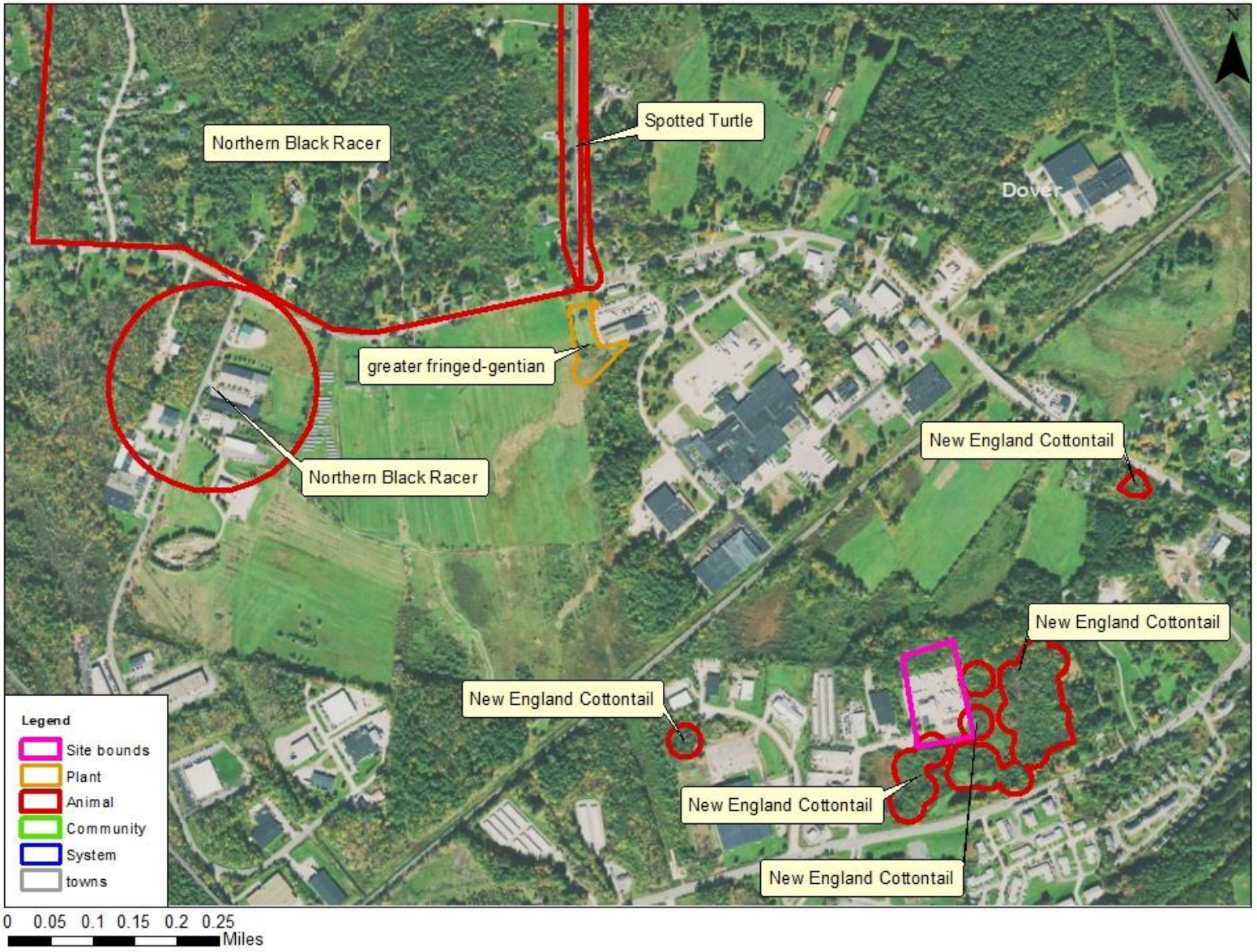
Contact NH Fish & Game at (603) 271-0467 with questions.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

CONFIDENTIAL – NH Dept. of Environmental Services review

NHB22-3536



From: DNCR: NHB Review
To: Chris Chiaramonte
Cc: Samuel Fortier; Ben Clark
Subject: RE: NHB Review: NHB22-3536
Date: Thursday, November 17, 2022 2:55:36 PM
Attachments: image001.png

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Chris,

Thank you for providing NHB with existing and proposed site plans, photographs, and a thorough explanation of proposed work within this project.

Upon review of the materials provided, NHB has no further concerns regarding this proposed project.

Thank you,

Ashley Litwinenko
Environmental Reviewer
Natural Heritage Bureau (NHB)
Division of Forests & Lands - DNCR
172 Pembroke Rd., Concord, NH 03301
Phone: 603-271-2834
Datacheck Tool
NHB Botany information

From: Chris Chiaramonte <CChiaramonte@cmaengineers.com>
Sent: Wednesday, November 16, 2022 10:30 AM
To: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Cc: Samuel Fortier <SFortier@cmaengineers.com>; Ben Clark <BClark@cmaengineers.com>
Subject: RE: NHB Review: NHB22-3536

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.

Hi Ashley,

Please see attached figure showing the proposed site layout and aerial image in the background. COAST is proposing to redevelop their existing facility located at 42 Sumner Drive in Dover, NH. Pavement will be expanded along the southern and western limits of the property. Minor tree clearing will be required along the northern and southern edge of pavement for the proposed stormwater management system. The dashed yellow line highlights the proposed limits of work. For reference, this project was previously evaluated under NHB21-1065. This figure is also being sent to Fish and Game as part of the consultation process. Please let me know if any additional information is needed.

Thank you,
Chris

Chris Chiaramonte, EIT
Project Engineer

CMA Engineers, Inc.
35 Bow St.
Portsmouth, NH 03801
Ph: 603-431-6196
www.cmaengineers.com

From: Max H. Huynh <MHuynh@cmaengineers.com>
Sent: Tuesday, November 15, 2022 3:55 PM
To: Chris Chiaramonte <CChiaramonte@cmaengineers.com>; Ben Clark <BClark@cmaengineers.com>
Subject: FW: NHB Review: NHB22-3536

From: DNCR: NHB Review <nhbreview@dncr.nh.gov>
Sent: Tuesday, November 15, 2022 2:27 PM
To: Max H. Huynh <MHuynh@cmaengineers.com>
Cc: Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>; Holman, Heidi <Heidi.L.Holman@wildlife.nh.gov>
Subject: NHB Review: NHB22-3536

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Attached, please find the review we have completed. If your review memo includes potential impacts to plants or natural communities please contact me for further information. If your project had potential impacts to wildlife, please contact NH Fish and Game at the phone number listed on the review.

Best,
Ashley

Ashley Litwinenko
Environmental Reviewer / Ecological Information Specialist

NH Natural Heritage Bureau
DNCR - Forests & Lands
172 Pembroke Rd

Appendix F

NRCS Soil Mapping

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Strafford County, New Hampshire



July 7, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....11
Strafford County, New Hampshire.....13
BzB—Buxton silt loam, 3 to 8 percent slopes.....13
ScA—Scantic silt loam, 0 to 3 percent slopes.....14
References.....16

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,540 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 20 40 80 120

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 22, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 19, 2021—Nov 1, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BzB	Buxton silt loam, 3 to 8 percent slopes	2.8	33.2%
ScA	Scantic silt loam, 0 to 3 percent slopes	5.7	66.8%
Totals for Area of Interest		**8.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Strafford County, New Hampshire

BzB—Buxton silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d6p
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Buxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Buxton

Setting

Parent material: Glaciomarine

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 28 inches: silty clay loam
H3 - 28 to 43 inches: silty clay

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F145XY006CT - Semi-Rich Moist Lake Plain
Hydric soil rating: No

Minor Components

Elmwood

Percent of map unit: 10 percent
Hydric soil rating: No

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

ScA—Scantic silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9d8s
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Scantic and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Marine terraces

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 23 inches: silty clay loam
H3 - 23 to 40 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Biddeford

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Swanton

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Not named wet

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Appendix G

Project Photographs

New Hampshire Division of Historical Resources
Request for Project Review

COAST Bus Facility



Photo 1
Bus Facility Entrance (Looking west towards Sumner Drive)

New Hampshire Division of Historical Resources
Request for Project Review

COAST Bus Facility



Photo 2
Entrance Area West(Looking northwest toward the edge of the property)

COAST Bus Facility



Photo 3
Entrance Area South (Looking South towards the edge of the property)

COAST Bus Facility



Photo 4
Southern Boundary (Looking Southeast to edge of property)

COAST Bus Facility



Photo 5
North West Area (Looking north towards edge of property)

COAST Bus Facility



Photo 6
Transport Facility (Looking west toward current facilities)

COAST Bus Facility



Photo 7
Main Facilities Building Entrance (Looking north toward Main Building)

COAST Bus Facility



Photo 8
North West Corner of Site (Looking north towards northwest boundary)

COAST Bus Facility



Photo 9
Northern Edge of Site (Looking east towards the eastern boundary)

COAST Bus Facility



Photo 10
Northern Boundary Conditions (Looking North towards past existing site boundary)

Appendix H

Extreme Precipitation Tables

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.899 degrees West
Latitude	43.181 degrees North
Elevation	0 feet
Date/Time	Thu, 07 Jul 2022 12:09:16 -0400

Coastal Community requires 15% increase
2-YR = 3.61
10-YR = 5.45
25-YR = 6.90
50-YR = 8.25
100-YR = 9.87

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.54	2.00	2.60	2.86	**1yr**	2.30	2.75	3.15	3.87	4.44	**1yr**
2yr	0.32	0.49	0.61	0.81	1.01	1.29	**2yr**	0.88	1.17	1.50	1.91	2.44	3.14	3.49	**2yr**	2.78	3.36	3.85	4.58	5.22	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.38	3.07	3.97	4.47	**5yr**	3.51	4.30	4.92	5.79	6.55	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.84	**10yr**	1.22	1.69	2.18	2.82	3.66	4.74	5.40	**10yr**	4.20	5.19	5.92	6.92	7.78	**10yr**
25yr	0.46	0.74	0.94	1.29	1.72	2.26	**25yr**	1.48	2.09	2.69	3.52	4.60	6.00	6.92	**25yr**	5.31	6.66	7.57	8.75	9.78	**25yr**
50yr	0.51	0.83	1.06	1.48	1.99	2.66	**50yr**	1.72	2.46	3.17	4.18	5.48	7.17	8.36	**50yr**	6.35	8.04	9.12	10.46	11.64	**50yr**
100yr	0.58	0.93	1.20	1.70	2.31	3.11	**100yr**	2.00	2.88	3.74	4.95	6.52	8.58	10.11	**100yr**	7.59	9.72	10.99	12.50	13.85	**100yr**
200yr	0.64	1.04	1.35	1.95	2.69	3.66	**200yr**	2.32	3.39	4.42	5.88	7.78	10.26	12.21	**200yr**	9.08	11.75	13.25	14.96	16.48	**200yr**
500yr	0.75	1.24	1.61	2.34	3.29	4.52	**500yr**	2.84	4.21	5.48	7.36	9.81	13.01	15.70	**500yr**	11.51	15.10	16.97	18.96	20.77	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.90	**1yr**	0.64	0.88	0.91	1.25	1.57	2.08	2.47	**1yr**	1.84	2.38	2.90	3.34	4.03	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.16	1.36	1.83	2.36	3.04	3.39	**2yr**	2.69	3.26	3.74	4.46	5.05	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.15	2.78	3.71	4.12	**5yr**	3.28	3.96	4.60	5.41	6.11	**5yr**
10yr	0.38	0.59	0.73	1.02	1.31	1.60	**10yr**	1.13	1.56	1.82	2.45	3.13	4.27	4.78	**10yr**	3.78	4.60	5.31	6.25	7.02	**10yr**
25yr	0.44	0.66	0.83	1.18	1.55	1.91	**25yr**	1.34	1.87	2.11	2.85	3.66	4.99	5.79	**25yr**	4.41	5.57	6.48	7.56	8.43	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.19	**50yr**	1.52	2.14	2.35	3.20	4.11	5.70	6.69	**50yr**	5.05	6.43	7.53	8.74	9.68	**50yr**
100yr	0.54	0.81	1.02	1.47	2.01	2.51	**100yr**	1.74	2.45	2.63	3.58	4.59	6.51	7.72	**100yr**	5.76	7.42	8.76	10.09	11.09	**100yr**
200yr	0.60	0.90	1.14	1.64	2.29	2.87	**200yr**	1.98	2.81	2.93	4.01	5.13	7.43	8.91	**200yr**	6.58	8.57	10.17	11.66	12.74	**200yr**
500yr	0.69	1.03	1.33	1.93	2.75	3.45	**500yr**	2.37	3.38	3.40	4.65	5.96	8.81	10.75	**500yr**	7.80	10.34	12.40	14.14	15.23	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	**1yr**	0.75	1.05	1.24	1.74	2.21	2.85	3.06	**1yr**	2.53	2.95	3.40	4.20	4.79	**1yr**
2yr	0.33	0.51	0.62	0.84	1.04	1.25	**2yr**	0.90	1.22	1.48	1.95	2.51	3.27	3.61	**2yr**	2.89	3.47	3.98	4.73	5.42	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.58	**5yr**	1.13	1.55	1.85	2.50	3.20	4.23	4.82	**5yr**	3.74	4.64	5.25	6.20	6.97	**5yr**
10yr	0.46	0.70	0.87	1.21	1.57	1.92	**10yr**	1.35	1.88	2.23	3.04	3.85	5.20	6.02	**10yr**	4.61	5.78	6.60	7.61	8.49	**10yr**
25yr	0.55	0.84	1.05	1.50	1.97	2.47	**25yr**	1.70	2.42	2.87	3.96	4.95	7.02	8.07	**25yr**	6.21	7.76	8.80	10.01	11.07	**25yr**
50yr	0.64	0.97	1.21	1.74	2.34	2.99	**50yr**	2.02	2.92	3.49	4.82	6.00	8.67	10.10	**50yr**	7.67	9.72	10.98	12.31	13.53	**50yr**
100yr	0.74	1.12	1.41	2.03	2.79	3.61	**100yr**	2.41	3.53	4.23	5.90	7.29	10.71	12.65	**100yr**	9.47	12.16	13.67	15.16	16.55	**100yr**
200yr	0.86	1.30	1.64	2.38	3.32	4.37	**200yr**	2.86	4.28	5.14	7.22	8.85	13.27	15.85	**200yr**	11.74	15.24	17.04	18.65	20.28	**200yr**
500yr	1.05	1.57	2.01	2.93	4.16	5.61	**500yr**	3.59	5.49	6.64	9.44	11.45	17.64	21.37	**500yr**	15.61	20.55	22.83	24.58	26.54	**500yr**

Powered by ACIS Northeast Regional Climate Center

Appendix I

Drainage Analysis

I.1 Pre-Development Drainage Analysis

- i. Drainage Diagram
- ii. Pre-Development Color Coded Soil Plan
- iii. 2-YR, 10-YR, 25-YR, and 50-YR Node Summaries
- iv. 10-Year, 24-Hour Storm Calculations

I.2 Post-Development Drainage Analysis

- i. Drainage Diagram
- ii. Post-Development Color Coded Soil Plan
- iii. NHDES Best management Practices Worksheets
- iv. 2-YR, 10-YR, 25-YR, and 50-YR Node Summaries
- v. 10-Year, 24 Hour Storm Calculations

Appendix I.1

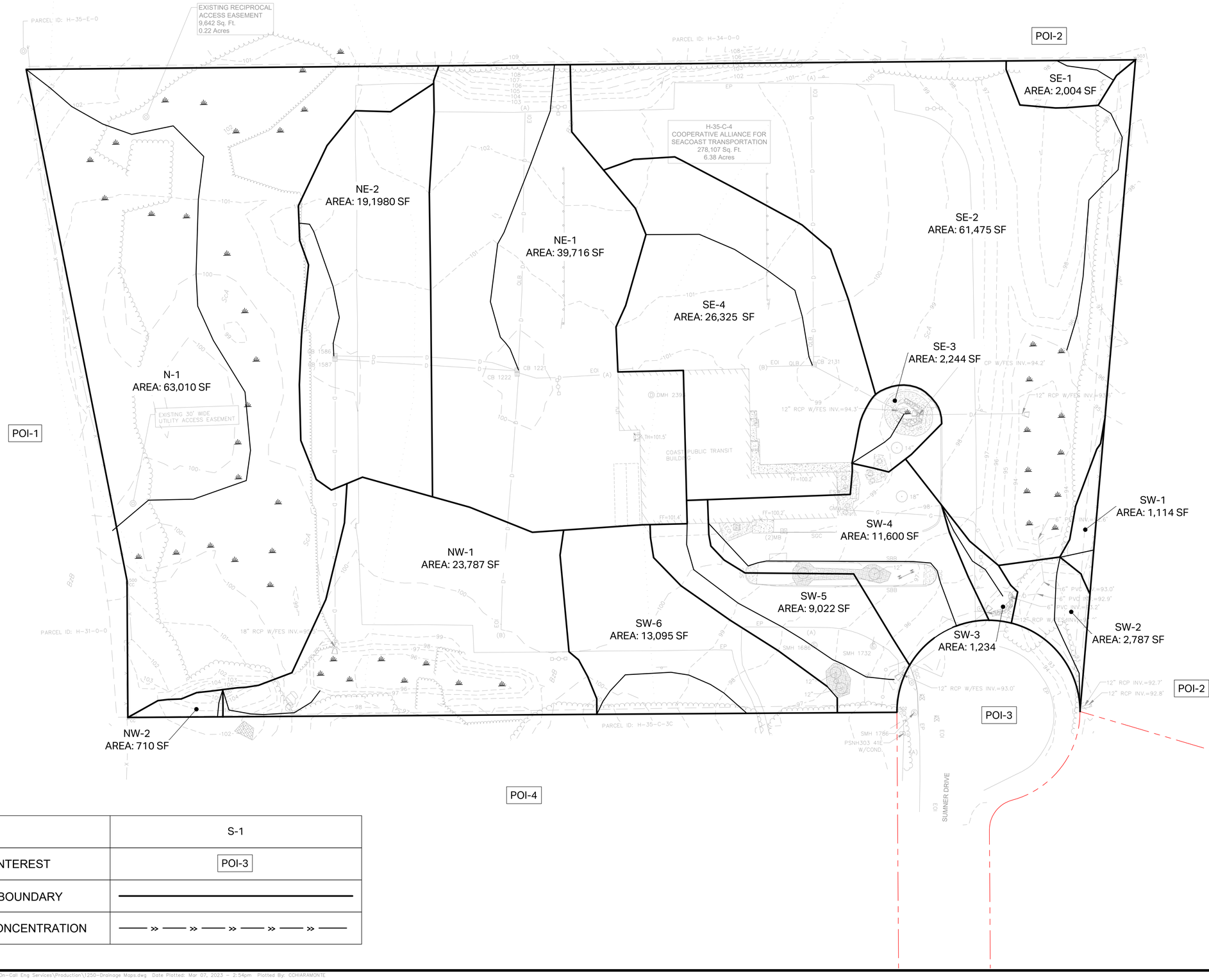
Pre-Development Drainage Analysis

I.1 Pre-Development Drainage Analysis

- i. Drainage Diagram
- ii. Pre-Development Color Coded Soil Plan
- iii. 2-YR, 10-YR, 25-YR, and 50-YR Node Summaries
- iv. 10-year, 24-Hour Storm Calculations

Appendix I.1.i

Pre-Development Drainage Analysis – Drainage Diagram



SUBBASIN	S-1
POINT OF INTEREST	POI-3
SUBBASIN BOUNDARY	———
TIME OF CONCENTRATION	——» ——» ——» ——» ——» ——

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

no.	revision	date	by

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 9, 2023
project no: 1250
checked by: BCC
scale: 1" = 20' (0, 20', 40')

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Pre-Development Drainage Map

drawing no. DRAIN-1

sheet: 21 of 22

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Drainage Maps.dwg Date Plotted: Mar 07, 2023 - 2:54pm Plotted By: CCHIARAMONTE

Appendix I.1.iii

Pre-Development Drainage Analysis – Node Summaries

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: N-1 Runoff Area=63,010 sf 1.04% Impervious Runoff Depth=1.51"
Flow Length=448' Tc=30.1 min CN=77 Runoff=1.42 cfs 0.182 af

Subcatchment NE-1: Runoff Area=39,716 sf 93.42% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=95 Runoff=2.98 cfs 0.232 af

Subcatchment NE-2: Runoff Area=19,980 sf 60.91% Impervious Runoff Depth=2.65"
Flow Length=102' Tc=6.9 min CN=91 Runoff=1.33 cfs 0.101 af

Subcatchment NW-1: Runoff Area=23,787 sf 48.06% Impervious Runoff Depth=2.37"
Flow Length=79' Tc=6.1 min CN=88 Runoff=1.47 cfs 0.108 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=77 Runoff=0.03 cfs 0.002 af

Subcatchment SE-1: Runoff Area=2,004 sf 0.00% Impervious Runoff Depth=0.50"
Flow Length=40' Slope=0.0375 '/' Tc=7.6 min CN=58 Runoff=0.02 cfs 0.002 af

Subcatchment SE-2: Runoff Area=61,475 sf 45.99% Impervious Runoff Depth=1.58"
Flow Length=174' Tc=14.8 min CN=78 Runoff=1.95 cfs 0.186 af

Subcatchment SE-3: Runoff Area=2,244 sf 0.00% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=80 Runoff=0.10 cfs 0.007 af

Subcatchment SE-4: Runoff Area=26,325 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=2.07 cfs 0.170 af

Subcatchment SW-1: Runoff Area=1,114 sf 0.00% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=77 Runoff=0.04 cfs 0.003 af

Subcatchment SW-2: Runoff Area=2,787 sf 0.00% Impervious Runoff Depth=1.58"
Flow Length=104' Tc=9.6 min CN=78 Runoff=0.10 cfs 0.008 af

Subcatchment SW-3: Runoff Area=1,234 sf 29.34% Impervious Runoff Depth=0.76"
Tc=6.0 min CN=64 Runoff=0.02 cfs 0.002 af

Subcatchment SW-4: Runoff Area=11,600 sf 68.12% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=92 Runoff=0.81 cfs 0.061 af

Subcatchment SW-5: Runoff Area=9,022 sf 57.70% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=90 Runoff=0.60 cfs 0.044 af

Subcatchment SW-6: Runoff Area=13,095 sf 53.28% Impervious Runoff Depth=2.55"
Flow Length=120' Tc=8.1 min CN=90 Runoff=0.81 cfs 0.064 af

Reach 10R: Flow to Lot H-34 Avg. Flow Depth=0.22' Max Vel=1.19 fps Inflow=1.32 cfs 0.369 af
n=0.022 L=75.0' S=0.0040 '/' Capacity=1.72 cfs Outflow=1.31 cfs 0.369 af

Pond 1P: CB 2131 Peak Elev=95.77' Inflow=2.07 cfs 0.170 af
12.0" Round Culvert n=0.012 L=61.0' S=0.0115 '/' Outflow=2.07 cfs 0.170 af

Pond 2P: Ex. Forebay Peak Elev=95.04' Storage=10 cf Inflow=2.18 cfs 0.177 af
Outflow=2.18 cfs 0.177 af

Pond 3P: Ex. System #1 Peak Elev=94.56' Storage=3,586 cf Inflow=3.60 cfs 0.363 af
Discarded=0.01 cfs 0.005 af Primary=0.85 cfs 0.323 af Secondary=1.96 cfs 0.035 af Outflow=2.82 cfs 0.363 af

Pond 5P: Ex. 6" PVC Peak Elev=93.97' Storage=59 cf Inflow=0.62 cfs 0.046 af
Primary=0.54 cfs 0.046 af Secondary=0.00 cfs 0.000 af Outflow=0.54 cfs 0.046 af

Pond 11P: Ex. 12" RCP Culvert Peak Elev=94.00' Inflow=0.60 cfs 0.044 af
12.0" Round Culvert n=0.012 L=69.0' S=0.0000 '/' Outflow=0.60 cfs 0.044 af

Pond 13P: Ex. System #2 Peak Elev=97.95' Storage=6,262 cf Inflow=5.78 cfs 0.440 af
Discarded=0.01 cfs 0.016 af Primary=5.67 cfs 0.298 af Outflow=5.68 cfs 0.315 af

Pond 14P: Ex. CB 1221/1222 Peak Elev=99.65' Inflow=2.98 cfs 0.232 af
12.0" Round Culvert n=0.010 L=116.0' S=0.0198 '/' Outflow=2.98 cfs 0.232 af

Pond 15P: Ex. CB 1586/1587 Peak Elev=98.75' Inflow=4.31 cfs 0.333 af
18.0" Round Culvert n=0.012 L=186.0' S=0.0108 '/' Outflow=4.31 cfs 0.333 af

Link POI-1: H-31-0-0 Inflow=1.42 cfs 0.182 af
Primary=1.42 cfs 0.182 af

Link POI-2: H-34-0-0 Inflow=3.20 cfs 0.417 af
Primary=3.20 cfs 0.417 af

Link POI-3: Sumner Dr ROW Inflow=0.81 cfs 0.061 af
Primary=0.81 cfs 0.061 af

Link POI-4: H-35-C-4 Inflow=6.51 cfs 0.364 af
Primary=6.51 cfs 0.364 af

Total Runoff Area = 6.384 ac Runoff Volume = 1.172 af Average Runoff Depth = 2.20"
50.95% Pervious = 3.253 ac 49.05% Impervious = 3.131 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: N-1 Runoff Area=63,010 sf 1.04% Impervious Runoff Depth=3.00"
Flow Length=448' Tc=30.1 min CN=77 Runoff=2.87 cfs 0.362 af

Subcatchment NE-1: Runoff Area=39,716 sf 93.42% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=95 Runoff=4.64 cfs 0.370 af

Subcatchment NE-2: Runoff Area=19,980 sf 60.91% Impervious Runoff Depth=4.42"
Flow Length=102' Tc=6.9 min CN=91 Runoff=2.16 cfs 0.169 af

Subcatchment NW-1: Runoff Area=23,787 sf 48.06% Impervious Runoff Depth=4.10"
Flow Length=79' Tc=6.1 min CN=88 Runoff=2.49 cfs 0.186 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=77 Runoff=0.06 cfs 0.004 af

Subcatchment SE-1: Runoff Area=2,004 sf 0.00% Impervious Runoff Depth=1.42"
Flow Length=40' Slope=0.0375 '/' Tc=7.6 min CN=58 Runoff=0.06 cfs 0.005 af

Subcatchment SE-2: Runoff Area=61,475 sf 45.99% Impervious Runoff Depth=3.10"
Flow Length=174' Tc=14.8 min CN=78 Runoff=3.88 cfs 0.364 af

Subcatchment SE-3: Runoff Area=2,244 sf 0.00% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=80 Runoff=0.19 cfs 0.014 af

Subcatchment SE-4: Runoff Area=26,325 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=3.15 cfs 0.263 af

Subcatchment SW-1: Runoff Area=1,114 sf 0.00% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=77 Runoff=0.09 cfs 0.006 af

Subcatchment SW-2: Runoff Area=2,787 sf 0.00% Impervious Runoff Depth=3.10"
Flow Length=104' Tc=9.6 min CN=78 Runoff=0.20 cfs 0.017 af

Subcatchment SW-3: Runoff Area=1,234 sf 29.34% Impervious Runoff Depth=1.88"
Tc=6.0 min CN=64 Runoff=0.06 cfs 0.004 af

Subcatchment SW-4: Runoff Area=11,600 sf 68.12% Impervious Runoff Depth=4.53"
Tc=6.0 min CN=92 Runoff=1.30 cfs 0.101 af

Subcatchment SW-5: Runoff Area=9,022 sf 57.70% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=90 Runoff=0.98 cfs 0.074 af

Subcatchment SW-6: Runoff Area=13,095 sf 53.28% Impervious Runoff Depth=4.31"
Flow Length=120' Tc=8.1 min CN=90 Runoff=1.34 cfs 0.108 af

Reach 10R: Flow to Lot H-34 Avg. Flow Depth=0.26' Max Vel=1.32 fps Inflow=1.95 cfs 0.541 af
n=0.022 L=75.0' S=0.0040 '/' Capacity=1.72 cfs Outflow=1.86 cfs 0.541 af

Pond 1P: CB 2131 Peak Elev=96.10' Inflow=3.15 cfs 0.263 af
12.0" Round Culvert n=0.012 L=61.0' S=0.0115 '/' Outflow=3.15 cfs 0.263 af

Pond 2P: Ex. Forebay Peak Elev=95.47' Storage=27 cf Inflow=3.34 cfs 0.277 af
Outflow=3.33 cfs 0.277 af

Pond 3P: Ex. System #1 Peak Elev=94.61' Storage=3,802 cf Inflow=6.32 cfs 0.641 af
Discarded=0.01 cfs 0.007 af Primary=0.87 cfs 0.462 af Secondary=5.39 cfs 0.172 af Outflow=6.27 cfs 0.641 af

Pond 5P: Ex. 6" PVC Peak Elev=94.32' Storage=119 cf Inflow=1.04 cfs 0.079 af
Primary=0.70 cfs 0.077 af Secondary=0.38 cfs 0.002 af Outflow=1.07 cfs 0.079 af

Pond 11P: Ex. 12" RCP Culvert Peak Elev=94.37' Inflow=0.98 cfs 0.074 af
12.0" Round Culvert n=0.012 L=69.0' S=0.0000 '/' Outflow=0.98 cfs 0.074 af

Pond 13P: Ex. System #2 Peak Elev=98.00' Storage=6,486 cf Inflow=9.28 cfs 0.725 af
Discarded=0.01 cfs 0.018 af Primary=9.11 cfs 0.582 af Outflow=9.12 cfs 0.600 af

Pond 14P: Ex. CB 1221/1222 Peak Elev=101.39' Inflow=4.64 cfs 0.370 af
12.0" Round Culvert n=0.010 L=116.0' S=0.0198 '/' Outflow=4.64 cfs 0.370 af

Pond 15P: Ex. CB 1586/1587 Peak Elev=99.12' Inflow=6.79 cfs 0.539 af
18.0" Round Culvert n=0.012 L=186.0' S=0.0108 '/' Outflow=6.79 cfs 0.539 af

Link POI-1: H-31-0-0 Inflow=2.87 cfs 0.362 af
Primary=2.87 cfs 0.362 af

Link POI-2: H-34-0-0 Inflow=7.59 cfs 0.741 af
Primary=7.59 cfs 0.741 af

Link POI-3: Sumner Dr ROW Inflow=1.30 cfs 0.101 af
Primary=1.30 cfs 0.101 af

Link POI-4: H-35-C-4 Inflow=10.51 cfs 0.694 af
Primary=10.51 cfs 0.694 af

Total Runoff Area = 6.384 ac Runoff Volume = 2.048 af Average Runoff Depth = 3.85"
50.95% Pervious = 3.253 ac 49.05% Impervious = 3.131 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: N-1 Runoff Area=63,010 sf 1.04% Impervious Runoff Depth=4.28"
Flow Length=448' Tc=30.1 min CN=77 Runoff=4.09 cfs 0.515 af

Subcatchment NE-1: Runoff Area=39,716 sf 93.42% Impervious Runoff Depth=6.31"
Tc=6.0 min CN=95 Runoff=5.93 cfs 0.479 af

Subcatchment NE-2: Runoff Area=19,980 sf 60.91% Impervious Runoff Depth=5.84"
Flow Length=102' Tc=6.9 min CN=91 Runoff=2.81 cfs 0.223 af

Subcatchment NW-1: Runoff Area=23,787 sf 48.06% Impervious Runoff Depth=5.50"
Flow Length=79' Tc=6.1 min CN=88 Runoff=3.29 cfs 0.250 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=77 Runoff=0.08 cfs 0.006 af

Subcatchment SE-1: Runoff Area=2,004 sf 0.00% Impervious Runoff Depth=2.34"
Flow Length=40' Slope=0.0375 '/' Tc=7.6 min CN=58 Runoff=0.11 cfs 0.009 af

Subcatchment SE-2: Runoff Area=61,475 sf 45.99% Impervious Runoff Depth=4.38"
Flow Length=174' Tc=14.8 min CN=78 Runoff=5.48 cfs 0.516 af

Subcatchment SE-3: Runoff Area=2,244 sf 0.00% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=80 Runoff=0.27 cfs 0.020 af

Subcatchment SE-4: Runoff Area=26,325 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=3.99 cfs 0.335 af

Subcatchment SW-1: Runoff Area=1,114 sf 0.00% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=77 Runoff=0.13 cfs 0.009 af

Subcatchment SW-2: Runoff Area=2,787 sf 0.00% Impervious Runoff Depth=4.38"
Flow Length=104' Tc=9.6 min CN=78 Runoff=0.29 cfs 0.023 af

Subcatchment SW-3: Runoff Area=1,234 sf 29.34% Impervious Runoff Depth=2.93"
Tc=6.0 min CN=64 Runoff=0.09 cfs 0.007 af

Subcatchment SW-4: Runoff Area=11,600 sf 68.12% Impervious Runoff Depth=5.96"
Tc=6.0 min CN=92 Runoff=1.69 cfs 0.132 af

Subcatchment SW-5: Runoff Area=9,022 sf 57.70% Impervious Runoff Depth=5.73"
Tc=6.0 min CN=90 Runoff=1.28 cfs 0.099 af

Subcatchment SW-6: Runoff Area=13,095 sf 53.28% Impervious Runoff Depth=5.73"
Flow Length=120' Tc=8.1 min CN=90 Runoff=1.75 cfs 0.143 af

Reach 10R: Flow to Lot H-34 Avg. Flow Depth=0.29' Max Vel=1.39 fps Inflow=2.30 cfs 0.670 af
n=0.022 L=75.0' S=0.0040 '/' Capacity=1.72 cfs Outflow=2.28 cfs 0.670 af

Pond 1P: CB 2131 Peak Elev=96.90' Inflow=3.99 cfs 0.335 af
12.0" Round Culvert n=0.012 L=61.0' S=0.0115 '/' Outflow=3.99 cfs 0.335 af

Pond 2P: Ex. Forebay Peak Elev=96.05' Storage=72 cf Inflow=4.26 cfs 0.355 af
Outflow=4.17 cfs 0.355 af

Pond 3P: Ex. System #1 Peak Elev=94.64' Storage=3,927 cf Inflow=8.79 cfs 0.871 af
Discarded=0.01 cfs 0.008 af Primary=0.87 cfs 0.564 af Secondary=7.85 cfs 0.299 af Outflow=8.73 cfs 0.871 af

Pond 5P: Ex. 6" PVC Peak Elev=94.35' Storage=123 cf Inflow=1.38 cfs 0.106 af
Primary=0.71 cfs 0.098 af Secondary=0.72 cfs 0.007 af Outflow=1.42 cfs 0.106 af

Pond 11P: Ex. 12" RCP Culvert Peak Elev=94.46' Inflow=1.28 cfs 0.099 af
12.0" Round Culvert n=0.012 L=69.0' S=0.0000 '/' Outflow=1.28 cfs 0.099 af

Pond 13P: Ex. System #2 Peak Elev=98.04' Storage=6,641 cf Inflow=12.02 cfs 0.953 af
Discarded=0.01 cfs 0.018 af Primary=11.86 cfs 0.809 af Outflow=11.87 cfs 0.827 af

Pond 14P: Ex. CB 1221/1222 Peak Elev=103.17' Inflow=5.93 cfs 0.479 af
12.0" Round Culvert n=0.010 L=116.0' S=0.0198 '/' Outflow=5.93 cfs 0.479 af

Pond 15P: Ex. CB 1586/1587 Peak Elev=99.67' Inflow=8.73 cfs 0.702 af
18.0" Round Culvert n=0.012 L=186.0' S=0.0108 '/' Outflow=8.73 cfs 0.702 af

Link POI-1: H-31-0-0 Inflow=4.09 cfs 0.515 af
Primary=4.09 cfs 0.515 af

Link POI-2: H-34-0-0 Inflow=10.41 cfs 1.010 af
Primary=10.41 cfs 1.010 af

Link POI-3: Sumner Dr ROW Inflow=1.69 cfs 0.132 af
Primary=1.69 cfs 0.132 af

Link POI-4: H-35-C-4 Inflow=13.69 cfs 0.958 af
Primary=13.69 cfs 0.958 af

Total Runoff Area = 6.384 ac Runoff Volume = 2.767 af Average Runoff Depth = 5.20"
50.95% Pervious = 3.253 ac 49.05% Impervious = 3.131 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: N-1 Runoff Area=63,010 sf 1.04% Impervious Runoff Depth=5.50"
Flow Length=448' Tc=30.1 min CN=77 Runoff=5.23 cfs 0.663 af

Subcatchment NE-1: Runoff Area=39,716 sf 93.42% Impervious Runoff Depth=7.65"
Tc=6.0 min CN=95 Runoff=7.13 cfs 0.581 af

Subcatchment NE-2: Runoff Area=19,980 sf 60.91% Impervious Runoff Depth=7.17"
Flow Length=102' Tc=6.9 min CN=91 Runoff=3.41 cfs 0.274 af

Subcatchment NW-1: Runoff Area=23,787 sf 48.06% Impervious Runoff Depth=6.81"
Flow Length=79' Tc=6.1 min CN=88 Runoff=4.02 cfs 0.310 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=77 Runoff=0.10 cfs 0.007 af

Subcatchment SE-1: Runoff Area=2,004 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=40' Slope=0.0375 '/' Tc=7.6 min CN=58 Runoff=0.16 cfs 0.013 af

Subcatchment SE-2: Runoff Area=61,475 sf 45.99% Impervious Runoff Depth=5.62"
Flow Length=174' Tc=14.8 min CN=78 Runoff=6.98 cfs 0.661 af

Subcatchment SE-3: Runoff Area=2,244 sf 0.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=80 Runoff=0.34 cfs 0.025 af

Subcatchment SE-4: Runoff Area=26,325 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=4.78 cfs 0.403 af

Subcatchment SW-1: Runoff Area=1,114 sf 0.00% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=77 Runoff=0.16 cfs 0.012 af

Subcatchment SW-2: Runoff Area=2,787 sf 0.00% Impervious Runoff Depth=5.62"
Flow Length=104' Tc=9.6 min CN=78 Runoff=0.36 cfs 0.030 af

Subcatchment SW-3: Runoff Area=1,234 sf 29.34% Impervious Runoff Depth=3.98"
Tc=6.0 min CN=64 Runoff=0.13 cfs 0.009 af

Subcatchment SW-4: Runoff Area=11,600 sf 68.12% Impervious Runoff Depth=7.29"
Tc=6.0 min CN=92 Runoff=2.04 cfs 0.162 af

Subcatchment SW-5: Runoff Area=9,022 sf 57.70% Impervious Runoff Depth=7.05"
Tc=6.0 min CN=90 Runoff=1.56 cfs 0.122 af

Subcatchment SW-6: Runoff Area=13,095 sf 53.28% Impervious Runoff Depth=7.05"
Flow Length=120' Tc=8.1 min CN=90 Runoff=2.13 cfs 0.177 af

Reach 10R: Flow to Lot H-34 Avg. Flow Depth=0.31' Max Vel=1.43 fps Inflow=2.53 cfs 0.781 af
n=0.022 L=75.0' S=0.0040 '/' Capacity=1.72 cfs Outflow=2.56 cfs 0.781 af

Pond 1P: CB 2131 Peak Elev=97.78' Inflow=4.78 cfs 0.403 af
12.0" Round Culvert n=0.012 L=61.0' S=0.0115 '/' Outflow=4.78 cfs 0.403 af

Pond 2P: Ex. Forebay Peak Elev=96.62' Storage=142 cf Inflow=5.12 cfs 0.429 af
Outflow=4.89 cfs 0.429 af

Pond 3P: Ex. System #1 Peak Elev=94.66' Storage=4,032 cf Inflow=11.07 cfs 1.090 af
Discarded=0.01 cfs 0.009 af Primary=0.88 cfs 0.650 af Secondary=10.12 cfs 0.431 af Outflow=11.00 cfs 1.090 af

Pond 5P: Ex. 6" PVC Peak Elev=94.36' Storage=127 cf Inflow=1.69 cfs 0.131 af
Primary=0.71 cfs 0.118 af Secondary=0.94 cfs 0.013 af Outflow=1.65 cfs 0.131 af

Pond 11P: Ex. 12" RCP Culvert Peak Elev=94.56' Inflow=1.56 cfs 0.122 af
12.0" Round Culvert n=0.012 L=69.0' S=0.0000 '/' Outflow=1.56 cfs 0.122 af

Pond 13P: Ex. System #2 Peak Elev=98.08' Storage=6,772 cf Inflow=14.55 cfs 1.165 af
Discarded=0.01 cfs 0.019 af Primary=14.40 cfs 1.021 af Outflow=14.41 cfs 1.040 af

Pond 14P: Ex. CB 1221/1222 Peak Elev=105.59' Inflow=7.13 cfs 0.581 af
12.0" Round Culvert n=0.010 L=116.0' S=0.0198 '/' Outflow=7.13 cfs 0.581 af

Pond 15P: Ex. CB 1586/1587 Peak Elev=100.46' Inflow=10.53 cfs 0.855 af
18.0" Round Culvert n=0.012 L=186.0' S=0.0108 '/' Outflow=10.53 cfs 0.855 af

Link POI-1: H-31-0-0 Inflow=5.23 cfs 0.663 af
Primary=5.23 cfs 0.663 af

Link POI-2: H-34-0-0 Inflow=13.04 cfs 1.267 af
Primary=13.04 cfs 1.267 af

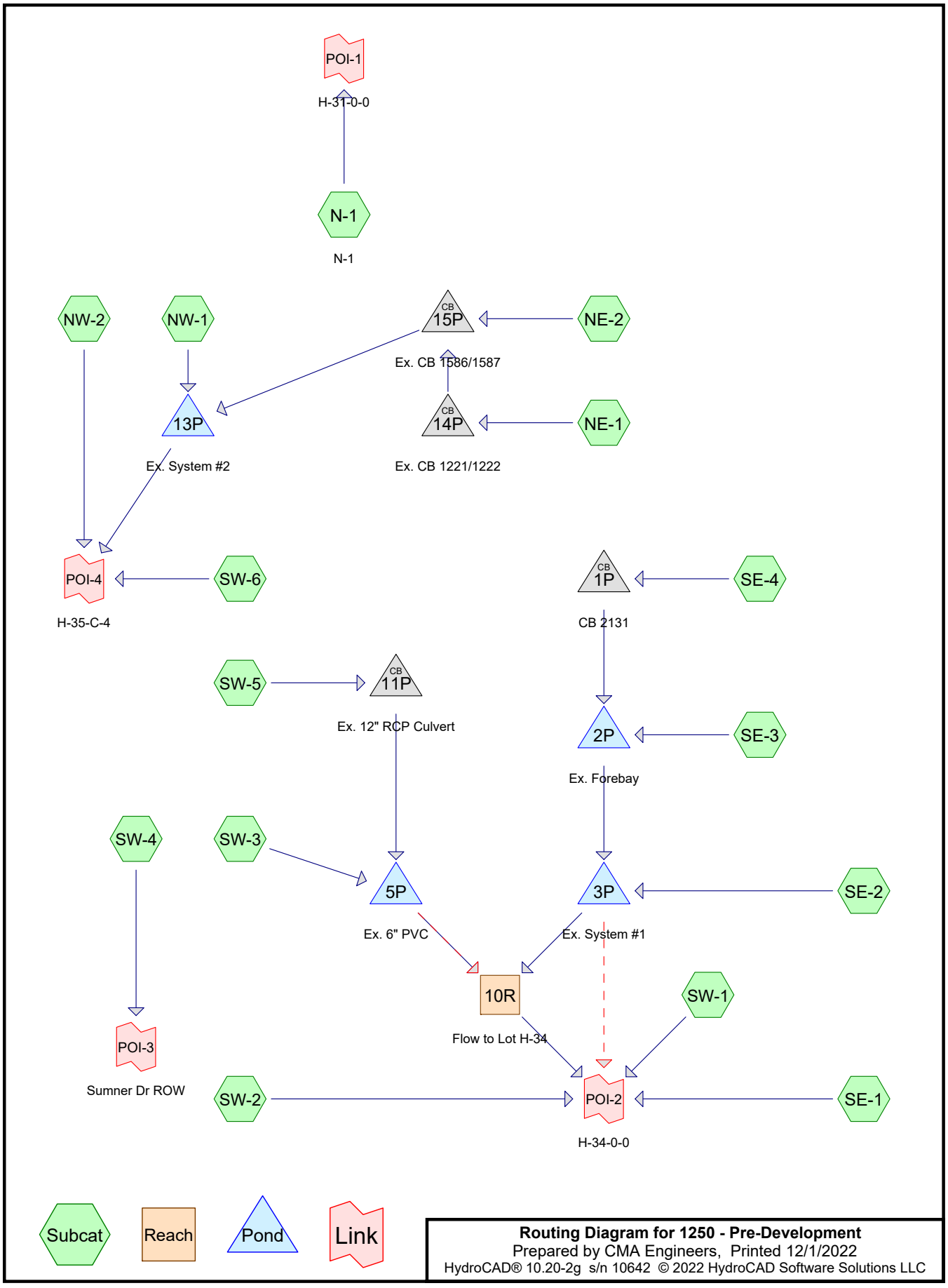
Link POI-3: Sumner Dr ROW Inflow=2.04 cfs 0.162 af
Primary=2.04 cfs 0.162 af

Link POI-4: H-35-C-4 Inflow=16.63 cfs 1.205 af
Primary=16.63 cfs 1.205 af

Total Runoff Area = 6.384 ac Runoff Volume = 3.450 af Average Runoff Depth = 6.48"
50.95% Pervious = 3.253 ac 49.05% Impervious = 3.131 ac

Appendix I.1.iv

Pre-Development Drainage Analysis – 10-Year Storm Calculations


POI-1
H-31-0-0
N-1
N-1
NW-2
NW-1
CB
15P
NE-2
Ex. CB 1586/1587
13P
Ex. System #2
CB
14P
NE-1
Ex. CB 1221/1222
POI-4
H-35-C-4
SW-6
CB
1P
SE-4
CB 2131
SW-5
CB
11P
Ex. 12" RCP Culvert
2P
SE-3
Ex. Forebay
SW-4
SW-3
5P
Ex. 6" PVC
3P
SE-2
Ex. System #1
10R
Flow to Lot H-34
SW-1
POI-3
Sumner Dr ROW
SW-2
POI-2
SE-1
H-34-0-0
Subcat
Reach
Pond
Link
Routing Diagram for 1250 - Pre-Development
Prepared by CMA Engineers, Printed 12/1/2022
HydroCAD® 10.20-2g s/n 10642 © 2022 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.465	39	>75% Grass cover, Good, HSG A (N-1, NE-1, NW-1, SE-1, SE-2, SW-3, SW-4)
1.270	80	>75% Grass cover, Good, HSG D (N-1, NE-1, NE-2, NW-1, SE-2, SE-3, SW-2, SW-3, SW-4, SW-5, SW-6)
0.002	91	Gravel roads, HSG D (SE-3)
2.915	98	Paved parking, HSG D (N-1, NE-1, NE-2, NW-1, SE-2, SE-4, SW-3, SW-4, SW-5, SW-6)
0.217	98	Roofs, HSG D (NE-1, SE-4, SW-4, SW-5)
1.516	77	Woods, Good, HSG D (N-1, NE-2, NW-2, SE-1, SW-1, SW-2, SW-5)
6.384	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.465	HSG A	N-1, NE-1, NW-1, SE-1, SE-2, SW-3, SW-4
0.000	HSG B	
0.000	HSG C	
5.920	HSG D	N-1, NE-1, NE-2, NW-1, NW-2, SE-1, SE-2, SE-3, SE-4, SW-1, SW-2, SW-3, SW-4, SW-5, SW-6
0.000	Other	
6.384		**TOTAL AREA**

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: N-1 Runoff Area=63,010 sf 1.04% Impervious Runoff Depth=3.00"
Flow Length=448' Tc=30.1 min CN=77 Runoff=2.87 cfs 0.362 af

Subcatchment NE-1: Runoff Area=39,716 sf 93.42% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=95 Runoff=4.64 cfs 0.370 af

Subcatchment NE-2: Runoff Area=19,980 sf 60.91% Impervious Runoff Depth=4.42"
Flow Length=102' Tc=6.9 min CN=91 Runoff=2.16 cfs 0.169 af

Subcatchment NW-1: Runoff Area=23,787 sf 48.06% Impervious Runoff Depth=4.10"
Flow Length=79' Tc=6.1 min CN=88 Runoff=2.49 cfs 0.186 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=77 Runoff=0.06 cfs 0.004 af

Subcatchment SE-1: Runoff Area=2,004 sf 0.00% Impervious Runoff Depth=1.42"
Flow Length=40' Slope=0.0375 '/' Tc=7.6 min CN=58 Runoff=0.06 cfs 0.005 af

Subcatchment SE-2: Runoff Area=61,475 sf 45.99% Impervious Runoff Depth=3.10"
Flow Length=174' Tc=14.8 min CN=78 Runoff=3.88 cfs 0.364 af

Subcatchment SE-3: Runoff Area=2,244 sf 0.00% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=80 Runoff=0.19 cfs 0.014 af

Subcatchment SE-4: Runoff Area=26,325 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=3.15 cfs 0.263 af

Subcatchment SW-1: Runoff Area=1,114 sf 0.00% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=77 Runoff=0.09 cfs 0.006 af

Subcatchment SW-2: Runoff Area=2,787 sf 0.00% Impervious Runoff Depth=3.10"
Flow Length=104' Tc=9.6 min CN=78 Runoff=0.20 cfs 0.017 af

Subcatchment SW-3: Runoff Area=1,234 sf 29.34% Impervious Runoff Depth=1.88"
Tc=6.0 min CN=64 Runoff=0.06 cfs 0.004 af

Subcatchment SW-4: Runoff Area=11,600 sf 68.12% Impervious Runoff Depth=4.53"
Tc=6.0 min CN=92 Runoff=1.30 cfs 0.101 af

Subcatchment SW-5: Runoff Area=9,022 sf 57.70% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=90 Runoff=0.98 cfs 0.074 af

Subcatchment SW-6: Runoff Area=13,095 sf 53.28% Impervious Runoff Depth=4.31"
Flow Length=120' Tc=8.1 min CN=90 Runoff=1.34 cfs 0.108 af

Reach 10R: Flow to Lot H-34 Avg. Flow Depth=0.26' Max Vel=1.32 fps Inflow=1.95 cfs 0.541 af
n=0.022 L=75.0' S=0.0040 '/' Capacity=1.72 cfs Outflow=1.86 cfs 0.541 af

Pond 1P: CB 2131 Peak Elev=96.10' Inflow=3.15 cfs 0.263 af
12.0" Round Culvert n=0.012 L=61.0' S=0.0115 '/' Outflow=3.15 cfs 0.263 af

Pond 2P: Ex. Forebay Peak Elev=95.47' Storage=27 cf Inflow=3.34 cfs 0.277 af
Outflow=3.33 cfs 0.277 af

Pond 3P: Ex. System #1 Peak Elev=94.61' Storage=3,802 cf Inflow=6.32 cfs 0.641 af
Discarded=0.01 cfs 0.007 af Primary=0.87 cfs 0.462 af Secondary=5.39 cfs 0.172 af Outflow=6.27 cfs 0.641 af

Pond 5P: Ex. 6" PVC Peak Elev=94.32' Storage=119 cf Inflow=1.04 cfs 0.079 af
Primary=0.70 cfs 0.077 af Secondary=0.38 cfs 0.002 af Outflow=1.07 cfs 0.079 af

Pond 11P: Ex. 12" RCP Culvert Peak Elev=94.37' Inflow=0.98 cfs 0.074 af
12.0" Round Culvert n=0.012 L=69.0' S=0.0000 '/' Outflow=0.98 cfs 0.074 af

Pond 13P: Ex. System #2 Peak Elev=98.00' Storage=6,486 cf Inflow=9.28 cfs 0.725 af
Discarded=0.01 cfs 0.018 af Primary=9.11 cfs 0.582 af Outflow=9.12 cfs 0.600 af

Pond 14P: Ex. CB 1221/1222 Peak Elev=101.39' Inflow=4.64 cfs 0.370 af
12.0" Round Culvert n=0.010 L=116.0' S=0.0198 '/' Outflow=4.64 cfs 0.370 af

Pond 15P: Ex. CB 1586/1587 Peak Elev=99.12' Inflow=6.79 cfs 0.539 af
18.0" Round Culvert n=0.012 L=186.0' S=0.0108 '/' Outflow=6.79 cfs 0.539 af

Link POI-1: H-31-0-0 Inflow=2.87 cfs 0.362 af
Primary=2.87 cfs 0.362 af

Link POI-2: H-34-0-0 Inflow=7.59 cfs 0.741 af
Primary=7.59 cfs 0.741 af

Link POI-3: Sumner Dr ROW Inflow=1.30 cfs 0.101 af
Primary=1.30 cfs 0.101 af

Link POI-4: H-35-C-4 Inflow=10.51 cfs 0.694 af
Primary=10.51 cfs 0.694 af

Total Runoff Area = 6.384 ac Runoff Volume = 2.048 af Average Runoff Depth = 3.85"
50.95% Pervious = 3.253 ac 49.05% Impervious = 3.131 ac

Summary for Subcatchment N-1: N-1

Runoff = 2.87 cfs @ 12.42 hrs, Volume= 0.362 af, Depth= 3.00"
Routed to Link POI-1 : H-31-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
57,869	77	Woods, Good, HSG D
658	98	Paved parking, HSG D
31	39	>75% Grass cover, Good, HSG A
4,452	80	>75% Grass cover, Good, HSG D
63,010	77	Weighted Average
62,352		98.96% Pervious Area
658		1.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	63	0.0323	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
7.3	37	0.0050	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"
10.0	321	0.0059	0.54		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	27	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.1	448	Total			

Summary for Subcatchment NE-1:

Runoff = 4.64 cfs @ 12.09 hrs, Volume= 0.370 af, Depth= 4.87"
Routed to Pond 14P : Ex. CB 1221/1222

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
3,468	98	Roofs, HSG D
33,635	98	Paved parking, HSG D
1,759	39	>75% Grass cover, Good, HSG A
854	80	>75% Grass cover, Good, HSG D
39,716	95	Weighted Average
2,613		6.58% Pervious Area
37,103		93.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment NE-2:

Runoff = 2.16 cfs @ 12.10 hrs, Volume= 0.169 af, Depth= 4.42"
Routed to Pond 15P : Ex. CB 1586/1587

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
12,170	98	Paved parking, HSG D
3,036	77	Woods, Good, HSG D
4,774	80	>75% Grass cover, Good, HSG D
19,980	91	Weighted Average
7,810		39.09% Pervious Area
12,170		60.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	30	0.0386	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
1.0	72	0.0283	1.18		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.9	102	Total			

Summary for Subcatchment NW-1:

Runoff = 2.49 cfs @ 12.09 hrs, Volume= 0.186 af, Depth= 4.10"
Routed to Pond 13P : Ex. System #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
11,432	98	Paved parking, HSG D
661	39	>75% Grass cover, Good, HSG A
3,474	80	>75% Grass cover, Good, HSG D
8,220	80	>75% Grass cover, Good, HSG D
23,787	88	Weighted Average
12,355		51.94% Pervious Area
11,432		48.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	57	0.1400	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
0.2	22	0.0454	1.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.1	79	Total			

Summary for Subcatchment NW-2:

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 3.00"
Routed to Link POI-4 : H-35-C-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
710	77	Woods, Good, HSG D
710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SE-1:

Runoff = 0.06 cfs @ 12.12 hrs, Volume= 0.005 af, Depth= 1.42"
Routed to Link POI-2 : H-34-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
1,025	77	Woods, Good, HSG D
979	39	>75% Grass cover, Good, HSG A
2,004	58	Weighted Average
2,004		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	40	0.0375	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"

Summary for Subcatchment SE-2:

Runoff = 3.88 cfs @ 12.21 hrs, Volume= 0.364 af, Depth= 3.10"
Routed to Pond 3P : Ex. System #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
28,272	98	Paved parking, HSG D
16,068	39	>75% Grass cover, Good, HSG A
10,314	80	>75% Grass cover, Good, HSG D
6,821	80	>75% Grass cover, Good, HSG D
61,475	78	Weighted Average
33,203		54.01% Pervious Area
28,272		45.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	75	0.0333	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
1.7	99	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.8	174	Total			

Summary for Subcatchment SE-3:

Runoff = 0.19 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 3.29"
Routed to Pond 2P : Ex. Forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
2,168	80	>75% Grass cover, Good, HSG D
76	91	Gravel roads, HSG D
2,244	80	Weighted Average
2,244		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SE-4:

Runoff = 3.15 cfs @ 12.09 hrs, Volume= 0.263 af, Depth= 5.21"
Routed to Pond 1P : CB 2131

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
4,489	98	Roofs, HSG D
21,836	98	Paved parking, HSG D
26,325	98	Weighted Average
26,325		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SW-1:

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 3.00"
Routed to Link POI-2 : H-34-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
1,114	77	Woods, Good, HSG D
1,114		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SW-2:

Runoff = 0.20 cfs @ 12.14 hrs, Volume= 0.017 af, Depth= 3.10"
Routed to Link POI-2 : H-34-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
2,138	77	Woods, Good, HSG D
649	80	>75% Grass cover, Good, HSG D
2,787	78	Weighted Average
2,787		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	50	0.0540	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
1.8	54	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.6	104	Total			

Summary for Subcatchment SW-3:

Runoff = 0.06 cfs @ 12.10 hrs, Volume= 0.004 af, Depth= 1.88"
Routed to Pond 5P : Ex. 6" PVC

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
362	98	Paved parking, HSG D
654	39	>75% Grass cover, Good, HSG A
218	80	>75% Grass cover, Good, HSG D
1,234	64	Weighted Average
872		70.66% Pervious Area
362		29.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SW-4:

Runoff = 1.30 cfs @ 12.09 hrs, Volume= 0.101 af, Depth= 4.53"
Routed to Link POI-3 : Sumner Dr ROW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
87	39	>75% Grass cover, Good, HSG A
1,270	98	Roofs, HSG D
3,611	80	>75% Grass cover, Good, HSG D
6,632	98	Paved parking, HSG D
11,600	92	Weighted Average
3,698		31.88% Pervious Area
7,902		68.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SW-5:

Runoff = 0.98 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 4.31"
Routed to Pond 11P : Ex. 12" RCP Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
4,994	98	Paved parking, HSG D
3,661	80	>75% Grass cover, Good, HSG D
155	77	Woods, Good, HSG D
212	98	Roofs, HSG D
9,022	90	Weighted Average
3,816		42.30% Pervious Area
5,206		57.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc 6 min**

Summary for Subcatchment SW-6:

Runoff = 1.34 cfs @ 12.11 hrs, Volume= 0.108 af, Depth= 4.31"
Routed to Link POI-4 : H-35-C-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
6,977	98	Paved parking, HSG D
6,118	80	>75% Grass cover, Good, HSG D
13,095	90	Weighted Average
6,118		46.72% Pervious Area
6,977		53.28% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0300	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"
0.3	20	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	120	Total			

Summary for Reach 10R: Flow to Lot H-34

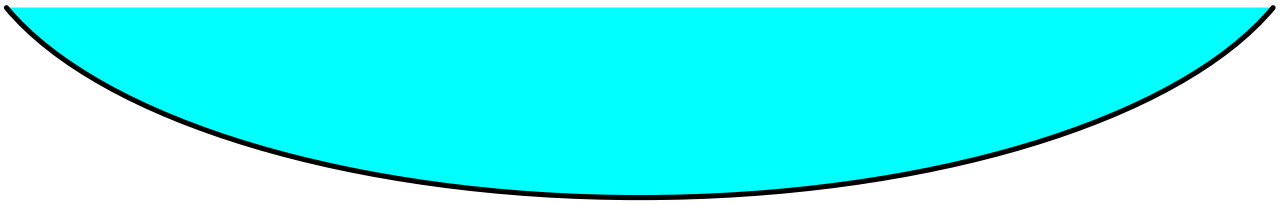
[91] Warning: Storage range exceeded by 0.01'
[55] Hint: Peak inflow is 113% of Manning's capacity

Inflow Area = 2.303 ac, 59.99% Impervious, Inflow Depth = 2.82" for 10-YR event
Inflow = 1.95 cfs @ 12.11 hrs, Volume= 0.541 af
Outflow = 1.86 cfs @ 12.13 hrs, Volume= 0.541 af, Atten= 5%, Lag= 1.2 min
Routed to Link POI-2 : H-34-0-0

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 2.3 min

Peak Storage= 105 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 8.15'
Bank-Full Depth= 0.25' Flow Area= 1.3 sf, Capacity= 1.72 cfs

8.00' x 0.25' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 75.0' Slope= 0.0040 '/'
Inlet Invert= 93.00', Outlet Invert= 92.70'



‡

Summary for Pond 1P: CB 2131

Inflow Area = 0.604 ac,100.00% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 3.15 cfs @ 12.09 hrs, Volume= 0.263 af
Outflow = 3.15 cfs @ 12.09 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min
Primary = 3.15 cfs @ 12.09 hrs, Volume= 0.263 af
Routed to Pond 2P : Ex. Forebay

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 96.10' @ 12.11 hrs
Flood Elev= 98.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	95.00'	**12.0" Round Culvert** L= 61.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 95.00' / 94.30' S= 0.0115 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=2.72 cfs @ 12.09 hrs HW=96.06' TW=95.43' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.72 cfs @ 4.06 fps)

Summary for Pond 2P: Ex. Forebay

Inflow Area = 0.656 ac, 92.15% Impervious, Inflow Depth = 5.06" for 10-YR event
Inflow = 3.34 cfs @ 12.09 hrs, Volume= 0.277 af
Outflow = 3.33 cfs @ 12.09 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.3 min
Primary = 3.33 cfs @ 12.09 hrs, Volume= 0.277 af
Routed to Pond 3P : Ex. System #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 95.47' @ 12.10 hrs Surf.Area= 56 sf Storage= 27 cf
Flood Elev= 98.50' Surf.Area= 573 sf Storage= 714 cf

Plug-Flow detention time= 0.1 min calculated for 0.276 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (750.4 - 750.3)

Volume	Invert	Avail.Storage	Storage Description
#1	94.20'	714 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.20	1	0	0
95.00	21	9	9
96.00	96	59	67
97.00	177	137	204
98.00	340	259	462
98.30	573	137	599
98.50	573	115	714

Device	Routing	Invert	Outlet Devices
#1	Primary	94.20'	**12.0" Round Culvert** L= 67.5' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 94.20' / 93.60' S= 0.0089 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	98.30'	**15.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=3.27 cfs @ 12.09 hrs HW=95.45' TW=94.59' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.27 cfs @ 4.16 fps)
└—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: Ex. System #1

Inflow Area = 2.067 ac, 60.63% Impervious, Inflow Depth = 3.72" for 10-YR event
Inflow = 6.32 cfs @ 12.13 hrs, Volume= 0.641 af
Outflow = 6.27 cfs @ 12.14 hrs, Volume= 0.641 af, Atten= 1%, Lag= 0.2 min
Discarded = 0.01 cfs @ 12.05 hrs, Volume= 0.007 af
Primary = 0.87 cfs @ 12.10 hrs, Volume= 0.462 af
Routed to Reach 10R : Flow to Lot H-34
Secondary = 5.39 cfs @ 12.14 hrs, Volume= 0.172 af
Routed to Link POI-2 : H-34-0-0

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 94.61' @ 12.14 hrs Surf.Area= 4,088 sf Storage= 3,802 cf

Plug-Flow detention time= 31.8 min calculated for 0.640 af (100% of inflow)
Center-of-Mass det. time= 31.8 min (828.3 - 796.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	5,404 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	52	0	0
94.00	3,083	1,568	1,568
94.50	4,088	1,793	3,360
95.00	4,088	2,044	5,404

Device	Routing	Invert	Outlet Devices
#1	Primary	93.00'	**6.0" Round Culvert** L= 28.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.00' / 93.00' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	94.50'	**65.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Discarded	93.00'	**0.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.05 hrs HW=94.52' (Free Discharge)
↑—**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.87 cfs @ 12.10 hrs HW=94.61' TW=93.26' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.87 cfs @ 4.42 fps)

Secondary OutFlow Max=5.36 cfs @ 12.14 hrs HW=94.61' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 5.36 cfs @ 0.77 fps)

Summary for Pond 5P: Ex. 6" PVC

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[80] Warning: Exceeded Pond 11P by 0.13' @ 12.05 hrs (1.01 cfs 0.008 af)

Inflow Area = 0.235 ac, 54.29% Impervious, Inflow Depth = 4.02" for 10-YR event
Inflow = 1.04 cfs @ 12.09 hrs, Volume= 0.079 af
Outflow = 1.07 cfs @ 12.11 hrs, Volume= 0.079 af, Atten= 0%, Lag= 1.1 min
Primary = 0.70 cfs @ 12.12 hrs, Volume= 0.077 af
Routed to Reach 10R : Flow to Lot H-34
Secondary = 0.38 cfs @ 12.11 hrs, Volume= 0.002 af
Routed to Reach 10R : Flow to Lot H-34

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 94.32' @ 12.12 hrs Surf.Area= 184 sf Storage= 119 cf

Plug-Flow detention time= 1.5 min calculated for 0.079 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (793.0 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.20'	244 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.20	1	0	0
94.00	157	63	63
94.25	184	43	106
95.00	184	138	244

Device	Routing	Invert	Outlet Devices
#1	Primary	93.20'	**6.0" Round Culvert** L= 17.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.20' / 92.90' S= 0.0170 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Secondary	94.25'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.69 cfs @ 12.12 hrs HW=94.30' TW=93.26' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.69 cfs @ 3.51 fps)

Secondary OutFlow Max=0.34 cfs @ 12.11 hrs HW=94.31' TW=93.26' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.34 cfs @ 0.59 fps)

Summary for Pond 11P: Ex. 12" RCP Culvert

[57] Hint: Peaked at 94.37' (Flood elevation advised)

Inflow Area = 0.207 ac, 57.70% Impervious, Inflow Depth = 4.31" for 10-YR event
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.074 af
Outflow = 0.98 cfs @ 12.09 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Primary = 0.98 cfs @ 12.09 hrs, Volume= 0.074 af
Routed to Pond 5P : Ex. 6" PVC

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 94.37' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	93.20'	**12.0" Round Culvert** L= 69.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 93.20' / 93.20' S= 0.0000 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=94.21' TW=94.28' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Summary for Pond 13P: Ex. System #2

[80] Warning: Exceeded Pond 15P by 0.30' @ 24.50 hrs (0.21 cfs 0.021 af)

Inflow Area = 1.917 ac, 72.72% Impervious, Inflow Depth = 4.54" for 10-YR event
Inflow = 9.28 cfs @ 12.09 hrs, Volume= 0.725 af
Outflow = 9.12 cfs @ 12.11 hrs, Volume= 0.600 af, Atten= 2%, Lag= 1.0 min
Discarded = 0.01 cfs @ 11.45 hrs, Volume= 0.018 af
Primary = 9.11 cfs @ 12.11 hrs, Volume= 0.582 af
Routed to Link POI-4 : H-35-C-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 98.00' @ 12.11 hrs Surf.Area= 4,051 sf Storage= 6,486 cf
Flood Elev= 98.50' Surf.Area= 4,051 sf Storage= 8,493 cf

Plug-Flow detention time= 123.7 min calculated for 0.599 af (83% of inflow)
Center-of-Mass det. time= 55.2 min (833.0 - 777.8)

Volume	Invert	Avail.Storage	Storage Description
#1	95.50'	8,493 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.50	1	0	0
96.00	1,608	402	402
97.00	3,145	2,377	2,779
97.80	4,051	2,878	5,657
98.00	4,051	810	6,467
98.50	4,051	2,026	8,493

Device	Routing	Invert	Outlet Devices
#1	Primary	97.80'	**40.0' long x 9.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.46 2.55 2.70 2.69 2.68 2.68 2.67 2.64 2.64 2.64 2.65 2.64 2.65 2.65 2.66 2.67 2.69
#2	Discarded	95.50'	**0.100 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.45 hrs HW=97.83' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=8.94 cfs @ 12.11 hrs HW=98.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.94 cfs @ 1.11 fps)

Summary for Pond 14P: Ex. CB 1221/1222

[58] Hint: Peaked 1.89' above defined flood level

Inflow Area = 0.912 ac, 93.42% Impervious, Inflow Depth = 4.87" for 10-YR event
Inflow = 4.64 cfs @ 12.09 hrs, Volume= 0.370 af
Outflow = 4.64 cfs @ 12.09 hrs, Volume= 0.370 af, Atten= 0%, Lag= 0.0 min
Primary = 4.64 cfs @ 12.09 hrs, Volume= 0.370 af
Routed to Pond 15P : Ex. CB 1586/1587

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 101.39' @ 12.10 hrs
Flood Elev= 99.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	98.00'	**12.0" Round Culvert** L= 116.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.00' / 95.70' S= 0.0198 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.38 cfs @ 12.09 hrs HW=101.24' TW=99.09' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 4.38 cfs @ 5.57 fps)

Summary for Pond 15P: Ex. CB 1586/1587

Inflow Area = 1.370 ac, 82.54% Impervious, Inflow Depth = 4.72" for 10-YR event
Inflow = 6.79 cfs @ 12.09 hrs, Volume= 0.539 af
Outflow = 6.79 cfs @ 12.09 hrs, Volume= 0.539 af, Atten= 0%, Lag= 0.0 min
Primary = 6.79 cfs @ 12.09 hrs, Volume= 0.539 af
Routed to Pond 13P : Ex. System #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 99.12' @ 12.09 hrs
Flood Elev= 99.30'

Device	Routing	Invert	Outlet Devices
#1	Primary	97.50'	**18.0" Round Culvert** L= 186.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 97.50' / 95.50' S= 0.0108 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=6.57 cfs @ 12.09 hrs HW=99.09' TW=98.00' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 6.57 cfs @ 4.35 fps)

Summary for Link POI-1: H-31-0-0

Inflow Area = 1.447 ac, 1.04% Impervious, Inflow Depth = 3.00" for 10-YR event
Inflow = 2.87 cfs @ 12.42 hrs, Volume= 0.362 af
Primary = 2.87 cfs @ 12.42 hrs, Volume= 0.362 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POI-2: H-34-0-0

Inflow Area = 2.438 ac, 56.65% Impervious, Inflow Depth = 3.65" for 10-YR event
Inflow = 7.59 cfs @ 12.13 hrs, Volume= 0.741 af
Primary = 7.59 cfs @ 12.13 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POI-3: Sumner Dr ROW

Inflow Area = 0.266 ac, 68.12% Impervious, Inflow Depth = 4.53" for 10-YR event
Inflow = 1.30 cfs @ 12.09 hrs, Volume= 0.101 af
Primary = 1.30 cfs @ 12.09 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POI-4: H-35-C-4

Inflow Area = 2.233 ac, 69.57% Impervious, Inflow Depth = 3.73" for 10-YR event
Inflow = 10.51 cfs @ 12.11 hrs, Volume= 0.694 af
Primary = 10.51 cfs @ 12.11 hrs, Volume= 0.694 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Appendix I.2

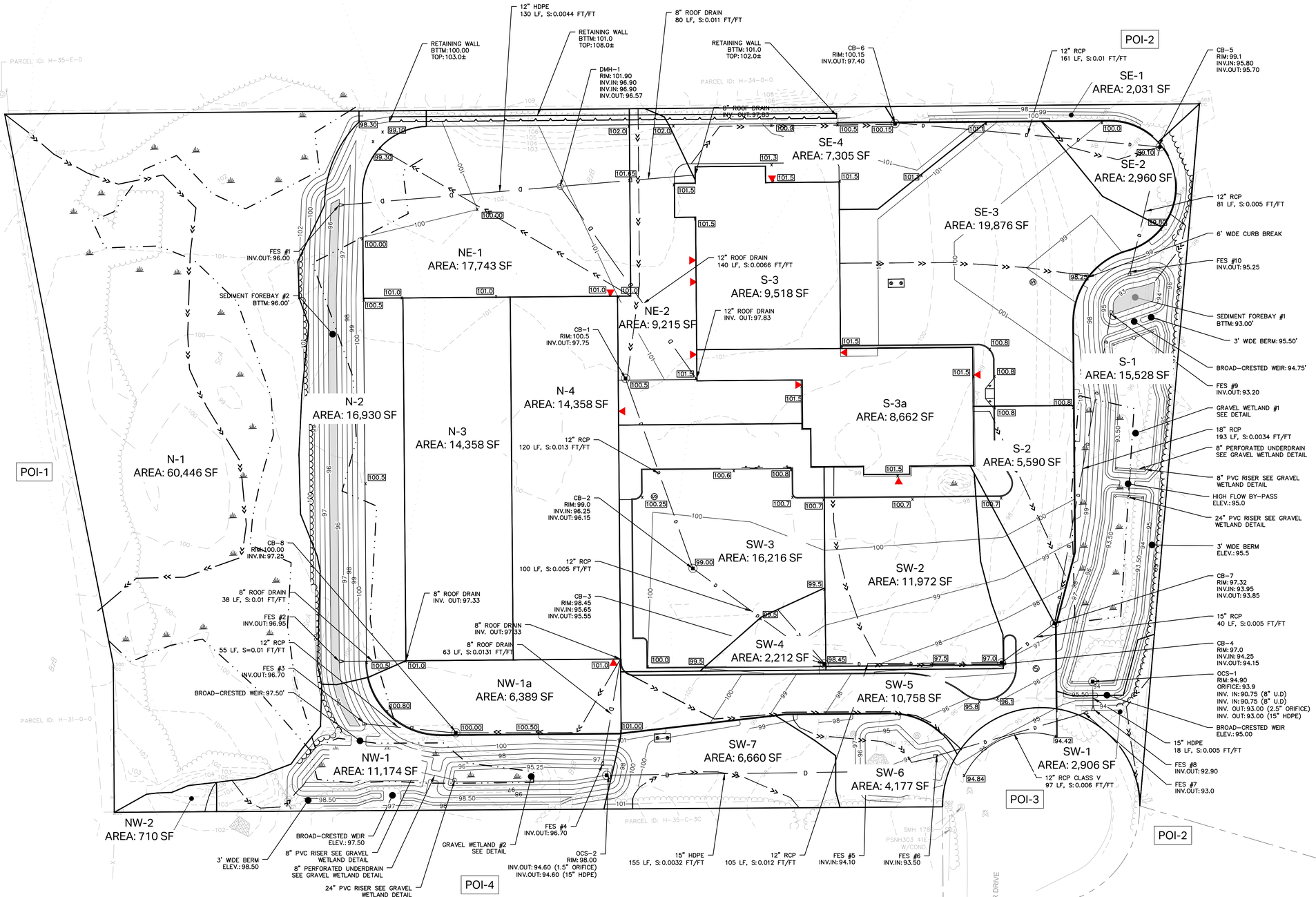
Post-Development Drainage Analysis

I.1 Post-Development Drainage Analysis

- i. Drainage Diagram
- ii. Post-Development Color Coded Soil Plan
- iii. NHDES Best Management Practices Worksheets
- iv. 2-YR, 10-YR, 25-YR, and 50-YR Node Summaries
- v. 10-year, 24-Hour Storm Calculations

Appendix I.2.i

Post-Development Drainage Analysis – Drainage Diagram



SUBBASIN	S-1
POINT OF INTEREST	POI-3
SUBBASIN BOUNDARY	———
TIME OF CONCENTRATION	——— » ——— » ——— » ——— » ——— » ———

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Drainage Maps.dwg Date Plotted: Mar 07, 2023 - 2:54pm Plotted By: CCHIARAMONTE

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 9, 2023
project no: 1250
checked by: BCC
scale: 40' 20' 0 Scale: 1" = 20'

Operations and Maintenance Facility
Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Post-Development Drainage Map

drawing no.
DRAIN-2

sheet: 22 of 22

Appendix I.2.iii

Post-Development Drainage Analysis – NHDES Best Management Practice Worksheets

GRAVEL WETLAND DESIGN CRITERIA
(Env-Wq 1508.05)

Type/Node Name: **Gravel Wetland #1 (1P) - Forebay #1 (2P)**

Enter the node name in the drainage analysis if applicable.

2.10	ac	A = Area draining to the practice	
1.69	ac	A_I = Impervious area draining to the practice	
0.80	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.77	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.62	ac-in	WQV= 1" x Rv x A	
5,888	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
589	cf	10% x WQV (check calc for sediment forebay)	
2,650	cf	45% x WQV (check calc for gravel wetland treatment bay volume)	
900	cf	V_{SED} = Sediment forebay volume	**≥ 10%WQV**
3,648	cf	V_{TB1} = Volume of treatment bay 1 [1]	**≥ 45%WQV**
4,968	cf	V_{TB2} = Volume of treatment bay 2 [1]	**≥ 45%WQV**
0.14	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec) [2]	
93.76	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.13	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{avg}$**
25.16	hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
3.00	:1	Pond side slopes	**≥ 3:1**
95.30	ft	Elevation of SHWT	
93.30	ft	SHWT - 2 feet	
93.00	ft	Epp = Elevation of the permanent pool (elevation of lowest orifice) [3]	**≤ E_{SHWT} - 2 ft**
85.00	ft	Length of the flow path between the inlet and outlet in each cell	**≥ 15 ft**
Trash Rack		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.39	ft	Peak elevation of the 50-year storm event (E_{50})	
95.50	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

Qualified professional that developed the planting plan
Name, Profession:

1. Volume stored above the wetland soil and below the high flow by-pass.

2. To ensure orifice is sized so that WQV is released at a relatively stable rate.

3. 4" to 8" below the wetland soil. If lowest orifice is higher than (SHWT - 2 feet), and saturated hydraulic conductivity (Ksat) is greater than 0.015 in/hr, the system must be lined.

Designer's Notes:

Calc'd 12/1/2022 by C.Chiaramonte, EIT

Stage-Discharge for Pond 1P: Gravel Wetland #1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
90.58	0.00	93.23	0.06	95.88	26.78
90.63	0.00	93.28	0.07	95.93	28.53
90.68	0.00	93.33	0.08	95.98	**30.31**
90.73	0.00	93.38	0.09		
90.78	0.00	93.43	0.09		
90.83	0.00	93.48	0.10		
90.88	0.00	93.53	0.11		
90.93	0.00	93.58	0.11		
90.98	0.00	93.63	0.12		
91.03	0.00	93.68	0.12		
91.08	0.00	93.73	0.13		
91.13	0.00	93.78	0.13		
91.18	0.00	93.83	0.14		
91.23	0.00	93.88	0.14		
91.28	0.00	93.93	0.15		
91.33	0.00	93.98	0.15		
91.38	0.00	94.03	0.16		
91.43	0.00	94.08	0.16		
91.48	0.00	94.13	0.17		
91.53	0.00	94.18	0.17		
91.58	0.00	94.23	0.17		
91.63	0.00	94.28	0.18		
91.68	0.00	94.33	0.18		
91.73	0.00	94.38	0.19		
91.78	0.00	94.43	0.19		
91.83	0.00	94.48	0.19		
91.88	0.00	94.53	0.20		
91.93	0.00	94.58	0.20		
91.98	0.00	94.63	0.20		
92.03	0.00	94.68	0.48		
92.08	0.00	94.73	1.39		
92.13	0.00	94.78	2.66		
92.18	0.00	94.83	4.21		
92.23	0.00	94.88	5.23		
92.28	0.00	94.93	5.33		
92.33	0.00	94.98	5.43		
92.38	0.00	95.03	5.64		
92.43	0.00	95.08	6.12		
92.48	0.00	95.13	6.75		
92.53	0.00	95.18	7.49		
92.58	0.00	95.23	8.35		
92.63	0.00	95.28	9.33		
92.68	0.00	95.33	10.41		
92.73	0.00	95.38	11.59		
92.78	0.00	95.43	12.85		
92.83	0.00	95.48	14.20		
92.88	0.00	95.53	15.62		
92.93	0.00	95.58	17.14		
92.98	0.00	95.63	18.66		
93.03	0.00	95.68	20.19		
93.08	0.01	95.73	21.78		
93.13	0.03	95.78	23.41		
93.18	0.05	95.83	25.08		

Stage-Area-Storage for Pond 1P: Gravel Wetland #1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
90.58	0	93.23	4,377	95.88	19,922
90.63	92	93.28	4,423	95.93	20,311
90.68	183	93.33	4,468	95.98	**20,701**
90.73	275	93.38	4,514		
90.78	367	93.43	4,560		
90.83	458	93.48	4,606		
90.88	550	93.53	4,799		
90.93	642	93.58	5,032		
90.98	733	93.63	5,269		
91.03	825	93.68	5,510		
91.08	917	93.73	5,755		
91.13	1,008	93.78	6,003		
91.18	1,100	93.83	6,255		
91.23	1,192	93.88	6,511		
91.28	1,283	93.93	6,770		
91.33	1,375	93.98	7,034		
91.38	1,467	94.03	7,301		
91.43	1,558	94.08	7,572		
91.48	1,650	94.13	7,847		
91.53	1,742	94.18	8,126		
91.58	1,833	94.23	8,409		
91.63	1,925	94.28	8,697		
91.68	2,017	94.33	8,988		
91.73	2,108	94.38	9,283		
91.78	2,200	94.43	9,582		
91.83	2,292	94.48	9,885		
91.88	2,383	94.53	10,193		
91.93	2,475	94.58	10,504		
91.98	2,566	94.63	10,819		
92.03	2,658	94.68	11,138		
92.08	2,750	94.73	11,462		
92.13	2,841	94.78	11,789		
92.18	2,933	94.83	12,120		
92.23	3,025	94.88	12,456		
92.28	3,116	94.93	12,795		
92.33	3,208	94.98	13,138		
92.38	3,300	95.03	13,486		
92.43	3,391	95.08	13,837		
92.48	3,483	95.13	14,193		
92.53	3,575	95.18	14,553		
92.58	3,666	95.23	14,918		
92.63	3,735	95.28	15,287		
92.68	3,804	95.33	15,660		
92.73	3,873	95.38	16,037		
92.78	3,941	95.43	16,419		
92.83	4,010	95.48	16,804		
92.88	4,056	95.53	17,194		
92.93	4,102	95.58	17,583		
92.98	4,148	95.63	17,973		
93.03	4,193	95.68	18,363		
93.08	4,239	95.73	18,753		
93.13	4,285	95.78	19,142		
93.18	4,331	95.83	19,532		

GRAVEL WETLAND DESIGN CRITERIA
(Env-Wq 1508.05)

Type/Node Name: **Gravel Wetland #2 (23P) - Forebay #2 (3P)**

Enter the node name in the drainage analysis if applicable.

2.28	ac	A = Area draining to the practice	
1.73	ac	A_I = Impervious area draining to the practice	
0.76	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.73	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
1.67	ac-in	WQV= 1" x Rv x A	
6,055	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
606	cf	10% x WQV (check calc for sediment forebay)	
2,725	cf	45% x WQV (check calc for gravel wetland treatment bay volume)	
4,673	cf	V_{SED} = Sediment forebay volume	**≥ 10%WQV**
2,947	cf	V_{TB1} = Volume of treatment bay 1 [1]	**≥ 45%WQV**
3,291	cf	V_{TB2} = Volume of treatment bay 2 [1]	**≥ 45%WQV**
0.14	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec) [2]	
97.13	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.09	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{avg}$**
37.38	hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
3.00	:1	Pond side slopes	**≥ 3:1**
93.16	ft	Elevation of SHWT	
91.16	ft	SHWT - 2 feet	
94.60	ft	Epp = Elevation of the permanent pool (elevation of lowest orifice) [3]	**≤ E_{SHWT} - 2 ft**
50.00	ft	Length of the flow path between the inlet and outlet in each cell	**≥ 15 ft**
Trash Rack		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
98.01	ft	Peak elevation of the 50-year storm event (E_{50})	
98.50	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

Qualified professional that developed the planting plan
Name, Profession:

1. Volume stored above the wetland soil and below the high flow by-pass.

2. To ensure orifice is sized so that WQV is released at a relatively stable rate.

3. 4" to 8" below the wetland soil. If lowest orifice is higher than (SHWT - 2 feet), and saturated hydraulic conductivity (Ksat) is greater than 0.015 in/hr, the system must be lined.

Designer's Notes:

Calc'd 12/1/2022 by C.Chiaramonte, EIT

Stage-Discharge for Pond 23P: Gravel Wetland #2

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
92.34	0.00	0.00	0.00
92.44	0.00	0.00	0.00
92.54	0.00	0.00	0.00
92.64	0.00	0.00	0.00
92.74	0.00	0.00	0.00
92.84	0.00	0.00	0.00
92.94	0.00	0.00	0.00
93.04	0.00	0.00	0.00
93.14	0.00	0.00	0.00
93.24	0.00	0.00	0.00
93.34	0.00	0.00	0.00
93.44	0.00	0.00	0.00
93.54	0.00	0.00	0.00
93.64	0.00	0.00	0.00
93.74	0.00	0.00	0.00
93.84	0.00	0.00	0.00
93.94	0.00	0.00	0.00
94.04	0.00	0.00	0.00
94.14	0.00	0.00	0.00
94.24	0.00	0.00	0.00
94.34	0.00	0.00	0.00
94.44	0.00	0.00	0.00
94.54	0.00	0.00	0.00
94.64	0.00	0.00	0.00
94.74	0.02	0.02	0.00
94.84	0.02	0.02	0.00
94.94	0.03	0.03	0.00
95.04	0.04	0.04	0.00
95.14	0.04	0.04	0.00
95.24	0.04	0.04	0.00
95.34	0.05	0.05	0.00
95.44	0.05	0.05	0.00
95.54	0.06	0.06	0.00
95.64	0.06	0.06	0.00
95.74	0.06	0.06	0.00
95.84	0.06	0.06	0.00
95.94	0.07	0.07	0.00
96.04	0.07	0.07	0.00
96.14	0.07	0.07	0.00
96.24	0.07	0.07	0.00
96.34	0.08	0.08	0.00
96.44	0.08	0.08	0.00
96.54	0.08	0.08	0.00
96.64	0.08	0.08	0.00
96.74	0.09	0.09	0.00
96.84	0.09	0.09	0.00
96.94	0.09	0.09	0.00
97.04	0.09	0.09	0.00
97.14	0.09	0.09	0.00
97.24	0.09	0.09	0.00
97.34	0.10	0.10	0.00
97.44	0.10	0.10	0.00
97.54	0.38	0.10	0.28
97.64	1.96	0.10	1.86
97.74	4.33	0.10	4.23
97.84	7.44	0.11	7.34
97.94	11.26	0.11	11.16
98.04	16.26	0.53	15.73
98.14	23.56	2.85	20.71
98.24	31.91	6.26	25.65
98.34	38.20	7.25	30.95
98.44	**44.01**	**7.37**	**36.64**

Stage-Area-Storage for Pond 23P: Gravel Wetland #2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
92.34	0	94.99	1,338	97.64	8,080
92.39	28	95.04	1,352	97.69	8,297
92.44	56	95.09	1,366	97.74	8,517
92.49	84	95.14	1,380	97.79	8,741
92.54	112	95.19	1,394	97.84	8,968
92.59	140	95.24	1,408	97.89	9,199
92.64	168	95.29	1,479	97.94	9,433
92.69	196	95.34	1,552	97.99	9,670
92.74	224	95.39	1,628	98.04	9,912
92.79	252	95.44	1,707	98.09	10,162
92.84	280	95.49	1,789	98.14	10,419
92.89	308	95.54	1,873	98.19	10,684
92.94	336	95.59	1,960	98.24	10,956
92.99	363	95.64	2,050	98.29	11,236
93.04	391	95.69	2,142	98.34	11,523
93.09	419	95.74	2,238	98.39	11,818
93.14	447	95.79	2,336	98.44	12,120
93.19	475	95.84	2,436	98.49	**12,430**
93.24	503	95.89	2,540		
93.29	531	95.94	2,646		
93.34	559	95.99	2,755		
93.39	587	96.04	2,867		
93.44	615	96.09	2,981		
93.49	643	96.14	3,099		
93.54	671	96.19	3,220		
93.59	699	96.24	3,344		
93.64	727	96.29	3,471		
93.69	755	96.34	3,601		
93.74	783	96.39	3,734		
93.79	811	96.44	3,870		
93.84	839	96.49	4,009		
93.89	867	96.54	4,151		
93.94	895	96.59	4,297		
93.99	923	96.64	4,445		
94.04	951	96.69	4,596		
94.09	979	96.74	4,751		
94.14	1,007	96.79	4,908		
94.19	1,035	96.84	5,069		
94.24	1,062	96.89	5,232		
94.29	1,090	96.94	5,399		
94.34	1,118	96.99	5,568		
94.39	1,141	97.04	5,741		
94.44	1,162	97.09	5,917		
94.49	1,183	97.14	6,097		
94.54	1,204	97.19	6,280		
94.59	1,225	97.24	6,466		
94.64	1,240	97.29	6,656		
94.69	1,254	97.34	6,849		
94.74	1,268	97.39	7,046		
94.79	1,282	97.44	7,246		
94.84	1,296	97.49	7,449		
94.89	1,310	97.54	7,656		
94.94	1,324	97.59	7,866		

Appendix I.2.iv

Post-Development Drainage Analysis – Node Summaries

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: Runoff Area=60,446 sf 0.00% Impervious Runoff Depth=1.38"
Flow Length=448' Tc=30.1 min CN=75 Runoff=1.23 cfs 0.160 af

Subcatchment N-2: Runoff Area=16,930 sf 31.91% Impervious Runoff Depth=2.20"
Tc=6.0 min CN=86 Runoff=0.98 cfs 0.071 af

Subcatchment N-3: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=1.13 cfs 0.093 af

Subcatchment N-4: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=1.13 cfs 0.093 af

Subcatchment NE-1: Runoff Area=17,743 sf 93.23% Impervious Runoff Depth=3.26"
Tc=6.0 min CN=97 Runoff=1.38 cfs 0.111 af

Subcatchment NE-2: Runoff Area=9,215 sf 98.01% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.73 cfs 0.060 af

Subcatchment NW-1: Runoff Area=11,174 sf 0.00% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=80 Runoff=0.51 cfs 0.037 af

Subcatchment NW-1a: Runoff Area=6,389 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.50 cfs 0.041 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=1.51"
Tc=6.0 min CN=77 Runoff=0.03 cfs 0.002 af

Subcatchment S-1: Runoff Area=15,528 sf 0.00% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=80 Runoff=0.70 cfs 0.051 af

Subcatchment S-2: Runoff Area=5,590 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.44 cfs 0.036 af

Subcatchment S-3: Runoff Area=9,518 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.75 cfs 0.061 af

Subcatchment S-3a: Runoff Area=8,662 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.68 cfs 0.056 af

Subcatchment SE-1: Runoff Area=2,031 sf 0.00% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=80 Runoff=0.09 cfs 0.007 af

Subcatchment SE-2: Runoff Area=2,960 sf 89.63% Impervious Runoff Depth=3.15"
Tc=6.0 min CN=96 Runoff=0.23 cfs 0.018 af

Subcatchment SE-3: Runoff Area=20,275 sf 98.03% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=1.60 cfs 0.131 af

Subcatchment SE-4: Runoff Area=7,305 sf 81.19% Impervious Runoff Depth=3.05"
Tc=6.0 min CN=95 Runoff=0.55 cfs 0.043 af

Subcatchment SW-1: Runoff Area=2,906 sf 0.00% Impervious Runoff Depth=1.65"
Flow Length=105' Tc=6.2 min CN=79 Runoff=0.13 cfs 0.009 af

Subcatchment SW-2: Runoff Area=11,972 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.94 cfs 0.077 af

Subcatchment SW-3: Runoff Area=16,216 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=1.28 cfs 0.105 af

Subcatchment SW-4: Runoff Area=2,212 sf 100.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=98 Runoff=0.17 cfs 0.014 af

Subcatchment SW-5: Runoff Area=10,758 sf 100.00% Impervious Runoff Depth=3.38"
Flow Length=200' Slope=0.0200 '/' Tc=10.9 min CN=98 Runoff=0.73 cfs 0.069 af

Subcatchment SW-6: Runoff Area=4,177 sf 0.00% Impervious Runoff Depth=1.72"
Flow Length=100' Slope=0.0500 '/' Tc=6.4 min CN=80 Runoff=0.19 cfs 0.014 af

Subcatchment SW-7: Runoff Area=6,660 sf 0.00% Impervious Runoff Depth=1.72"
Flow Length=120' Tc=8.1 min CN=80 Runoff=0.28 cfs 0.022 af

Reach 17R: Flow to Driveway Culvert Avg. Flow Depth=0.04' Max Vel=0.77 fps Inflow=0.10 cfs 0.153 af
n=0.022 L=45.0' S=0.0133 '/' Capacity=375.01 cfs Outflow=0.10 cfs 0.153 af

Pond 1P: Gravel Wetland #1 Peak Elev=94.77' Storage=11,744 cf Inflow=6.62 cfs 0.514 af
Outflow=2.47 cfs 0.392 af

Pond 2P: Forebay #1 Peak Elev=95.16' Storage=1,250 cf Inflow=5.93 cfs 0.483 af
Outflow=5.92 cfs 0.463 af

Pond 3P: Forebay #2 Peak Elev=97.78' Storage=6,061 cf Inflow=4.29 cfs 0.341 af
Outflow=3.24 cfs 0.233 af

Pond 4P: DMH-1 Peak Elev=97.99' Inflow=1.43 cfs 0.117 af
12.0" Round Culvert n=0.013 L=130.0' S=0.0044 '/' Outflow=1.43 cfs 0.117 af

Pond 18P: Driveway Culvert Peak Elev=94.15' Inflow=0.27 cfs 0.166 af
12.0" Round Culvert n=0.012 L=97.0' S=0.0093 '/' Outflow=0.27 cfs 0.166 af

Pond 19P: CB-7 Peak Elev=95.49' Inflow=3.56 cfs 0.292 af
18.0" Round Culvert n=0.013 L=193.0' S=0.0034 '/' Outflow=3.56 cfs 0.292 af

Pond 23P: Gravel Wetland #2 Peak Elev=97.66' Storage=8,178 cf Inflow=5.56 cfs 0.456 af
Primary=0.10 cfs 0.153 af Secondary=2.31 cfs 0.179 af Outflow=2.41 cfs 0.332 af

Pond CB-1: CB-1 Peak Elev=98.18' Inflow=0.73 cfs 0.060 af
12.0" Round Culvert n=0.012 L=120.0' S=0.0125 '/' Outflow=0.73 cfs 0.060 af

Pond CB-2: CB-2 Peak Elev=97.05' Inflow=2.00 cfs 0.164 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=2.00 cfs 0.164 af

Pond CB-3: CB-3 Peak Elev=96.42' Inflow=2.18 cfs 0.179 af
12.0" Round Culvert n=0.012 L=105.0' S=0.0124 '/' Outflow=2.18 cfs 0.179 af

Pond CB-4: CB-4 Peak Elev=95.70' Inflow=3.12 cfs 0.256 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=3.12 cfs 0.256 af

Pond CB-5: CB-5 Peak Elev=96.20' Inflow=0.78 cfs 0.060 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0056 '/' Outflow=0.78 cfs 0.060 af

Pond CB-6: CB-6 Peak Elev=97.77' Inflow=0.55 cfs 0.043 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0100 '/' Outflow=0.55 cfs 0.043 af

Pond CB-8: Peak Elev=97.83' Inflow=0.50 cfs 0.041 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0100 '/' Outflow=0.50 cfs 0.041 af

Link POI-1: H-31-0-0 Inflow=1.23 cfs 0.160 af
Primary=1.23 cfs 0.160 af

Link POI-2: H-34-0-0 Inflow=2.74 cfs 0.574 af
Primary=2.74 cfs 0.574 af

Link POI-3: Sumner Dr ROW Inflow=0.73 cfs 0.069 af
Primary=0.73 cfs 0.069 af

Link POI-4: H-35-C-4 Inflow=2.44 cfs 0.204 af
Primary=2.44 cfs 0.204 af

Total Runoff Area = 6.384 ac Runoff Volume = 1.380 af Average Runoff Depth = 2.59"
42.66% Pervious = 2.723 ac 57.34% Impervious = 3.661 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: Runoff Area=60,446 sf 0.00% Impervious Runoff Depth=2.82"
Flow Length=448' Tc=30.1 min CN=75 Runoff=2.58 cfs 0.326 af

Subcatchment N-2: Runoff Area=16,930 sf 31.91% Impervious Runoff Depth=3.89"
Tc=6.0 min CN=86 Runoff=1.70 cfs 0.126 af

Subcatchment N-3: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.72 cfs 0.143 af

Subcatchment N-4: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.72 cfs 0.143 af

Subcatchment NE-1: Runoff Area=17,743 sf 93.23% Impervious Runoff Depth=5.10"
Tc=6.0 min CN=97 Runoff=2.11 cfs 0.173 af

Subcatchment NE-2: Runoff Area=9,215 sf 98.01% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.10 cfs 0.092 af

Subcatchment NW-1: Runoff Area=11,174 sf 0.00% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=80 Runoff=0.97 cfs 0.070 af

Subcatchment NW-1a: Runoff Area=6,389 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.76 cfs 0.064 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=3.00"
Tc=6.0 min CN=77 Runoff=0.06 cfs 0.004 af

Subcatchment S-1: Runoff Area=15,528 sf 0.00% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=80 Runoff=1.34 cfs 0.098 af

Subcatchment S-2: Runoff Area=5,590 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.67 cfs 0.056 af

Subcatchment S-3: Runoff Area=9,518 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.14 cfs 0.095 af

Subcatchment S-3a: Runoff Area=8,662 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.04 cfs 0.086 af

Subcatchment SE-1: Runoff Area=2,031 sf 0.00% Impervious Runoff Depth=3.29"
Tc=6.0 min CN=80 Runoff=0.18 cfs 0.013 af

Subcatchment SE-2: Runoff Area=2,960 sf 89.63% Impervious Runoff Depth=4.98"
Tc=6.0 min CN=96 Runoff=0.35 cfs 0.028 af

Subcatchment SE-3: Runoff Area=20,275 sf 98.03% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=2.43 cfs 0.202 af

Subcatchment SE-4: Runoff Area=7,305 sf 81.19% Impervious Runoff Depth=4.87"
Tc=6.0 min CN=95 Runoff=0.85 cfs 0.068 af

Subcatchment SW-1: Runoff Area=2,906 sf 0.00% Impervious Runoff Depth=3.19"
Flow Length=105' Tc=6.2 min CN=79 Runoff=0.24 cfs 0.018 af

Subcatchment SW-2: Runoff Area=11,972 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.43 cfs 0.119 af

Subcatchment SW-3: Runoff Area=16,216 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=1.94 cfs 0.162 af

Subcatchment SW-4: Runoff Area=2,212 sf 100.00% Impervious Runoff Depth=5.21"
Tc=6.0 min CN=98 Runoff=0.26 cfs 0.022 af

Subcatchment SW-5: Runoff Area=10,758 sf 100.00% Impervious Runoff Depth=5.21"
Flow Length=200' Slope=0.0200 '/' Tc=10.9 min CN=98 Runoff=1.12 cfs 0.107 af

Subcatchment SW-6: Runoff Area=4,177 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=100' Slope=0.0500 '/' Tc=6.4 min CN=80 Runoff=0.36 cfs 0.026 af

Subcatchment SW-7: Runoff Area=6,660 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=120' Tc=8.1 min CN=80 Runoff=0.54 cfs 0.042 af

Reach 17R: Flow to Driveway Culvert Avg. Flow Depth=0.04' Max Vel=0.78 fps Inflow=0.11 cfs 0.163 af
n=0.022 L=45.0' S=0.0133 '/' Capacity=375.01 cfs Outflow=0.11 cfs 0.163 af

Pond 1P: Gravel Wetland #1 Peak Elev=95.10' Storage=13,988 cf Inflow=10.29 cfs 0.826 af
Outflow=6.38 cfs 0.686 af

Pond 2P: Forebay #1 Peak Elev=95.29' Storage=1,373 cf Inflow=9.04 cfs 0.749 af
Outflow=8.94 cfs 0.729 af

Pond 3P: Forebay #2 Peak Elev=97.95' Storage=7,014 cf Inflow=6.75 cfs 0.544 af
Outflow=4.54 cfs 0.437 af

Pond 4P: DMH-1 Peak Elev=98.53' Inflow=2.17 cfs 0.181 af
12.0" Round Culvert n=0.013 L=130.0' S=0.0044 '/' Outflow=2.17 cfs 0.181 af

Pond 18P: Driveway Culvert Peak Elev=94.24' Inflow=0.46 cfs 0.189 af
12.0" Round Culvert n=0.012 L=97.0' S=0.0093 '/' Outflow=0.46 cfs 0.189 af

Pond 19P: CB-7 Peak Elev=96.01' Inflow=5.41 cfs 0.451 af
18.0" Round Culvert n=0.013 L=193.0' S=0.0034 '/' Outflow=5.41 cfs 0.451 af

Pond 23P: Gravel Wetland #2 Peak Elev=97.86' Storage=9,079 cf Inflow=8.85 cfs 0.793 af
Primary=0.11 cfs 0.163 af Secondary=8.15 cfs 0.502 af Outflow=8.25 cfs 0.665 af

Pond CB-1: CB-1 Peak Elev=98.32' Inflow=1.10 cfs 0.092 af
12.0" Round Culvert n=0.012 L=120.0' S=0.0125 '/' Outflow=1.10 cfs 0.092 af

Pond CB-2: CB-2 Peak Elev=97.78' Inflow=3.04 cfs 0.254 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=3.04 cfs 0.254 af

Pond CB-3: CB-3 Peak Elev=97.21' Inflow=3.31 cfs 0.276 af
12.0" Round Culvert n=0.012 L=105.0' S=0.0124 '/' Outflow=3.31 cfs 0.276 af

Pond CB-4: CB-4 Peak Elev=96.45' Inflow=4.74 cfs 0.395 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=4.74 cfs 0.395 af

Pond CB-5: CB-5 Peak Elev=96.34' Inflow=1.20 cfs 0.096 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0056 '/' Outflow=1.20 cfs 0.096 af

Pond CB-6: CB-6 Peak Elev=97.87' Inflow=0.85 cfs 0.068 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0100 '/' Outflow=0.85 cfs 0.068 af

Pond CB-8: Peak Elev=98.00' Inflow=0.76 cfs 0.064 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0100 '/' Outflow=0.76 cfs 0.064 af

Link POI-1: H-31-0-0 Inflow=2.58 cfs 0.326 af
Primary=2.58 cfs 0.326 af

Link POI-2: H-34-0-0 Inflow=6.97 cfs 0.905 af
Primary=6.97 cfs 0.905 af

Link POI-3: Sumner Dr ROW Inflow=1.12 cfs 0.107 af
Primary=1.12 cfs 0.107 af

Link POI-4: H-35-C-4 Inflow=8.70 cfs 0.548 af
Primary=8.70 cfs 0.548 af

Total Runoff Area = 6.384 ac Runoff Volume = 2.283 af Average Runoff Depth = 4.29"
42.66% Pervious = 2.723 ac 57.34% Impervious = 3.661 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: Runoff Area=60,446 sf 0.00% Impervious Runoff Depth=4.06"
Flow Length=448' Tc=30.1 min CN=75 Runoff=3.73 cfs 0.470 af

Subcatchment N-2: Runoff Area=16,930 sf 31.91% Impervious Runoff Depth=5.27"
Tc=6.0 min CN=86 Runoff=2.27 cfs 0.171 af

Subcatchment N-3: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=2.18 cfs 0.183 af

Subcatchment N-4: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=2.18 cfs 0.183 af

Subcatchment NE-1: Runoff Area=17,743 sf 93.23% Impervious Runoff Depth=6.54"
Tc=6.0 min CN=97 Runoff=2.68 cfs 0.222 af

Subcatchment NE-2: Runoff Area=9,215 sf 98.01% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=1.40 cfs 0.117 af

Subcatchment NW-1: Runoff Area=11,174 sf 0.00% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=80 Runoff=1.34 cfs 0.098 af

Subcatchment NW-1a: Runoff Area=6,389 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=0.97 cfs 0.081 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=77 Runoff=0.08 cfs 0.006 af

Subcatchment S-1: Runoff Area=15,528 sf 0.00% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=80 Runoff=1.87 cfs 0.137 af

Subcatchment S-2: Runoff Area=5,590 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=0.85 cfs 0.071 af

Subcatchment S-3: Runoff Area=9,518 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=1.44 cfs 0.121 af

Subcatchment S-3a: Runoff Area=8,662 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=1.31 cfs 0.110 af

Subcatchment SE-1: Runoff Area=2,031 sf 0.00% Impervious Runoff Depth=4.60"
Tc=6.0 min CN=80 Runoff=0.24 cfs 0.018 af

Subcatchment SE-2: Runoff Area=2,960 sf 89.63% Impervious Runoff Depth=6.42"
Tc=6.0 min CN=96 Runoff=0.45 cfs 0.036 af

Subcatchment SE-3: Runoff Area=20,275 sf 98.03% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=3.08 cfs 0.258 af

Subcatchment SE-4: Runoff Area=7,305 sf 81.19% Impervious Runoff Depth=6.31"
Tc=6.0 min CN=95 Runoff=1.09 cfs 0.088 af

Subcatchment SW-1: Runoff Area=2,906 sf 0.00% Impervious Runoff Depth=4.49"
Flow Length=105' Tc=6.2 min CN=79 Runoff=0.34 cfs 0.025 af

Subcatchment SW-2: Runoff Area=11,972 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=1.82 cfs 0.153 af

Subcatchment SW-3: Runoff Area=16,216 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=2.46 cfs 0.207 af

Subcatchment SW-4: Runoff Area=2,212 sf 100.00% Impervious Runoff Depth=6.66"
Tc=6.0 min CN=98 Runoff=0.34 cfs 0.028 af

Subcatchment SW-5: Runoff Area=10,758 sf 100.00% Impervious Runoff Depth=6.66"
Flow Length=200' Slope=0.0200 '/' Tc=10.9 min CN=98 Runoff=1.42 cfs 0.137 af

Subcatchment SW-6: Runoff Area=4,177 sf 0.00% Impervious Runoff Depth=4.60"
Flow Length=100' Slope=0.0500 '/' Tc=6.4 min CN=80 Runoff=0.50 cfs 0.037 af

Subcatchment SW-7: Runoff Area=6,660 sf 0.00% Impervious Runoff Depth=4.60"
Flow Length=120' Tc=8.1 min CN=80 Runoff=0.75 cfs 0.059 af

Reach 17R: Flow to Driveway Culvert Avg. Flow Depth=0.05' Max Vel=0.78 fps Inflow=0.11 cfs 0.170 af
n=0.022 L=45.0' S=0.0133 '/' Capacity=375.01 cfs Outflow=0.11 cfs 0.170 af

Pond 1P: Gravel Wetland #1 Peak Elev=95.27' Storage=15,212 cf Inflow=13.12 cfs 1.075 af
Outflow=9.12 cfs 0.923 af

Pond 2P: Forebay #1 Peak Elev=95.40' Storage=1,492 cf Inflow=11.47 cfs 0.959 af
Outflow=11.25 cfs 0.938 af

Pond 3P: Forebay #2 Peak Elev=98.06' Storage=7,640 cf Inflow=8.68 cfs 0.706 af
Outflow=6.65 cfs 0.599 af

Pond 4P: DMH-1 Peak Elev=99.07' Inflow=2.76 cfs 0.232 af
12.0" Round Culvert n=0.013 L=130.0' S=0.0044 '/' Outflow=2.76 cfs 0.232 af

Pond 18P: Driveway Culvert Peak Elev=94.29' Inflow=0.60 cfs 0.206 af
12.0" Round Culvert n=0.012 L=97.0' S=0.0093 '/' Outflow=0.60 cfs 0.206 af

Pond 19P: CB-7 Peak Elev=96.57' Inflow=6.86 cfs 0.576 af
18.0" Round Culvert n=0.013 L=193.0' S=0.0034 '/' Outflow=6.86 cfs 0.576 af

Pond 23P: Gravel Wetland #2 Peak Elev=97.95' Storage=9,470 cf Inflow=12.18 cfs 1.063 af
Primary=0.11 cfs 0.170 af Secondary=11.44 cfs 0.764 af Outflow=11.55 cfs 0.934 af

Pond CB-1: CB-1 Peak Elev=99.44' Inflow=1.40 cfs 0.117 af
12.0" Round Culvert n=0.012 L=120.0' S=0.0125 '/' Outflow=1.40 cfs 0.117 af

Pond CB-2: CB-2 Peak Elev=99.36' Inflow=3.86 cfs 0.324 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=3.86 cfs 0.324 af

Pond CB-3: CB-3 Peak Elev=98.54' Inflow=4.19 cfs 0.352 af
12.0" Round Culvert n=0.012 L=105.0' S=0.0124 '/' Outflow=4.19 cfs 0.352 af

Pond CB-4: CB-4 Peak Elev=97.38' Inflow=6.01 cfs 0.505 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=6.01 cfs 0.505 af

Pond CB-5: CB-5 Peak Elev=96.44' Inflow=1.54 cfs 0.125 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0056 '/' Outflow=1.54 cfs 0.125 af

Pond CB-6: CB-6 Peak Elev=97.94' Inflow=1.09 cfs 0.088 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0100 '/' Outflow=1.09 cfs 0.088 af

Pond CB-8: Peak Elev=98.12' Inflow=0.97 cfs 0.081 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0100 '/' Outflow=0.97 cfs 0.081 af

Link POI-1: H-31-0-0 Inflow=3.73 cfs 0.470 af
Primary=3.73 cfs 0.470 af

Link POI-2: H-34-0-0 Inflow=10.09 cfs 1.173 af
Primary=10.09 cfs 1.173 af

Link POI-3: Sumner Dr ROW Inflow=1.42 cfs 0.137 af
Primary=1.42 cfs 0.137 af

Link POI-4: H-35-C-4 Inflow=12.22 cfs 0.829 af
Primary=12.22 cfs 0.829 af

Total Runoff Area = 6.384 ac Runoff Volume = 3.017 af Average Runoff Depth = 5.67"
42.66% Pervious = 2.723 ac 57.34% Impervious = 3.661 ac

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 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 N-1: Runoff Area=60,446 sf 0.00% Impervious Runoff Depth=5.27"
Flow Length=448' Tc=30.1 min CN=75 Runoff=4.82 cfs 0.609 af

Subcatchment N-2: Runoff Area=16,930 sf 31.91% Impervious Runoff Depth=6.57"
Tc=6.0 min CN=86 Runoff=2.80 cfs 0.213 af

Subcatchment N-3: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=2.61 cfs 0.220 af

Subcatchment N-4: Runoff Area=14,358 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=2.61 cfs 0.220 af

Subcatchment NE-1: Runoff Area=17,743 sf 93.23% Impervious Runoff Depth=7.89"
Tc=6.0 min CN=97 Runoff=3.21 cfs 0.268 af

Subcatchment NE-2: Runoff Area=9,215 sf 98.01% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=1.67 cfs 0.141 af

Subcatchment NW-1: Runoff Area=11,174 sf 0.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=80 Runoff=1.69 cfs 0.125 af

Subcatchment NW-1a: Runoff Area=6,389 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=1.16 cfs 0.098 af

Subcatchment NW-2: Runoff Area=710 sf 0.00% Impervious Runoff Depth=5.50"
Tc=6.0 min CN=77 Runoff=0.10 cfs 0.007 af

Subcatchment S-1: Runoff Area=15,528 sf 0.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=80 Runoff=2.35 cfs 0.174 af

Subcatchment S-2: Runoff Area=5,590 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=1.02 cfs 0.086 af

Subcatchment S-3: Runoff Area=9,518 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=1.73 cfs 0.146 af

Subcatchment S-3a: Runoff Area=8,662 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=1.57 cfs 0.133 af

Subcatchment SE-1: Runoff Area=2,031 sf 0.00% Impervious Runoff Depth=5.86"
Tc=6.0 min CN=80 Runoff=0.31 cfs 0.023 af

Subcatchment SE-2: Runoff Area=2,960 sf 89.63% Impervious Runoff Depth=7.77"
Tc=6.0 min CN=96 Runoff=0.53 cfs 0.044 af

Subcatchment SE-3: Runoff Area=20,275 sf 98.03% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=3.68 cfs 0.311 af

Subcatchment SE-4: Runoff Area=7,305 sf 81.19% Impervious Runoff Depth=7.65"
Tc=6.0 min CN=95 Runoff=1.31 cfs 0.107 af

Subcatchment SW-1: Runoff Area=2,906 sf 0.00% Impervious Runoff Depth=5.74"
Flow Length=105' Tc=6.2 min CN=79 Runoff=0.43 cfs 0.032 af

Subcatchment SW-2: Runoff Area=11,972 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=2.17 cfs 0.183 af

Subcatchment SW-3: Runoff Area=16,216 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=2.94 cfs 0.248 af

Subcatchment SW-4: Runoff Area=2,212 sf 100.00% Impervious Runoff Depth=8.01"
Tc=6.0 min CN=98 Runoff=0.40 cfs 0.034 af

Subcatchment SW-5: Runoff Area=10,758 sf 100.00% Impervious Runoff Depth=8.01"
Flow Length=200' Slope=0.0200 '/' Tc=10.9 min CN=98 Runoff=1.69 cfs 0.165 af

Subcatchment SW-6: Runoff Area=4,177 sf 0.00% Impervious Runoff Depth=5.86"
Flow Length=100' Slope=0.0500 '/' Tc=6.4 min CN=80 Runoff=0.63 cfs 0.047 af

Subcatchment SW-7: Runoff Area=6,660 sf 0.00% Impervious Runoff Depth=5.86"
Flow Length=120' Tc=8.1 min CN=80 Runoff=0.95 cfs 0.075 af

Reach 17R: Flow to Driveway Culvert Avg. Flow Depth=0.05' Max Vel=0.81 fps Inflow=0.12 cfs 0.176 af
n=0.022 L=45.0' S=0.0133 '/' Capacity=375.01 cfs Outflow=0.12 cfs 0.176 af

Pond 1P: Gravel Wetland #1 Peak Elev=95.39' Storage=16,125 cf Inflow=15.85 cfs 1.308 af
Outflow=11.86 cfs 1.149 af

Pond 2P: Forebay #1 Peak Elev=95.52' Storage=1,592 cf Inflow=13.74 cfs 1.154 af
Outflow=13.50 cfs 1.134 af

Pond 3P: Forebay #2 Peak Elev=98.14' Storage=8,094 cf Inflow=10.48 cfs 0.857 af
Outflow=8.26 cfs 0.750 af

Pond 4P: DMH-1 Peak Elev=99.63' Inflow=3.30 cfs 0.279 af
12.0" Round Culvert n=0.013 L=130.0' S=0.0044 '/' Outflow=3.30 cfs 0.279 af

Pond 18P: Driveway Culvert Peak Elev=94.33' Inflow=0.73 cfs 0.223 af
12.0" Round Culvert n=0.012 L=97.0' S=0.0093 '/' Outflow=0.73 cfs 0.223 af

Pond 19P: CB-7 Peak Elev=97.20' Inflow=8.21 cfs 0.693 af
18.0" Round Culvert n=0.013 L=193.0' S=0.0034 '/' Outflow=8.21 cfs 0.693 af

Pond 23P: Gravel Wetland #2 Peak Elev=98.01' Storage=9,752 cf Inflow=14.94 cfs 1.315 af
Primary=0.12 cfs 0.176 af Secondary=14.09 cfs 1.010 af Outflow=14.21 cfs 1.186 af

Pond CB-1: CB-1 Peak Elev=101.38' Inflow=1.67 cfs 0.141 af
12.0" Round Culvert n=0.012 L=120.0' S=0.0125 '/' Outflow=1.67 cfs 0.141 af

Pond CB-2: CB-2 Peak Elev=101.27' Inflow=4.62 cfs 0.390 af
12.0" Round Culvert n=0.012 L=100.0' S=0.0050 '/' Outflow=4.62 cfs 0.390 af

Pond CB-3: CB-3 Peak Elev=100.06' Inflow=5.02 cfs 0.424 af
12.0" Round Culvert n=0.012 L=105.0' S=0.0124 '/' Outflow=5.02 cfs 0.424 af

Pond CB-4: CB-4 Peak Elev=98.36' Inflow=7.19 cfs 0.607 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0050 '/' Outflow=7.19 cfs 0.607 af

Pond CB-5: CB-5 Peak Elev=96.53' Inflow=1.85 cfs 0.151 af
12.0" Round Culvert n=0.012 L=80.0' S=0.0056 '/' Outflow=1.85 cfs 0.151 af

Pond CB-6: CB-6 Peak Elev=98.00' Inflow=1.31 cfs 0.107 af
12.0" Round Culvert n=0.012 L=160.0' S=0.0100 '/' Outflow=1.31 cfs 0.107 af

Pond CB-8: Peak Elev=98.21' Inflow=1.16 cfs 0.098 af
12.0" Round Culvert n=0.012 L=55.0' S=0.0100 '/' Outflow=1.16 cfs 0.098 af

Link POI-1: H-31-0-0 Inflow=4.82 cfs 0.609 af
Primary=4.82 cfs 0.609 af

Link POI-2: H-34-0-0 Inflow=13.01 cfs 1.426 af
Primary=13.01 cfs 1.426 af

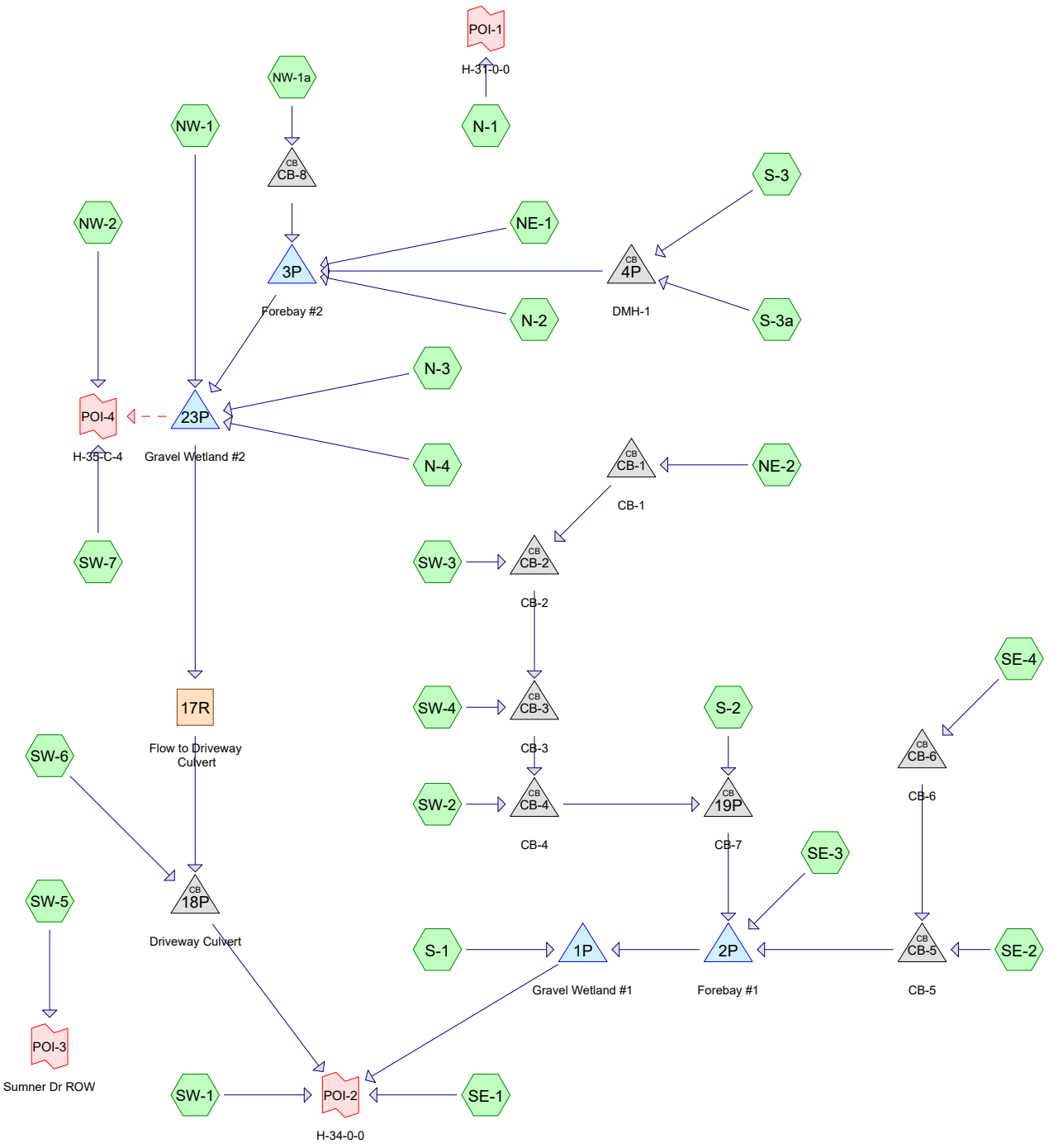
Link POI-3: Sumner Dr ROW Inflow=1.69 cfs 0.165 af
Primary=1.69 cfs 0.165 af

Link POI-4: H-35-C-4 Inflow=15.09 cfs 1.092 af
Primary=15.09 cfs 1.092 af

Total Runoff Area = 6.384 ac Runoff Volume = 3.709 af Average Runoff Depth = 6.97"
42.66% Pervious = 2.723 ac 57.34% Impervious = 3.661 ac

Appendix I.2.v

Post-Development Drainage Analysis – 10-Year Storm Calculations



Routing Diagram for 1250 - Post-Development
Prepared by CMA Engineers, Printed 3/7/2023
HydroCAD® 10.20-2g s/n 10642 © 2022 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.070	39	>75% Grass cover, Good, HSG A (N-1)
1.269	80	>75% Grass cover, Good, HSG D (N-2, NE-1, NE-2, NW-1, S-1, SE-1, SE-2, SE-3, SE-4, SW-1, SW-6, SW-7)
2.584	98	Paved parking, HSG D (N-2, NE-1, NE-2, NW-1a, S-2, SE-2, SE-3, SE-4, SW-2, SW-3, SW-4, SW-5)
1.077	98	Roofs, HSG D (N-3, N-4, S-3, S-3a)
1.384	77	Woods, Good, HSG D (N-1, NW-1, NW-2, SW-1)
6.384	**89**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.070	HSG A	N-1
0.000	HSG B	
0.000	HSG C	
6.314	HSG D	N-1, N-2, N-3, N-4, NE-1, NE-2, NW-1, NW-1a, NW-2, S-1, S-2, S-3, S-3a, SE-1, SE-2, SE-3, SE-4, SW-1, SW-2, SW-3, SW-4, SW-5, SW-6, SW-7
0.000	Other	
6.384		**TOTAL AREA**

Summary for Subcatchment N-1:

Runoff = 2.58 cfs @ 12.42 hrs, Volume= 0.326 af, Depth= 2.82"
Routed to Link POI-1 : H-31-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
57,401	77	Woods, Good, HSG D
3,045	39	>75% Grass cover, Good, HSG A
60,446	75	Weighted Average
60,446		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	63	0.0323	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
7.3	37	0.0050	0.09		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"
10.0	321	0.0059	0.54		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.3	27	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.1	448	Total			

Summary for Subcatchment N-2:

Runoff = 1.70 cfs @ 12.09 hrs, Volume= 0.126 af, Depth= 3.89"
Routed to Pond 3P : Forebay #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
11,527	80	>75% Grass cover, Good, HSG D
5,403	98	Paved parking, HSG D
16,930	86	Weighted Average
11,527		68.09% Pervious Area
5,403		31.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment N-3:

Runoff = 1.72 cfs @ 12.09 hrs, Volume= 0.143 af, Depth= 5.21"
Routed to Pond 23P : Gravel Wetland #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
14,358	98	Roofs, HSG D
14,358		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment N-4:

Runoff = 1.72 cfs @ 12.09 hrs, Volume= 0.143 af, Depth= 5.21"
Routed to Pond 23P : Gravel Wetland #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
14,358	98	Roofs, HSG D
14,358		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment NE-1:

Runoff = 2.11 cfs @ 12.09 hrs, Volume= 0.173 af, Depth= 5.10"
Routed to Pond 3P : Forebay #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
16,541	98	Paved parking, HSG D
1,202	80	>75% Grass cover, Good, HSG D
17,743	97	Weighted Average
1,202		6.77% Pervious Area
16,541		93.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment NE-2:

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 0.092 af, Depth= 5.21"
Routed to Pond CB-1 : CB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
9,032	98	Paved parking, HSG D
183	80	>75% Grass cover, Good, HSG D
9,215	98	Weighted Average
183		1.99% Pervious Area
9,032		98.01% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment NW-1:

Runoff = 0.97 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 3.29"
Routed to Pond 23P : Gravel Wetland #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
10,372	80	>75% Grass cover, Good, HSG D
802	77	Woods, Good, HSG D
11,174	80	Weighted Average
11,174		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment NW-1a:

Runoff = 0.76 cfs @ 12.09 hrs, Volume= 0.064 af, Depth= 5.21"
Routed to Pond CB-8 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
6,389	98	Paved parking, HSG D
6,389		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment NW-2:

Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.004 af, Depth= 3.00"
Routed to Link POI-4 : H-35-C-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
710	77	Woods, Good, HSG D
710		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment S-1:

Runoff = 1.34 cfs @ 12.09 hrs, Volume= 0.098 af, Depth= 3.29"
Routed to Pond 1P : Gravel Wetland #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
15,528	80	>75% Grass cover, Good, HSG D
15,528		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment S-2:

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 5.21"
Routed to Pond 19P : CB-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
5,590	98	Paved parking, HSG D
5,590		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment S-3:

Runoff = 1.14 cfs @ 12.09 hrs, Volume= 0.095 af, Depth= 5.21"
Routed to Pond 4P : DMH-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
9,518	98	Roofs, HSG D
9,518		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment S-3a:

Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.086 af, Depth= 5.21"
Routed to Pond 4P : DMH-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
8,662	98	Roofs, HSG D
8,662		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SE-1:

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 3.29"
Routed to Link POI-2 : H-34-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
2,031	80	>75% Grass cover, Good, HSG D
2,031		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SE-2:

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.028 af, Depth= 4.98"
Routed to Pond CB-5 : CB-5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
2,653	98	Paved parking, HSG D
307	80	>75% Grass cover, Good, HSG D
2,960	96	Weighted Average
307		10.37% Pervious Area
2,653		89.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SE-3:

Runoff = 2.43 cfs @ 12.09 hrs, Volume= 0.202 af, Depth= 5.21"
Routed to Pond 2P : Forebay #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
19,876	98	Paved parking, HSG D
399	80	>75% Grass cover, Good, HSG D
20,275	98	Weighted Average
399		1.97% Pervious Area
19,876		98.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SE-4:

Runoff = 0.85 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 4.87"
Routed to Pond CB-6 : CB-6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
5,931	98	Paved parking, HSG D
1,374	80	>75% Grass cover, Good, HSG D
7,305	95	Weighted Average
1,374		18.81% Pervious Area
5,931		81.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, Calc'd Tc < 6 min**

Summary for Subcatchment SW-1:

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 3.19"
Routed to Link POI-2 : H-34-0-0

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
1,512	80	>75% Grass cover, Good, HSG D
1,394	77	Woods, Good, HSG D
2,906	79	Weighted Average
2,906		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	25	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.61"
1.9	80	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.2	105	Total			

Summary for Subcatchment SW-2:

Runoff = 1.43 cfs @ 12.09 hrs, Volume= 0.119 af, Depth= 5.21"
Routed to Pond CB-4 : CB-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
11,972	98	Paved parking, HSG D
11,972		100.00% Impervious Area

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

Summary for Subcatchment SW-3:

Runoff = 1.94 cfs @ 12.09 hrs, Volume= 0.162 af, Depth= 5.21"
Routed to Pond CB-2 : CB-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
16,216	98	Paved parking, HSG D
16,216		100.00% Impervious Area

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

Summary for Subcatchment SW-4:

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.022 af, Depth= 5.21"
Routed to Pond CB-3 : CB-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
2,212	98	Paved parking, HSG D
2,212		100.00% Impervious Area

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

Summary for Subcatchment SW-5:

Runoff = 1.12 cfs @ 12.15 hrs, Volume= 0.107 af, Depth= 5.21"
Routed to Link POI-3 : Sumner Dr ROW

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
10,758	98	Paved parking, HSG D
10,758		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.2	100	0.0200	0.18		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"
1.7	100	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
10.9	200	Total			

Summary for Subcatchment SW-6:

Runoff = 0.36 cfs @ 12.10 hrs, Volume= 0.026 af, Depth= 3.29"
Routed to Pond 18P : Driveway Culvert

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
4,177	80	>75% Grass cover, Good, HSG D
4,177		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0500	0.26		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"

Summary for Subcatchment SW-7:

Runoff = 0.54 cfs @ 12.12 hrs, Volume= 0.042 af, Depth= 3.29"
Routed to Link POI-4 : H-35-C-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.45"

Area (sf)	CN	Description
6,660	80	>75% Grass cover, Good, HSG D
6,660		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0300	0.21		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.61"
0.3	20	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.1	120	Total			

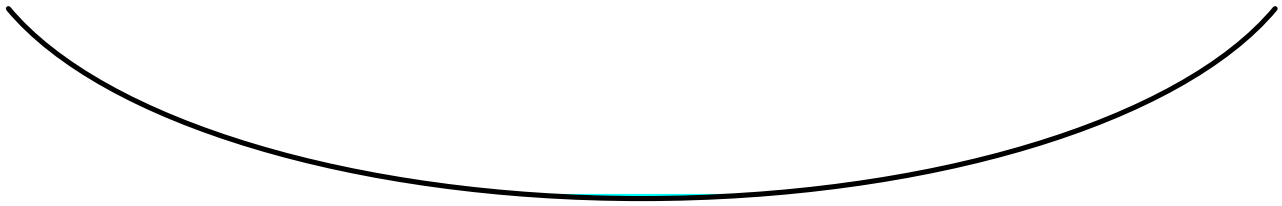
Summary for Reach 17R: Flow to Driveway Culvert

Inflow Area = 2.276 ac, 75.89% Impervious, Inflow Depth > 0.86" for 10-YR event
Inflow = 0.11 cfs @ 12.15 hrs, Volume= 0.163 af
Outflow = 0.11 cfs @ 12.16 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.6 min
Routed to Pond 18P : Driveway Culvert

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.78 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 1.0 min

Peak Storage= 6 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.04' , Surface Width= 4.49'
Bank-Full Depth= 2.00' Flow Area= 40.0 sf, Capacity= 375.01 cfs

30.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 45.0' Slope= 0.0133 '/'
Inlet Invert= 94.10', Outlet Invert= 93.50'



‡

Summary for Pond 1P: Gravel Wetland #1

Inflow Area = 2.095 ac, 80.51% Impervious, Inflow Depth = 4.73" for 10-YR event
Inflow = 10.29 cfs @ 12.10 hrs, Volume= 0.826 af
Outflow = 6.38 cfs @ 12.20 hrs, Volume= 0.686 af, Atten= 38%, Lag= 6.6 min
Primary = 6.38 cfs @ 12.20 hrs, Volume= 0.686 af
Routed to Link POI-2 : H-34-0-0

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 95.10' @ 12.20 hrs Surf.Area= 7,112 sf Storage= 13,988 cf
Flood Elev= 95.50' Surf.Area= 7,794 sf Storage= 16,960 cf

Plug-Flow detention time= 252.6 min calculated for 0.685 af (83% of inflow)
Center-of-Mass det. time= 185.0 min (957.1 - 772.1)

Volume	Invert	Avail.Storage	Storage Description
#1	90.58'	8,847 cf	**Cell #1 (Prismatic)** Listed below (Recalc)
#2	90.58'	12,010 cf	**Cell #2 (Prismatic)** Listed below (Recalc)
		20,857 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
90.58	1,925	0.0	0	0
92.58	1,925	40.0	1,540	1,540
92.83	1,925	30.0	144	1,684
93.49	1,925	20.0	254	1,938
93.50	1,925	100.0	19	1,958
94.00	2,252	100.0	1,044	3,002
95.00	2,956	100.0	2,604	5,606
95.50	3,336	100.0	1,573	7,179
96.00	3,336	100.0	1,668	8,847

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
90.58	2,658	0.0	0	0
92.58	2,658	40.0	2,126	2,126
92.83	2,658	30.0	199	2,326
93.49	2,658	20.0	351	2,677
93.50	2,658	100.0	27	2,703
94.00	3,082	100.0	1,435	4,138
95.00	3,983	100.0	3,533	7,671
95.50	4,458	100.0	2,110	9,781
96.00	4,458	100.0	2,229	12,010

Device	Routing	Invert	Outlet Devices
#1	Primary	95.00'	**9.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Primary	93.00'	**15.0" Round Culvert** L= 18.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.00' / 92.90' S= 0.0056 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	94.65'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	93.00'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.35 cfs @ 12.20 hrs HW=95.10' TW=0.00' (Dynamic Tailwater)
- **1=Broad-Crested Rectangular Weir** (Weir Controls 0.69 cfs @ 0.77 fps)
- **2=Culvert** (Inlet Controls 5.66 cfs @ 4.62 fps)
  - **3=Orifice/Grate** (Passes < 15.76 cfs potential flow)
  - **4=Orifice/Grate** (Passes < 0.23 cfs potential flow)

Summary for Pond 2P: Forebay #1

[80] Warning: Exceeded Pond 19P by 0.90' @ 24.50 hrs (2.42 cfs 0.367 af)

Inflow Area = 1.739 ac, 97.01% Impervious, Inflow Depth = 5.17" for 10-YR event
Inflow = 9.04 cfs @ 12.09 hrs, Volume= 0.749 af
Outflow = 8.94 cfs @ 12.10 hrs, Volume= 0.729 af, Atten= 1%, Lag= 0.6 min
Primary = 8.94 cfs @ 12.10 hrs, Volume= 0.729 af
Routed to Pond 1P : Gravel Wetland #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 95.29' @ 12.11 hrs Surf.Area= 985 sf Storage= 1,373 cf
Flood Elev= 97.32' Surf.Area= 1,070 sf Storage= 1,592 cf

Plug-Flow detention time= 34.5 min calculated for 0.729 af (97% of inflow)
Center-of-Mass det. time= 17.0 min (765.9 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	1,592 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	275	0	0
94.00	534	405	405
95.00	871	703	1,107
95.50	1,070	485	1,592

Device	Routing	Invert	Outlet Devices
#1	Primary	94.75'	**9.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=8.13 cfs @ 12.10 hrs HW=95.28' TW=94.97' (Dynamic Tailwater)
1=Broad-Crested Rectangular Weir (Weir Controls 8.13 cfs @ 1.70 fps)

Summary for Pond 3P: Forebay #2

[80] Warning: Exceeded Pond 4P by 0.94' @ 24.45 hrs (1.88 cfs 0.259 af)
[80] Warning: Exceeded Pond CB-8 by 0.26' @ 24.35 hrs (0.19 cfs 0.015 af)

Inflow Area = 1.360 ac, 78.51% Impervious, Inflow Depth = 4.80" for 10-YR event
Inflow = 6.75 cfs @ 12.09 hrs, Volume= 0.544 af
Outflow = 4.54 cfs @ 12.13 hrs, Volume= 0.437 af, Atten= 33%, Lag= 2.8 min
Primary = 4.54 cfs @ 12.13 hrs, Volume= 0.437 af
Routed to Pond 23P : Gravel Wetland #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 97.95' @ 12.18 hrs Surf.Area= 5,640 sf Storage= 7,014 cf

Plug-Flow detention time= 148.7 min calculated for 0.436 af (80% of inflow)
Center-of-Mass det. time= 73.7 min (835.3 - 761.6)

Volume	Invert	Avail.Storage	Storage Description
#1	96.00'	10,419 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.00	1,604	0	0
97.00	3,609	2,607	2,607
97.50	4,655	2,066	4,673
98.00	5,737	2,598	7,271
98.50	6,857	3,149	10,419

Device	Routing	Invert	Outlet Devices
#1	Primary	97.50'	**9.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.86 cfs @ 12.13 hrs HW=97.93' TW=97.86' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 3.86 cfs @ 0.99 fps)

Summary for Pond 4P: DMH-1

Inflow Area = 0.417 ac,100.00% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 2.17 cfs @ 12.09 hrs, Volume= 0.181 af
Outflow = 2.17 cfs @ 12.09 hrs, Volume= 0.181 af, Atten= 0%, Lag= 0.0 min
Primary = 2.17 cfs @ 12.09 hrs, Volume= 0.181 af
Routed to Pond 3P : Forebay #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 98.53' @ 12.10 hrs
Flood Elev= 100.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.57'	**12.0" Round Culvert** L= 130.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 96.57' / 96.00' S= 0.0044 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.01 cfs @ 12.09 hrs HW=98.49' TW=97.88' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 2.01 cfs @ 2.55 fps)

Summary for Pond 18P: Driveway Culvert

[63] Warning: Exceeded Reach 17R INLET depth by 0.09' @ 12.10 hrs

Inflow Area = 2.372 ac, 72.82% Impervious, Inflow Depth > 0.96" for 10-YR event
Inflow = 0.46 cfs @ 12.10 hrs, Volume= 0.189 af
Outflow = 0.46 cfs @ 12.10 hrs, Volume= 0.189 af, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.10 hrs, Volume= 0.189 af
Routed to Link POI-2 : H-34-0-0

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 94.24' @ 12.10 hrs
Flood Elev= 95.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	93.90'	**12.0" Round Culvert** L= 97.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 93.90' / 93.00' S= 0.0093 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.46 cfs @ 12.10 hrs HW=94.24' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.46 cfs @ 1.98 fps)

Summary for Pond 19P: CB-7

[80] Warning: Exceeded Pond CB-4 by 0.60' @ 24.45 hrs (1.18 cfs 0.127 af)

Inflow Area = 1.038 ac, 99.60% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 5.41 cfs @ 12.09 hrs, Volume= 0.451 af
Outflow = 5.41 cfs @ 12.09 hrs, Volume= 0.451 af, Atten= 0%, Lag= 0.0 min
Primary = 5.41 cfs @ 12.09 hrs, Volume= 0.451 af
Routed to Pond 2P : Forebay #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 96.01' @ 12.10 hrs
Flood Elev= 97.32'

Device	Routing	Invert	Outlet Devices
#1	Primary	93.85'	**18.0" Round Culvert** L= 193.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.85' / 93.20' S= 0.0034 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.98 cfs @ 12.09 hrs HW=95.94' TW=95.27' (Dynamic Tailwater)
1=Culvert (Outlet Controls 4.98 cfs @ 2.82 fps)

Summary for Pond 23P: Gravel Wetland #2

Inflow Area = 2.276 ac, 75.89% Impervious, Inflow Depth = 4.18" for 10-YR event
Inflow = 8.85 cfs @ 12.10 hrs, Volume= 0.793 af
Outflow = 8.25 cfs @ 12.15 hrs, Volume= 0.665 af, Atten= 7%, Lag= 3.2 min
Primary = 0.11 cfs @ 12.15 hrs, Volume= 0.163 af
Routed to Reach 17R : Flow to Driveway Culvert
Secondary = 8.15 cfs @ 12.15 hrs, Volume= 0.502 af
Routed to Link POI-4 : H-35-C-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 97.86' @ 12.15 hrs Surf.Area= 4,610 sf Storage= 9,079 cf
Flood Elev= 98.50' Surf.Area= 6,302 sf Storage= 12,498 cf

Plug-Flow detention time= 171.4 min calculated for 0.665 af (84% of inflow)

Center-of-Mass det. time= 103.3 min (905.1 - 801.8)

Volume	Invert	Avail.Storage	Storage Description
#1	92.32'	5,891 cf	**Cell #1 (Prismatic)** Listed below (Recalc)
#2	92.32'	6,607 cf	**Cell #2 (Prismatic)** Listed below (Recalc)
		12,498 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.32	713	0.0	0	0
92.33	713	40.0	3	3
94.33	713	40.0	570	573
94.58	713	30.0	53	627
95.24	713	20.0	94	721
95.25	713	100.0	7	728
96.00	1,065	100.0	667	1,395
97.00	1,597	100.0	1,331	2,726
98.00	2,199	100.0	1,898	4,624
98.50	2,872	100.0	1,268	5,891

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
92.32	685	0.0	0	0
92.33	685	40.0	3	3
94.33	685	40.0	548	551
94.58	685	30.0	51	602
95.24	685	20.0	90	693
95.25	685	100.0	7	699
96.00	1,151	100.0	689	1,388
97.00	1,838	100.0	1,495	2,882
98.00	2,597	100.0	2,218	5,100
98.50	3,430	100.0	1,507	6,607

Device	Routing	Invert	Outlet Devices
#1	Secondary	97.50'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	94.60'	**15.0" Round Culvert** L= 155.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.60' / 94.10' S= 0.0032 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	98.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	94.60'	**1.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.11 cfs @ 12.15 hrs HW=97.86' TW=94.14' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.11 cfs of 6.65 cfs potential flow)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 8.61 fps)

Secondary OutFlow Max=8.14 cfs @ 12.15 hrs HW=97.86' TW=0.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 8.14 cfs @ 1.50 fps)

Summary for Pond CB-1: CB-1

Inflow Area = 0.212 ac, 98.01% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 1.10 cfs @ 12.09 hrs, Volume= 0.092 af
Outflow = 1.10 cfs @ 12.09 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min
Primary = 1.10 cfs @ 12.09 hrs, Volume= 0.092 af
Routed to Pond CB-2 : CB-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 98.32' @ 12.11 hrs
Flood Elev= 100.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	97.75'	**12.0" Round Culvert** L= 120.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 97.75' / 96.25' S= 0.0125 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.92 cfs @ 12.09 hrs HW=98.30' TW=97.58' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.92 cfs @ 2.97 fps)

Summary for Pond CB-2: CB-2

Inflow Area = 0.584 ac, 99.28% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 3.04 cfs @ 12.09 hrs, Volume= 0.254 af
Outflow = 3.04 cfs @ 12.09 hrs, Volume= 0.254 af, Atten= 0%, Lag= 0.0 min
Primary = 3.04 cfs @ 12.09 hrs, Volume= 0.254 af
Routed to Pond CB-3 : CB-3

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 97.78' @ 12.14 hrs
Flood Elev= 99.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	96.15'	**12.0" Round Culvert** L= 100.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 96.15' / 95.65' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=2.25 cfs @ 12.09 hrs HW=97.58' TW=97.05' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 2.25 cfs @ 2.86 fps)

Summary for Pond CB-3: CB-3

Inflow Area = 0.635 ac, 99.34% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 3.31 cfs @ 12.09 hrs, Volume= 0.276 af
Outflow = 3.31 cfs @ 12.09 hrs, Volume= 0.276 af, Atten= 0%, Lag= 0.0 min
Primary = 3.31 cfs @ 12.09 hrs, Volume= 0.276 af
Routed to Pond CB-4 : CB-4

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 97.21' @ 12.12 hrs
Flood Elev= 98.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	95.55'	**12.0" Round Culvert** L= 105.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 95.55' / 94.25' S= 0.0124 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=2.64 cfs @ 12.09 hrs HW=97.05' TW=96.29' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.64 cfs @ 3.36 fps)

Summary for Pond CB-4: CB-4

Inflow Area = 0.909 ac, 99.54% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 4.74 cfs @ 12.09 hrs, Volume= 0.395 af
Outflow = 4.74 cfs @ 12.09 hrs, Volume= 0.395 af, Atten= 0%, Lag= 0.0 min
Primary = 4.74 cfs @ 12.09 hrs, Volume= 0.395 af
Routed to Pond 19P : CB-7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 96.45' @ 12.13 hrs
Flood Elev= 96.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	94.15'	**15.0" Round Culvert** L= 40.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 94.15' / 93.95' S= 0.0050 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf

Primary OutFlow Max=3.49 cfs @ 12.09 hrs HW=96.29' TW=95.94' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.49 cfs @ 2.85 fps)

Summary for Pond CB-5: CB-5

Inflow Area = 0.236 ac, 83.62% Impervious, Inflow Depth = 4.90" for 10-YR event
Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.096 af
Outflow = 1.20 cfs @ 12.09 hrs, Volume= 0.096 af, Atten= 0%, Lag= 0.0 min
Primary = 1.20 cfs @ 12.09 hrs, Volume= 0.096 af
Routed to Pond 2P : Forebay #1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 96.34' @ 12.09 hrs
Flood Elev= 99.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	95.70'	**12.0" Round Culvert** L= 80.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 95.70' / 95.25' S= 0.0056 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.09 hrs HW=96.33' TW=95.27' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 1.17 cfs @ 3.22 fps)

Summary for Pond CB-6: CB-6

Inflow Area = 0.168 ac, 81.19% Impervious, Inflow Depth = 4.87" for 10-YR event
Inflow = 0.85 cfs @ 12.09 hrs, Volume= 0.068 af
Outflow = 0.85 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.09 hrs, Volume= 0.068 af
Routed to Pond CB-5 : CB-5

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 97.87' @ 12.09 hrs
Flood Elev= 100.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	97.40'	**12.0" Round Culvert** L= 160.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 97.40' / 95.80' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.83 cfs @ 12.09 hrs HW=97.87' TW=96.33' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.83 cfs @ 2.32 fps)

Summary for Pond CB-8:

Inflow Area = 0.147 ac,100.00% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 0.76 cfs @ 12.09 hrs, Volume= 0.064 af
Outflow = 0.76 cfs @ 12.09 hrs, Volume= 0.064 af, Atten= 0%, Lag= 0.0 min
Primary = 0.76 cfs @ 12.09 hrs, Volume= 0.064 af
Routed to Pond 3P : Forebay #2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 98.00' @ 12.19 hrs
Flood Elev= 100.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	97.25'	**12.0" Round Culvert** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 97.25' / 96.70' S= 0.0100 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.55 cfs @ 12.09 hrs HW=97.97' TW=97.88' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.55 cfs @ 1.29 fps)

Summary for Link POI-1: H-31-0-0

Inflow Area = 1.388 ac, 0.00% Impervious, Inflow Depth = 2.82" for 10-YR event
Inflow = 2.58 cfs @ 12.42 hrs, Volume= 0.326 af
Primary = 2.58 cfs @ 12.42 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POI-2: H-34-0-0

Inflow Area = 4.580 ac, 74.53% Impervious, Inflow Depth > 2.37" for 10-YR event
Inflow = 6.97 cfs @ 12.19 hrs, Volume= 0.905 af
Primary = 6.97 cfs @ 12.19 hrs, Volume= 0.905 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POI-3: Sumner Dr ROW

Inflow Area = 0.247 ac,100.00% Impervious, Inflow Depth = 5.21" for 10-YR event
Inflow = 1.12 cfs @ 12.15 hrs, Volume= 0.107 af
Primary = 1.12 cfs @ 12.15 hrs, Volume= 0.107 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Link POI-4: H-35-C-4

Inflow Area = 0.169 ac, 0.00% Impervious, Inflow Depth = 38.90" for 10-YR event
Inflow = 8.70 cfs @ 12.15 hrs, Volume= 0.548 af
Primary = 8.70 cfs @ 12.15 hrs, Volume= 0.548 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Appendix J

Reduced-Size Design Drawings (8.5x11)

Appendix K

Tax Maps and Zoning Maps

CITY OF DOVER
STAFFORD COUNTY NH
TAX ASSESSORS MAP

Map Page: H-2

SITE

- Parcels
- Parcel on Adjacent Maps
- Buildings
- Rail Road
- Water Body
- Swamp/Marsh
- Streams
- A-20-0-0 Parcel Number
- 0.24 AC Parcel Acreage
- 240 Address Number

400 200 0 400 Feet

1:2,400
1 " = 200 '

This map is for assessment and planning purposes only. It is not intended to be used for description, conveyance, authoritative definition of any legal boundary, or property title. This is not a survey product. Users are encouraged to examine the documentation associated with the data on which this map is based for information related to its accuracy, currentness and limitations.

Map Generated: Thursday, July 5, 2018

AppGeo

Dover Zoning Map



Property Information

Property ID	H0035-C00004
Location	42 SUMNER DR
Owner	COOPERATIVE ALLIANCE FOR
Land Use	910
Zoning Code	CM

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

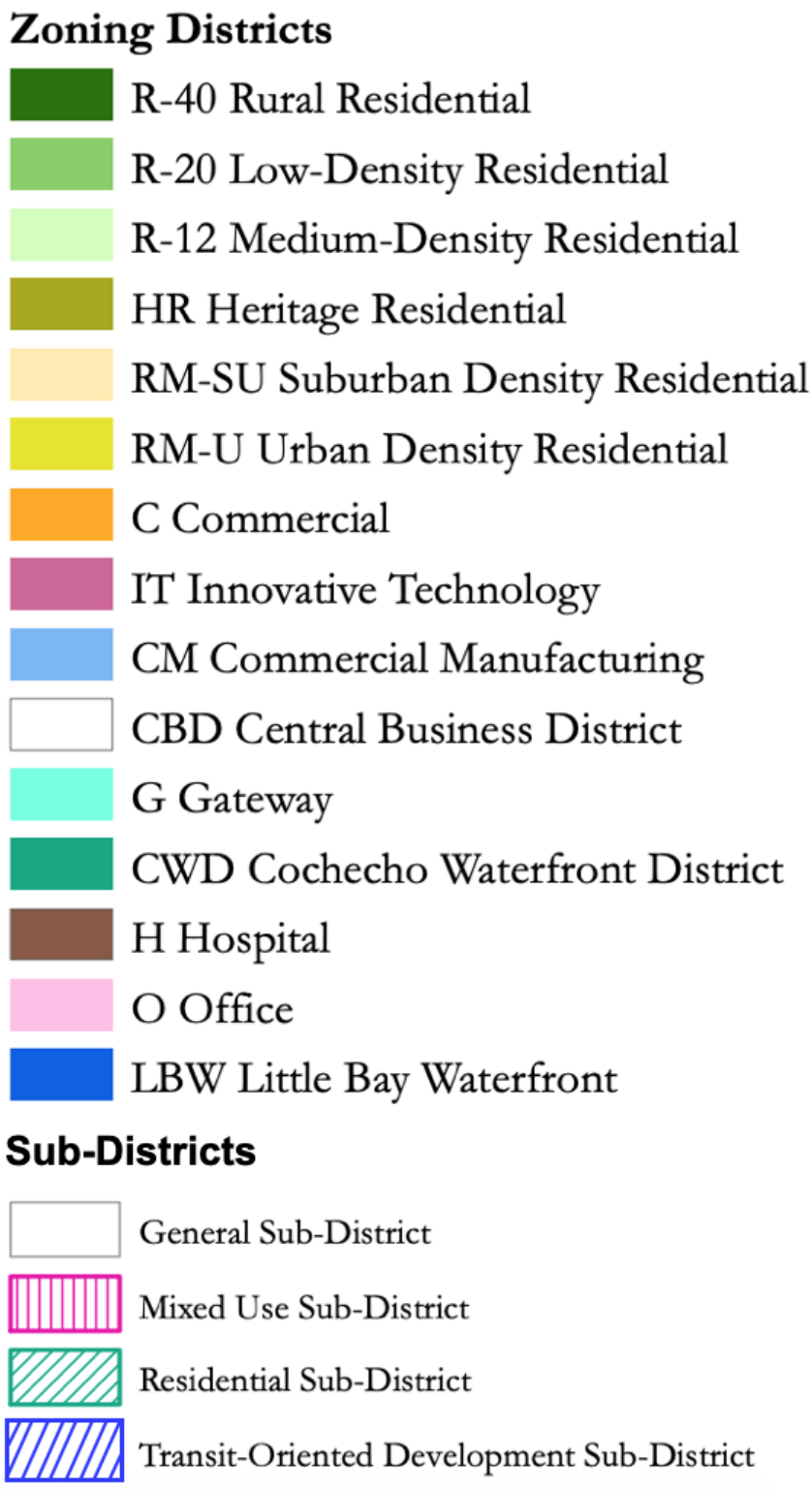
City of Dover, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 12/16/2022
Data updated Daily

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

Map Theme Legends

Zoning



Appendix L

Inspection and Maintenance Plan

INSPECTION AND MAINTENANCE (I&M) MANUAL FOR STORMWATER BEST MANAGEMENT PRACTICES

Cooperative Alliance for Seacoast Transportation - Operations and Maintenance Facility (Tax Map H, Block 35, Lot C-4

42 Sumner Drive, Dover, New Hampshire

The purpose of the I&M Manual is to assist the responsible parties in inspecting, maintaining and understanding the functions of the stormwater best management practices (BMPs).

Inspections records shall be maintained by the responsibility party(ies) indicated below and made available to the New Hampshire Department of Environmental Services upon request.

Inspections are to completed on an ANNUAL basis.

Establishment and maintenance of 85% vegetative cover over the solar area is a required condition of the site's NHDES-Alteration of Terrain Permit.

All mowing on the site shall occur after October 15 and before April 15 in order to limit impacts to turtles, snakes, and grassland birds.

No chemical herbicides or pesticides shall be used on site.

Permanent species placards for identifying the state listed Eastern hognose snake and Northern black racer shall be installed on the property. It is also strongly recommended that placards for wood turtles (state species of special concern) are also installed.

Party Responsible for Long Term Reporting, Inspection and Maintenance (After Construction Completion):
COAST, Contact: Rad Nichols
42 Sumner Drive
Dover, NH 03820
(603) 516-0782
rnichols@coastbug.org

The BMPS for this project are:

1. **Sediment Forebays**
2. **Gravel Wetlands**

See location map in following pages.

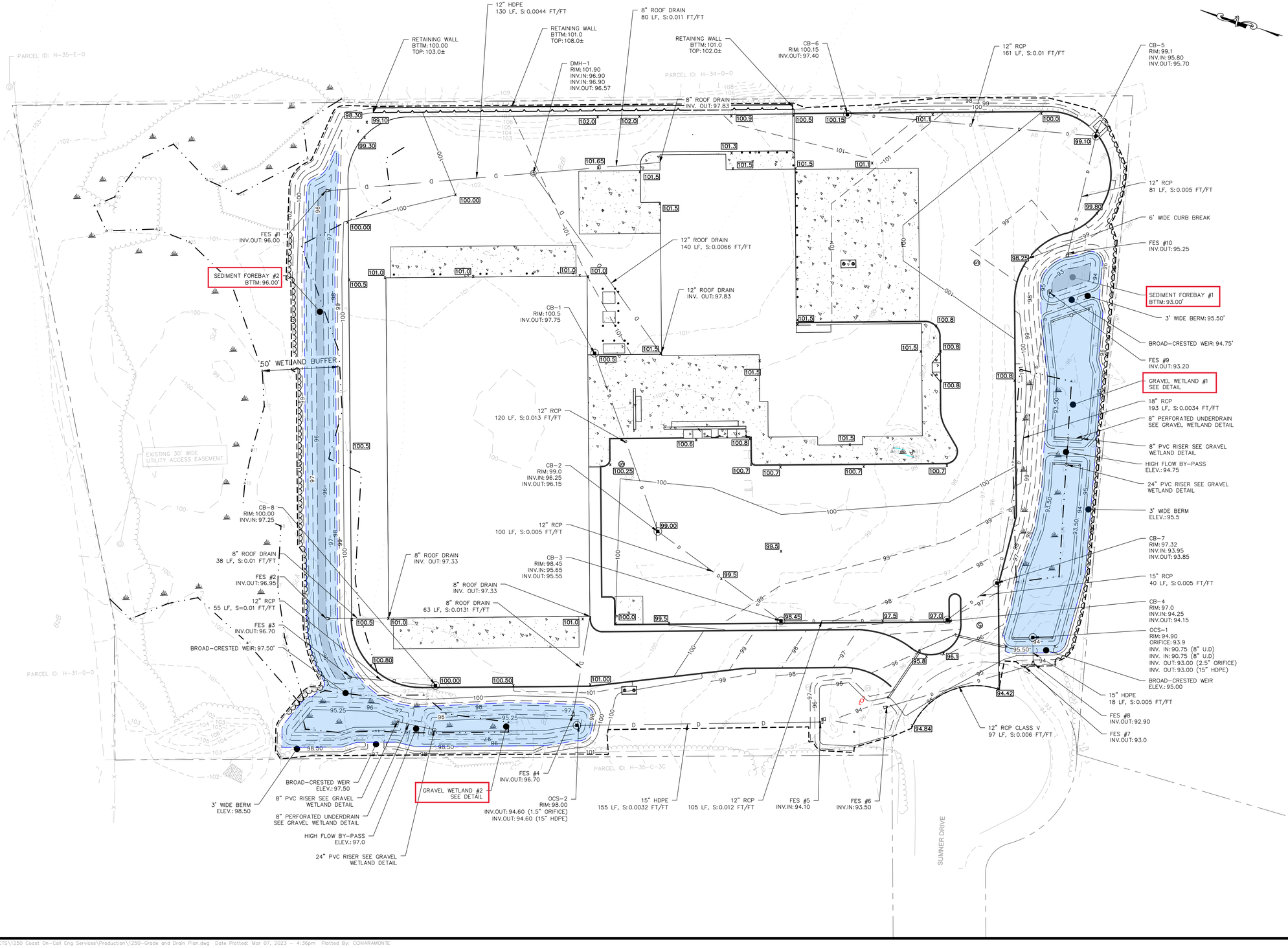
Site Stormwater Features Inspection Checklist

Inspection/Maintenance Item	Comments	Check if follow up maintenance performed	Maintenance Date
Vegetation mowed?			
Woody vegetation present?			
Strong Stand of Vegetation (Greater than 85%)?			
Stormwater swales clear of debris and excessive vegetation			
General condition of swales and stormwater ponds			
Invasive Species Require Removal?			
Estimated quantity of sediment in ponds			
Quantity of standing water present in ponds?			
If the infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional shall assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration basin bottom.			
Sideslopes stable or signs of erosion present?			
Other comments			

Inspection and Maintenance Log

Maintain this summary of inspections performed over time.

Date	Inspection (Yes or No)	Maintenance (Yes or No)	List BMPs inspected and/or Provide Maintenance Comments



no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

designed by: CFC
drawn by: CFC
approved by: PAC
date: March 9, 2023
project no: 1250
checked by: PAC
scale: 30 0 60
Scale: 1" = 30'

Cooperative Alliance for Seacoast Transportation, Dover, NH

Operations and Maintenance Facility
42 Sumner Drive

Grading & Drainage Plan

drawing no. C-4

sheet: 9 of 22

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Grade and Drain Plan.dwg Date Plotted: Mar 07, 2023 - 4:36pm Plotted By: CCHIARAMONTE

Regular Inspection and Maintenance Guidance for The Subsurface Gravel Wetland Stormwater Management Device

Regular inspection and maintenance is critical to the effective operation of Subsurface Gravel Wetland (SGW) systems. It is the responsibility of the owner to maintain the SGW in accordance with the minimum design standards. This page provides guidance on maintenance activities that are typically required for these systems, along with the suggested frequency for each activity. Individual systems may have more, or less, frequent maintenance needs, depending on a variety of factors including but not limited to: the occurrence of large storm events, overly wet or dry periods, regional hydrologic conditions, and the upstream land use.

ACTIVITIES

The most common maintenance activity is the removal of sediment and organic debris from the system and bypass structures. Visual inspections are routine for system maintenance. This includes looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress, and debris and sediment accumulation in the system. Vegetation coverage is integral to the performance of the system. A SGW system is a subsurface horizontal filtration system and does not rely on surface soil infiltration capacity for treatment. As such, surface infiltration rates are expected to be low and not a criterion for cleaning. Rather, stormwater access to subsurface treatment is by way of a hydraulic inlet. It is important to ensure these inlets are performing properly.

ACTIVITY	FREQUENCY
CLOGGING AND SYSTEM PERFORMANCE	
Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning. **Remedy:** Repair or replace any damaged structural parts, inlets and outlets. Clear or remove debris or restrictions.	Annually, more frequently in the first year of operation
Check for internal erosion, evidence of short circuiting, and animal burrows. **Remedy:** Soil erosion from short-circuiting or animal boroughs should be repaired when they occur.	
Check that the system is fully draining within a 24 - 48 hour period after rain events **Remedy:** Repair or restore hydraulic inlet or outlet function.	
VEGETATION	
Check for robust vegetation coverage throughout the system and dead or dying plants. **Remedy:** Vegetation should cover > 75% of the system and should be reseeded and cared for as needed.	Annually or as needed
Cut and remove vegetation from the Gravel Wetland System and forebay in order to maintain nitrogen removal performance. **Remedy:** The vegetation should be cut and removed from the system to prevent nitrogen from cycling back into the system.	Once every 3 years

CHECKLIST FOR INSPECTION OF SUBSURFACE GRAVEL WETLAND SYSTEMS

Location:
Inspector:
Date:
Time:
Site Conditions:
Days Since Last Rain Event:

Inspection Items	Satisfactory (S) or Unsatisfactory (U)	Comments/Corrective Action
1. Initial Inspection After Planting		
Plants are stable, roots not exposed	**S U**	
Surface is at design level, no evidence of preferential flow/shoving	**S U**	
Inlet and outlet/bypass are functional	**S U**	
2. Operation (1 time/year minimum, Spring/Fall)		
Flow is unobstructed in openings (grates, orifices, etc)	**S U**	
Structures are operational with no evidence of deterioration	**S U**	
3. Standing Water (1 time/year minimum)		
No evidence of standing water after 24-48 hours since rainfall	**S U**	
4. Vegetation Condition and Coverage		
Vegetation condition good with good coverage (typically > 75%)	**S U**	
5. Vegetation removal (once every 3 years)		
Prune dead, diseased, or decaying plants	**S U**	
6. Other Issues		
Note any additional issues not previously covered.	**S U**	

Corrective Action Needed	Due Date
1.	
2.	
3.	
Inspector Signature	**Date**

CONTROL OF INVASIVE PLANTS

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

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

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

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

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 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.



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.

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.

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.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td>oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td>Fruits, Seeds, Plant Fragments
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td></td><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard *(Alliaria petiolata)* spotted knapweed *(Centaurea maculosa)* ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort *(Cynanchum nigrum)* ▪ May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort *(Cynanchum rossicum)* giant hogweed *(Heracleum mantegazzianum)* ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket *(Hesperis matronalis)* perennial pepperweed *(Lepidium latifolium)* purple loosestrife *(Lythrum salicaria)* Japanese stilt grass *(Microstegium vimineum)* mile-a-minute weed *(Polygonum perfoliatum)*	**Fruits and Seeds**	**Prior to flowering** Depends on scale of infestation Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. **During and following flowering** Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**Fruits, Seeds, Plant Fragments** 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.	**Small infestation** ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. **Large infestation** ▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. ▪ Monitor and remove any sprouting material. ▪ Pile, let dry, and burn.

January 2010

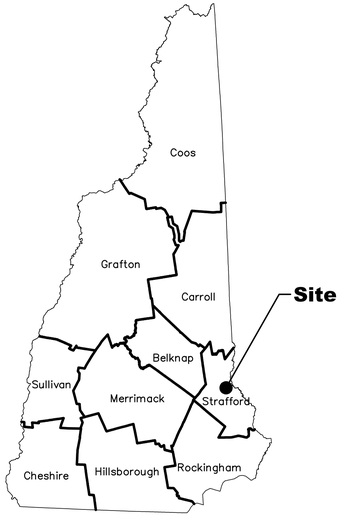
UNH Cooperative Extension programs and policies are consistent with pertinent Federal and State laws and regulations, and prohibits discrimination in its programs, activities and employment on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sex, sexual orientation, or veteran's, marital or family status. College of Life Sciences and Agriculture, County Governments, NH Dept. of Resources and Economic Development, Division of Forests and Lands, NH Fish and Game ,and U.S. Dept. of Agriculture cooperating.

Cooperative Alliance for Seacoast Transportation
Operations and Maintenance Facility

Preliminary Permitting Plans
March 16, 2023

Sheet Index

1	Cover Sheet
2-3	General Notes
4-5	Existing Conditions Plan
6	Site Preparation & Demolition Plan
7	Site Layout Plan
8	Utilities Plan
9	Grading & Drainage Plan
10	Sediment & Erosion Control Plan
11	Landscape Plan
12-20	Construction Details
21	Fire Truck Turning Template
22-23	Drainage Maps



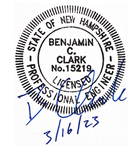
Locus Plan

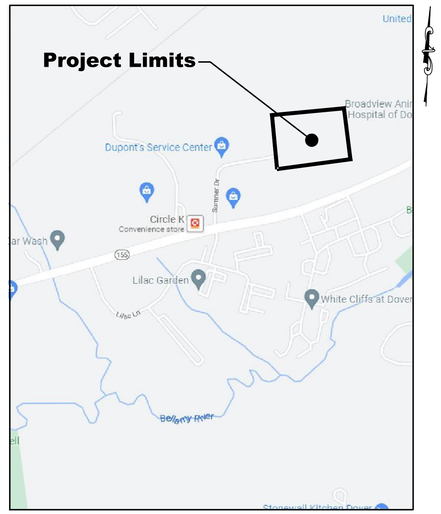
Prepared For:

Cooperative Alliance for Seacoast Transportation
42 Sumner Drive
Dover, NH 03820

Prepared By:

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH 603/431-6196 • Manchester, NH 603/627-0708 • Portland, ME 207/541-4223
c m a e n g i n e e r s . c o m





Project Location

0 500 1000 Feet

GENERAL CONSTRUCTION NOTES:

1. ALL WORK SHALL BE IN CONFORMANCE WITH CURRENT CITY OF DOVER SPECIFICATIONS AND DETAILS.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, AND PROCEDURES, AND FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH ALL WORK INCLUDED UNDER THIS CONTRACT, INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA REGULATIONS. THE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL SAFETY BARRIERS, WARNING FLASHERS, ETC., AS REQUIRED BY THE CONDUCT OF THE WORK FOR THE PROTECTION OF WORKERS AND NON– WORKERS ALIKE. THE OWNER AND ENGINEER WILL PERIODICALLY REVIEW CONSTRUCTION FOR COMPLIANCE WITH THE PLANS AND SPECIFICATIONS; SUCH REVIEW DOES NOT IMPLY APPROVAL OF METHODS OF CONSTRUCTION.
3. THE CONTRACTOR SHALL PROVIDE STAGING AREAS AS REQUIRED FOR STAGING, PROCESSING, AND STOCKPILING OF EQUIPMENT AND MATERIALS. THE CONTRACTOR SHALL PREPARE THE AREA AS NECESSARY AND INSTALL ALL EROSION CONTROL DEVICES TO MEET NHDES STANDARDS. THE CONTRACTOR SHALL STOCKPILE, HANDLE AND TRANSPORT MATERIALS TO PRESERVE THEIR QUALITY AND FITNESS FOR THE WORK. MATERIALS SHALL ALSO BE STORED TO FACILITATE INSPECTION AND MAY BE SUBJECT TO INSPECTION AND RETESTING BEFORE INCORPORATION IN THE WORK. PRIVATE PROPERTY SHALL NOT BE USED FOR STORAGE PURPOSES WITHOUT WRITTEN PERMISSION OF THE PROPERTY OWNER. IF REQUESTED, COPIES OF SUCH WRITTEN PERMISSION SHALL BE FURNISHED TO THE OWNER. AFTER COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL RETURN THE STAGING AREA TO PREEXISTING CONDITIONS TO THE SATISFACTION OF THE PROPERTY OWNER AND THE CITY.
4. EXISTING CONDITIONS SURVEY AND TOPOGRAPHY PROVIDED BY DOUCET SURVEY, LCC IN JULY 2020. BENCHMARKS AND HORIZONTAL CONTROL POINTS FOR THE CONTRACTOR TO LAYOUT THE WORK HAVE BEEN ESTABLISHED AND ARE SHOWN ON THE PLANS.
5. THE CONTRACTOR SHALL PERFORM ALL REQUIRED LAYOUT AND DEVELOPING AS–BUILT DOCUMENTATION WORK WITH COMPETENT, QUALIFIED PERSONNEL IN A MANNER CONSISTENT WITH THE CURRENT SURVEY/LAYOUT PRACTICES AND ACCEPTABLE TO THE ENGINEER. NO SEPARATE PAYMENT FOR THIS WORK WILL BE MADE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH QUALIFIED PERSONS TO ASSIST IN THIS CHECKING AS NEEDED AND ON REQUEST OF THE ENGINEER. THE CONTRACTOR SHALL PERFORM ALL NECESSARY LAYOUT WORK IN ORDER TO CONSTRUCT ALL ELEMENTS OF THE PROJECT AS SHOWN ON THE PLANS AND SPECIFIED IN THE CONTRACT. THIS WORK SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, STAKEOUT NECESSARY TO ESTABLISH LINES AND GRADES AS EARTHWORK OPERATIONS PROGRESS; STAKEOUT, LAYOUT AND ELEVATIONS AS REQUIRED FOR INSTALLING DRAIN LINES, SEWER LINES, WATER LINES, AND OTHER ITEMS INCLUDED IN THE WORK.
6. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE ACCURACY OF THE WORK. THE ENGINEER MAY CHECK ALL, OR ANY PORTION, OF THE LAYOUT, MADE BY THE CONTRACTOR. ANY NECESSARY CORRECTION TO THE WORK SHALL BE MADE IMMEDIATELY BY THE CONTRACTOR. SUCH CHECKING BY THE ENGINEER WILL NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITIES FOR THE ACCURACY OR COMPLETENESS OF THE WORK. NO CLAIM WILL BE CONSIDERED BECAUSE OF ALLEGED INACCURACIES UNLESS THE CONTRACTOR NOTIFIES THE ENGINEER THEREOF IN WRITING IMMEDIATELY UPON DISCOVERY OF THE ALLEGED INACCURACIES AND AFFORDS THE ENGINEER THE OPPORTUNITY TO CHECK OR VERIFY THE CONTROL IN QUESTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PRESERVATION OF ALL BENCHMARKS AND CONTROL POINTS. IF ANY OF THE CONTROL POINTS ARE DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION, THE CONTRACTOR SHALL REPLACE THEM AT NO EXPENSE TO THE OWNER. DAMAGED OR DESTROYED CONTROL POINTS, BENCHMARKS, STAKES, OR ANY REFERENCE POINTS DAMAGED OR MADE INACCESSIBLE BY THE PROGRESS OF CONSTRUCTION SHALL BE REPLACED OR TRANSFERRED BY THE CONTRACTOR, SUBJECT TO VERIFICATION BY THE ENGINEER. REPLACEMENT OF ANY LAYOUT POINTS SHALL BE PERFORMED BY, OR UNDER, THE DIRECTION OF A NH LICENSED LAND SURVEYOR.
8. APPARENT PROPERTY BOUNDARY IS BASED ON THE EXISTING CONDITIONS SURVEY. PERFORM ALL WORK WITHIN THE EXISTING PROPERTY BOUNDARY OR ACQUIRE A TEMPORARY RIGHT–OF–ENTRY AGREEMENT.
9. THE CONTRACTOR SHALL PROTECT PRIVATE PROPERTY AND SHALL TAKE ALL NECESSARY MEASURES AND PRECAUTIONS TO AVOID DAMAGE TO EXISTING TREES, SHRUBS, LAWNS, PLANTINGS, ETC. THIS PROTECTION WILL INCLUDE THE TRIMMING OF TREES PRIOR TO CONSTRUCTION IF NECESSARY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRS/REPLACEMENT OF ALL DAMAGED ITEMS.
10. THE CONTRACTOR SHALL PLAN AND PERFORM TEST PIT EXCAVATION WELL IN ADVANCE OF COMMENCING CONSTRUCTION AND ORDERING MATERIALS TO ALLOW TIME TO REVIEW ACTUAL CONDITIONS ENCOUNTERED. TEST PITS NOT SPECIFICALLY IDENTIFIED, SHALL BE EXCAVATED BY THE CONTRACTOR AT THE DIRECTION OF THE ENGINEER.
11. ALL EXCAVATIONS SHALL BE THOROUGHLY SECURED ON A DAILY BASIS BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION OPERATIONS IN THE IMMEDIATE AREA.
12. ALL DRAINAGE STRUCTURES TO BE ABANDONED IN PLACE SHALL HAVE THE CONE REMOVED AND BE FILLED WITH GRAVEL. THE MATERIAL SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 12 INCHES OF COMPACTED THICKNESS. ALL PIPE CURVES SHALL BE PLUGGED WITH A CONCRETE MASONRY PLUG.
13. PLUGGING EXISTING PIPES WITH BRICK AND MORTAR SHALL BE CONSIDERED SUBSIDIARY TO THE DRAINAGE WORK.
14. PIPE CONNECTIONS TO REPLACEMENT STRUCTURES ARE SUBSIDIARY TO THE STRUCTURE.
15. ALL PROPOSED AND EXISTING DRAINAGE AND SANITARY SEWER STRUCTURE RIM AND PIPE INVERT ELEVATIONS ARE TO BE FIELD VERIFIED BY THE CONTRACTOR AND ACCEPTED BY THE ENGINEER.
16. THE CONTRACTOR SHALL SET ALL MANHOLE FRAMES AND COVERS, CATCH BASIN GRATES, AND WATER VALVE COVERS TO BE FLUSH WITH THE BASE PAVEMENT GRADES, THEN RAISED TO 1/8" TO 1/4" BELOW FINAL PAVEMENT ELEVATIONS DURING INSTALLATION OF THE FINAL WEARING COARSE.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND RELOCATION OF ALL SIGNS THAT CONFLICT WITH THE WORK (INCIDENTAL TO CONSTRUCTION). ANY SIGNS DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
18. FINAL LOCATION OF TRAFFIC SIGNS AND SUPPORTS AS SHOWN IN THE PLANS SHALL BE FIELD–CONFIRMED BY THE CONTRACTOR AND ACCEPTED BY THE ENGINEER PRIOR TO INSTALLATION.
19. REMOVE TOPSOIL FOR ITS TOTAL DEPTH WITHIN THE LIMITS OF THE SLOPE LINES. UNLESS OTHERWISE DIRECTED, STOCKPILE TOPSOIL AND USE IT ON THIS PROJECT AS NEEDED.
20. ALL DISTURBED AREAS NOT DESIGNATED TO BE PAVED OR LANDSCAPED OTHERWISE SHALL HAVE LOAM BORROW PLACED AND SEEDED. THE LOAM BORROW SHALL HAVE A MINIMUM DEPTH OF 4" AND SHALL BE PLACED FLUSH WITH THE TOP OF ADJACENT CURBING, EDGING, PAVEMENT MILLINGS, BACK OF SIDEWALK OR OTHER PAVED EDGE.
21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE RESTORATION AND CLEAN UP UPON COMPLETION OF THE PROJECT.

PERMIT NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL CONSTRUCTION PERMITS: LOCAL AND STATE, AS WELL AS FROM PUBLIC UTILITIES, INCLUDING BUT NOT LIMITED TO A RIGHT–OF–WAY TRENCH PERMIT FROM THE DOVER DPW.
2. THE CONTRACTOR SHALL PREPARE A PROJECT SPECIFIC STORMWATER POLLUTION PREVENTION PLAN (SWPPP) AND OBTAIN AN EPA CONSTRUCTION GENERAL PERMIT.
3. THE CONTRACTOR SHALL ADHERE TO ALL THE CONDITIONS OF THE ENVIRONMENTAL PERMITS OBTAINED FOR THE PROJECT (SEE APPENDIX IN SPECIFICATIONS).

EXISTING UTILITY NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL EXISTING UTILITY LOCATIONS, PUBLIC OR PRIVATE, SHOWN OR NOT SHOWN, ON THESE PLANS PRIOR TO CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION SHALL BE TAKEN BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL NOTIFY DIG–SAFE AT 1–800–225–4977 AT LEAST 72 HOURS PRIOR TO BEGINNING WORK TO CONFIRM THE LOCATION OF UNDERGROUND UTILITIES.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION, PROTECTION AND REPAIR (IF DAMAGED) OF ALL EXISTING UTILITY MAINS AND SERVICES. THE LOCATIONS OF KNOWN GAS, WATER, AND SEWER MAINS SHOWN ON THESE DRAWINGS ARE APPROXIMATE. EXISTING GAS, WATER, AND SEWER SERVICE LATERALS MAY NOT BE SHOWN AND THE CONTRACTOR SHOULD ANTICIPATE THEIR EXISTENCE. THE CONTRACTOR SHOULD CONSIDER CONFLICTS, HAND EXCAVATION, AND DECREASE IN PRODUCTION WHEN PREPARING THEIR BID.

DISPOSAL OF SURPLUS MATERIAL:

1. UNSUITABLE MATERIALS AND BOULDERS/ROCK/STONES AS DEFINED BY THE SPECIFICATIONS THAT ARE NOT ACCEPTABLE AS FILL MATERIAL SHALL BE REMOVED FROM THE SITE. ALL PAVEMENT AND SUBGRADE SOILS REMOVED DURING CONSTRUCTION TO ACHIEVE PROPOSED GRADES SHALL BECOME PROPERTY OF THE CONTRACTOR. DISPOSAL IS THE CONTRACTOR'S RESPONSIBILITY.
2. UNLESS REQUESTED BY THE OWNER, ALL FRAMES, COVERS, GRATES, VALVES AND VALVE BOXES, AND CURBING TO BE REMOVED DURING THE PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ALL PAVEMENT, CONCRETE AND SUBGRADE SOILS REMOVED DURING CONSTRUCTION TO ACHIEVE PROPOSED GRADES SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ALL SIDEWALK PAVEMENT, SIDEWALK BRICK, CONCRETE OR BRICK STRUCTURES, SEWER MANHOLES, DRAINAGE, WATER AND SEWER PIPE TO BE REMOVED/DEMOLISHED SHALL BECOME THE PROPERTY OF THE CONTRACTOR.
3. IF ASBESTOS CEMENT (AC) PIPE IS ENCOUNTERED, ALL WORK SHALL BE DONE IN ACCORDANCE WITH ENV–A 1800 ASBESTOS MANAGEMENT AND CONTROL. IF THE AC PIPE IS BROKEN OR REQUIRES CUTTING OR BREAKING, A LICENSED ABATEMENT CONTRACTOR MUST COMPLETE THIS WORK AND PROPERLY BAG AND DISPOSE OF THE PIPE MATERIALS. ALL DISPOSAL SHALL BE DONE IN ACCORDANCE WITH ENV–A 1800 AND ENV–SW 901. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND DISPOSING ASBESTOS CEMENT PIPE, INCLUDING SERVICE CONNECTIONS, WITHIN THE LIMITS OF TRENCH EXCAVATION. THE CONTRACTOR SHALL MAINTAIN WATER SERVICE TO USERS THROUGH THE USE OF TEMPORARY BYPASS PIPING AND VALVES.
4. REMOVAL AND PROPER DISPOSAL OF EXISTING DRAINAGE AND SANITARY SEWER STRUCTURES AND PIPE SHALL BE SUBSIDIARY TO PROPOSED WORK ITEMS WHEN THE EXISTING DRAINAGE AND SEWER ITEMS ARE LOCATED WITHIN THE TRENCH LIMITS OF THE PROPOSED DRAINAGE ITEMS AS SPECIFIED IN SECTION 206 OF THE NHDOT STANDARD SPECIFICATION.

BORING NOTES:

1. BORINGS INDICATED ON THE PLANS WERE MADE BY JOHN TURNER CONSULTING AND GEOTECHNICAL SERVICES, INC IN JULY 2022. BLOW COUNTS SHOWN ARE THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" O.D. STANDARD SPLIT SPOON SAMPLER 6" USING A 140 LB WEIGHT FALLING 30".
2. BORINGS ARE FOR DESIGN PURPOSES SHOWING CONDITIONS AT BORING POINTS ONLY, AND DO NOT NECESSARILY INDICATE MATERIAL TO BE ENCOUNTERED DURING CONSTRUCTION.
3. WATER LEVELS INDICATE THUS ▽ WERE MEASURED AT THE TIME OF EXPLORATION. THE WATER LEVELS ENCOUNTERED DURING CONSTRUCTION MAY VARY CONSIDERABLY DUE TO PREVAILING CLIMATE, RAINFALL, OR OTHER FACTORS.
4. THE GEOTECHNICAL INVESTIGATION REPORT IS PROVIDED AS AN APPENDIX TO THE CONTRACT DOCUMENTS.

SANITARY SEWER NOTES:

1. THE SANITARY SEWER MAIN SHALL BE HDPE DR 11. THE PIPE SHALL BE CONNECTED TO THE EXISTING SEWER MANHOLE IN SUMNER DRIVE AND STUBBED AND CAPPED ON THE NORTH END FOR FUTURE CONNECTION AS SHOWN ON THE PLANS.
2. SEWER MAINS SHALL BE CONSTRUCTED WITH ADEQUATE SEPARATION FROM WATER MAINS. ADEQUATE SEPARATION IS DEFINED AS 10' OF HORIZONTAL SEPARATION AND 18 INCHES VERTICAL SEPARATION BELOW THE WATER MAIN. IF THE MINIMUM 18" VERTICAL SEPARATION IS NOT ACHIEVABLE, A WAIVER FROM NHDES IS REQUIRED.

GRADING AND DRAINAGE NOTES:

1. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, LATEST EDITION.
2. ALL PROPOSED CATCH BASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 3' SUMPS.

EROSION CONTROL NOTES:

1. SEE SHEET D–101 AND D–102 FOR EROSION CONTROL NOTES AND DETAILS

WATER NOTES:

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE CITY OF DOVER'S CONSTRUCTION STANDARDS AND DETAILS AND NH DES ENV–DW 404. THE MORE STRINGENT REGULATION SHALL APPLY.
2. ALL WATER MAINS SHALL BE CLASS 52 CEMENT LINED DUCTILE IRON (CLDI) PIPE. ALL CLDI PIPE SHALL MEET, OR EXCEED, CURRENT AWWA C151 SPECIFICATIONS FOR DUCTILE IRON WATER PIPE.
3. WATER MAINS AND SERVICES SHALL HAVE A MINIMUM COVER OF 5'–0". WHERE TOP OF WATER MAIN IS LESS THAN 5'–0" BELOW FINISHED GRADE, THE CONTRACTOR SHALL INSTALL RIGID INSULATION IN CONFORMANCE WITH THE TYPICAL WATER TRENCH DETAIL.
4. ALL CLDI WATER MAINS SHALL BE ENCASED IN POLYETHYLENE ENCASEMENT (POLYWRAP). SEE SPECIFICATION SECTION 02611W.
5. AT PIPE CROSSINGS, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE SEWER/DRAIN PIPE AS POSSIBLE. SPECIAL STRUCTURAL SUPPORTS FOR THE WATER AND SEWER PIPES MAY BE REQUIRED.
6. ALL MATERIALS COMING IN PHYSICAL CONTACT WITH DRINKING WATER MUST BE CERTIFIED TO MEET THE ANSI/NSF STANDARD 61 BY EITHER THE UNDERWRITERS LABS (UL) OR THE NATIONAL SANITATION FOUNDATION (NSF).
7. DISINFECTION AND TESTING OF WATER LINES SHALL BE DONE IN ACCORDANCE WITH CITY OF DOVER AND CURRENT AWWA STANDARDS.
8. ALL EXISTING WATER PIPE IDENTIFIED TO BE ABANDONED SHALL BE CAPPED AT ALL EXPOSED ENDS AND ABANDONED IN PLACE UNLESS REMOVAL IS REQUIRED BECAUSE OF OTHER INTERFERENCES (INCIDENTAL).
9. THE CONTRACTOR SHALL USE RESTRAINT SYSTEMS ON ALL VALVES AND FITTINGS UNLESS OTHERWISE NOTED ON THE PLANS.
10. ALL GATE VALVES SHALL HAVE RESTRAINED MECHANICAL JOINTS AND SHALL OPEN RIGHT.
11. EXISTING CURB BOX AND/OR OTHER CASTINGS DISTURBED OR RELOCATED BY CONSTRUCTION ACTIVITIES SHALL BE ADJUSTED TO MATCH FINAL GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER (SUBSIDIARY).
12. WHERE WATER MAIN IS LESS THAN 4'–0" HORIZONTALLY FROM A STRUCTURE, THE CONTRACTOR SHALL INSTALL 2" OF RIGID INSULATION ALONG THE SIDE WALL OF THE WATER MAIN TRENCH A MINIMUM OF 10'–0" HORIZONTALLY BEYOND THE CENTERLINE OF THE STRUCTURE IN BOTH DIRECTIONS TO PROTECT THE WATER MAIN FROM FREEZING.
13. MAINTAIN A MINIMUM OF 10' HORIZONTAL DISTANCE BETWEEN WATER MAIN AND SEWER PIPING. NOTIFY ENGINEERS IF ANY DISCREPANCY.
14. EXISTING FIRE HYDRANTS SHALL BE REMOVED, DECOMMISSIONED BELOW GRADE, AND DELIVERED TO A LOCATION SPECIFIED BY THE OWNER.
15. THE CONTRACTOR SHALL INSTALL THE WATER SERVICE CONNECTIONS (INCLUDING SERVICE SADDLES IF REQUIRED, LIVE TAPS, CORPORATIONS, CURB STOP, CURB BOX, AND PE WATER SERVICE PIPE) WITH TRACER WIRE AT THE SIZE SPECIFIED IN THE SERVICE SCHEDULE AND CONNECT THE EXISTING WATER SERVICE TO THE NEW CURB BOX. THE NEW SERVICE SHALL BE CONNECTED TO THE EXISTING SERVICE PIPE PAST THE CURB STOP UNLESS THE EXISTING WATER SERVICE PIPE IS GALVANIZED CAST IRON, GALVANIZED STEEL OR LEAD; IN THIS CASE, THE CONTRACTOR SHALL NOTIFY THE CITY AND ENGINEER.

UTILITY NOTES:

1. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.

   WATER/SEWER – CITY OF DOVER

   ELECTRIC – EVERSOURCE ENERGY

   GAS – UNITIL
2. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST ADDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
3. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
4. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
5. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL WORK INCLUDING, BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, AND TRANSFORMER CONSTRUCTION WITH EVERSOURCE ENERGY.

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

STATE OF NEW HAMPSHIRE – BENJAMIN C. CLARK No. 15219 – PROFESSIONAL ENGINEER – 5/16/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
scale: 40' 20' 0 Scale: 1" = 20'
date: March 16, 2023
project no: 1250
checked by: BCC

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
General Notes

drawing no. N-1

sheet: 2 of 23

ABBREVIATIONS:

ABBREV.	MEANING
@	AT
ABD	ABANDONED
ABAN	ABANDON IN PLACE
ACP	ASBESTOS CEMENT PIPE
ADD'L	ADDITIONAL
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BTM	BOTTOM
BH	BRADLEY HEAD
BIT	BITUMINOUS CONCRETE
BLDG	BUILDING
BMP	BUILDING MONITORING POINT
BOW	BOTTOM OF WALL
BR	BRICK
CB	CATCH BASIN
C.B.	CONCRETE BOUND
CBCI	CATCH BASIN WITH CURB INLET
CC	CAST-IN-PLACE CONCRETE
CEM	CEMENT
CL	CLEAR
℄	CENTER LINE
CLF	CHAIN LINK FENCE
CI	CAST IRON
CICL	CAST IRON CEMENT-LINED
CIP	CAST IN PLACE
C.O.	CLEAN OUT
CONC	CONCRETE
CONN	CONNECTION
COR	CORNER
CP	CONCRETE PIPE
CMP	CORRUGATED METAL PIPE
CSE	COBBLE STONE EDGE
D	DRAIN
DEPT	DEPARTMENT
DH	DRILL HOLE
DI	DUCTILE IRON
DIA	DIAMETER
DICL	DUCTILE IRON CEMENT-LINED
DIA	DIAMETER
DISCH	DISCHARGE
DMH	DRAIN MANHOLE
DLY	DOUBLE SOLID YELLOW LINE
DT	DRAIN TILE
DWG	DRAWING
EA	EACH
EF	EACH FACE
EM	ELECTRIC METER
E-VAULT	ELECTRIC-VAULT
EL, ELEV	ELEVATION
ELEC, E	ELECTRIC
EOP	EDGE OF PAVEMENT
EXIST	EXISTING
ESHWL	EXIST. SEASONAL HIGH WATER TABLE
F&C	FRAME AND COVER
FA	FIRE ALARM
FD	FLOOR DRAIN
FED	FEDERAL
FH	FIRE HYDRANT
FM	FORCE MAIN
FND	FOUND
FP	FLAG POLE
FT	FOOT
GM	GAS METER
GRAN	GRANITE
HDPE	HIGH DENSITY POLYETHYLENE
HH	HAND HOLE
HORIZ	HORIZONTAL
HYD	HYDRANT
H/C	HANDICAP
INV	INVERT
IN	INCHES
IP	IRON PIPE
L	LEAVE
MBOX	MAIL BOX
MHB	MASS HIGHWAY BOUND
MHW	MEAN HIGH WATER
MIN	MINIMUM
MON	MONUMENT
NIC	NOT IN CONTRACT
NO, #	NUMBER
NTS	NOT TO SCALE
PB	PULL BOX
PC	PRECAST CONCRETE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PCI	PIT CAST IRON
PCB	PROPOSED CATCH BASIN
PDMH	PROPOSED DRAINAGE MANHOLE
PERF	PEFORATED
PM	PARKING METER
PNS	PIPE NOT SEEN
POCS	PROPOSED OUTLET CONTROL STRUCTURE
PROP	PROPOSE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R	REMOVE/RELOCATE
REC	RECORD INFORMATION
REINF	REINFORCEMENT
RES	REVERE EXTENSION SEWER
RET	RETAIN
RCP	REINFORCED CONCRETE PIPE
RS	RECEIVING SHAFT
ROW	RIGHT-OF-WAY
SB	STREET LIGHT BASE
S.B.	STONE BOUND
SD	STORM DRAIN
SF	FIRE SERVICE
SGC	SLOPED GRANITE CURB
SLCC	STREET LIGHT CONTROL CABINET
SMH	SEWER MANHOLE
SPEC	SPECIFICATION
SWL	SINGLE WHITE LINE
SQ	SQUARE
S	SANITARY SEWER
ST	STEEL

ABBREV.	MEANING
STD	SINGLE TILE DUCT
STY	STORY
SW	SIDEWALK
T&B.	TOP AND BOTTOM
TBC	TOP BACK OF CURB
TCC	TRAFFIC CONTROL CABINET
TD	TELEDUCT
TEL	TELEPHONE CONDUIT/DUCT BANK
TH	TOP OF HATCH
TL	TRAFFIC LIGHT CONDUIT
TOH	TOP OF HOOD
TOW	TOP OF WALL
TRAF	TRAFFIC CONDUIT
TS	TRAFFIC SIGNAL
TYP	TYPICAL
UMP	UTILITY MONITORING POINT
UNK	UNKNOWN
UP	UTILITY POLE
VC	VITRIFIED CLAY
VERT	VERTICAL
VGC	VERTICAL GRANITE CURB
W	WATER
W/	WITH
WC	WYE CONNECTION
WIP	WROUGHT IRON PIPE
WM	WATER METER
WMH	WATER MANHOLE
WFLG	WETLAND FLAG

GENERAL SYMBOLS:

EXISTING		PROPOSED
	UTILITY POLE & GUY WIRE	
	UTILITY POLE W/ LIGHT	
	LIGHT POLE	
	MAILBOX	
	VENT PIPE	
	SIGNS (TWO POSTS)	
	GRANITE BOUND FOUND	
	DRILL HOLE FOUND	
	IRON PIPE	
	IRON ROD	
	METAL POST	
	GRANITE OR CONC. POST	
	WOOD HUB	
	DRILL HOLE	
	WOOD FENCE POST	
	SIGNAL JUNCTION BOX	
	ELECTRICAL CONDUIT	
	PAD MOUNTED TRANSFORMER	
	ELECTRICAL PANEL	
	ELECTRICAL BOX	
E	ELECTRIC METER	
	FIRE HYDRANT	
	GAS GATE VALVE	GV
	WATER GATE VALVE	
	WATER CURB STOP	
	VALVE ELECTRIC BOX	
	CATCH BASIN	
D	DRAIN MANHOLE	D
E	ELECTRIC MANHOLE	
T	TELEPHONE MANHOLE	
W	WATER MANHOLE	
S	SEWER MANHOLE	S
M	MANHOLE	
	BUSH/SHRUB	
	TREE STUMP	
	CONIFEROUS TREE	
	DECIDUOUS TREE	
	ROCK	
	BORING	
	TEST PIT	
	WETLAND	
	WETLAND FLAG	
	SPOT LIGHT	
	GUY WIRE	
LAPN	TAX SHEET – LOT NUMBER	
RCRD	ROCKINGHAM COUNTY REGISTRY OF DEEDS	
EOP	EDGE OF PAVEMENT	
SGC	SLOPED FACE GRANITE CURB	
VGC	VERTICAL FACED GRANITE CURB	
RWBL	MODULAR BLOCK RETAINING WALL	
RWC	CONCRETE RETAINING WALL	
RWM	MORTARED RETAINING WALL	
RWS	STONE RETAINING WALL	
	EDGE OF PAVEMENT	
	WOOD FENCE	
x x	CHAIN LINK FENCE	
	EROSION CONTROL FIBER ROLL	
+335.2	SPOT ELEVATION	131.75'
	City LAYOUT LINE	
	OVERHEAD WIRES	T
S	SEWER LINE	
FM	FORCEMAIN	fm
D	DRAIN LINE	D
G	GAS LINE	G
W	WATER SERVICE UNDERGROUND	PWS
UGE	UNDERGROUND ELECTRIC LINE	UGE
UGC	UNDERGROUND COMMUNICATIONS	T
	APPROX. ABUTTERS	
	LOT LINE	
	SHRUB LINE	
	TREE LINE	
	STONE WALL	
	GUARDRAIL	
	MAJOR CONTOUR LINE	100
	MINOR CONTOUR LINE	99
	EASEMENT LINE	
	WETLAND LINE	
	STATE HIGHWAY LAYOUT LINE	
W	WATER MAIN	PW
X	BARBED WIRE FENCE	
	CEMENT CONCRETE	
	CRUSHED STONE	
	RIP RAP	
	RETAINING WALL	
LA	LANDSCAPED AREA	
	BOLLARD	
	SLOPE LINE	
	CONSTRUCTION BASELINE	302+00
	LIMITS OF WORK	
	THRUST BLOCK	
	ELECTRICAL MANHOLE	PEMH
	ELECTRICAL TRANSFORMER	T
	OUTLET CONTROL STRUCTURE WITH GRATE	
	OUTLET CONTROL STRUCTURE WITH COVER	
	HEADWALL	
	FLARED END SECTION	

by	date	revision	no.

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

NEW HAMPSHIRE – STATE OF – BENJAMIN C. CLARK No.15219 – PROFESSIONAL ENGINEER – 5/19/23

designed by: STF/RED	drawn by: CFC	approved by: PAC	scale:
date: March 16, 2023	project no: 1250	checked by: BCC	

Cooperative Alliance for Seacoast Transportation, Dover, NH

Operations and Maintenance Facility
42 Sumner Drive

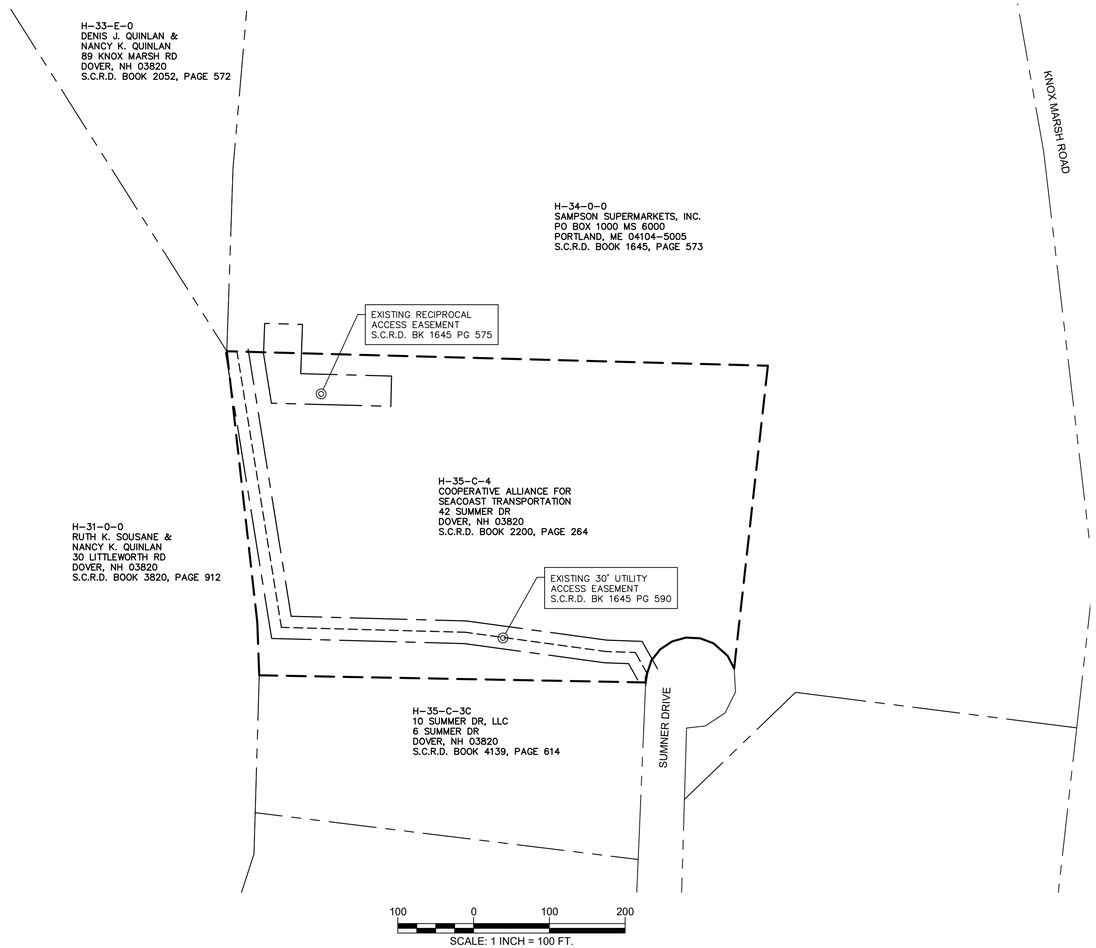
Legend and Abbreviations

drawing no.
N-2

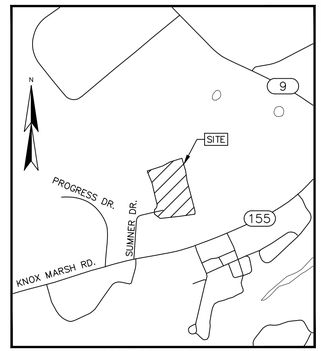
sheet: 3 of 23

NOTES:

1. REFERENCE: PARCEL ID: H0035-C00004
   42 SUMNER DRIVE
   DOVER, NEW HAMPSHIRE
   D.S.I. PROJECT NO. 6545
2. TOTAL PARCEL AREA: SQ. FT. OR AC.
3. OWNER OF RECORD: COOPERATIVE ALLIANCE FOR
   SEACOAST TRANSPORTATION
   42 SUMNER DRIVE
   DOVER, NH 03820
   S.C.R.D. BOOK 2200 PAGE 264
4. ZONE: I-2
5. FIELD SURVEY PERFORMED BY J.M.L. & J.H.H. DURING JUNE 2020 USING A TRIMBLE S6 TOTAL STATION AND A TRIMBLE R10 SURVEY GRADE GPS WITH A TRIMBLE TSC3 DATA COLLECTOR AND A TRIMBLE DINI DIGITAL AUTO LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
6. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2800) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
7. VERTICAL DATUM IS BASED ON APPROXIMATE NAVD88(GEOID12A) (±.2') DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
8. JURISDICTIONAL WETLANDS DELINEATED BY WEST ENVIRONMENTAL, INC DURING JUNE 2020 IN ACCORDING TO THE:
   - US ARMY CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL, TECHNICAL REPORT Y-87-1 (JANUARY, 1987).
   - REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION (2012).
   - NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS: NORTHEAST (REGION 1). U.S. FISH AND WILDLIFE SERVICE (2013).
   - CODE OF ADMINISTRATIVE RULES. WETLANDS BOARD, STATE OF NEW HAMPSHIRE (CURRENT).
   - FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.0, 2016 AND (FOR DISTURBED SITES) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4. NEHSTC (MAY 2017).
9. FLOOD HAZARD ZONE: "X", PER FIRM MAP #33017C0320E, DATED 09/30/2015.
10. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 1' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY. WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.
11. UNDERGROUND UTILITIES WITHIN THE SURVEY AREA SHOWN HEREON ARE THE RESULT OF AN UNDERGROUND UTILITY DESIGNATION COMPLETED BY DOUCET SURVEY ON JUNE 2020 AND FROM DATA OBTAINED FROM RECORD MAPS AND DRAWINGS. DOUCET'S UTILITY DESIGNATION WAS COMPLETED IN ACCORDANCE WITH THE STANDARD PROCEDURES SET FORTH IN ASCE 38-02 AND CONSISTENT WITH APPROPRIATE QUALITY LEVELS. DRAIN AND SANITARY SEWER LINES WERE VISUALLY ALIGNED AND MAPPED AT QUALITY LEVEL C UNLESS OTHERWISE SHOWN. DRAIN AND SEWER LINES SHOWN AT QUALITY LEVEL B WERE LOCATED USING SURFACE GEOPHYSICAL TECHNIQUES. ALL ABOVE GROUND STRUCTURES, SURFACE FEATURES AND THE LOCATION OF THE MARK OUT ARE THE RESULT OF AN INSTRUMENT SURVEY COMPLETED BY DOUCET UNLESS OTHERWISE NOTED. THERE MAY BE OTHER UNDERGROUND UTILITIES, THE EXISTENCE OF WHICH ARE NOT KNOWN OR CERTIFIED BY THE UNDERSIGNED. DIG SAFE NEW HAMPSHIRE AND THE APPROPRIATE AUTHORITIES MUST BE NOTIFIED PRIOR TO CONDUCTING TEST BORINGS, EXCAVATION, OR CONSTRUCTION ACTIVITIES.
12. THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.
13. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH AND IN RELATION TO THE CURRENT LEGAL DESCRIPTION, AND IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP, OR DEFINE THE LIMITS OF TITLE.







LOCATION MAP (n.t.s.)

LEGEND
- APPROXIMATE LOT LINE
- APPROXIMATE ABUTTER LOT LINE
- EXISTING EASEMENT LINE

REFERENCE PLANS:

1. "SITE PLAN BUS TERMINAL AND MAINTENANCE FACILITY" DATED 8-26-94 BY CIVIL WORKS S.C.R.D. PLAN 1124 COAST SITE PLAN.
2. "F. W. WEBB MFG. CO. DIVISION OF LOT 3 SUMNER DRIVE" DATED SEPT, 1974 BY G. L. DAVIS & ASSOCIATES CIVIL ENGINEERS S.C.R.D. PLAN P001-F005-057.
3. "PROPERTY PLAN INDUSTRIAL DEVELOPMENT AUTHORITY SUMNER DAVIS LAND" DATED AUG, 1969 BY G. L. DAVIS & ASSOCIATES CIVIL ENGINEERS S.C.R.D. PLAN P011-F003-008.
4. "SUMNER DRIVE ACCESS PLAN FOR NEW HAMPSHIRE DISTRIBUTORS INC." DATED AUGUST 27, 1982 BY RICHAD D. BARTLETT L.L.S S.C.R.D. PLAN P023A-0129.
5. "LOT LINE ADJUSTMENT PLAN PREPARED FOR DENNIS QUINLAN AND RUTH SOUSANE" DATED AUGUST 24, 1993 BY MCENEANEY SURVEY ASSOCIATES, INC. S.C.R.D. PLAN P0042-0099.
6. "PLAN OF CONSERVATION EASEMENT- LAND OF RUTH SOUSANE AND DENNIS & NANCY QUINLAN" DATED DEC. 16, 1996 BY RICHARD P. TOWLE S.C.R.D. PLAN P0051-0097.

PURSUANT TO RSA 676:18, III:

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000.

_____ L.L.S. #824

_____ DATE

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET REGISTRY OF DEED REQUIREMENTS AND ARE NOT A CERTIFICATION TO TITLE OR OWNERSHIP OF PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE ACCORDING TO CURRENT TOWN ASSESSORS RECORDS.

EXISTING CONDITIONS PLAN

FOR

CMA ENGINEERS

OF

COAST PUBLIC TRANSIT

42 SUMNER DRIVE

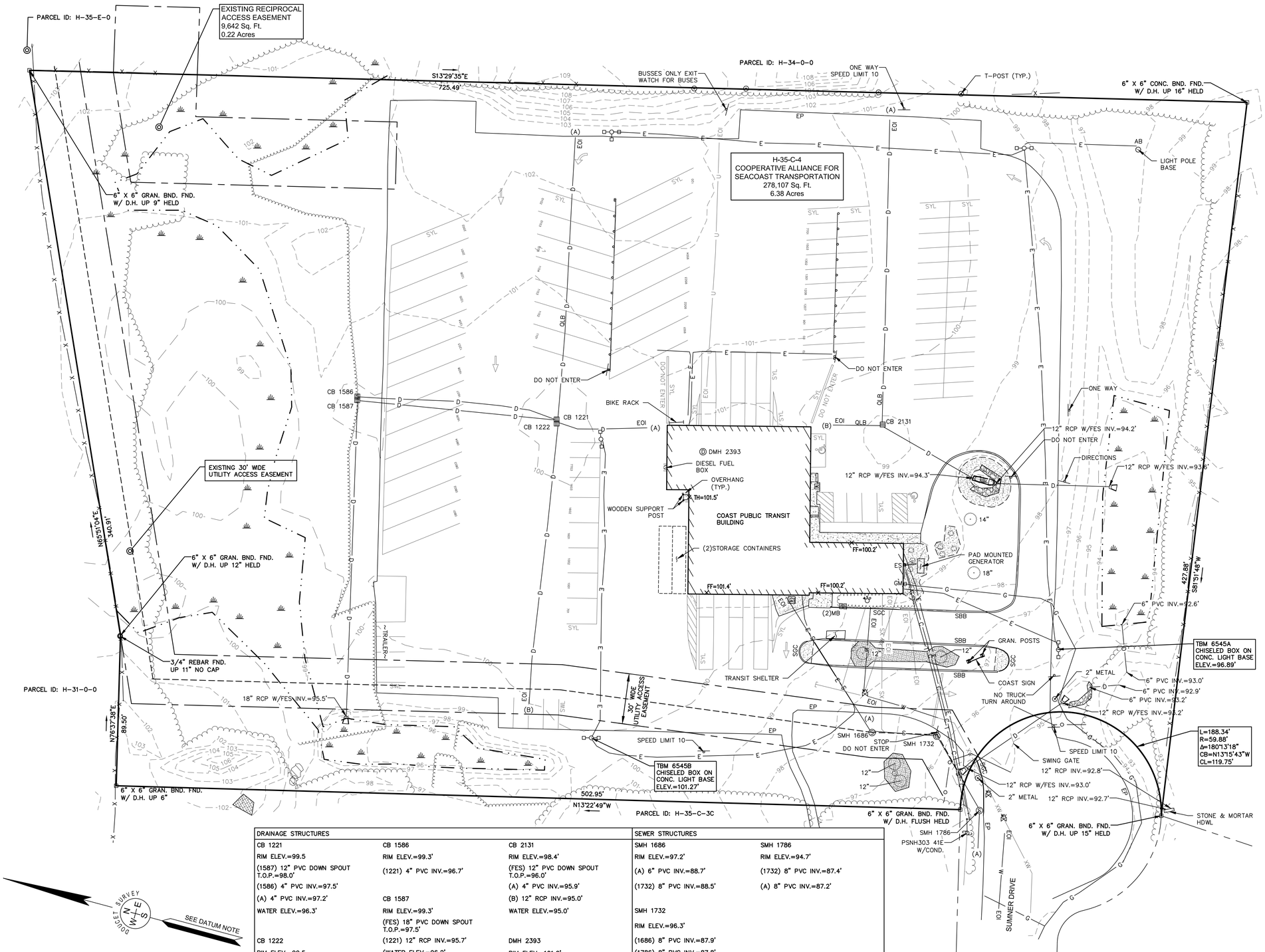
DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	E.D.P.	DATE:	JULY 2020
CHECKED BY:	W.J.D.	DRAWING NO.	6545A
JOB NO.	6545	SHEET	1 OF 2

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
2 Commerce Drive (Suite 202) Bedford, NH 03110 (603) 614-4060
10 Storer Street (Riverview Suite) Kennebunk, ME (207) 502-7005
http://www.doucetsurvey.com

FILE NAME: C:\Users\WJD\Desktop\Local\Temp\AcPublish_3036\6545A C3D2020-07-10.dwg LAYOUT NAME: COVER SHEET 1 PLOTTED: Friday, July 10, 2020 - 3:10pm



DRAINAGE STRUCTURES			SEWER STRUCTURES	
CB 1221	CB 1586	CB 2131	SMH 1686	SMH 1786
RIM ELEV.=99.5	RIM ELEV.=99.3'	RIM ELEV.=98.4'	RIM ELEV.=97.2'	RIM ELEV.=94.7'
(1587) 12" PVC DOWN SPOUT T.O.P.=98.0'	(1221) 4" PVC INV.=96.7'	(FES) 12" PVC DOWN SPOUT T.O.P.=96.0'	(A) 6" PVC INV.=88.7'	(1732) 8" PVC INV.=87.4'
(1586) 4" PVC INV.=97.5'		(A) 4" PVC INV.=95.9'	(1732) 8" PVC INV.=88.5'	(A) 8" PVC INV.=87.2'
(A) 4" PVC INV.=97.2'	CB 1587	(B) 12" RCP INV.=95.0'		
WATER ELEV.=96.3'	RIM ELEV.=99.3'	WATER ELEV.=95.0'	SMH 1732	
	(FES) 18" PVC DOWN SPOUT T.O.P.=97.5'		RIM ELEV.=96.3'	
CB 1222	(1221) 12" RCP INV.=95.7'	DMH 2393	(1686) 8" PVC INV.=87.9'	
RIM ELEV.=99.5	(WATER ELEV.=96.2'	RIM ELEV.=101.2'	(1786) 8" PVC INV.=87.8'	
(A) 4" PVC INV.=97.3 CAPPED		INSIDE GARAGE UNABLE TO OPEN		
(B) 4" PVC INV.=97.3'				

LEGEND

- LOT LINE
- ABUTTERS LOT LINE
- X — BARBED WIRE FENCE
- S — SEWER LINE (QUALITY LEVEL B)
- D — DRAIN LINE (QUALITY LEVEL B)
- G — GAS LINE (QUALITY LEVEL B)
- E — UNDERGROUND ELECTRIC LINE (QUALITY LEVEL B)
- W — WATER LINE (QUALITY LEVEL B)
- U — POSSIBLE UNDER DRAIN
- XW — WATER LINE (QUALITY LEVEL D)
- XS — SEWER LINE (QUALITY LEVEL D)
- 100 — MAJOR CONTOUR LINE
- 99 — MINOR CONTOUR LINE
- TREE LINE
- SHRUB LINE
- EDGE OF WETLAND
- WETLAND AREA
- CONCRETE
- RIP RAP
- LANDSCAPED AREA
- CRUSHED STONE
- LEDGE OUTCROP
- LIGHT POLE (MULTI-ARMS)
- SIGN
- IRON PIPE/ROD FOUND
- BOUND FOUND
- POST
- POST
- WATER GATE VALVE
- WATER SHUTOFF VALVE
- PAD MOUNTED TRANSFORMER
- CATCH BASIN
- DRAIN MANHOLE
- F.E.S — FLARED END SECTION
- SEWER MANHOLE
- DECIDUOUS TREE
- DECIDUOUS BUSH
- ROCK/BOULDER
- ACCESSIBLE PARKING SPACE

TYP.	TYPICAL
BND. FND.	BOUND FOUND
GRAN.	GRANITE
HDWL	HEADWALL
D.H.	DRILL HOLE
FF	FINISHED FLOOR ELEVATION
TH	THRESHOLD ELEVATION
EP	EDGE OF PAVEMENT
SGC	SLOPED GRANITE CURB
SBB	SLOPED BITUMINOUS BERM
SWL	SINGLE WHITE LINE
SYL	SINGLE YELLOW LINE
ES	ELECTRIC SWITCH
GM	GAS METER
EOI	END OF GEOPHYSICAL INFORMATION
AB	ABANDONED

QUALITY LEVEL ACCORDING TO ASCE 38-02

QLB	QUALITY LEVEL "B" SUBSURFACE UTILITIES HAVE BEEN MARKED USING A VARIETY OF GEOPHYSICAL TOOLS
QLC	QUALITY LEVEL "C" SURVEYED THE LOCATION OF OBSERVABLE UTILITIES
QLD	QUALITY LEVEL "D" LIMITED PHYSICAL EVIDENCE, DIGITIZED FROM RESEARCH AND HISTORICAL DATA

30 0 30 60

SCALE: 1 INCH = 30 FT.

EXISTING CONDITIONS PLAN

FOR

CMA ENGINEERS

OF

COAST PUBLIC TRANSIT

42 SUMNER DRIVE

DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	E.D.P.	DATE:	JULY 2020
CHECKED BY:	W.J.D.	DRAWING NO.	6545A
JOB NO.	6545	SHEET	2 OF 2

DOUCET SURVEY LLC

Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
2 Commerce Drive (Suite 202) Bedford, NH 03110 (603) 614-4060
10 Storer Street (Riverview Suite) Kennebunk, ME (207) 502-7005
http://www.doucetsurvey.com

FILE NAME: C:\Users\EA\AppData\Local\Temp\AcPublish_30360\6545A CSD2020-07-10.dwg LAYOUT NAME: SHEET 2 PLOTTED: Friday, July 10, 2020 - 3:10pm

EXISTING RECIPROCAL ACCESS EASEMENT
9,642 Sq. Ft.
0.22 Acres

PARCEL ID: H-35-E-0

EXISTING LIGHT FIXTURES TO BE REMOVED

EXISTING GUARDRAIL TO BE REMOVED

EXISTING UTILITY TO BE REMOVED

BUSSES ONLY EXIT WATCH FOR BUSSES TO BE REMOVED

ONE WAY TO BE REMOVED

SPEED LIMIT TO BE REMOVED

T-POST (TYP.)

EXISTING LIGHT FIXTURES AND ASSOCIATED CONDUIT TO BE REMOVED

PARCEL ID: H-34-0-0

EP

H-35-C-4
COOPERATIVE ALLIANCE FOR SEACOAST TRANSPORTATION
278,107 Sq. Ft.
6.38 Acres

LIGHT POLE BASE

PROPOSED TREELINE

EXISTING 4" PVC TO BE REMOVED

EXISTING PAVEMENT TO BE REMOVED

PROPOSED TREELINE

LIMITS OF WORK (TYP.)

EXISTING CATCH BASIN TO BE REMOVED

EXISTING 12" RCP TO BE REMOVED

50' WETLAND BUFFER

EXISTING 4" PVC TO BE REMOVED

EXISTING 12" RCP TO BE REMOVED

DO NOT ENTER TO BE REMOVED

BIKE RACK TO BE REMOVED

DO NOT ENTER TO BE REMOVED

ONE WAY TO BE REMOVED

12" RCP W/FES INV.=94.2' TO BE REMOVED

DO NOT ENTER TO BE REMOVED

DIRECTIONS TO BE REMOVED

12" RCP W/FES INV.=94.3' TO BE REMOVED

EXISTING CATCH BASINS TO BE REMOVED

DMH 2393 TO BE REMOVED

DIESEL FUEL BOX TO BE REMOVED

OVERHANG (TYP.)

12" RCP W/FES INV.=94.3' TO BE REMOVED

EXISTING CURBING WITHIN LIMITS OF WORK TO BE REMOVED

EXISTING GAS TO BE REMOVED

WOODEN SUPPORT POST TO BE REMOVED

COAST PUBLIC TRANSIT BUILDING TO BE REMOVED

COAST SIGN AND GRANITE POSTS TO BE STORED ON SITE, COORDINATE NEW LOCATION WITH OWNER

(2)STORAGE CONTAINERS TO BE RELOCATED, COORDINATE WITH OWNER

EXISTING 4" PVC TO BE REMOVED

EXISTING GENERATOR TO BE REUSED, COORDINATE WITH OWNER

PAD MOUNTED GENERATOR

EXISTING LIGHT FIXTURES AND ASSOCIATED CONDUIT TO BE REMOVED

TRANSIT SHELTER TO BE REMOVED

30' WIDE UTILITY ACCESS EASEMENT

EXISTING 30' WIDE UTILITY ACCESS EASEMENT

PARCEL ID: H-31-0-0

18" RCP W/FES INV.=95.5' TO BE REMOVED

12" RCP W/FES INV.=93.0' TO BE REMOVED

6" PVC INV.=92.0' TO BE REMOVED

6" PVC INV.=93.2' TO BE REMOVED

2" METAL TO BE REMOVED

TO BE REMOVED

PROPOSED STABILIZED CONSTRUCTION ENTRANCE

SPEED LIMIT 10 TO BE REMOVED

SWING GATE TO BE REMOVED

SMH 1686

STOP

DO NOT ENTER

12" RCP W/FES INV.=93.0' TO BE REMOVED

2" METAL TO BE REMOVED

12" RCP INV.=92.7'

12" RCP INV.=92.8'

STONE & MORTAR HDWL

LIMITS OF WORK (TYP.)

EXISTING LIGHT FIXTURES AND ASSOCIATED CONDUIT TO BE REMOVED

EXISTING UTILITIES WITHIN CLOUDED AREA TO BE REMOVED, COORDINATE LIMITS WITH UTILITY PLAN

EXISTING SEWER MANHOLES TO REMAIN, SEE UTILITY PLAN

LIMITS OF WATER MAIN TO BE REMOVED, SEE UTILITY PLAN

PARCEL ID: H-35-C-3C

SMH 1786
PSNH303 41E
W/COND.

SUMNER DRIVE

Legend

- Property Line Setbacks
- Wetlands
- Wetland Setback
- Property Line

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Site Plan.dwg Date Plotted: Mar 14, 2023 – 2:05pm Plotted By: CCHIARAMONTE

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
cmaengineers.com

BENJAMIN C. CLARK NUMBER 14026 REGISTERED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE
3/16/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: 1" = 30'
0 30' 60'
Scale: 1" = 30'

Cooperative Alliance for Seacoast Transportation, Dover, NH

Operations and Maintenance Facility
42 Sumner Drive

Site Preparation and Demolition Plan

drawing no.
C-1

sheet: 9 of 23

GENERAL SITE NOTES:

1. THE INTENT OF THIS PLAN IS TO PRESENT THE EXISTING COAST BUS FACILITY REDEVELOPMENT PROJECT CONSISTING OF 28,700 SF VEHICLE STORAGE BUILDING AND 17,000 SF ADMINISTRATION, OPERATIONS, AND MAINTENANCE BUILDING.

2. OWNER OF RECORD:

   COOPERATIVE ALLIANCE FOR SEACOAST TRANSPORTATION
   42 SUMNER DRIVE
   DOVER, NH 03820
   S.C.R.D. BOOK 2200, PAGE 264

   OWNER SIGNATURE

3. THE PARCEL SHOWN IS LOT NO. H–35, MAP C–4 OF THE CITY OF DOVER TAX ASSESSOR'S MAPS.

4. THE SUBJECT PARCEL CONTAIN 6.38 ACRES / 278,107 SF OF LAND.

5. EXISTING RECIPROCAL ACCESS EASEMENT S.C.R.D. BK. 1645 PG. 575 & EXISTING 30' UTILITY ACCESS EASEMENT S.C.R.D. BK. 1645 PG. 590

6. CURRENT CITY OF DOVER ZONING DISTRICT IS COMMERCIAL MANUFACTURING:

	REQUIRED	PROVIDED
MIN. LOT SIZE:	20,000 SF	278,107 SF
MIN. LOT FRONTAGE:	100 FT	188.34 FT
MIN. YARD SETBACKS:		
FRONT:	35 FT	150 FT
SIDE:	10 FT	91 FT
REAR:	10 FT	36 FT
ABUT–A–STREET:	35 FT	91 FT
MAX. LOT COVERAGE:	50 %	17 %
MAX. BUILDING HEIGHT:	50 FT	30 FT 8 IN & 26 FT
GREEN SPACE:	33 %	44 %

   THIS PROPERTY FALLS WITHIN THE FOLLOWING ZONING OVERLAY DISTRICTS:
   –GROUND WATER PROTECTION DISTRICT (TERTIARY)
   –WETLAND PROTECTION DISTRICT

8. PARKING REQUIREMENTS – OFFICE & INDUSTRIAL USE

   MAX. # OF SPACES FOR OFFICE = 8,000 SF X 1/300 SF = 26.6 SPACES
   MAX. # OF SPACES FOR INDUSTRIAL = 38,700 SF X 1/800 SF = 48.3 SPACES

   MAX. # OF SPACES ALLOWED = 75 SPACES
   PROVIDED SPACES = 73 SPACES (3 ADA W/ 1 VAN)

9. CONDITIONAL USE PERMIT – CONSTRUCT STORMWATER MANAGEMENT SYSTEM WITHIN THE WETLAND BUFFER. (170–27.1.G.d.iv)

10. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A FIELD SURVEY PERFORMED BY DOUCET SURVEY DURING JUNE 2020 USING A TRIMBLE S6 TOTAL STATION AND A TRIMBLE R10 SURVEY GRADE GPS WITH A TRIMBLE TSC3 DATA COLLECTOR AND A TRIMBLE DINI DIGITIAL AUTO LEVEL, WITH A PRECISION GREATER THAN 1:15,000.

11. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2800) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.

12. VERTICAL DATUM IS BASED ON APPROXIMATE NAVD88(GEOID12A) (±.2') DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.

13. SUBJECT PARCEL IS NOT LOCATED WITHIN A FEDERALLY DESIGNATED FLOOD HAZARD AREA (33017C0320E EFF. 9/30/2015).

14. JURISDICTIONAL WETLANDS DELINEATED BY WEST ENVIRONMENTAL, INC DURING JUNE 2020 IN ACCORDING TO THE:

   14.1. US ARMY CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL, TECHNICAL REPORT Y–87–1 (JANUARY, 1987).
   14.2. REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION (2012).
   14.3. NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS: NORTHEAST (REGION 1). U.S. FISH AND WILDLIFE SERVICE (2013).
   14.4. CODE OF ADMINISTRATIVE RULES. WETLANDS BOARD, STATE OF NEW HAMPSHIRE (CURRENT).
   14.5. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.0, 2016 AND (FOR DISTURBED SITES) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4. NEHSTC (MAY 2017).

15. THE INSTALLATION OF ELECTRIC POWER, CABLE TELEVISION AND TELEPHONE LINES SHALL BE UNDERGROUND THROUGHOUT THE SITE.

16. THE SUBJECT PARCEL IS SERVED BY MUNICIPAL WATER AND SEWER.

17. THE LIMITS OF CONSTRUCTION DISTURBANCE THAT ARE LOCATED WITHIN 50 FT OF CONSERVATION AND WETLAND DISTRICTS SHALL BE STAKED, FLAGGED, AND CLEARLY IDENTIFIED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS.

18. 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.

19. 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.

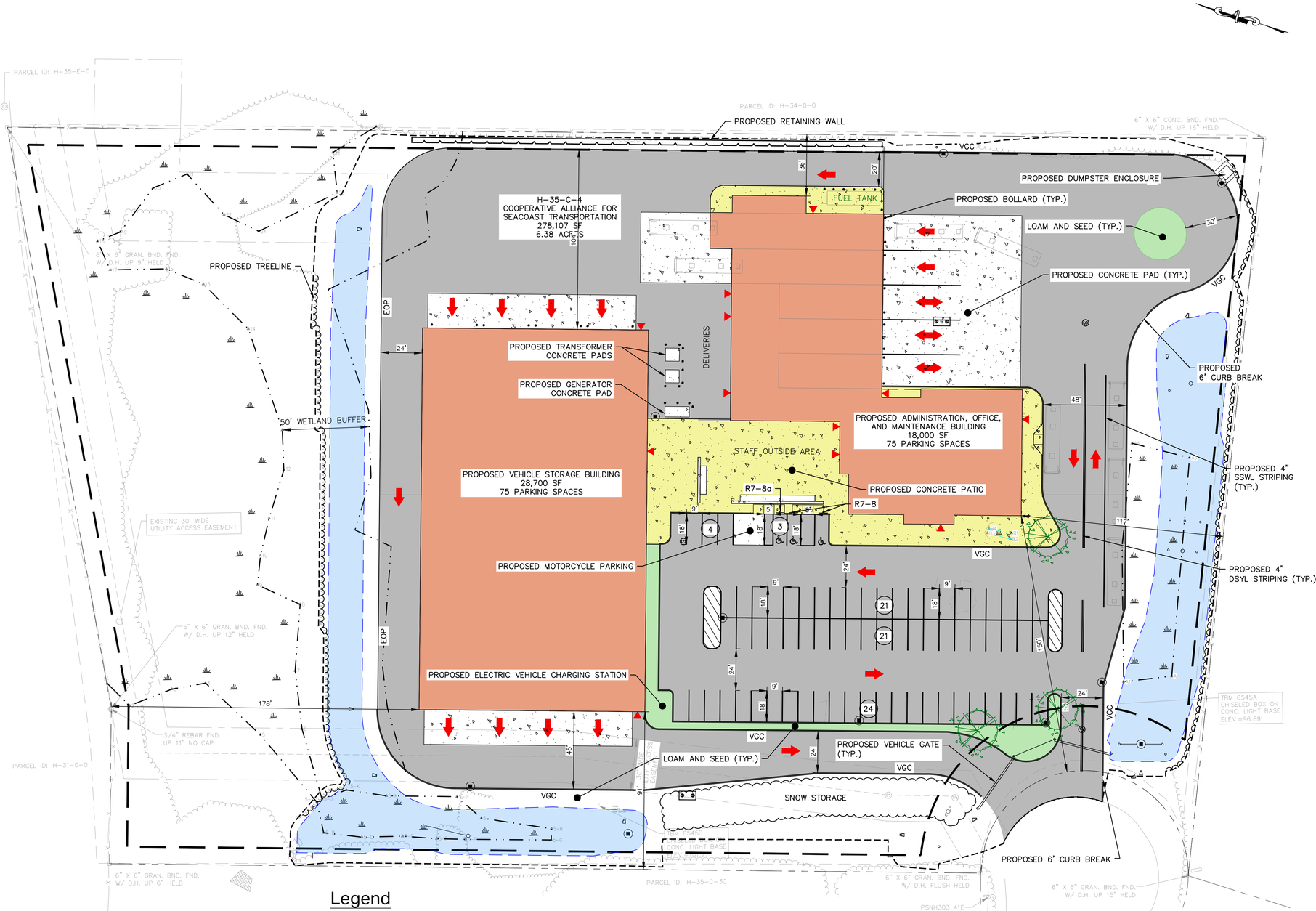
20. SITE CONSTRUCTION HOURS SHALL BE LIMITED TO MONDAY–FRIDAY 7 AM–6 PM, SATURDAY AND SUNDAY 9 AM–4 PM. HOURS OF CONSTRUCTION MUST BE DOCUMENTED ON A SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. SAID SIGNAGE MUST BE LOCATED AND APPROVED BY THE CITY ENGINEER OR PLANNING DIRECTOR.

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

22. EXTERIOR LIGHTING SHALL BE CUT–OFF TYPE FIXTURES PER CHAPTER 153–14–E AND SHALL PROVIDE LIGHTING DIRECTED ON–SITE ONLY.

23. THE PROPOSED STRUCTURE SHALL BE SERVED BY A SPRINKLER SYSTEM AS REQUIRED BY CHAPTER 81–30 OF THE CODE OF THE CITY OF DOVER AND THE ADOPTED STATE OF NH BUILDING AND FIRE CODES.

24. SPRINKLER CONNECTIONS MUST BE FLUSHED IN ACCORDANCE WITH NEPA 24 AND A CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM MUST BE COMPLETED AND APPROVED BY INSPECTION AND SERVICES PRIOR TO CONNECTION OF THE BLACKFLOW DEVCE.



Legend

- Property Line Setbacks
- Building Door
- Pavement
- Building
- Sidewalk
- Grass/Landscaping
- Stormwater Treatment
- Traffic Flow Direction
- Concrete Pad
- Wetlands
- Wetland Setback
- Property Line

PERMIT	FILED	APPROVED
CITY OF DOVER – SITE PLAN	3/16/2023	–
CITY OF DOVER – CUP	3/16/2023	–
NHDES – AOT	–	–
NHDHR – RPR	–	–
NHB DATA CHECK	11/15/2022	11/17/2022
NH FISH AND GAME CONSULTATION	–	–
EPA ENOI	–	–

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

BENJAMIN C. CLARK No. 15219 NEW HAMPSHIRE – STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER
5/14/23

by	date	revision	no.

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: PAC
scale: 30' 0 60' Scale: 1" = 30'

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Site Layout Plan

drawing no. C-2

sheet: 7 of 23

PROPOSED 1,000 GALLON
OIL–WATER SEPARATOR
RIM:101.35
INV. IN:97.20
INV. OUT:97.03

SMH–102
RIM:98.95
SUMP:92.40
INV. IN:95.43 8"(N)
INV. IN:93.15 8"(NW)
INV. OUT:92.90 8"(W)

PROPOSED FLOOR DRAIN
INV. OUT=97.83'

PROPOSED FLOOR DRAIN
INV. OUT=97.83'

76' of 8" SDR 35 @ 2.09%

29' of 8" SDR 35 @ 2.15%

85' of 8" SDR 35 @ 1.96%

PROPOSED GAS SERVICE

PROPOSED (2) THREE PHASE
PAD–MOUNTED TRANSFORMERS

PROPOSED GENERATOR

69' of 8" SDR 35 @ 1.44%

PROPOSED SANITARY SEWER SERVICE
INV. OUT=94.83'

PROPOSED 2" COPPER DOMESTIC WATER

PROPOSED 6" DI FIRE SERVICE PROTECTION

PROPOSED WATER SHUT OFF VALVE

PROPOSED EVERSOURCE
PULL BOX

SMH–101
RIM:100.17
SUMP:93.65
INV. IN:95.40 8"(N)
INV. IN:95.40 8"(E)
INV. OUT:94.15 8"(W)

PROPOSED 6" DI WATER MAIN

PROPOSED SEWER SERVICE
INV. OUT=95.83'

20' of 8" SDR 35 @ 2.20%

PROPOSED UNDERGROUND
ELECTRIC SERVICE

PROPOSED UNDERGROUND
TELECOM SERVICE

PROPOSED CONNECTION FOR
FUTURE ELECTRIC VEHICLE
CHARGING STATION

142' of 8" SDR 35 @ 2.11%

PROPOSED 6"
GATE VALVE

PROPOSED 2" COPPER DOMESTIC WATER

PROPOSED 6"x6"x6"
MJ TEE

PROPOSED JOINT
RESTRAINTS (TYP.)
SEE DETAIL

PROPOSED WATER SHUT OFF VALVE

PROPOSED 6" DI FIRE SERVICE

SMH–103
RIM:96.56
SUMP:89.00
INV. IN:89.75 8"(E)
INV. OUT:89.50 8"(NW)

CONNECT TO EXISTING 6"
WATER MAIN

87' of 8" SDR 35 @ 1.97%

231' of 8" SDR 35 @ 1.36%

111' of 8" SDR 35 @ 1.87%

'50' WETLAND BUFFER

EXISTING 30' WIDE
UTILITY ACCESS EASEMENT

EX. SMH–1732
RIM:96.18
SUMP:87.30
INV. IN:87.90 8"(SE)
INV. IN:87.90 8"(N)
INV. OUT:87.80 8"(SW)

PROPOSED GAS SERVICE

PROPOSED PULL BOX

PROPOSED 1,000 GALLON
OIL–WATER SEPARATOR
RIM:100.29
INV.IN:91.15
INV.OUT:90.83

EX. SMH–1686
RIM:97.18
SUMP:88.00
INV. IN:88.75 8"(N)
INV. OUT:88.50 8"(S)

PROPOSED RISER POLE

PROPOSED OVERHEAD ELECTRIC

SMH 1786
PSNH303 41E
W/COND.

SUMNER DRIVE

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

NEW HAMPSHIRE – BENJAMIN CLARK No.15219 – PROFESSIONAL ENGINEER – STATE
5/16/23

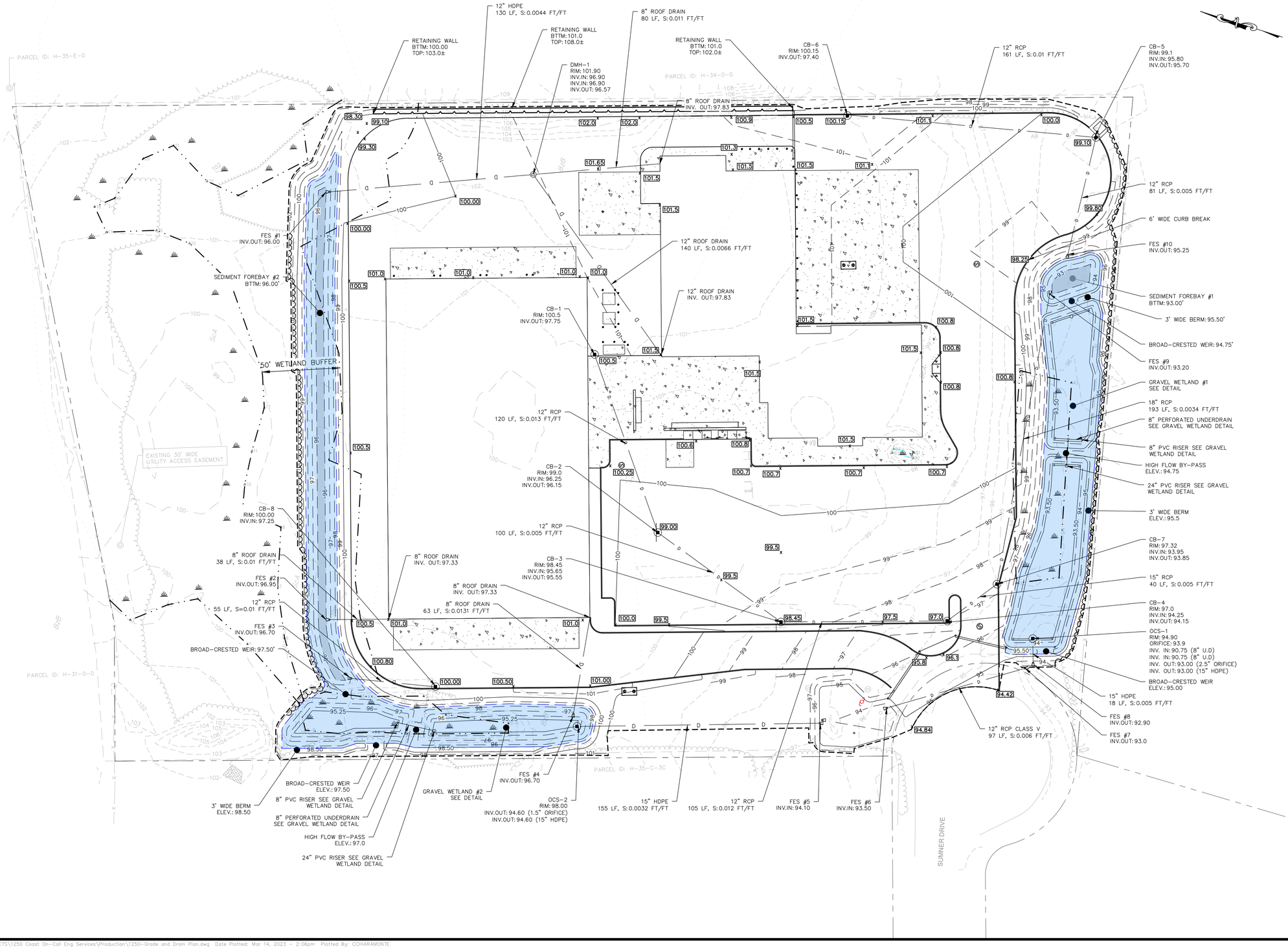
designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: 1" = 30'

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Utilities Plan

drawing no. C-3

sheet: 8 of 23

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Site Plan.dwg Date Plotted: Mar 14, 2023 – 2:05pm Plotted By: CCHIARAMONTE



no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

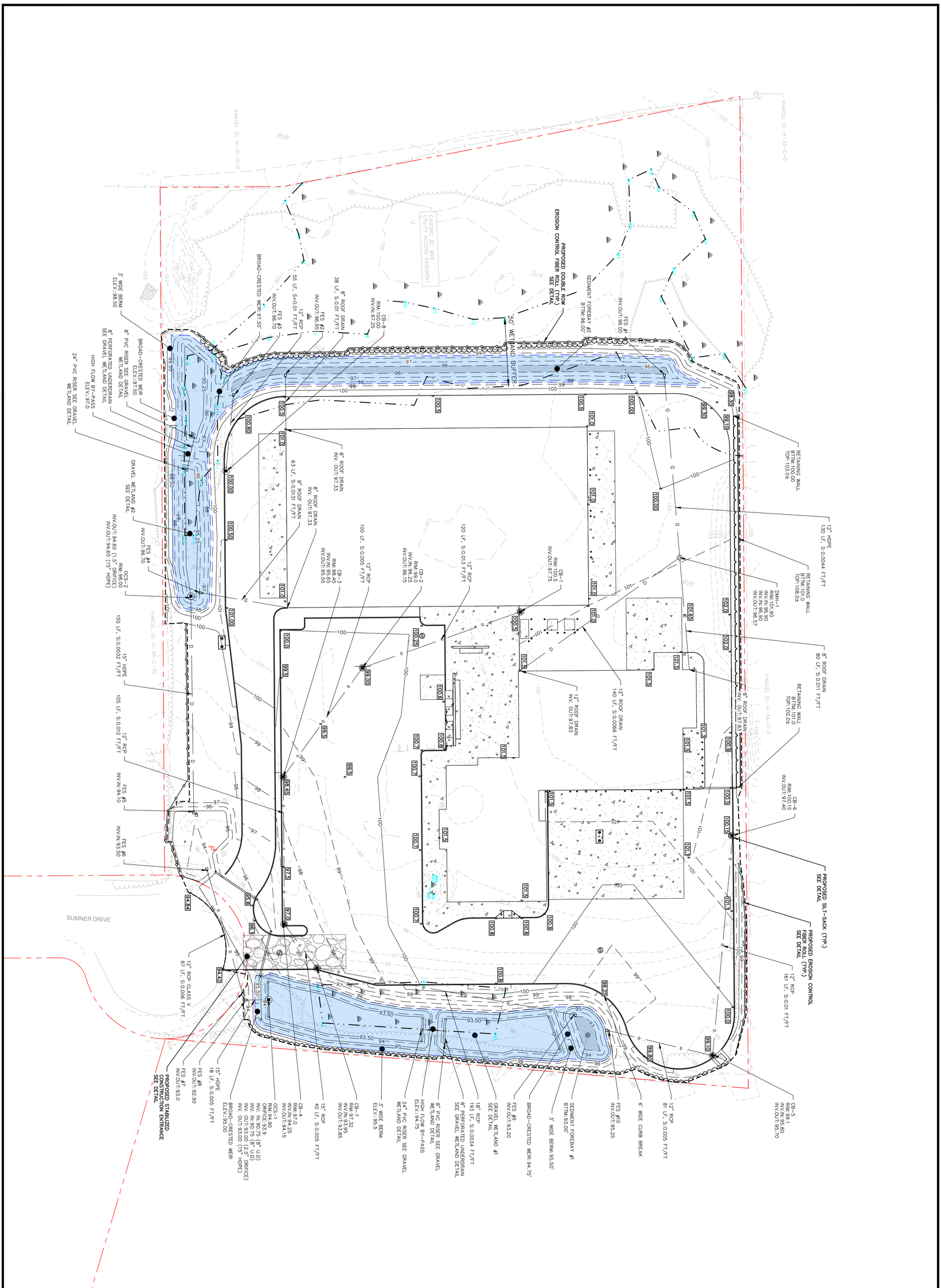
NEW HAMPSHIRE - 833N - BENJAMIN C. CLARK No.15219 - PROFESSIONAL ENGINEER - STATE OF
10/13/23

designed by: CFC
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: PAC
scale: 1" = 30'

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Grading & Drainage Plan

drawing no. C-4

sheet: 9 of 23



sheet: 10 of 23	drawing no.: C-5		
Cooperative Alliance for Seacoast Transportation, Dover, NH			
Operations and Maintenance Facility 42 Sumner Drive			
Sediment and Erosion Control Plan			

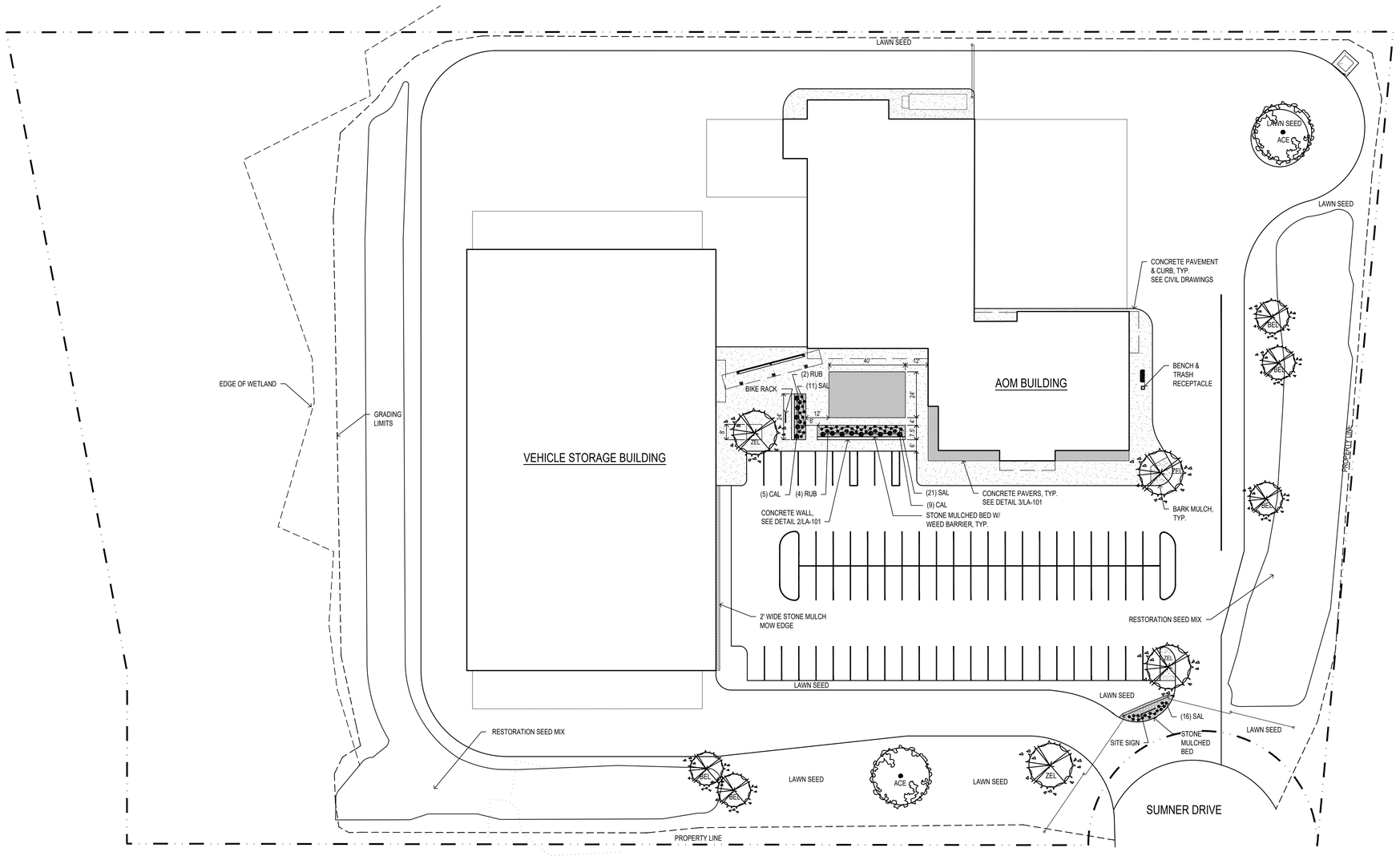
date: March 16, 2023	designed by: CFC
project no: 1250	drawn by: CFC
checked by: BCC	approved by: PAC

scale: 0 20' 40' Scale: 1" = 20'

STATE OF NEW HAMPSHIRE BENJAMIN C. CLARK No. 15219 PROFESSIONAL ENGINEER 5/16/23

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

no.	revision	date	by



LANDSCAPE GENERAL NOTES

1. ALL LANDSCAPE PLANTINGS SHALL BE LABELED WITH GENUS, SPECIES AND CULTIVAR. AT MINIMUM ONE PLANTING FROM EACH SPECIES SHALL BE LABELED. LABELING SHALL REMAIN IN PLACE UNTIL FINAL INSPECTION.
2. ANY PLANTING MATERIALS THAT ARE NOT OF PROPER SPECIES, SIZE, OR IN GOOD CONDITION SHALL BE REJECTED.
3. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES BEFORE BEGINNING LANDSCAPING INSTALLATION.
4. ALL SEEDED AREAS SHALL HAVE A MINIMUM OF 6 INCHES OF TOPSOIL DEPTH. TOPSOIL TO BE TREATED WITH A 12-25-12 PELLETIZED FERTILIZER @ 10 LBS. PER 1,000 SQUARE FEET. ALL SEEDED AREAS TO BE POWER RAKED PRIOR TO SEEDING.
5. THE CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING A THICK, WEED FREE LAWN THROUGH THE FIRST MOWING.
9. SOIL PLANTING MIXTURE SHALL BE A 6%-10% ORGANIC TOPSOIL, AMENDED WITH 10% WOOD ASH, 10% MANURE, & 30% PEAT MOSS(OR INCORPORATE ALL-GRO OR A SIMILAR DEHYDRATED NATURAL COMPOST MATERIAL. ALL PLANT MATERIAL PITS SHALL RECEIVE A MINIMUM OF 20% ALL-GRO OR EQUAL PLANT AMENDMENT.
10. PERENNIAL BEDS TO HAVE A MINIMUM DEPTH OF 12 INCHES OF SOIL PLANTING MIXTURE OVER UNCOMPACTED SUBGRADE.
11. ALL B&B MATERIAL WHICH ARE ENCASED IN WIRE BASKETS SHALL HAVE THE WIRES CUT LOOSE AND THE TOP THIRD REMOVED.
12. IF ROAD BASE IS ENCOUNTERED IN THE PLANTING BEDS IT SHALL BE REMOVED AND REPLACED WITH AMENDED PLANTING MATERIAL.
13. MULCHED AREAS SHALL HAVE A MINIMUM DEPTH OF 4" OF PINE/HEMLOCK BARK MULCH OVER WEED BARRIER FABRIC.
14. STONE BED AREAS TO HAVE A MINIMUM 3 INCHES OF NATURAL NON-CRUSHED STONE OVER WEED BARRIER FABRIC.
15. TREES SHALL HAVE A 4 INCH COVERING OF PINE/HEMLOCK MULCH. TREES SHALL HAVE A 6 FOOT DIAMETER SAUCER WITH A 'V' GROOVE EDGE.
16. TREES SHALL BE GUYED IN A TRIPOD FASHION WITH 2" X 2" X 8' HARDWOOD STAKES.
17. ALL PLANTING SHALL BE HAND WATERED IMMEDIATELY AFTER PLANTING. PLANTINGS SHALL BE MONITORED FOR THE MAINTENANCE PERIOD (90 DAYS) AND APPLY ADDITIONAL WATERING AS REQUIRED FOR PLANT ESTABLISHMENT.
18. THE CONTRACTOR IS TO PROVIDE A ONE YEAR WARRANTY ON ALL PLANTED MATERIALS. AT ONE YEAR FROM DATE OF INSTALLATION, ANY PLANTINGS NOT IN GOOD CONDITION SHALL BE REPLACED; ALL GUYS AND STAKES ARE TO BE REMOVED FROM TREES AND ANY LAWN BARE SPOTS ARE TO BE RESEEDED.

PLANT MATERIAL LEGEND

ACE	ACER SACCHARUM 'FALL FIESTA' (SUGAR MAPLE)	2 ½" CAL.
ZEL	ZELKOVA SERRATA (GREEN VASE ZELKOVA)	2 ½" CAL.
BET	BETULA NIGRA MULTISTEM (RIVER BIRCH)	6'-7'
CAL	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER' (REED GRASS)	#2 GAL.
RUB	RUDBECKIA FULGIDA SULLIVANTII 'GOLDSTURM' (BLACK EYED SUSAN)	#2 GAL.
SAL	SALVIA X SYLVESTRIS (BLUE HILL SAGE)	#1 GAL.

SEED MIXTURES

NEW ENGLAND WETLAND PLANTS, NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DRY SITES

BLUE SEAL LANDSCAPER'S LAWN SEED MIX

MISC. PRODUCTS

BARK MULCH: PREMIUM BLEND PINE/HEMLOCK MULCH

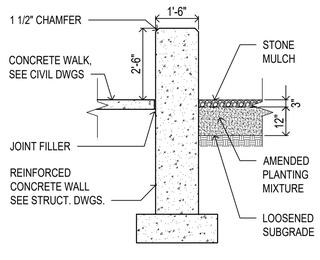
STONE MULCH: NON-CRUSHED ROOF BALLAST W/ 5 OZ. WEED BARRIER

ADDITIONAL ITEMS

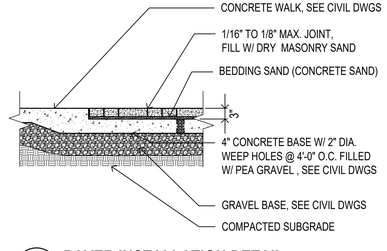
CONCRETE PAVERS: GENEST 4" X 8" X 2 3/8"PAVER, HOLLANDSTONE, COLOR: GRANITE MIX, BASKET WEAVE LAYING PATTERN. PAVERS TO SET IN SAND BED OVER A CONCRETE BASE. CONCRETE BASE TO HAVE WEEP HOLES @ 4'-0" O.C. SEE CIVIL DRAWINGS.

BIKE RACK: PILOT ROCK "SADDLEBACK" 7 BIKE RACK, HOT DIP GALVANIZED FINISH. RACK TO BE EMBEDDED IN 16" DIA. TUBE FOUNDATIONS, 4 FEET DEEP, 3000 LB. CONCRETE. FOUNDATIONS TO BE RECESSED BELOW CONCRETE WALK.

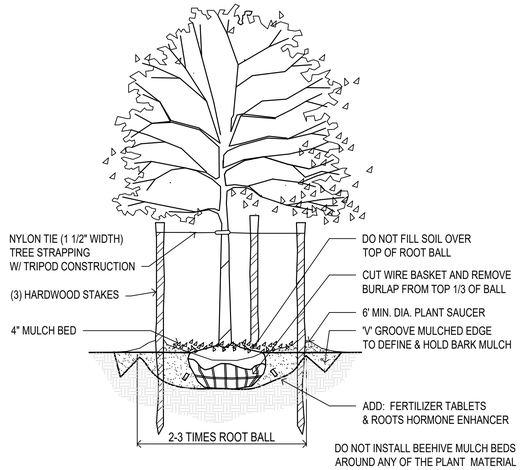
BENCH & TRASH CONTAINER: 6' RECYCLED PLASTIC AND POWDER COATED STEEL BENCH WITH BACK AND ARMS. MADISON CONTOUR BENCH MANUF. ANOVA. 35 GAL. MADISON TRASH RECPETACLE WITH VISOR HOOD TOP, MATERIALS TO MATCH BENCH.



2 / LA-101 **CONCRETE WALL SECTION DETAIL**
NTS



3 / LA-101 **PAVER INSTALLATION DETAIL**
NTS



4 / LA-101 **TREE PLANTING DETAIL**
NTS

1 / LA-101 **LANDSCAPE PLAN**
1" = 30'

PLAN NORTH

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH Manchester, NH Portland, ME
603/431-6196 603/627-0708 207/541-4223
c m a e n g i n e e r s . c o m
Robert E. Doyle PE RA
PO Box 1325, 35 Cushing Street
Dover, NH 03821-1325
603.738.2872
robyleperal@gmail.com

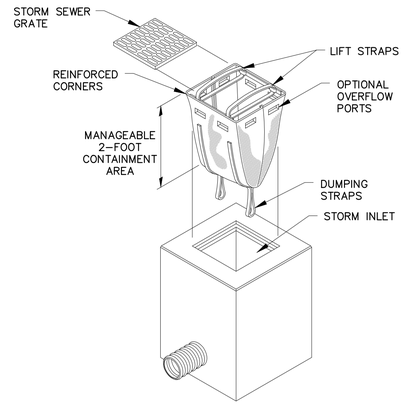
no.	issue	date	by

PROGRESS DRAWINGS NOT FOR CONSTRUCTION

designed by: RED | drawn by: RED | approved by: RED | scale: AS NOTED
date: MAR 16, 2023 | project no: 0090 | checked by: RED

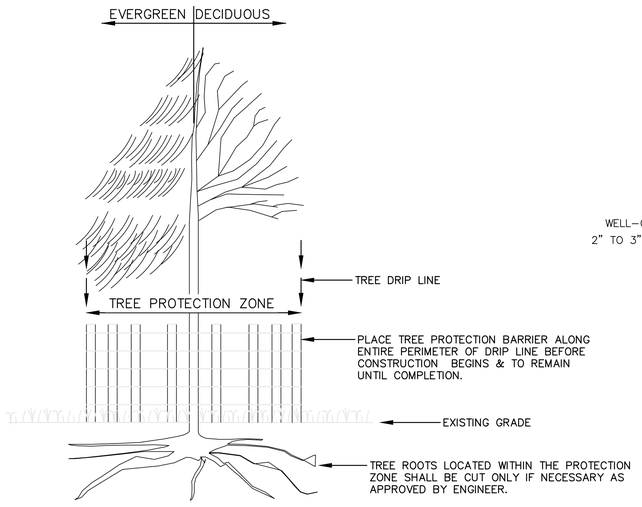
Cooperative Alliance for Seacoast Transportation (COAST)
Operations and Maintenance Facility
42 Sumner Drive, Dover, NH
LANDCAPE PLAN
ADMINISTRATION & OPERATIONS

drawing no. LA-101
sheet: XX of XX



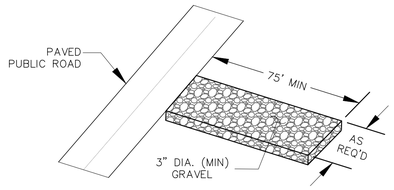
"Silt Sack" Sediment Control Device for Inlet Protection

Not to Scale



Temporary Tree Protection

Not to Scale

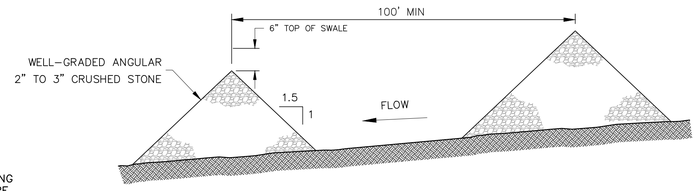


CONSTRUCTION SPECIFICATIONS:

1. STONE SIZE – USE 3" STONE (MIN)
2. LENGTH – AS REQUIRED, 75 FEET (MIN)
3. THICKNESS –Six (6) INCHES (MIN)
4. WIDTH – NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
8. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PERFORMED AFTER EACH RAIN.

(B) Stabilized Construction Entrance

Not to Scale

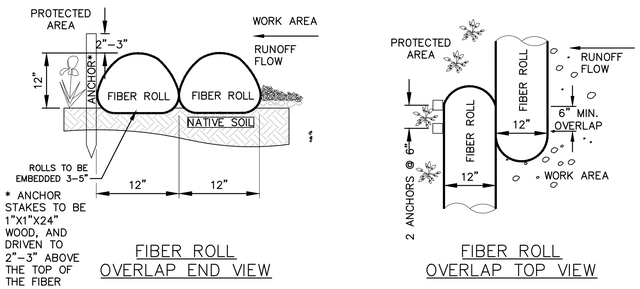


NOTES:

1. PLACE CRUSHED STONE TO WITHIN 6" OF TOP OF DRAINAGE WAY.
2. FOR ACTIVE DRAINAGE OUTFLOW CHECK DAMS SHALL BE PLACED IN SERIES (100–FEET MIN) ALONG FLOW LINE TO RETAIN SEDIMENTS.
3. THE MAXIMUM HEIGHT OF THE STONE CHECK DAM SHALL NOT EXCEED 2 FEET.
4. STONE CHECK DAMS SHALL BE CHECKED AFTER EACH RAINFALL AND REPAIRED IMMEDIATELY.
5. THE MAXIMUM SPACING BETWEEN THE DAMS SHALL BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE OVERFLOW ELEVATION OF THE DOWNSTREAM DAM.

(A) Stone Check Dam

Not to Scale

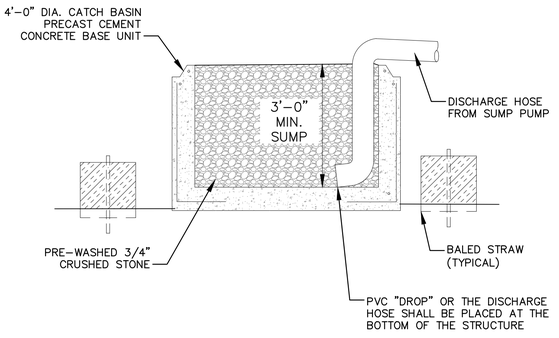


Erosion Control Fiber Roll

Not to Scale

Erosion Control Notes:

1. PERIMETER CONTROLS TO BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.
2. PRIOR TO CONSTRUCTION AND THEREAFTER EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED. PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE (BEFORE ROUGH GRADING THE SITE).
3. THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING DEVELOPMENT. WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME. LAND SHOULD NOT BE LEFT EXPOSED DURING THE WINTER MONTHS.
4. CATCH BASIN INSERTS, MIRAFI DANDY SACK OR EQUAL, SHALL BE INSTALLED AND MAINTAINED AT CATCH BASINS UNTIL PAVEMENT IS INSTALLED. SEDIMENT AND DEBRIS SHALL BE REMOVED FOLLOWING EACH STORM EVENT.
5. ALL DISTURBED AREAS AND SIDE SLOPES WHICH ARE FINISH GRADED WITH NO FURTHER CONSTRUCTION TO TAKE PLACE SHALL BE SEEDED AND MULCHED. ALL DISTURBED AREAS OUTSIDE LIMITS OF BUILDING, AND PAVEMENT SHALL BE STABILIZED WITH LOAM AND SEED. ALL SEED, LIME AND FERTILIZER PROGRAMS SHALL CONFORM TO ALL APPLICABLE SECTIONS OF THE SPECIFICATIONS.
6. ANY DISTURBED AREAS WHICH ARE TO BE LEFT TEMPORARILY, OR LONGER THAN TWO WEEKS AND WHICH WILL BE RE–GRADED LATER DURING CONSTRUCTION, SHALL BE TEMPORARILY SEEDED AND MACHINE STRAW MULCHED AT A RATE OF 1.5 TONS/ACRE.
7. AVOID USE OF UNDISTURBED AREAS WHEREVER POSSIBLE DURING CONSTRUCTION. CONSTRUCTION TRAFFIC SHALL TRAVEL THE ROADBEDS OF EXISTING AND FUTURE ROADS AND SHALL BE LIMITED TO WITHIN THE LIMITS OF CONSTRUCTION NOTED ON THE PLANS.
8. EROSION CONTROL DEVICES SHOWN REPRESENT MINIMUM MEASURES REQUIRED FOR EROSION CONTROL. THE CONTRACTOR SHALL TAKE ANY AND ALL NECESSARY MEASURES TO PREVENT TRANSPORTATION OF SEDIMENT BEYOND THE WORK AREA.
9. ALL STORMWATER MANAGEMENT SYSTEMS SHALL BE STABILIZED PRIOR TO DIRECTING FLOW TO THEM.
10. AFTER ALL DISTURBED AREAS HAVE BEEN STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES ARE TO BE REMOVED AND ACCUMULATED SEDIMENT DISPOSED OFF IN A LOCATION DESIGNATED BY THE OWNER.
11. WITHIN THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES COMPREHENSIVE SHORELAND PROTECTION ACT 250' BUFFER, ONLY LOW PHOSPHATE, SLOW RELEASE NITROGEN FERTILIZER OR LIMESTONE, MAY BE USED ON LAWNS OR AREAS WITH GRASS.
12. ALL ROADWAYS AND PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
13. ALL CUT AND FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
14. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY 0.5" OF RAINFALL.
15. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.
16. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    - BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
    - A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
    - A MINIMUM OF 3" OF NO–EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED
    - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED
18. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
19. TEMPORARY SEEDING (IF USED) SHALL BE PERENNIAL RYE GRASS, SPREAD 0.7LB/1000 SQ. FT.
20. WINTER CONSTRUCTION NOTES
    - ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING 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 INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS;
    - ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS;
    - AFTER NOVEMBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.



Dewatering Basin (Section)

Not to Scale

no.	revision	date	by

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

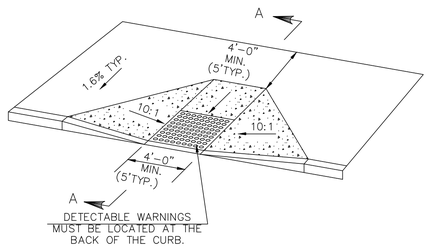
NEW HAMPSHIRE – STATE OF – PROFESSIONAL ENGINEER
BENJAMIN C. CLARK No.15519
5/24/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale:

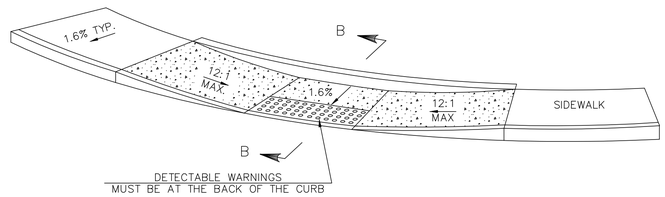
Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

drawing no. D-1

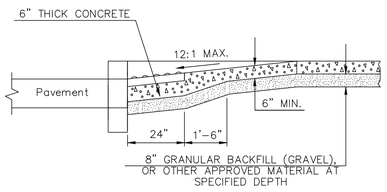
sheet: 12 of 23



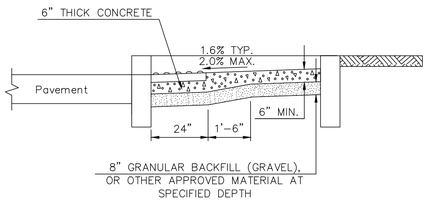
PERPENDICULAR CURB RAMP DETAIL



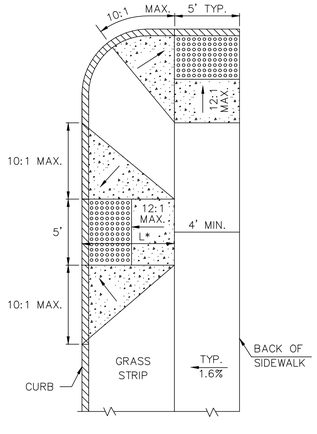
PARALLEL CURB RAMP DETAIL



SECTION A–A



SECTION B–B



PERPENDICULAR RAMP WITH GRASS PANEL

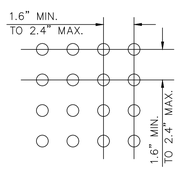
* LENGTH OF RAMP VARIES WITH SLOPE & WIDTH OF GRASS PANEL

THE ORDER OF PREFERENCE FOR LOCATION OF CORNER RAMPS:

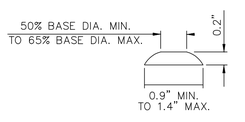
1. TWO SEPARATE RAMPS LOCATED ON TANGENT SIDEWALK AREA IMMEDIATELY OUTSIDE OF CORNER RADIUS.
2. TWO SEPARATE RAMPS SEPARATED BY 5' MINIMUM AS SHOWN ABOVE.
3. SINGLE RAMP SERVING TWO CROSSWALKS.

GENERAL NOTES

1. THE MAXIMUM RUNNING SLOPE OF ANY SIDEWALK CURB RAMP IS 12:1, THE MAXIMUM CROSS SLOPE IS 2%. THE SLOPE OF THE LANDING SHALL NOT EXCEED 2% IN ANY DIRECTION. RAMP RUNNING SLOPE EXCEPTION: A GREATER THAN 8.33% RAMP RUNNING GRADE IS ALLOWED WHERE THE THE ROADWAY AND THE SIDEWALK(S) ARE PARALLEL AND VERY CLOSE TOGETHER, WITH THE SAME GRADE, AND USING A GRADE OF 8.33% WOULD RESULT IN A RAMP LENGTH LONGER THAN 15'. IN THOSE CIRCUMSTANCES USE A MAXIMUM RAMP LENGTH OF 15' AND THE ALLOWABLE RUNNING SLOPE OF THE RAMP(S) IS GREATER THAN 8.33%
2. TRANSITIONS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. ROADWAY SHOULDER SLOPES ADJOINING SIDEWALK CURB RAMPS SHALL BE A MAXIMUM OF 5% (FULL WIDTH) FOR A DISTANCE OF 2 FT. FROM THE ROADWAY CURB LINE.
3. INTERCEPT DRAINAGE ALONG THE CURB IN ADVANCE OF SIDEWALK CURB RAMPS OR LANDINGS. CATCH BASINS, MANHOLES, ETC. SHALL NOT BE LOCATED IN, OR AT THE BASE OF, SIDEWALK CURB RAMPS OR LANDINGS.
4. THE BOTTOM OF THE SIDEWALK CURB RAMP OR LANDING, EXCLUSIVE OF THE FLARED SIDES, SHALL BE WHOLLY CONTAINED WITHIN THE CROSSWALK MARKINGS.
5. THE SURFACE OF A PERPENDICULAR SIDEWALK CURB RAMP OR THE LANDING OF A PARALLEL SIDEWALK CURB RAMP SHALL CONTRAST VISUALLY WITH THE ADJOINING SIDEWALK SURFACE, EITHER ASPHALT/LIGHT–COLORED CONCRETE OR LIGHT–COLORED CONCRETE/DARK–STAINED CONCRETE. THE CONCRETE SURFACE SHALL BE SLIP RESISTANT.
6. DETECTABLE WARNING PANELS SHALL BE THE FULL WIDTH OF THE LANDING, BLENDED TRANSITION, OR CURB RAMP THEY ARE A PART OF AND SHALL BE A MINIMUM OF 2 FEET IN DEPTH. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP, BLENDED TRANSITION, OR LANDING AND THE STREET.



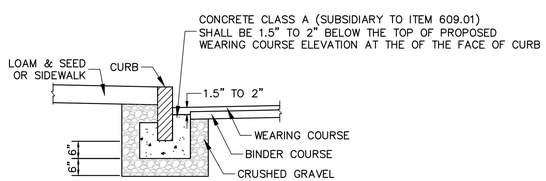
DOME SPACING



DOME SECTION

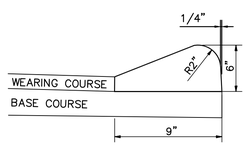
A Sidewalk & Curb Ramp Details

Not to Scale



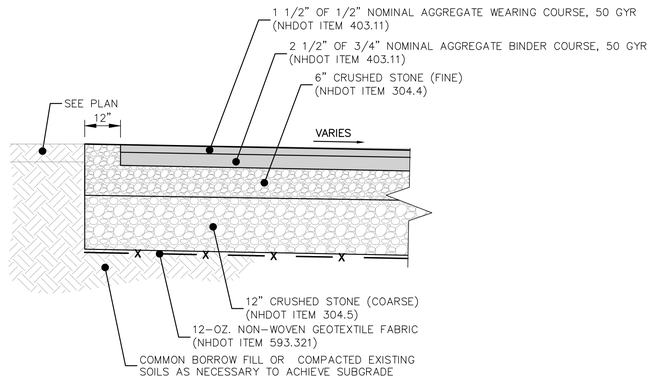
B Granite Curb w/ Concrete Backing

Not to Scale



C Bituminous Concrete Curb

Not to Scale



D General Bituminous Pavement Section

Not to Scale

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m



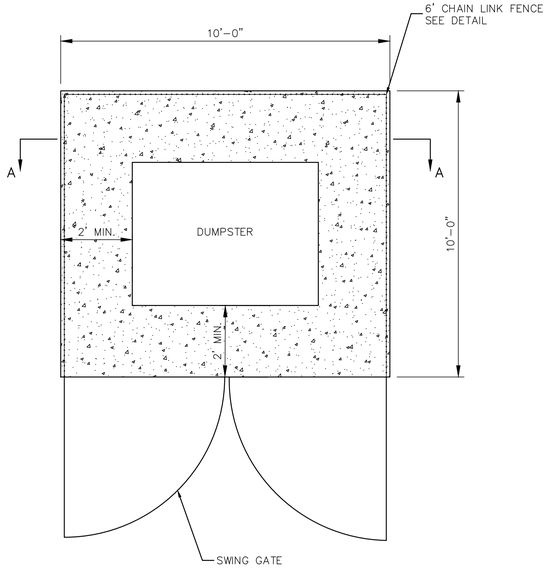
designed by:	drawn by:	approved by:	scale:
STF/RED	CFC	PAC	NTS

date:	project no:	checked by:
March 16, 2023	1250	BCC

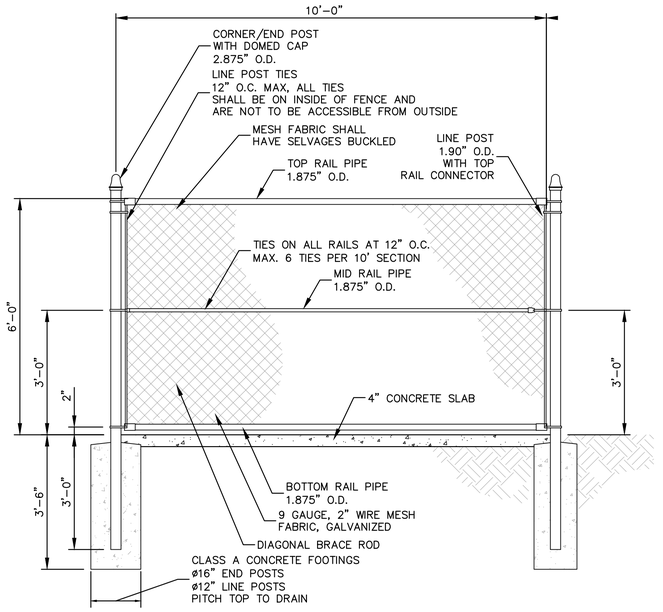
Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

drawing no.
D-2

sheet: 13 of 23



Plan

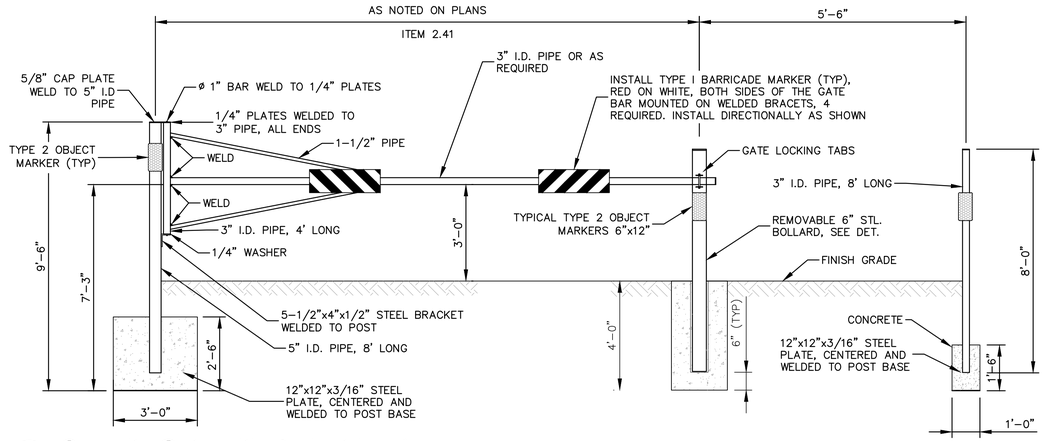


NOTES:

1. GATES AND POSTS SHALL BE HOT DIPPED GALVANIZED STEEL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR CATALOG CUTS FOR APPROVAL PRIOR TO FABRICATION

Section A-A

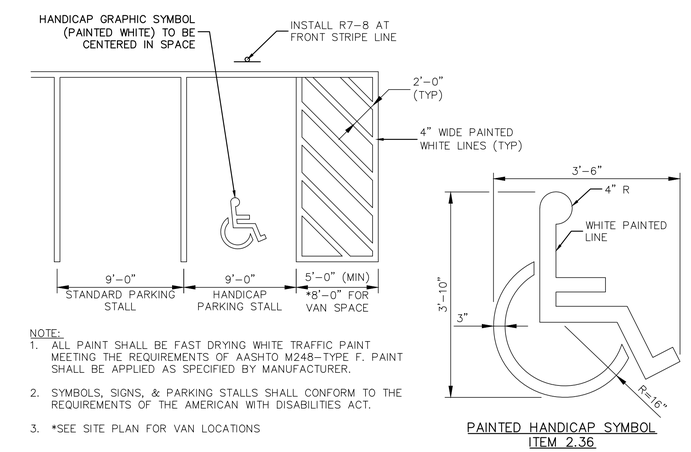
A *Chain Link Dumpster Enclosure*
Not to Scale



NOTES:

1. GATES AND POSTS SHALL BE HOT DIPPED GALVANIZED STEEL PAINTED GLOSS YELLOW. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR CATALOG CUTS FOR APPROVAL PRIOR TO FABRICATION
2. STEEL POSTS AND SWING ARMS SHALL BE 3" I.D. MINIMUM.
3. CONCRETE FOOTINGS AND GRAVEL BASE ARE SUBSIDIARY.
4. SECURITY GATES SHALL INCLUDE LOCKS AND KEYS AS SPECIFIED.
5. DRILL ø 1/4" HOLES 4'-0" CENTER TO CENTER IN BOTTOM OF GATE ARM FOR DRAINAGE.
6. A SECOND LOCKING POST SHALL BE INSTALLED BEHIND THE GATE, AS STAKED BY THE ENGINEER, ENABLING THE GATE TO BE LOCKED OPEN. TYPICAL TO LOCKING POST.

B *Security Gate with Pedestrian Access*
Not to Scale



NOTE:
1. ALL PAINT SHALL BE FAST DRYING WHITE TRAFFIC PAINT MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS, SIGNS, & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WITH DISABILITIES ACT.
3. *SEE SITE PLAN FOR VAN LOCATIONS

PAINTED HANDICAP SYMBOL
ITEM 2.36

C *Parking Stall Striping Detail*
Not to Scale

SIGNING NOTES:

1. EXISTING SIGNS THAT CONFLICT WITH THE PROPOSED LAYOUT SHALL BE REMOVED OR RELOCATED AS DIRECTED BY THE ENGINEER. THIS WORK PAID UNDER CONTRACT ITEMS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND RELOCATION OF ALL ROADWAY SIGNS. ANY SIGNS DAMAGED DURING THE COMPLETION OF WORK SHALL BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.
3. NOTE NEW REFLECTIVITY REQUIREMENTS IN THE 2016 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SECTION 718 PUBLISHED BY THE NHDOT.
4. REFER TO THE 2016 STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION AS PUBLISHED BY THE NHDOT FOR EXACT DETAILS OF PERMANENT SIGNING STANDARDS AND NHDOT SPECIFIC SIGNS.
5. REFER TO THE LATEST EDITION OF THE STANDARD HIGHWAY SIGNS MANUAL AS PUBLISHED BY THE USDOT-FHWA FOR EXACT DETAILS OF BORDERS, ETC.
6. THE MINIMUM SIGN HEIGHT FOR A ROAD SIGN IN A RURAL PROJECT SHALL BE 6-FEET. ALL OTHER SIGN HEIGHTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD.
7. ALL WARNING SIGNS SHALL HAVE TYPE IV BACKGROUND SHEETING UNLESS OTHERWISE SPECIFIED.
8. ALL EXISTING SIGNS THAT ARE REMOVED ARE TO BE STORED BY THE CONTRACTOR AND RESET AS DIRECTED. ANY EXISTING SIGNS TO BE RESET THAT ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS ARE TO BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
9. WHERE NEEDED, SIGNS POSTS SHALL BE U-CHANNEL, DIRECT BURIED, SINGLE POST.

SIGN TABLE (ITEM 2.42)

IDENT #	SIGN SIZE WIDTH (INCH)	SIGN SIZE HEIGHT (INCH)	TEXT	TEXT DIMENSIONS LETTER HEIGHT (INCH) UC	LC	CAPS	SHIELD SIZE (INCH)	ARROW (INCH)	NUMERAL (INCH)	# SIGNS REQ'D	SIGN AREA (SQ. FT) NOM. AREA	TOTAL AREA
R1-2	30	30	YIELD	REFER TO MUTCD AND ITS LATEST REVISIONS						1	2.70	2.70
W1-6R	36	12		REFER TO MUTCD AND ITS LATEST REVISIONS						1	3.00	3.00
R7-8	12	18	RESERVED PARKING	REFER TO MUTCD AND ITS LATEST REVISIONS						4	1.50	6.00
R7-8a	12	6	VAN ACCESSIBLE	REFER TO MUTCD AND ITS LATEST REVISIONS						4	0.50	2.00
R8-3	12	18	NO PARKING	REFER TO MUTCD AND ITS LATEST REVISIONS						1	1.50	1.50
R5-1	30	30	DO NOT ENTER	REFER TO MUTCD AND ITS LATEST REVISIONS						2	6.25	12.50
NA	18	24	AUTHORIZED VEHICLES ONLY	–						2	3.00	6.00

D *Sign Table*
Not to Scale

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

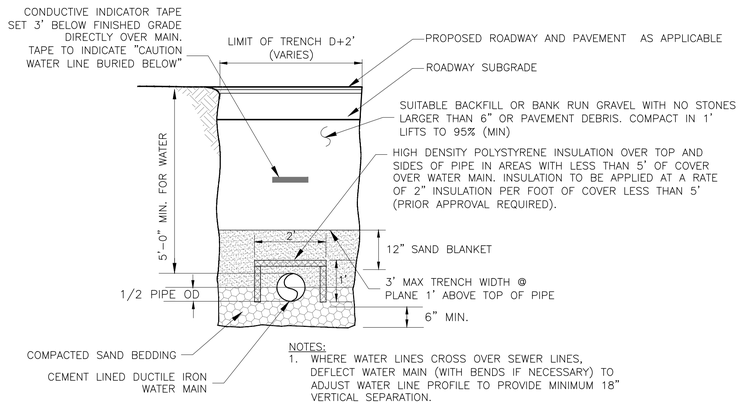
STATE OF NEW HAMPSHIRE - BENJAMIN CLARK No.15219 - LICENSED PROFESSIONAL ENGINEER

no.	revision	date	by

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: PAC
scale:

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

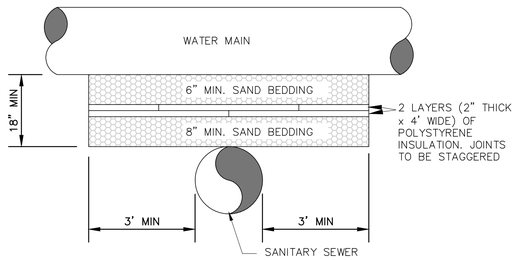
drawing no. D-3
sheet: 14 of 23



NOTES:
1. WHERE WATER LINES CROSS OVER SEWER LINES, DEFLECT WATER MAIN (WITH BENDS IF NECESSARY) TO ADJUST WATER LINE PROFILE TO PROVIDE MINIMUM 18" VERTICAL SEPARATION.

A Typical Water Main Trench

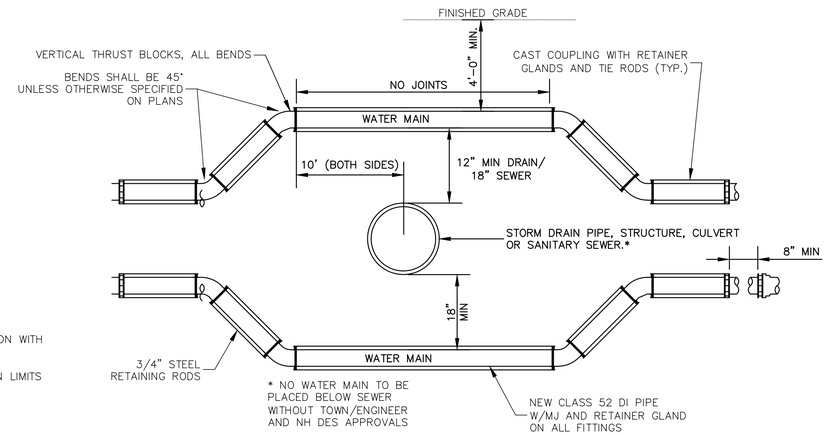
Not to Scale



WATER MAIN INSTALLATION NOTES:
1. INSULATION TO BE USED WHERE VERTICAL PIPE SEPARATION IS 24" OR LESS AND HORIZONTAL SEPARATION WITH A SEWER MANHOLE OR OTHER OPEN STRUCTURE IS 6' OR LESS.
2. INSTALL VERTICAL MJ BENDS WITH RESTRAINED JOINT FITTINGS OR SWEEP PIPE WITHIN THE SPECIFICATION LIMITS IF NECESSARY TO ADJUST WATER MAIN PROFILE TO GAIN MINIMUM VERTICAL SEPARATION ABOVE SEWER.
3. 2" OF INSULATION TO BE USED AROUND WATER SERVICE CONNECTIONS WHERE PIPE CROSSINGS OCCUR.
4. WHERE WATER MAIN CROSSES SEWER AT 45° TO 90° PROVIDE MAXIMUM SPACING OF PIPE JOINTS FROM CROSSING LOCATION FOR BOTH WATER MAIN AND SEWER PIPE.

B Water/Utility Crossing

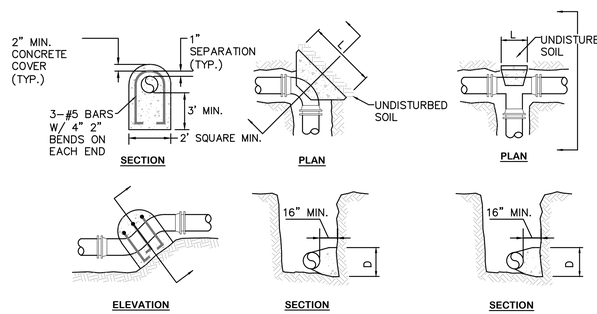
Not to Scale



NOTES:
1. PROVIDE NEW LINE USING CONTINUOUS LENGTHS OF POLYETHYLENE PIPE. NO COUPLING ALLOWED IN ROADWAY WITHOUT APPROVAL OF ENGINEER.
2. TAPS TO BE MADE AT APPROX. 10:00 AND 2:00
3. PROVIDE FOR SERVICE LINE CONTRACTION AND EXPANSION BY INSTALLING "S" IN SERVICE LINE NEAR MAIN.
4. IF SERVICE IS INSTALLED WITH LESS THAN 5'-0" COVER, INSULATE OVER LINE.
5. IF SERVICE HAS LESS THAN ADEQUATE SEPARATION (10' HORIZONTAL/18" VERTICAL-ABOVE) FROM SEWER MAINS/SERVICES, PROVIDE RIGID INSULATION ON TWO SIDES OF SERVICE PIPE.
6. TRACER WIRE (#10 INSULATED) SHALL BE PLACED ALONG THE SERVICE LINE AND SHALL BE A CONTINOUS LENGTH (WITHOUT SPLICES), EXCEPT FOR THE SPLICE AT THE STOP BOX, WHICH SHALL BE MADE WITH A COPPER CRIMP OR SPLIT BOLT CONNECTOR.
7. INSERT STAINLESS STEEL STIFFENERES REQUIRES ON ALL FLEXIBLE PLASTIC CONNECTIONS.
5. PRESSURE TEST, DISINFECT, AND FLUSH ALL WATER SERVICE CONNECTIONS.
6. CONNECT CURB STOP TO EXISTING SERVICE AT PROPERTY LINE OR AT LOCATION APPROVED BY THE ENGINEER (NO COUPLING WITHOUT APPROVAL OF ENGINEER).

C Water Service Installation

Not to Scale



NOTES:
1. Thrust blocks shall be precast concrete, except thrust blocks for vertical bends can be CIP concrete.
2. The minimum bearing areas shown above are based on a system pressure of 100 PSI. If the system pressure is above 100 psi, increase the noted areas proportional to the actual system pressure. For example, if the actual system pressure is 160 psi, multiply the above values by 160%.
3. Place thrust blocks such that the length (L) of the block is approximately twice as long as the depth (D).
4. Place thrust blocks against undisturbed soil.
5. Place thrust blocks along the full length of the fitting to maximize bearing area.
5. Place 2 layers of polyethylene or roofing paper around fittings prior to placement of the concrete to create a bond break & protect the bolts.
6. Place a solid concrete block between cap/plugs and thrust blocks.
7. Place a 12" long steel horseshoe-shaped pickup hook in all plug and cap thrust blocks. Diameter of hook shall be a minimum of 5/8".
8. Use of thrust blocks does not eliminate the requirement of retainer glands.
9. Thrust blocks are required on all fittings.
10. Coat all threaded rods, nuts, and bolts with bituminous paint.
11. Place anti-seize lubricant on all bolts.

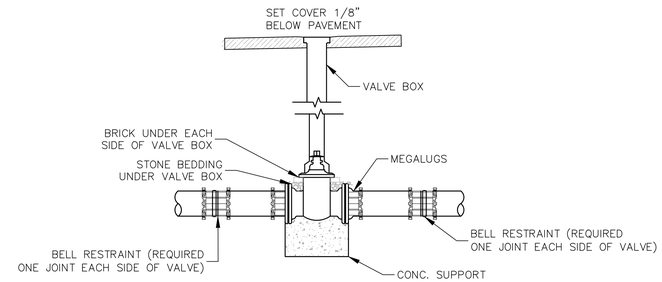
E Thrust Blocks

Not to Scale

THRUST BLOCK SCHEDULE
MINIMUM BEARING AREA (SQUARE FEET)

	PIPE SIZE							
Nominal Dia. (in)	4	6	8	10	12	16	20	24
Tees, Caps, Plugs, & Tapping Sleeves	1.05	2.32	4.15	6.37	9.15	16.23	25.44	36.58
90 Degree Bends	1.48	3.29	5.86	9.01	12.93	22.96	35.97	51.73
45 Degree Bends	0.80	1.78	3.17	4.88	7.00	12.42	19.47	28.00
22-1/2 Degree Bends	0.41	0.91	1.62	2.49	3.57	6.33	9.92	14.27
11-1/4 Degree Bends	0.21	0.46	0.81	1.25	1.79	3.18	4.99	7.17

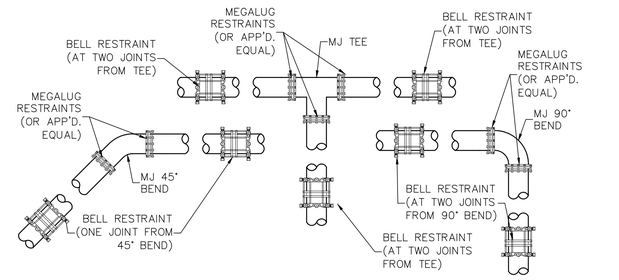
System Pressure: 100psi
Safety Factor: 1.5
Soil Bearing Capacity: 2,000psf



NOTES:
1. VALVE BOXES SHALL BE HEAVY PATTERN CAST IRON, TWO PIECE, SLIP TYPE, 5-INCH DIAMETER SHAFT WITH EXTENSION PIECES TO ALLOW SUFFICIENT COVER.
2. THE UPPER SECTION OF THE BOX SHALL BE TOP-FLANGE TYPE TO PREVENT SETTLEMENT.
3. THE LOWER SECTION SHALL BE BELLED-TYPE TO ENCLOSE THE OPERATING NUT OF THE VALVE.
4. THE COVER SHALL BE CAST IRON WITH THE WORD "WATER" PLAINLY CAST THEREON.
5. GATE VALVES SHALL OPEN LEFT.

F Valve & Valve Box Detail

Not to Scale



NOTES:
1. JOINT RESTRAINT IS REQUIRED AT ALL FITTINGS PER THE ABOVE TABLE.

VALVE	RESTRAINED JOINTS
IN LINE VALVES	BELL RESTR'T'S REQUIRED 1 JOINT EACH SIDE/VALVE

FITTING	RESTRAINED JOINTS
22.5° BEND	1 EACH SIDE
45° BEND	1 EACH SIDE
90° BEND	2 EACH SIDE
TEE	1 EA SIDE/RUN 2 ON BRANCH

G Joint Restraint Detail

Not to Scale

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

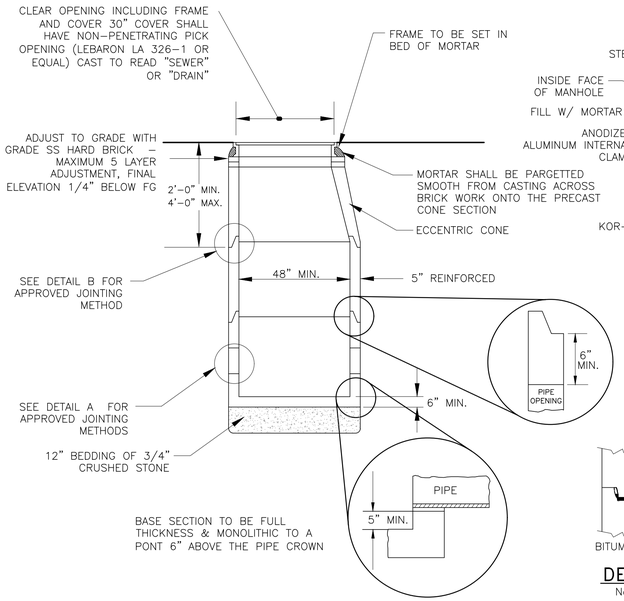


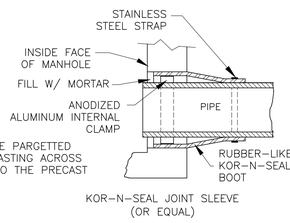
designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: NTS

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

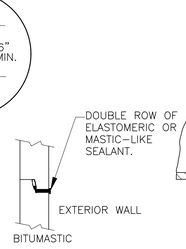
drawing no. D-4

sheet: 15 of 23

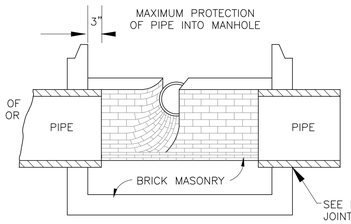




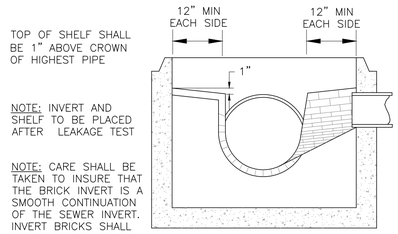
DETAIL A
Not to Scale



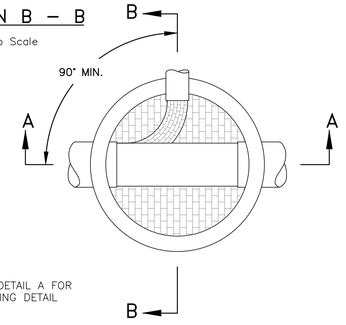
DETAIL-B
Not to Scale



SECTION A - A
Not to Scale



SECTION B - B
Not to Scale



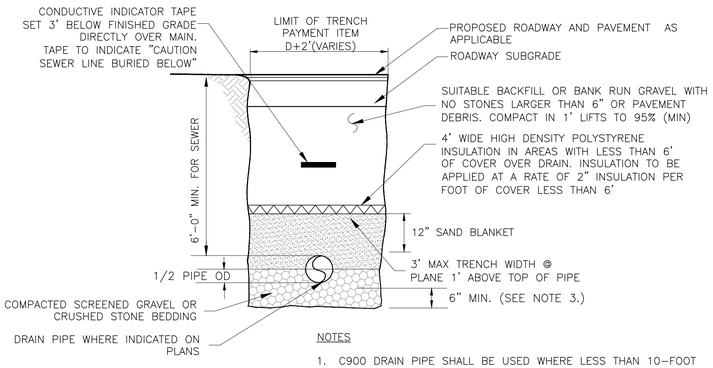
TYPICAL SEWER MANHOLE PLAN
Not to Scale

NOTES:

1. ALL SPACE REQUIREMENTS AND CONFIGURATIONS, SHALL BE AS SHOWN ON THE DRAWING. MANHOLES MAY BE AN ASSEMBLY OF PRECAST SECTIONS, WITH STEEL REINFORCEMENT, WITH ADEQUATE JOINTING, OR CONCRETE CAST MONOLITHICALLY IN PLACE WITH REINFORCEMENT. IN ANY APPROVED MANHOLE, THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND LOADS OF 8 TONS (H-20 LOADING) WITHOUT FAILURE AND PREVENT LEAKAGE IN EXCESS OF ONE GALLON PER DAY PER VERTICAL FOOT OF MANHOLE, CONTINUOUSLY FOR THE LIFE OF THE STRUCTURE. A PERIOD GENERALLY IN EXCESS OF 25 YEARS IS TO BE UNDERSTOOD IN BOTH CASES.
2. MANHOLE BARRELS AND CONE SECTIONS SHALL BE REINFORCED PRECAST CONCRETE.
3. PRECAST CONCRETE BARREL SECTIONS, CONES AND BASES SHALL CONFORM TO ASTM C 478.
4. LEAKAGE TEST SHALL BE PERFORMED PRIOR TO BACKFILL IN ACCORDANCE WITH THE SPECIFICATIONS.
5. INVERTS AND SHELVES: MANHOLES SHALL HAVE A BRICK PAVED SHELF AND INVERT, CONSTRUCTED TO CONFORM TO THE SIZE OF PIPE AND FLOW AT CHANGES IN DIRECTION, THE INVERTS SHALL BE LAID OUT IN CURVES OF THE LONGEST RADIUS POSSIBLE TANGENT TO THE CENTER LINE OF THE SEWER PIPES. SHELVES SHALL BE CONSTRUCTED TO THE ELEVATION OF THE HIGHEST PIPE CROWN AND SLOPE TO DRAIN TO THE FLOWING THROUGH CHANNEL. UNDERLAYMENT OF INVERT AND SHELF SHALL CONSIST OF BRICK MASONRY.
6. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. A 3-INCH (MINIMUM HEIGHT) "SEWER" OR "DRAIN" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
7. BEDDING: 3/4" CRUSHED STONE
8. HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF A TYPE APPROVED BY THE ENGINEER, WHICH TYPE SHALL, IN GENERAL, DEPEND FOR WATERTIGHTNESS UPON AN ELASTOMERIC OR MASTIC-LIKE GASKET APPLIED IN DOUBLE ROWS.
9. PIPE TO MANHOLE JOINTS SHALL BE ONLY AS APPROVED BY THE ENGINEER AND IN GENERAL WILL DEPEND FOR WATERTIGHTNESS UPON EITHER AN APPROVED NON-SHRINKING MORTAR OR ELASTOMERIC SEALANT.
10. FOR BITUMASTIC TYPE JOINTS THE AMOUNT OF SEALANT SHALL BE SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY. APPROVED BITUMASTIC SEALANTS: RAM-NEK KENT SEAL NO. 2EZ
11. ALL PRECAST SECTIONS AND BASES SHALL BE COATED ON THE EXTERIOR WITH A BITUMINOUS DAMP-PROOFING COATING.
12. NO MANHOLE STEPS ARE ALLOWED.

A

Sewer or Drain Manhole Detail
Not to Scale



SCREENED GRAVEL BEDDING

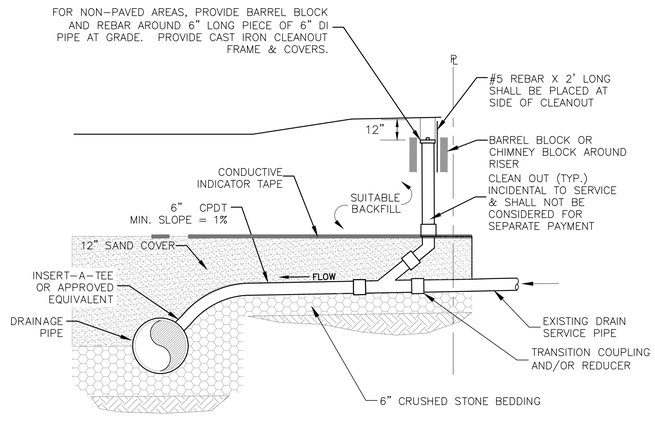
PERCENT PASSING	SIEVE SIZE
100%	1"
90-100%	3/4"
20-55%	3/8"
0-10%	#4
0-5%	#8

NOTES

1. C900 DRAIN PIPE SHALL BE USED WHERE LESS THAN 10-FOOT HORIZONTAL SEPARATION BETWEEN WATER AND SEWER LINE OCCURS.
2. WHERE WATER LINES CROSS OVER DRAIN LINES, PROVIDE 22 1/2° MJ BENDS AND THRUST BLOCKS TO ADJUST WATER LINE PROFILE TO PROVIDE MINIMUM 18" VERTICAL SEPARATION.
3. WHERE LEDGE IS ENCOUNTERED, THE TRENCH SHALL BE EXCAVATED 12 INCHES BELOW THE BOTTOM OF THE PIPE.

B

Typical Sanitary Drain Trench
Not to Scale

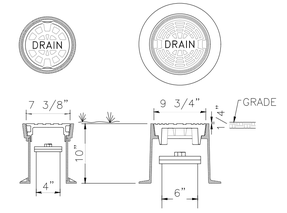


C

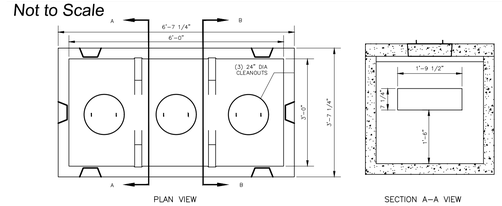
Foundation Drain Service Detail
Not to Scale

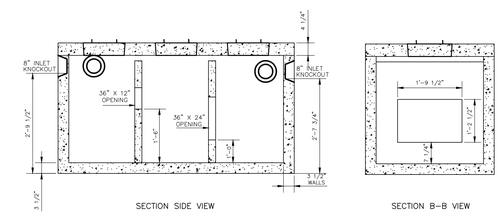
NOTES:

1. SERVICE CONNECTIONS SHALL BE INSTALLED BELOW WATER MAIN WHERE POSSIBLE.
2. ACTUAL LOCATION OF EXISTING FOUNDATION DRAINS ARE UNKNOWN. CONTRACTOR TO FIELD LOCATE THE EXISTING DRAIN AND TIE IT INTO THE PROPOSED FOUNDATION DRAIN SERVICE.
3. FOUNDATION DRAIN SERVICE LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE.
4. WHERE REDUCER IS REQUIRED TO TIE INTO THE EXISTING DRAIN SERVICE PIPE, CONTRACTOR SHALL USE ECCENTRIC REDUCER WITH THE TAPERED EDGE ALONG THE INVERT OF THE PIPE.



Cast Iron Cleanout Covers
Not to Scale





NOTES:
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. DESIGNED FOR AASHTO HS-20 LOADING, 1 TO 5 FT COVER ALSO AVAILABLE IN H-10 LOADING WITH 3" WALL.
3. TONGUE & GROOVE JOINT SEALED WITH BUTYL RESIN.

D

Oil Water Separator
Not to Scale

no.	revision	date	by

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 603/627-0708 207/541-4223
cmaengineers.com

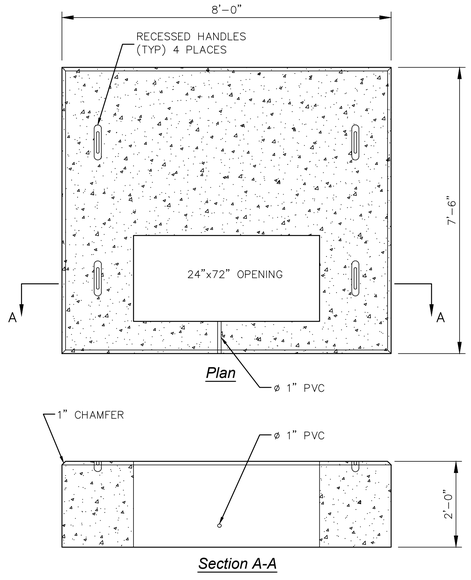
NEW HAMPSHIRE - STATE OF - PROFESSIONAL ENGINEER - BENJAMIN C. CLARK No.15219 - 3/14/23

designed by: STF/RED
drawn by: CPC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: NTS

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

drawing no. D-5

sheet: 16 of 23



Plan

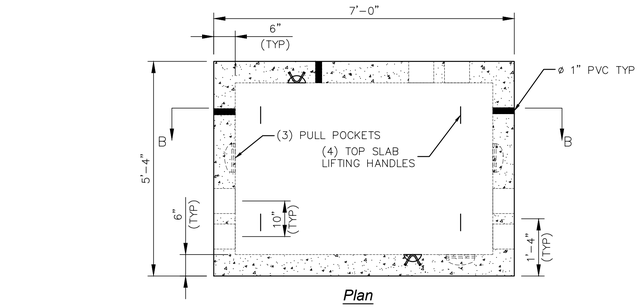
Section A-A

NOTES:

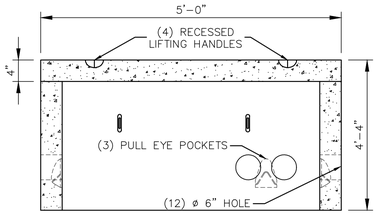
1. CONCRETE MINIMUM 4,000 PSI AFTER 28 DAYS.
2. REINFORCEMENT STEEL SHALL CONFORM TO ASTM A615 GRADE 60.

A 3 Phase 500 KVA Transformer Pad Detail

Not to Scale



Plan



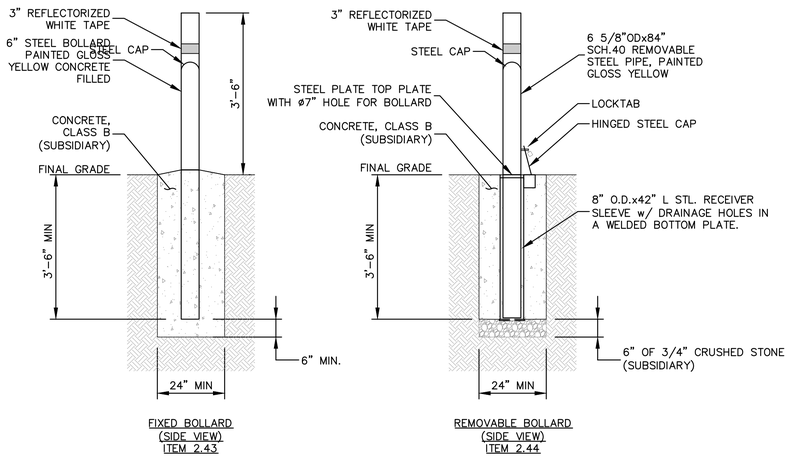
Section B-B

NOTES:

1. CONCRETE MINIMUM 5,000 PSI AFTER 28 DAYS.
2. REINFORCEMENT STEEL SHALL CONFORM TO ASTM A615 GRADE 60.
3. DESIGNED FOR HS-20 LOADING.

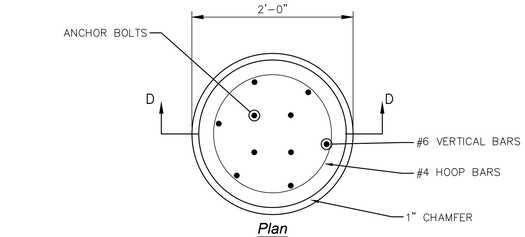
B Pull Box Detail

Not to Scale

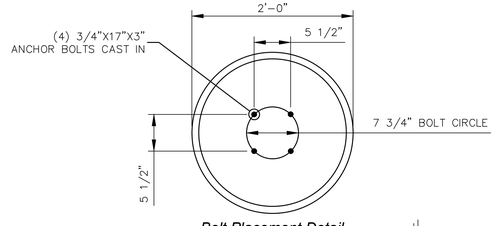


C Steel Bollard Detail

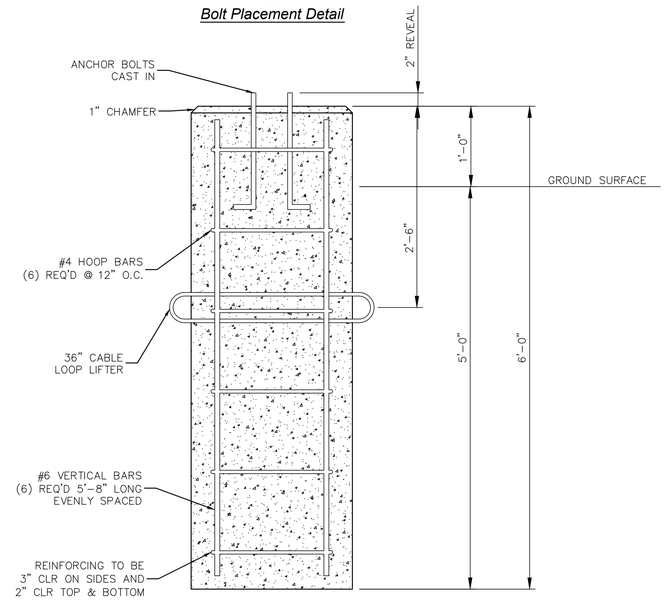
Not to Scale



Plan



Bolt Placement Detail



Section D-D

NOTES:

1. CONCRETE MINIMUM 5,000 PSI AFTER 28 DAYS.
2. LIGHT POLE BASE SIZE SHALL BE DESIGNED BY PROFESSIONAL ENGINEER AND SUBMITTED FOR REVIEW.

D Site Lighting Pole Foundation

Not to Scale

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

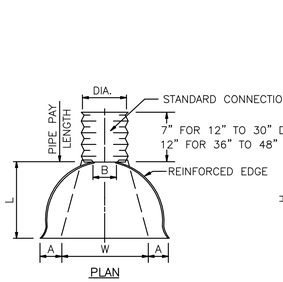
BENJAMIN C. CLARK No.15219 STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER
5/14/23

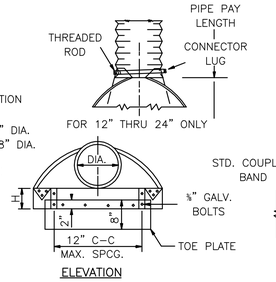
designed by: STF/RED	drawn by: CFC	approved by: PAC	scale: NTS
date: March 16, 2023	project no: 1250	checked by: BCC	

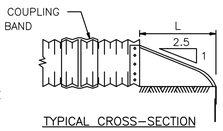
Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

drawing no. D-6

sheet: 17 of 23



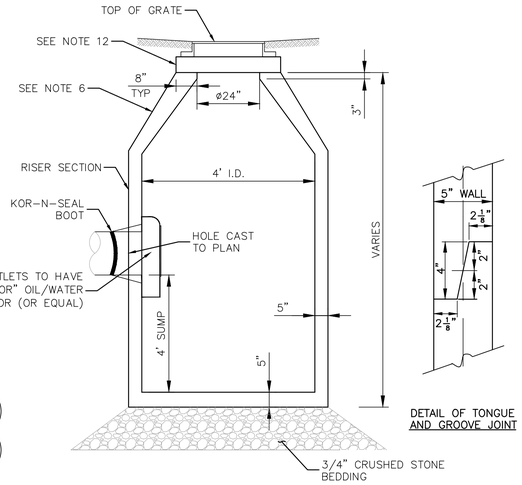




ITEM NO.	PIPE DIA.	METAL GAGE	DIMENSIONS				
			A (1"TOL.)	B MAX.	H (1"TOL.)	L (1½"TOL.)	W (2"TOL.)
603.34112	12"	16	6"	6"	6"	21"	24"
603.34115	15"	16	7"	8"	6"	26"	30"
603.34118	18"	16	8"	13"	6"	31"	36"

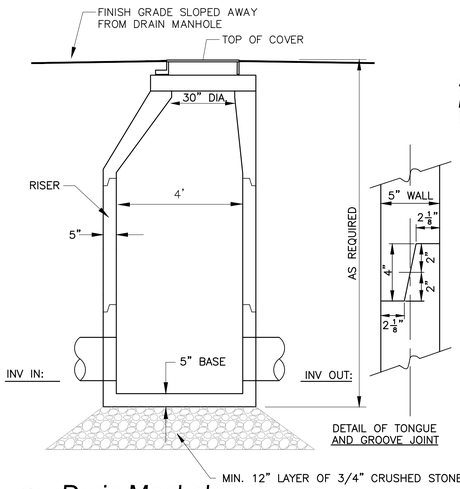
NOTES:
1. END SECTION IN ONE PIECE.
2. CONNECTOR SECTION, CORNER PLATE AND TOE PLATE TO BE SAME THICKNESS AS END SECTION AND EACH TO BE GALVANIZED.

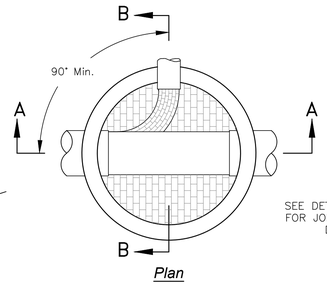
A End Section Detail
Not to Scale

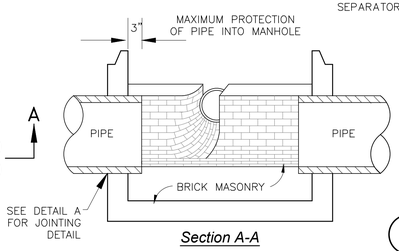


NOTES:
1. ALL STRUCTURES SHALL MEET H-20 LOADING. CONCRETE SHALL BE CLASS AA, 4,000 PSI AFTER 28 DAYS.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ.IN PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE OR THE GROOVE OF THE WALL JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FOOT.
4. HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE EITHER AN APPROVED ELASTOMERIC OR BITUMASTIC-LIKE GASKET.
5. FOR BITUMASTIC TYPE JOINTS, THE AMOUNT OF SEALANT SHALL BE SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY. APPROVED BITUMASTIC SEALANTS INCLUDE RAM-NEK, KENT SEAL NO. 2, EZ OR EQUAL.
6. ECCENTRIC CONES SHALL BE USED WHEN DEPTH TO CROWN OF SHALLOWEST PIPE EXCEEDS 30"; OTHERWISE FLAT TOP SLABS SHALL BE USED. RISERS OF 12", 36" AND 48" CAN BE USED TO REACH THE DESIRED DEPTH.
7. ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES. NO MORE THAN 75% OF A HORIZONTAL CROSS-SECTION SHALL BE HOLES, AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.
8. PIPE-TO-MANHOLE JOINTS SHALL BE A RUBBER-LIKE KOR-N-SEAL BOOT OR APPROVED EQUAL
9. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
10. CATCH BASIN GRATES TO BE NHDOT TYPE B WITH FRAMES.
11. FRAME AND GRATES SHALL BE BROUGHT TO GRADE USING GRADE SS HARD BRICKS (2 COURSE MIN., 12" MAX.) LAID FLAT. FRAMES SHALL BE SET IN A FULL BED OF MORTAR AND SEALED WITH PORTLAND CEMENT.
12. MANHOLE FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS HINGE COVER PER CITY OF PORTSMOUTH STANDARD.
13. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST.
14. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT
15. INVERT BRICKS SHALL BE LAIN ON EDGE.

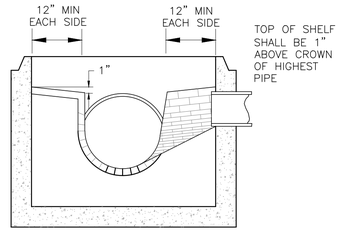
D 4' Diameter Catch Basin
Not to Scale



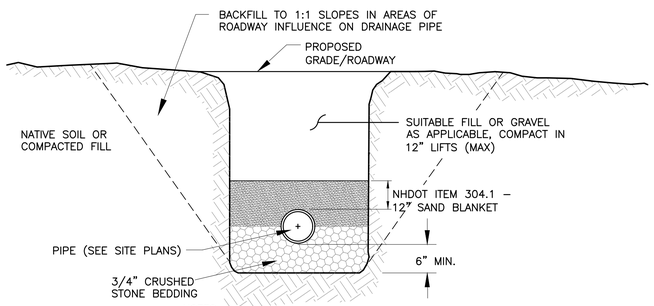




NOTE:
1. INVERT AND SHELF TO BE PLACED AFTER LEAKAGE TEST.
2. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT. INVERT BRICKS SHALL BE LAID ON EDGE.
3. ALL CONSTRUCTION MATERIALS AND PROCEDURES SHALL CONFORM TO THE STATE OF N.H. DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION-LATEST EDITION AND ADDENDUMS UNLESS OTHERWISE SPECIFIED.

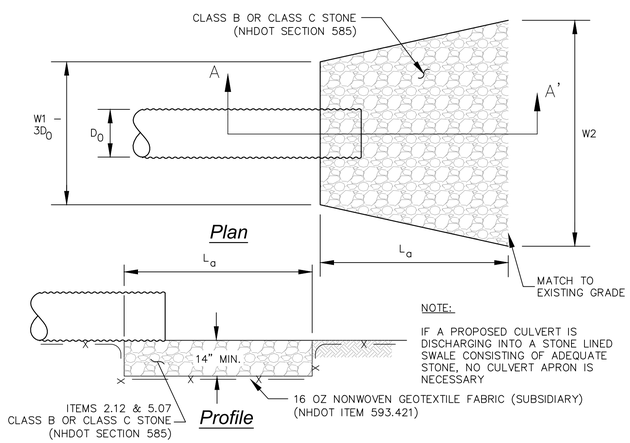


B Drain Manhole
Not to Scale



NOTES:
1. DRAINAGE PIPES SHALL BE INSTALLED AT A DEPTH SUCH THAT THE CROWN OF THE CULVERT IS AT LEAST 2' BELOW GRADE, UNLESS OTHERWISE NOTED.

C Drainage Pipe
Not to Scale



E Stone Outlet Protection
Not to Scale

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

no.	revision	date	by

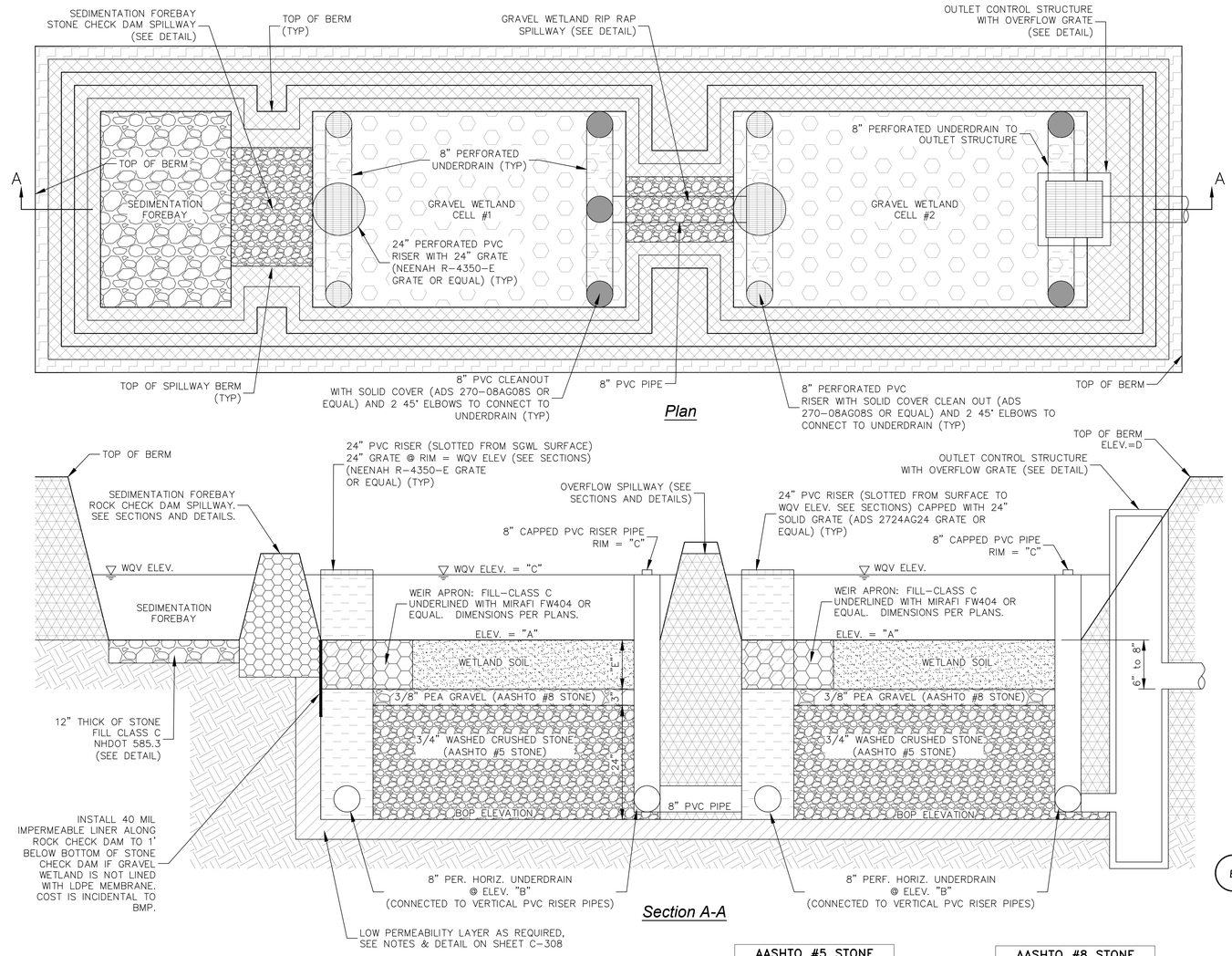
NEW HAMPSHIRE - BENJAMIN C. CLARK No.15219 - PROFESSIONAL ENGINEER - STATE OF
5/24/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: nts

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

drawing no. D-7

sheet: 18 of 23



Plan

Section A-A

NOTES:

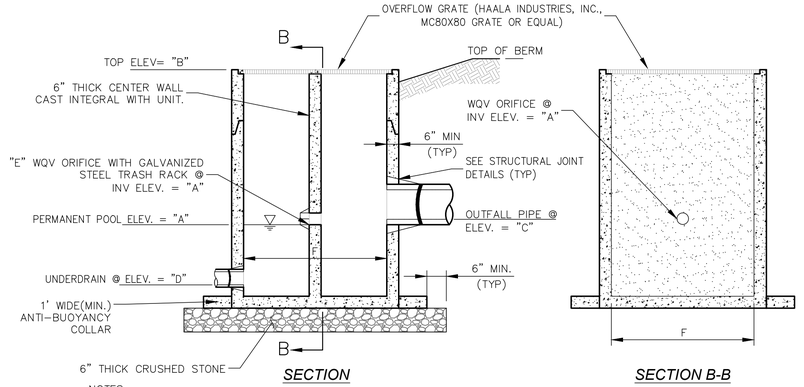
1. WETLAND SOIL SHALL BE A SANDY CLAY LOAM WITH A HYDRAULIC CONDUCTIVITY OF 0.1-0.01 FT/DAY. ORGANIC CONTENT SHALL BE GREATER THAN 15% BY VOLUME. CLAY CONTENT SHALL BE LESS THAN 15% BY VOLUME.
2. PERFORATED PVC RISER WITHIN WETLAND SOIL LAYER SHALL BE WRAPPED WITH MIRAFI 160N OR EQUAL.
3. PERFORATED PVC RISERS SHALL HAVE VERTICAL SLOTS CUT INTO PVC RISERS ABOVE GRADE MEASURING 3"x1/8".
4. BMP-2 WETLAND VEGETATION & FOREBAY SLOPES GRASSES SHALL BE SALT TOLERABLE.
5. RISERS AND CLEANOUTS RIM SHALL BE EQUAL TO OR GREATER THAN THE WQV ELEVATIONS. SEE BMP ELEVATIONS TABLE THIS SHEET.
6. RISERS SHALL BE PERFORATED FROM TOP OF WETLAND SOIL TO WQV ELEVATION (SEE BMP ELEVATIONS TABLE). SOLID PORTION OF RISER AND CLEANOUT COVER ADAPTER SHALL BE ABOVE THE WQV ELEVATION.

AASHTO #5 STONE (1" TO 1/2")	
SIEVE SIZE	% PASSING
1-1/2"	100
1"	90-100
3/4"	20-55
1/2"	0-10
3/8"	0-5

AASHTO #8 STONE (3/8" TO #8)	
SIEVE SIZE	% PASSING
1/2"	100
3/8"	85-100
#4	10-30
#8	0-10
#16	0-5

BMP ELEVATIONS		
	SUBSURFACE GRAVEL WETLANDS	
DIMENSION/ELEVATION	GW-1	GW-2
A	93.50	95.25
B	90.58	92.32
C (WQV ELEV)	93.76	97.13
D	95.0	98.50
E	8	8

A *Subsurface Gravel Wetland Detail*
Not to Scale



SECTION *SECTION B-B*

NOTES:

1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. PRECAST BOX STRUCTURE SHALL CONFORM TO ASTM C913 SPECIFICATIONS.
3. SEE DETAIL TITLE PIPE CONNECTION TO PRECAST MANHOLE STRUCTURES.
4. REINFORCEMENT:
   4.1. DEFORMED BARS SHALL CONFORM TO ASTM A-615 GRADE 60.
   4.2. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185-GRADE 70
5. REIN. STEEL SHALL HAVE 1' MINIMUM COVER.
6. THE STRUCTURE SHALL BE DESIGNED FOR HS 20-44 LOADING AND TO PREVENT FLOTATION IF FULLY SUBMERGED.
7. CRUSHED STONE BEDDING SHALL CONFORM TO NHDOT 304.4.
8. PIPE ELEVATIONS SHOWN SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
9. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
10. OUTLET PIPE SHALL BE FLUSH WITH INNER WALL.
11. BASE SHALL BE A SINGLE CAST UP TO A MINIMUM OF 8 INCHES ABOVE OUTFALL PIPE OR TOP OF BMP SURFACE WHICH EVER IS HIGHER

STRUCTURE DIMENSIONS		
	POCS STRUCTURE ID	
ELEV.	OCS-1	OCS-2
A	93.00	94.58
B	94.90	98.00
C	93.00	94.58
D	90.58	-
E WQV ORIFICE DIA (IN)	2.5	1.5
F STRUCTURE LxW DIMENSIONS (IN)	48x48	48x48

B *Gravel Wetland Outlet Control Structures*
Not to Scale

no.	revision	date	by

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

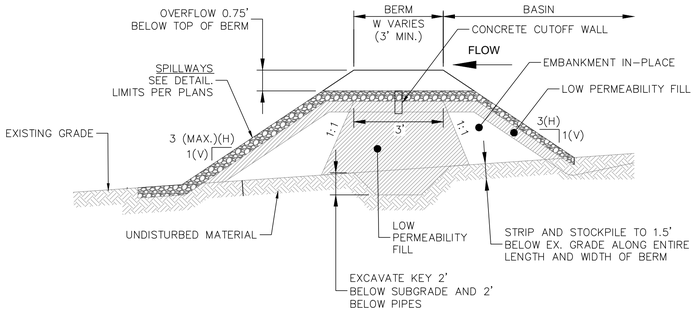
BENJAMIN C. CLARK No.15219 NEW HAMPSHIRE PROFESSIONAL ENGINEER 5/24/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: NTS

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

drawing no. D-8

sheet: 19 of 23

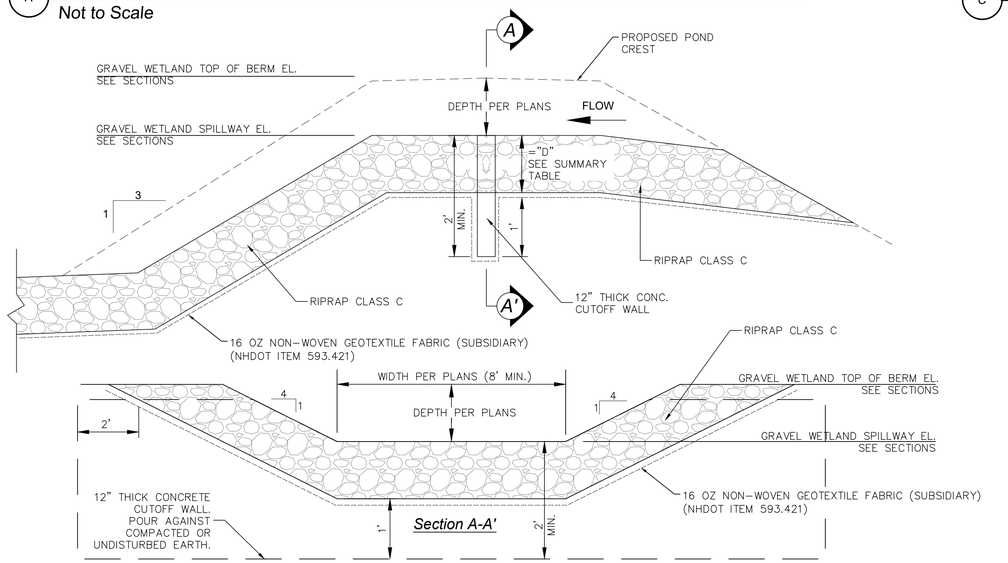


LOCATION	MATERIAL	NHDOT SPEC #	LOOSE LIFT THICKNESS (IN)	COMPACTION REQUIREMENTS (% MDD)[1]
EMBANKMENT	NATIVE SOIL[2]	203.6	12 (MAX)	92%[3]
LOAM COVER	BORROW[2]	646.51	4 (MIN)	80%
IMP. CORE	LOW PERMEABILITY	203.53	6 (MAX)	95%[3]

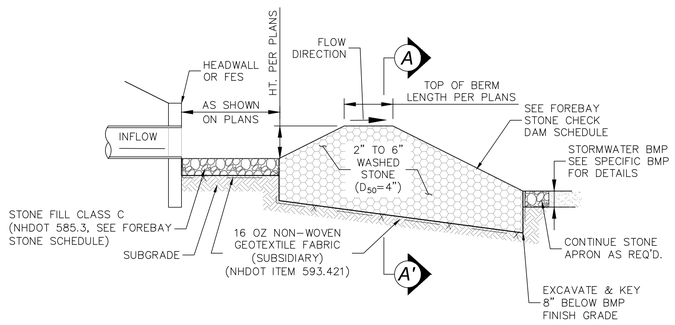
NOTES:
1. MDD: MAXIMUM DRY DENSITY.
2. ACCEPTABLE TO ENGINEER.
3. COMPACT TO TEST AVERAGE OF 92%, NO TEST LESS THAN 90.

LOW PERMEABILITY FILL	
SIEVE SIZE	% PASSING
3 IN	100
#4	80-100
#40	60-90
#100	40-60
#200	25-45

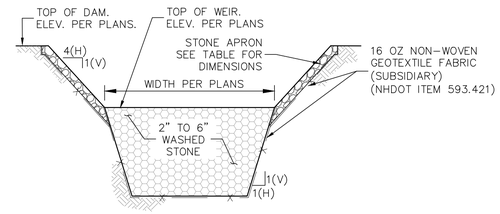
A Stormwater Dam/Berm Detail
Not to Scale



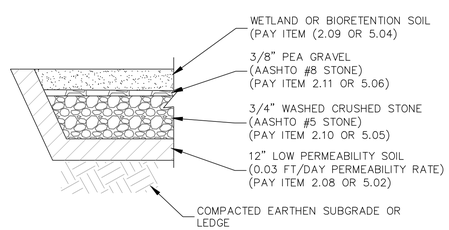
B Emergency/Highflow Bypass Weir and Spillway Detail
Not to Scale



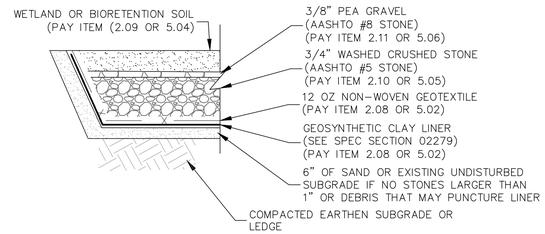
C BMP Forebay Rock Weir
Not to Scale



SECTION A-A



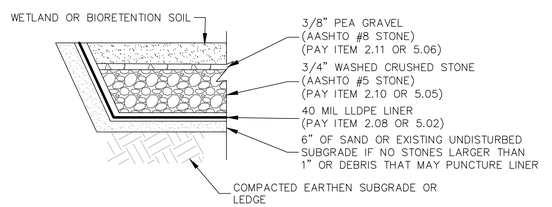
Low Permeability Soil
Alternative A



Geosynthetic Clay Liner (GCL)
Alternative B

LOW PERMEABILITY LAYER NOTES:

1. INFILTRATION TESTING OF THE NATIVE SOILS AT THE SUBGRADE AND WITHIN THE VICINITY OF THE PROPOSED GRAVEL WETLANDS AND BIORETENTION W/ ISR SHALL OCCUR PRIOR TO INSTALLATION AND SHALL BE COORDINATED WITH THE ENGINEER.
2. AN IMPERMEABLE LAYER (SEE ALTERNATIVES, THIS SHEET) SHALL BE USED IF EXISTING/INSITU SOILS HAVE GREATER THAN 10% FINES, IF PERMEABILITY RATE EXCEEDS 0.03 FT/DAY, OR IF EXCESSIVELY FRACTURED BEDROCK IS ENCOUNTERED. THE LINER SHALL EXTEND TO THE TOP OF THE WETLAND SOIL/BIORETENTION SOIL MIX.



LDPE Liner
Alternative C

D Low Permeability Layer Alternatives
Not to Scale

no.	revision	date	by

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
c m a e n g i n e e r s . c o m

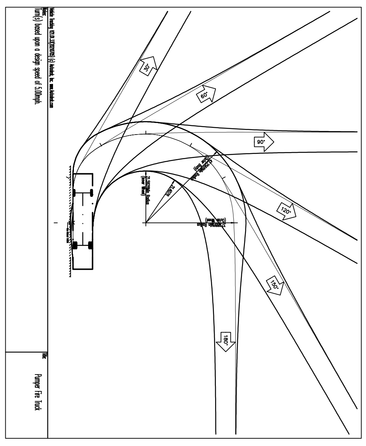
BENJAMIN CLARK No.12219 STATE OF NEW HAMPSHIRE - PROFESSIONAL ENGINEER
7/14/23

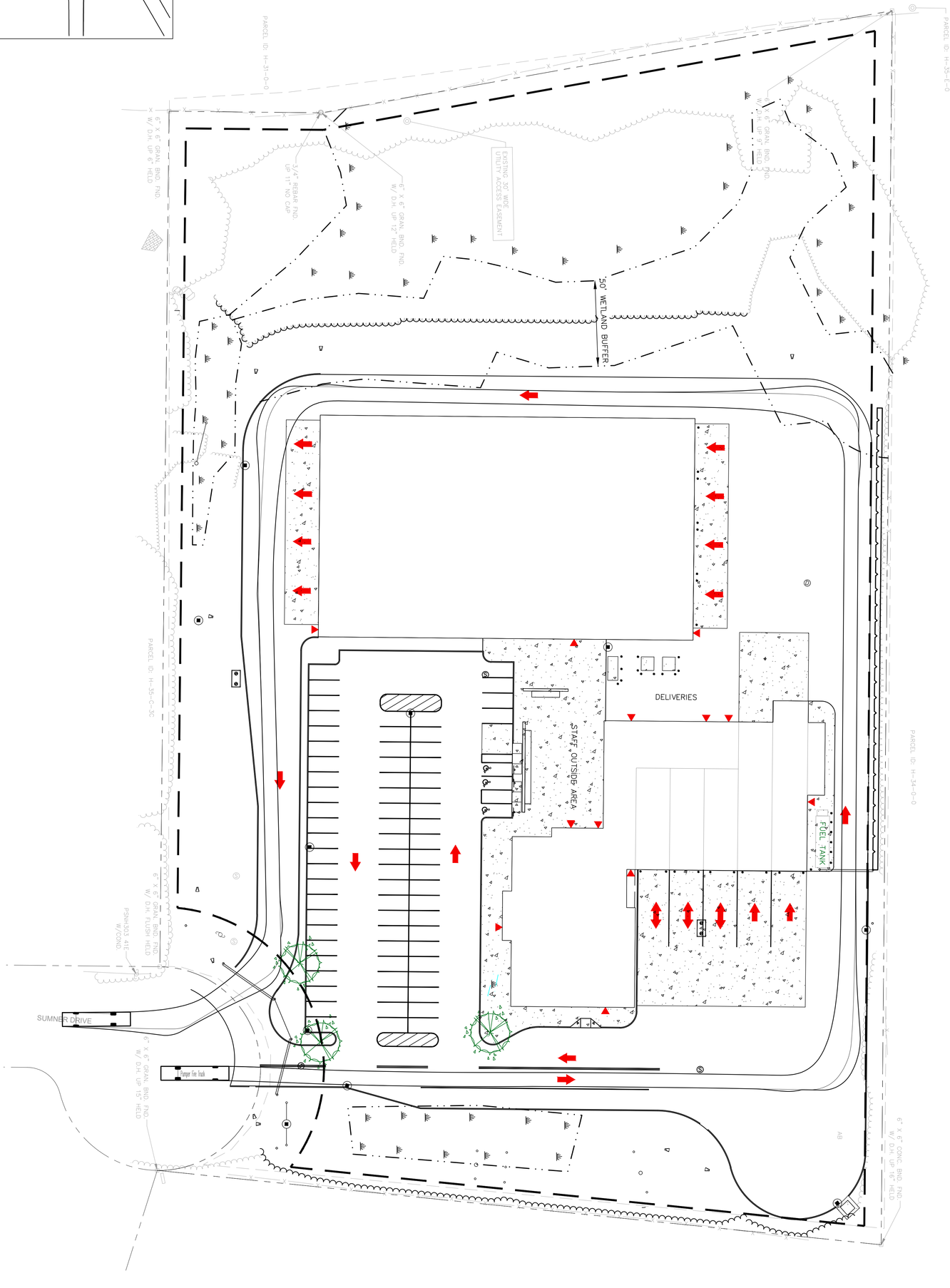
designed by: STF/RED | drawn by: CFC | approved by: PAC | scale: NTS
date: March 16, 2023 | project no: 1250 | checked by: BCC

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Details

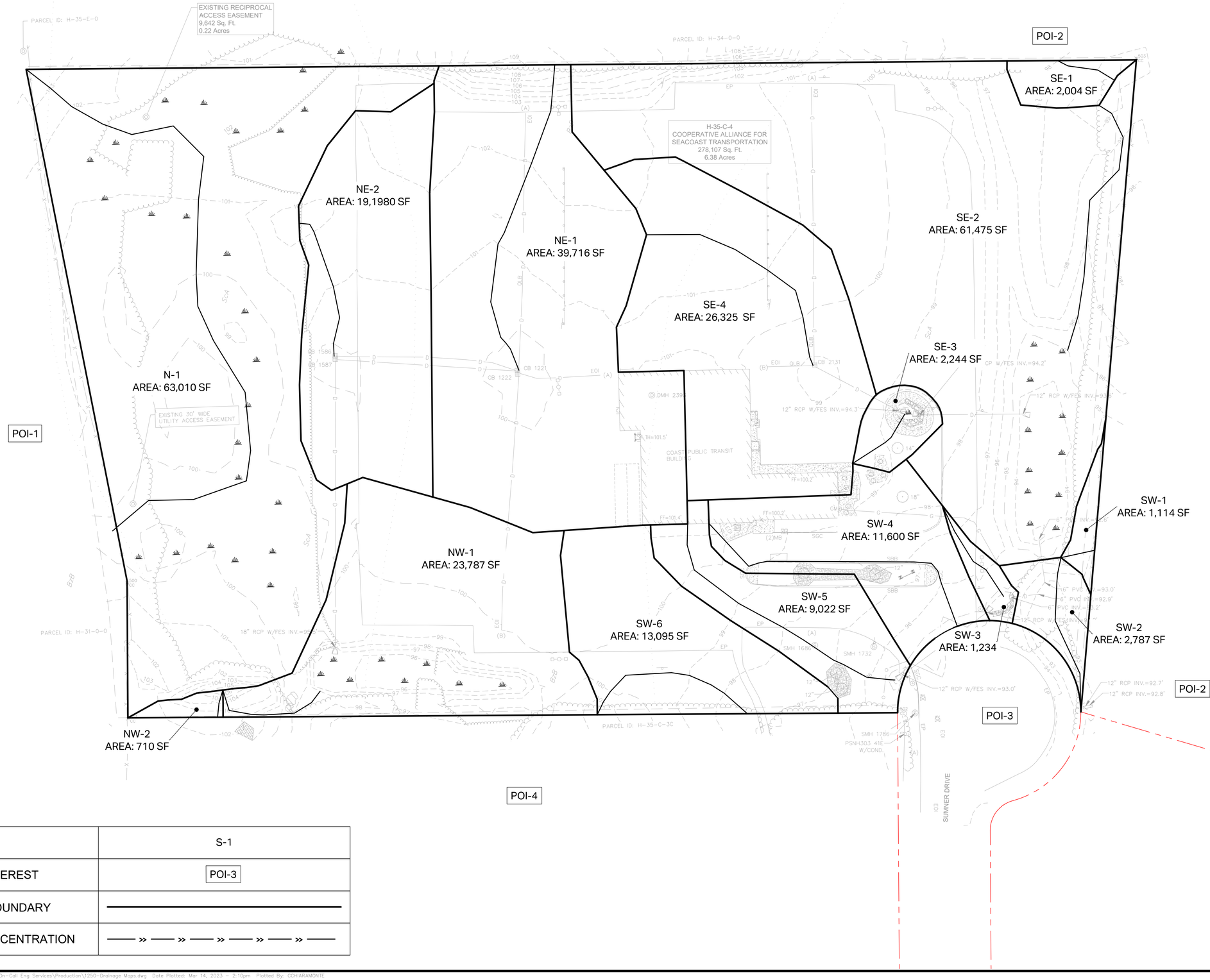
drawing no. D-8

sheet: 19 of 23





sheet: 7 of 23	drawing no. T-1	*Cooperative Alliance for Seacoast Transportation, Dover, NH* *Operations and Maintenance Facility* *42 Sumner Drive* *Fire Truck Turning Movement Plan*	date: March 16, 2023	designed by: STF/RED	STATE OF NEW HAMPSHIRE BENJAMIN C. CLARK No. 15219 LICENSED PROFESSIONAL ENGINEER 5/16/23	CMA ENGINEERS CIVIL/ENVIRONMENTAL/STRUCTURAL Portsmouth, NH 603/431-6196 • Manchester, NH 603/627-0708 • Portland, ME 207/541-4223 cmaengineers.com	no.	revision	date	by
			project no: 1250	drawn by: CFC						
			checked by: PAC	approved by: PAC						
			scale: 0 30' 60' Scale: 1" = 30'							



SUBBASIN	S-1
POINT OF INTEREST	POI-3
SUBBASIN BOUNDARY	———
TIME OF CONCENTRATION	——» ——» ——» ——» ——» ——

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Drainage Maps.dwg Date Plotted: Mar 14, 2023 – 2:10pm Plotted By: CCHIARAMONTE

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

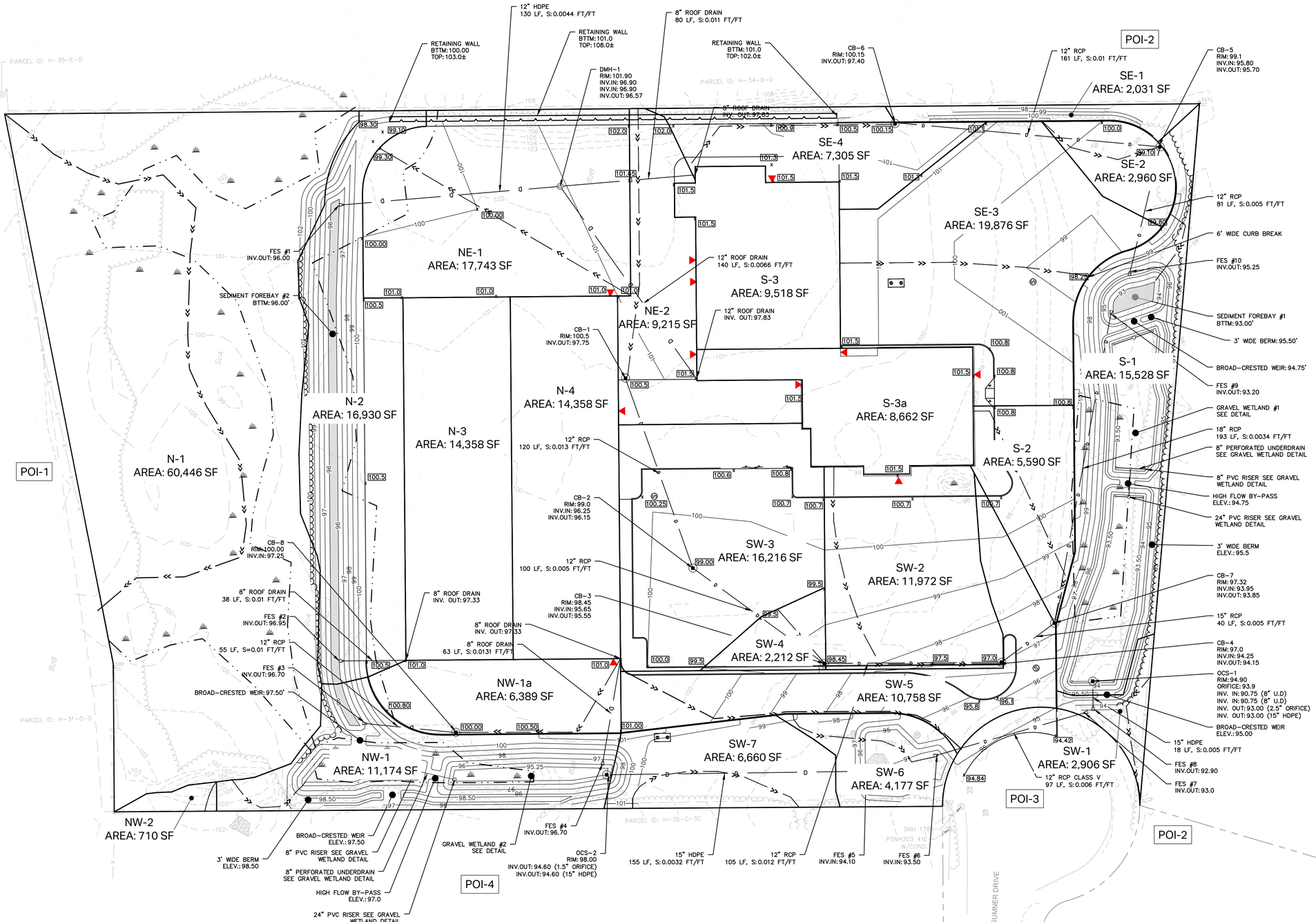
BENJAMIN C. CLARK No.15219 STATE OF NEW HAMPSHIRE – PROFESSIONAL ENGINEER
5/19/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: 1" = 20' (0, 20', 40')

Cooperative Alliance for Seacoast Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Pre-Development Drainage Map

drawing no.
DRAIN-1

sheet: 22 of 23



SUBBASIN	S-1
POINT OF INTEREST	POI-3
SUBBASIN BOUNDARY	———
TIME OF CONCENTRATION	——— » ——— » ——— » ——— » ——— » ———

F:\CADD\PROJECTS\1250 Coast On-Call Eng Services\Production\1250-Drainage Maps.dwg Date Plotted: Mar 14, 2023 - 2:10pm Plotted By: CCHIARAMONTE

no.	revision	date	by

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH • Manchester, NH • Portland, ME
603/431-6196 • 603/627-0708 • 207/541-4223
cmaengineers.com

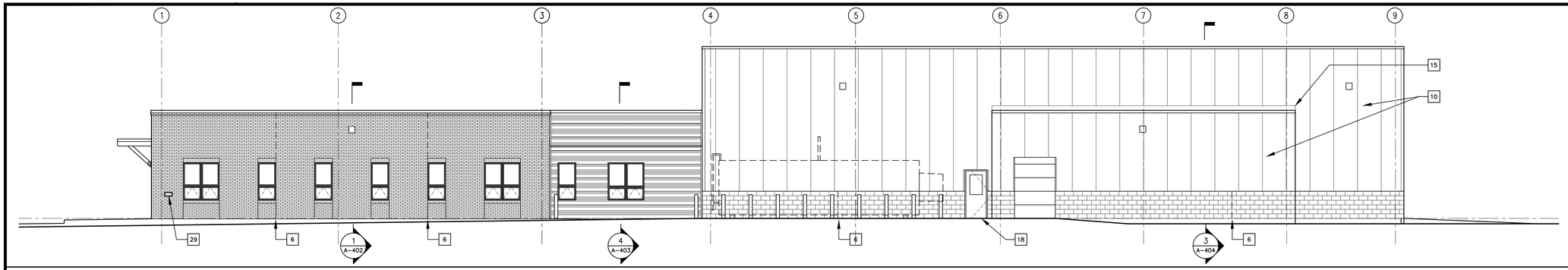
NEW HAMPSHIRE - 833N - BENJAMIN CLARK No.15219 - LICENSED PROFESSIONAL ENGINEER - 5/14/23

designed by: STF/RED
drawn by: CFC
approved by: PAC
date: March 16, 2023
project no: 1250
checked by: BCC
scale: 40' 20' 0 Scale: 1" = 20'

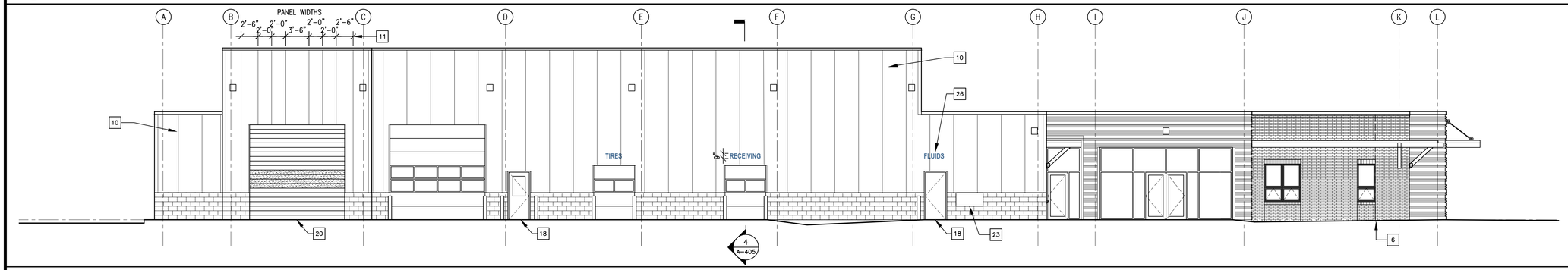
Operations and Maintenance Facility
Transportation, Dover, NH
Operations and Maintenance Facility
42 Sumner Drive
Post-Development Drainage Map

drawing no.
DRAIN-2

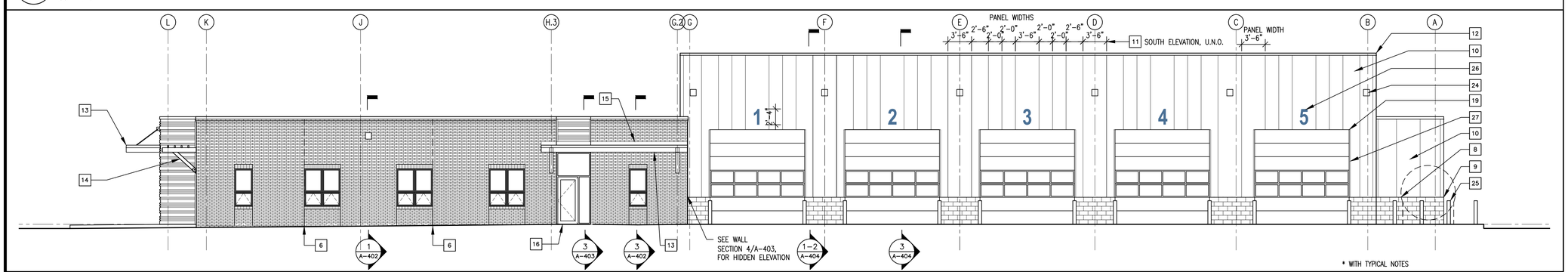
sheet: 23 of 23



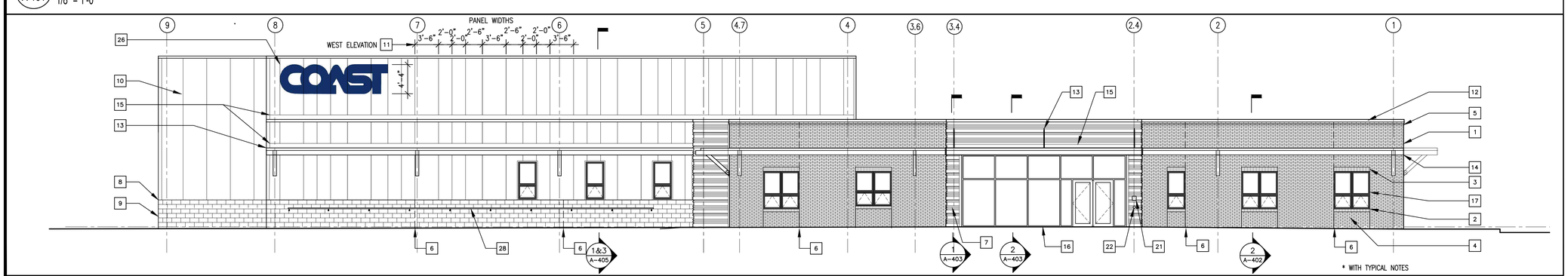
4 EAST ELEVATION
A-101 1/8" = 1'-0"



3 NORTH ELEVATION
A-101 1/8" = 1'-0"



2 SOUTH ELEVATION
A-101 1/8" = 1'-0"



1 WEST ELEVATION
A-101 1/8" = 1'-0"

ELEVATION NOTES

1. THE CONTRACTOR IS TO REVIEW PRIOR TO INSTALLATION THE LOCATION OF ALL MECHANICAL LOUVERS, ELECTRICAL DEVICES (I.E. FIRE ALARM STROBES, EMERGENCY LIGHTING, DIFFUSERS) AND VERIFY THE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
2. THE CONTRACTOR IS TO PROVIDE BLOCKING FOR ALL WALL MOUNTED FIXTURES.

EXTERIOR FINISH KEY

KEY NOTES

1. MODULAR BRICK MASONRY
2. BRICK MASONRY SILL
3. SOLDIER COURSE OVER STEEL LINTEL AT WINDOW HEAD
4. 1/2" RECESSED PANEL UNDER WINDOW
5. 1/2" CORBELLING (2 COURSES)
6. MASONRY CONTROL JOINT
7. HORIZONTAL METAL WALL PANEL W/ PREFABRICATED MITERED CORNERS @ (3) LOCATIONS
8. INSULATED 12X8X16 CMU
9. 8X8X16 CMU, ALTERNATE COURSES AT CORNERS
10. INSULATED VERTICAL METAL WALL PANEL, 42" WIDTH U.N.O.
11. INSUL. VERTICAL MTL. WALL PANEL PATTERN, WIDTHS AS DIMENSIONED
12. METAL ROOF EDGE, COLOR TO MATCH WALL PANEL (MATCH HORIZ. PANEL @ BRICK)
13. GALV. STEEL CANOPY W/ BRACES OR HANGER RODS, PTD. P11
14. GALV. STEEL SUN BREAKER CANOPY & BRACES, PTD. P11
15. ROOF MEMBRANE TERMINATION & MTL. COUNTER FLASHING, COLOR TO MATCH ROOF EDGE
16. ALUMINUM STOREFRONT FRAMING & ENTRANCE
17. ALUMINUM CLAD WOOD WINDOW
18. HOLLOW METAL DOOR, PTD. P10
19. STEEL SECTIONAL OVERHEAD DOOR
20. HIGH SPEED METAL ROLL UP DOOR
21. RECESSED EMERGENCY KEY BOX
22. AUTOMATIC DOOR PUSH BUTTON
23. REMOTE FLUIDS FILL W/ CONTAINMENT
24. WALL MOUNTED LIGHT FIXTURE, SEE ELEC. DWGS.
25. CONC. FILLED STEEL BOLLARDS, PAINTED SAFETY YELLOW
26. DIMENSIONAL VINYL LETTER SIGNAGE
27. MTL. FLASHING @ DOOR HEAD & JAMBS, FINISH TO MATCH WALL PANEL
28. 1 1/4 DIA. GALV. STEEL PIPE HANDRAIL ON BRACKETS, PTD. P10
29. MAIL SLOT: 5 3/8"H X 12"W R.O. W/ MTL. SECURITY COVER, PTD.

CMA ENGINEERS
Civil/Environmental/Structural
Portsmouth, NH Manchester, NH Portland, ME
603/431-6196 603/627-0708 207/541-4223
c m a e n g i n e e r s . c o m
Robert E. Doyle PE RA
PO Box 1325, 35 Cushing Street
Dover, NH 03821-1325
603.738.2872
rdoylepera@gmail.com

no.	issue	date	by

PROGRESS DRAWINGS NOT FOR CONSTRUCTION

designed by: RED
drawn by: RED
approved by: RED
date: DEC 8, 2022
project no: 0090
checked by: RED
scale: AS NOTED

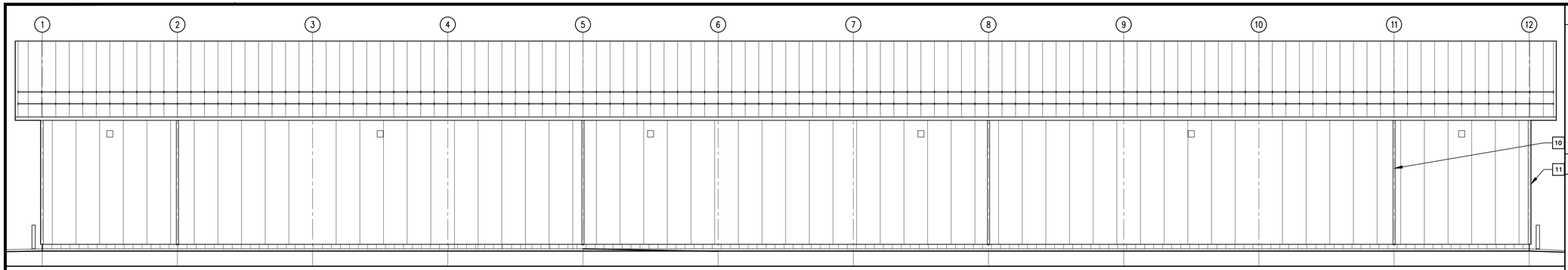
Cooperative Alliance for Seacoast Transportation (COAST)

Operations and Maintenance Facility
42 Sumner Drive, Dover, NH

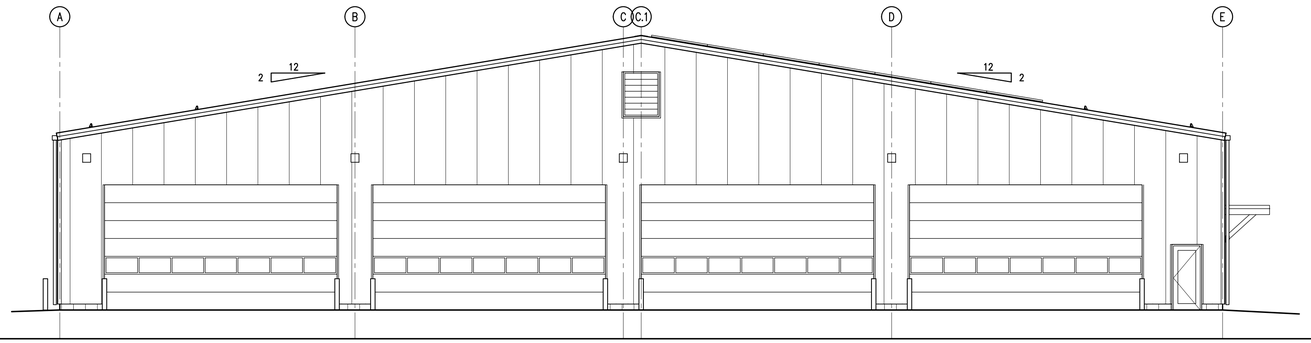
EXTERIOR ELEVATIONS

drawing no. A-301

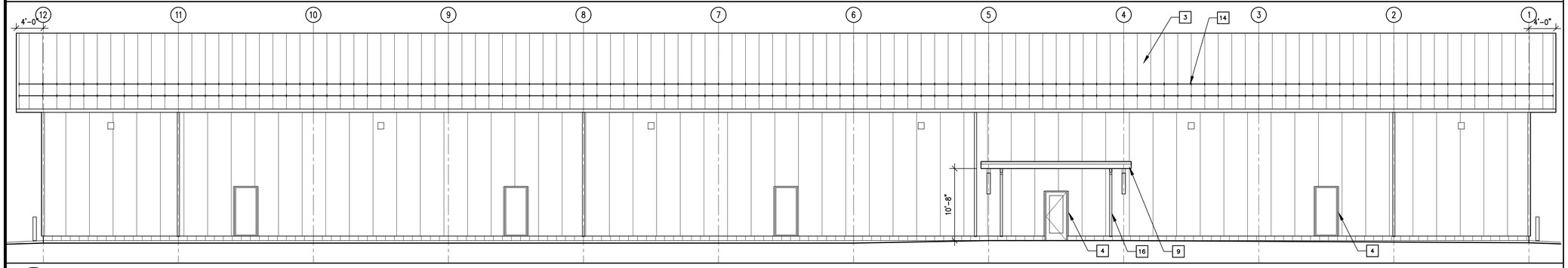
sheet: XX of XX



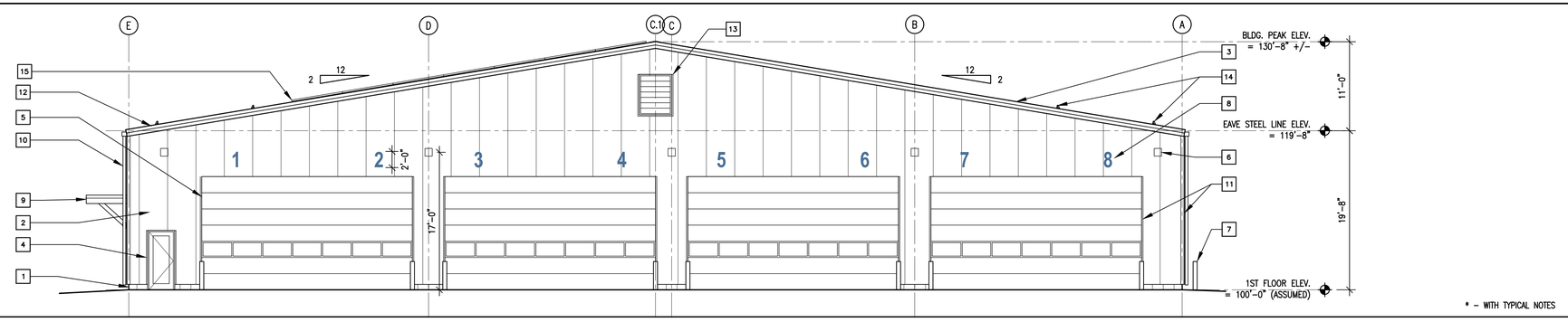
4 **NORTH ELEVATION**
A-101 1/8" = 1'-0"



3 **WEST ELEVATION**
A-101 1/8" = 1'-0"



2 **SOUTH ELEVATION**
A-101 1/8" = 1'-0"



1 **EAST ELEVATION**
A-101 1/8" = 1'-0"

* – WITH TYPICAL NOTES

ELEVATION NOTES

1. THE CONTRACTOR IS TO REVIEW PRIOR TO INSTALLATION THE LOCATION OF ALL MECHANICAL LOUVERS, ELECTRICAL DEVICES (I.E. FIRE ALARM STROBES, EMERGENCY LIGHTING, DIFFUSERS) AND VERIFY THE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
2. THE CONTRACTOR IS TO PROVIDE BLOCKING FOR ALL WALL MOUNTED FIXTURES.

EXTERIOR FINISH KEY

KEY NOTES

1. INSULATED 8X8X16 CMU, 1 COURSE
2. 3" INSULATED VERTICAL METAL WALL PANEL, 42" WIDE
3. STANDING SEAM METAL ROOF
4. ALUMINUM STOREFRONT FRAMING & ENTRANCES
5. STEEL SECTIONAL OVERHEAD DOOR
6. WALL MOUNTED LIGHT FIXTURE, SEE ELEC. DWGS.
7. CONC. FILLED STEEL BOLLARDS, PAINTED P10
8. DIMENSIONAL VINYL LETTER SIGNAGE WITH ALUMINUM EDGE
9. STEEL FRAMED CANOPY W/ BRACES, PTD. P10.
10. GUTTER & DOWNSPOUT, COLOR: TO MATCH WALL PANEL
11. CORNER (5") & JAMB (2") FLASHING, COLOR: TO MATCH WALL PANEL
12. RAKE FLASHING, COLOR: TO MATCH WALL PANEL
13. MECH. LOUVER, COLOR: TO MATCH WALL PANEL, SEE MECH. DWGS.
14. SNOW GUARDS – (2) ROWS @ EACH EAVE
15. SOLAR PV PANEL SYSTEM (N.I.C.) PROVIDE FOR SYSTEM LOADING
16. ROOF DRAIN CONNECTED TO DOWNSPOUT, TYP. OF 2

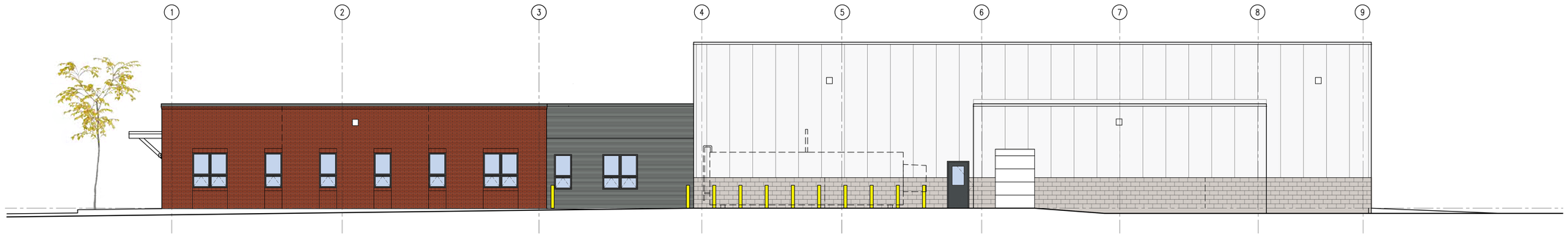
no.	revision	date	by

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH Manchester, NH Portland, ME
603/431-6196 603/627-0708 207/541-4223
cmaengineers.com
Robert E. Doyle PE RA
603.738.2872
PO Box 1325, 35 Cushing Street
Dover, NH 03821-1325
rdoylepera@gmail.com

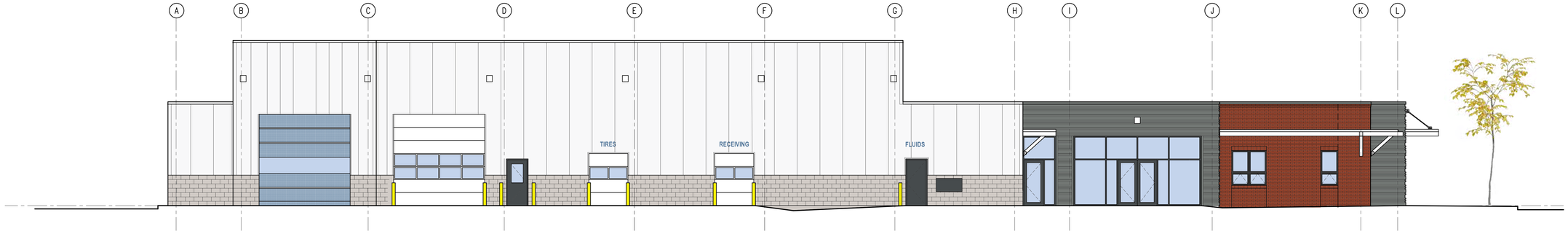
designed by: RED
drawn by: RED
approved by: RED
date: MAY 8, 2022
project no: 0090
checked by: RED
scale: AS NOTED

Cooperative Alliance for Seacoast Transportation (COAST)
Operations and Maintenance Facility
42 Sumner Drive, Dover, NH
VEHICLE STORAGE BUILDING
EXTERIOR ELEVATIONS

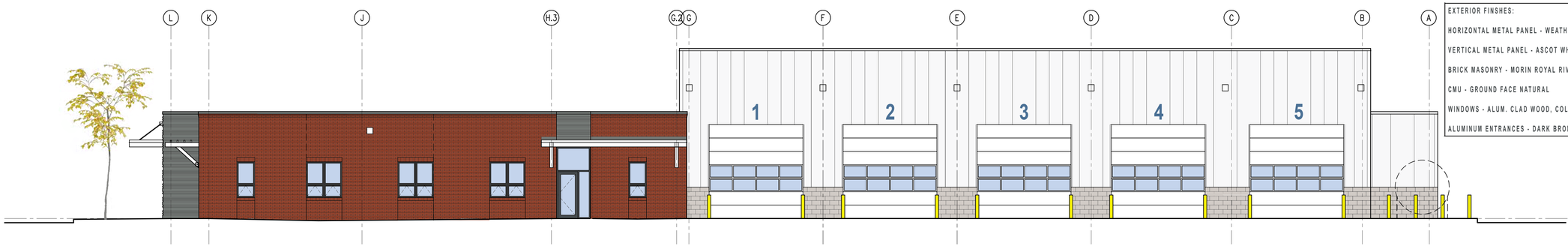
drawing no. A-301
sheet: XX of XX



4 EAST ELEVATION
A-101
1/8" = 1'-0"



3 NORTH ELEVATION
A-101
1/8" = 1'-0"



EXTERIOR FINSHES:

HORIZONTAL METAL PANEL - WEATHERED ZINC

VERTICAL METAL PANEL - ASCOT WHITE

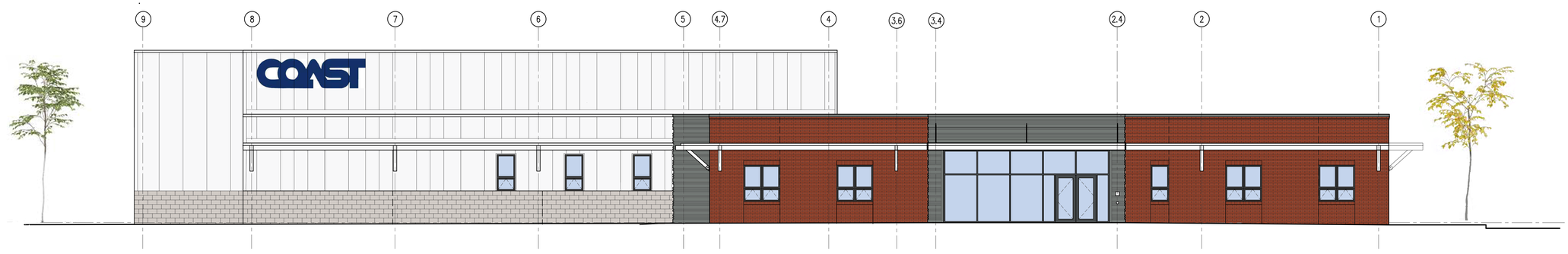
BRICK MASONRY - MORIN ROYAL RIVER RED RANGE

CMU - GROUND FACE NATURAL

WINDOWS - ALUM. CLAD WOOD, COLOR: IRON ORE

ALUMINUM ENTRANCES - DARK BRONZE ANODIZED

2 SOUTH ELEVATION
A-101
1/8" = 1'-0"



1 WEST ELEVATION
A-101
1/8" = 1'-0"

no.	date	by
01	10/3/2022	RED

issue: OWNER REVIEW SET

CMA ENGINEERS
CIVIL/ENVIRONMENTAL/STRUCTURAL
Portsmouth, NH 603/431-6196 Manchester, NH 603/627-0708 Portland, ME 207/541-4223
cmaengineers.com
Robert E. Doyle PE RA
PO Box 1326 35 Cushing Street Dover, NH 03821-1326
603.736.2872 rdoylepe@gmail.com

designed by: RED
drawn by: RED
approved by: RED
date: OCT 8, 2022
project no: 0090
checked by: RED
scale: AS NOTED

Cooperative Alliance for Seacoast Transportation (COAST)

Operations and Maintenance Facility
42 Sumner Drive, Dover, NH

EXTERIOR ELEVATIONS

drawing no. A-301

sheet: XX of XX

City of Dover, New Hampshire
SITE REVIEW APPLICATION

[Revision Date: July 1, 2021]

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

APPLICANT AND OWNER INFORMATION

Name of Applicant: Brady Sullivan Properties Telephone # 603.622.6223

Address of Applicant: 670 N. Commercial St

E-Mail Address: _____

Name of Property Owner (*if different from applicant*): Same as applicant (655 SOUTH WILLOW DOVER LLC) Telephone # _____

Address of Property Owner: Same as applicant

PROPERTY INFORMATION

Address of Property: 510 Martha's Way

Assessor's Map # H Lot(s) # 41-P

Zoning District(s) RM-SU Overlay District(s) n/a

Size of Parcel: 202,661 sq. ft. 4.65 ac. Property Deed: Book 5058 Page: 24

Existing Use of Property: Residential Multi Family

SITE PLAN INFORMATION

Describe Proposed Use: Adding amenity building to parcel for use of residents

Area of Parcel to be Developed: 35,000 sq. ft.

If Multi-family Residential: Number of Units 0 & Buildings Proposed 1 amenity building

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

Number of Parking Spaces: Existing 80 Proposed 80

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

Number of Employees Total: 4 In Maximum Shift: 4

Disposition of Parcel:

Building Footprint 4,615 sq. ft.

Total Building Area 4,615 sq. ft.

Paved Area no new parking sq. ft.

Building Setbacks:

Front Yard 81.9 ft.

Rear Yard 547 ft.

Side Yard: Right 36.9 ft. Left 56.7 ft.

City Water? X Yes ___ No How far is city water from the property? in frontage

City Sewer? X Yes ___ No How far is city sewer from the property? in frontage

TRANSFER OF DEVELOPMENT RIGHTS INFORMATION

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

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

Relief sought (Check All That Apply):

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

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

_____

_____

_____

BUILDING INFORMATION

Type of Building to be Built: Wood Frame

Height of Building: 20.3' Finished Floor Elevation: 96.2

Number of Seats (where applicable) _____

Estimated value of construction: 800,000 Refuse removal: Public / Private (circle one)

WAIVER REQUESTS

Site Review Regulations section(s) to be waived: none expected at this time

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

_____

_____

_____

_____

_____

_____

_____

SURVEYOR INFORMATION

Name of Surveyor and Company (Licensed in N.H.) Doucet Survey - Steve Michaud

Address 102 Kent Place, Newmarket, NH 03857 Telephone #: 603-659-6560

Professional License #: 916 E-mail address: Steve@doucetsurvey.com

ENGINEER INFORMATION

Name of Engineer and Company (Licensed in N.H.) Fuss & O'Neill - Brian Pratt

Address 50 Commercial St, Manchester, NH 03101 Telephone #: 603-222-3491

Professional License #: 12391 E-mail address: bpratt@fando.com

ARCHITECT INFORMATION

Name of Architect and Company (Licensed in N.H.) Brady Sullivan Properties - Chris Lewis

Address 670 Commercial St, Manchester NH 03101 Telephone #: 603-622.6223

Professional License #: 3620 E-mail address: clewis@bradysullivan.com

LANDSCAPE ARCHITECT INFORMATION

Name of Landscape Architect and Company (Licensed in N.H.) Fuss & O'Neill - Stephanie White

Address 50 Commercial St, Manchester, NH 03101 Telephone #: (860) 783-4785

Professional License #: 164 E-mail address: swhite@fando.com

SOIL SCIENTIST INFORMATION

Name of Soil Scientist and Company (Licensed in N.H.) n/a

Address _____ Telephone #: _____

Professional License #: _____ E-mail address: _____

CONSERVATION EASEMENT HOLDER

Name of Easement Holder: n/a Telephone #_____

Address Easement Holder: _____

SIGNATURES

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

Signature of Property Owner: _____ Date: 3/20/2023

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: 3/20/2023

AUTHORIZATION TO COMPLETE THE PROJECT ON SUBJECT PROPERTY

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

Signature of Property Owner: _____ Date: 3/20/2023

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: 3/20/2023

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

Per Rachael - to be completed at site plan submittal. - TRC only now

CITY OF DOVER SITE REVIEW
LIST OF ABUTTERS

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

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

City of Dover, New Hampshire
SITE PLAN REVIEW SUBMISSION CHECKLIST

[Revision Date: June 4, 2019]

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

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

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

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

APPLICANT: Brady Sullivan Properties File Number: _____

PROJECT TITLE: White Cliffs at Dover - Amenities Building

PROPERTY LOCATION: 510 Marthas Way Tax Map: H Lot: 41-P

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

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

REVIEWED BY: _____ DATE_____ TRC DATE_____

CITY OF DOVER PLANNING DEPARTMENT
Revised November 28, 2022

APPLICANT: _____ FILE NUMBER: _____

List of Common Site Plan Notes

The following list of commonly required notes is intended to be used as a guide to applicants and should not be construed as a comprehensive note requirement list for all projects. A preapplication conference with the Planning Department is suggested to help determine the actual notes that may be required.

1. The intent of this plan is to *(describe the purpose of the plan).*

2. Owners of Record are: Name
   Street address
   Municipality, State, Zip Code
   _____
   Authorized Signature

3. The parcel(*s*) is (*are*) shown as Lot No. _____, Map ____ of the City of Dover Tax Assessor's Maps.

4. The subject parcel(s) contains ____ acres or _____ sq. ft. area of land.

5. Title reference for the project parcel(*s*) is the Strafford County Registry of Deeds, Book No. ___, Page No. ___.

6. Reference Plans: (*List all reference plans and their SCRD #)*

7. All applicable right-of-way, conservation, slope, construction, power line, cross travel, or other easements shall be referenced in a note.

8. Current zoning dimensional and density requirements in effect are as follows:

   Required: Provided:

   a. Zoning district _____ sub-district _____
   b. Minimum lot size: _____ acres (sq. ft.)
   c. Minimum lot frontage: _____ ft.
   d. Minimum yard setbacks/build-to-lines:
      Front _____ft.
      Side _____ft.
      Rear _____ft.
      Abut-a-street _____ ft.
   e. Maximum/minimum lot coverage _____ %
   f. Minimum/maximum bldg. height _____ ft./stories

   This property falls within the following zoning overlay districts: *(List districts)*

9. 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.

10. Property line information has been obtained from a survey performed by *(surveyor)* on (*date*) with an error not greater than 1 in 10,000 (*or has been obtained from* _____ *Plan, prepared by (surveyor)*).

11. Subject parcel is (*is not*) located within a Federally designated flood hazard area (Community panel number 33017C0xxxD, Effective Date: September 30, 2015).

12. Wetlands were delineated by _____, Certified Wetlands Scientist, Certification Number ____, in accordance with Chapter 170-27.1 of the Zoning Ordinance, on _____, 20___.

13. As-built plans of the subdivision shall be submitted on paper and in digital format AutoCAD DWG, AutoCAD DXF or ESRI format to the City of Dover Engineer's Office upon completion of project if a street is proposed for City acceptance. 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. The installation of electric power, cable television and telephone lines shall be underground throughout the site for which development is proposed.

15. The subject parcel(s) is (are) served by municipal water and sewer (*or is served by on-site well and septic system*).

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. 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.

18. The limits of construction disturbance that are located in or within the 50 ft. of Conservation and Wetland Districts shall be staked, flagged and clearly identified prior any earth disturbing activity occurs.

19. All treatment swales to be constructed shall have sod bottoms.

20. 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.

21. 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.

22. Site Construction hours shall be limited to Monday-Friday 7 AM-6 PM, Saturday and Sunday 9 AM-4 PM. 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 Planning Director.

23. Building addresses (including apt/unit numbers if applicable) shall be assigned by the Building Official at the time of issuance of a building permit.

24. The proposed use for the site (structure) is _____. (More specific uses are encouraged, such as single family, duplex, multi-family, restaurant, hotel, doctor's office, etc. Should more than one use be proposed, an indication of the percentage of each use is suggested.)

25. The following federal and state permits have been issued for the subject property: (*List permit type, number and date of issuance.)*

26. Commercial vehicle route during construction shall conform to Dover City Code or be coordinated with the Community Services Director.

27. Any retaining wall taller than four feet (4') requires issuance of a building permit from Inspection Services.

28. Any fence taller than seven feet (7') requires the issuance of a building permit from Inspection Services.

29. 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

30. 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.

31. 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.

32. The maximum parking space calculation is _____ (broken down) and ____ spaces are provided.

33. Exterior lighting shall be cut-off type fixtures per Chapter 153-14-E and shall provide lighting directed on-site only.

34. Topographic survey performed by _____ on *(dates)*.

35. Elevations are based on U.S.G.S. NVD 1988 datum. (**or** Elevations depicted are based on information obtained from the City Engineer's Office and was derived from coordinates for control stations _____ and _____. These coordinates have not been adjusted to 1983 datum).

36. A security system shall be installed as required by Chapter 45, Article I, section 45-2 of the Code of the City of Dover. (*If a business establishment or multi-family dwelling contained in a new, altered or repaired structure*)

37. Approved backflow preventers shall be provided for both fire and domestic water lines.

38. The (*existing or proposed*) structure shall be served by a sprinkler system as required by Chapter 81- 30 of the Code of the City of Dover and the adopted State of NH Building and Fire Codes.

39. Sprinkler connections must be flushed in accordance with NFPA 24 and a Contractor's Material and Test Certificate for Underground Piping form must be completed and approved by Inspection Services prior to connection of the backflow device.

40. Fire department connection(s) shall be located on the street side of the building per NFPA 13. Access to the FDC shall maintain a clear and unobstructed path at all times.

41. The site layout is designed in compliance with applicable accessibility regulations. The proposed structure will be also be designed in accordance with applicable accessibility regulations. (i.e. IBC, ANSI-117.1) and NH RSA 155-A:5.

REMARKS:

March 16, 2023

Ms. Donna Benton
City of Dover Planning Department
288 Central Ave
Dover NH 03820

Re: Site Plan for Amenity Building
White Cliffs at Dover
Tax Map H Lot 41-P
Dover, New Hampshire
Fuss & O'Neill Reference No. 20220900.A10

Dear Ms. Benton,

On behalf of our client, Brady Sullivan Properties please find enclosed materials for a site plan addition to provide a new 4,600 s.f. amenity building at the White Cliffs at Dover Apartment Complex. The purpose of this letter is to provide a narrative of the improvements and start the TRC process.

Apartment Complex Information

The complex consists of 5 parcels of land with 1 or 2 buildings on each lot for a total of 8 buildings within the complex. Each building contains 24 units, for a total of 192 total units, with a mix of one- and two-bedroom units.

Proposed Amenity Building Location

The amenity building is proposed to be located within green space on lot 41-P, which is centrally located to the majority of the units and close to the front of the complex along Martha's Way. Note that a previous iteration of the concept plans was shown to City Staff, however due to utility relocations required for that location, the building has been relocated to this current location.

The Gateway Building
50 Commercial Street
Manchester, NH
03101
t 603.668.8223
800.286.2469

www.fando.com

California
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Proposed Amenity Building Parking and Access

The building will be wood framed and will have a main entrance facing the large parking lots at building 4 and 5. Two parking spaces nearest to the entrance are proposed to be converted to ADA accessible spaces with ADA ramps for access. Additional sidewalks are being added to Martha's Way and toward building 2 and 5 to allow easy pedestrian access to the facility from all units. It is anticipated that the residents will walk to the amenity building from their unit, however should residents prefer to drive, adequate shared parking is provided. Approx 156 parking spaces exist within 500 feet of the facility which should be well more than is needed for this facility and adjacent buildings.

Amenities

Indoor amenities include a theatre room, a fitness center, a game room, and an event room/lounge. The leasing office will also be located within this facility. The facility will have an outdoor patio with amenities such as seating, grills, and firepits. Additional outdoor amenities may be proposed in the future depending on the feedback from residents, and adequate space has been provided. The amenity building is located in relatively close proximity to the existing Bellamy River trail access as well providing access to offsite parks and walking trails.

Zoning/Conditional Use Permits

We have reviewed the zoning ordinance and located the building to be located within compliance with the building setbacks. Lot coverage is well under the 40% allowed by ordinance. We do not believe any variances or Conditional Use permits are required.

Utilities

There is an existing water line servicing building 2 that may need to be relocated, however the location or size is not easily determinable by field evidence or reference plans. The contractor will begin utility relocation services to determine the existing utility locations. Based on the results of those determinations, there are two options for connection to the existing water and sewer that we would like to discuss with the TRC.

Traffic Considerations

Because the amenity building will be used solely by residents of the complex, no additional trips are expected to be generated by this improvement. Therefore, no traffic study has been prepared.

Stormwater

See the stormwater report for a more detailed description of the proposed stormwater system. In general terms, stormwater is collected by gutters and roof leaders, or by sheet flow and yard drains. Perforated 12" HDPE pipes are provided to promote infiltration, groundwater recharge. These perforated pipes outlet to a shallow infiltration pond which has been sized to infiltrate the groundwater recharge volume and provide peak flow mitigation for the 2, 10, 25, and 50 year storms. Existing flows from the abutting parcel run through the northerly portion of the property. Its proposed to continue these flow patterns, however to modify the 18" inlet to control peak flows.

Lighting

Two decorative dark sky fixtures are proposed along the parking row nearest to the facility to provide lighting for the new sidewalk to the facility.

Landscaping

Attractive landscaping will be provided around the facility. Refer to the attached landscaping plan for details.

Architectural Drawings

Architectural plans have been uploaded to the City website as part of this application, including floorplans, elevations and renderings.

Enclosed with this TRC Submittal Letter are the Following Application Materials:

- Civil Plan Set & Survey (uploaded and 3 copies mailed)
- Architectural Renderings, Floorplans, and elevations (uploaded and 3 copies mailed)
- Stormwater Management Report (uploaded and 1 copy mailed)

If you have any questions or need additional information, feel free to contact me at your convenience. Please add us to your next agenda to start the TRC Process. We would like to request because of the scale of this project that the city consider administrative approval in lieu of site plan approval.

Very truly yours,

Brian A Pratt, P.E.
Senior Project Manager

We do not believe a CUP is required. This document uploaded because a PDF was required to be uploaded

We do not believe a Traffic Study is required. This document uploaded because a PDF was required to be uploaded

No additional trips expected to be generated by the amenity building since it will be used by residents of the complex only

Stormwater Management Report
for
White Cliffs at Dover – Amenities Building Improvements

Tax Map H Lot 41-P
510 Martha's Way
Dover, New Hampshire

March 15, 2023

Prepared by:

FUSS & O'NEILL

50 Commercial Street
Manchester, NH 03101

Project No. 2022-0900.A10

Table of Contents

Stormwater Management Report
White Cliffs at Dover

1 Narrative 3

2 Design Methodology 4

3 Watershed Analysis.....5

4 Design Summary 7

5 Construction Sequence/Erosion Control 10

Appendices

Appendix A Supporting Correspondence

- Web GIS – "Class A Surface Waters
- Web GIS – "Surface Water Impairments"
- Web GIS – "AOT Screening Layers"
- NRCS Web Soil Survey Map
- Ksat Values
- Aerial Map
- Site Photos

Appendix B Drainage Analysis

- Pre-Development 2-, 10-, 25- and 50-Year Node Listing
- Pre-Development 10 and 25-Year Full Summary and Report
- Post-Development 2-, 10-, 25- and 50-Year Node Listing
- Post-Development 10 and 25-Year Full Summary and Report
- Peak Pond Elevations 50-Year Calculations

Appendix C Additional Drainage Report Material

- BMP Worksheet
    - 10P Infiltration Pond (with stage discharge table)
- Inspection and Maintenance Manual
- Winter Maintenance and Salt Minimization
- Extreme Precipitation Table

Appendix D Plans

- Existing Drainage Area Plan – (WS-101)
- Proposed Drainage Area Plan – (WS-201)

1 Narrative

A. Introduction

Brady Sullivan Properties is proposing to improve the White Cliffs at Dover apartment complex at 510 Martha's Way by constructing a new Amenity Building for the residents use.

The complex consists of multiple properties and the building will be located within some grassed area on the subject parcel. Parking for the amenity building will be within the existing parking areas within the complex. No new parking is being added as the facility has adequate parking and the amenity building will be used by residents living and parking at the facility.

The improvements will consist of the new 4,000 s.f. building, outdoor patio space and associated walkways for access. Two existing parking spaces will be converted to ADA Parking at the main entry to the facility.

B. Site Location and Topography

The site is located at 510 Marthas Way in Dover, New Hampshire. The property is located on the east side of Martha's Way and to the west of "Building 2" and the the north of "Building 4" The site moderately slopes to the south and to the west with two discharge points. Stormwater from the north routes westerly through the property to an existing culvert and drainage easement which enters the Stormwater system within Martha's Way. Southerly flow sheet flows down an embankment toward the Bellamy River

C. Site Soils, Vegetative Cover and Ksat Values

Site Soils

The NRCS Web Soils Survey, prepared by the USDA-SCS, indicates the following soil types within the project watershed:

Symbol	Soils Name	Hydrologic Soil Group
HcB	Hollis Charlton Fine Sandy Loam	D
ScA	Scantic Silt Loam	C
WdB	Windsor Loamy Sand	A

Vegetated Cover

Aside from the structures, driveways and a few small areas of brush, most of the property has a good grass ground cover. There are no wetlands or wetland impacts in the subject area.

See Appendix A for the Web Soil Survey maps.

Ksat Values

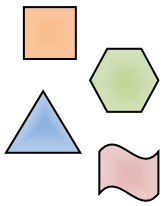
The Ksat values for each soil type were reviewed based on the Ksat values listed in the publication, "Ksat Values for New Hampshire Soils" dated September 2009 to determine if stormwater infiltration could be incorporated into the stormwater design for this project. The soils are on the limit of multiple different types of soils including A, C and D soils, with the infiltration practices being located within the A and C soils. This which would result in a 0.6-20 in/hr infiltration rate. Test pits were conducted across the site to determine if the soils would actually infiltrate and if the water table would support the infiltration. The soils were fine sandy loams capable of infiltration above the observed groundwater levels. Based on relatively high water table, underdrains will be provided to provide a 2' separation between the bottom of the infiltration practices and the lowered groundwater table to allow 2' of soil for the proposed infiltration and treatment in the infiltration basin. A rate of 1 in/hr to be conservative and add a factor of safety, along with routing the infiltration through the primary discharge (ie not "discarding" it) have also been added to the model as a conservative approach in case the infiltration is limited to traversing through the soil to the underdrains.

2 Design Methodology

A computer-aided design software package, HydroCAD (v 10.10-4a), was used to perform an intensive series of calculations to determine peak runoff flow rate, peak runoff flow velocity, and other relevant values for the post-development watershed model. The model is based on the SCS TR-20 program and is subject to cumulative rainfall/volume dependent routing calculations. Hydrographs are prepared for each element of the watershed and routed through the dynamic storage-indication method to produce various time-based results. Drainage summaries for the 2-, 10-, 25- and 50-Year storm events are provided in Appendix B of this report.

Labeling on drainage plans and diagrams is as follows:

- Reaches/ Analysis Points – Represented by a Rectangle or Square
- Subcatchment - Represented by a Hexagon
- Ponds/Catch Basin – Represented by a Triangle
- Links– Represented by an Irregular Octagon



A. Design Criteria

Rainfall Depths: Rainfall depths for this design are based on the Northeast Regional Climate Center Extreme Precipitation tables. Additionally, and in accordance with Env-Wq 1503.08(l), since the project site is located within the great bay region and will have a projected life that extends beyond 2050, the rainfall depths have been increased by 15

percent. Resulting in the following rainfall depths for each storm event. 2-year (3.6-inches), 10-year (5.44-inches), 25-year (6.88-inches) and 50-year (8.21-inches).

Closed Drainage: A minimum 3-feet of cover is maintained over the drainage pipes under pavement. This allows for frost protection and H-20 loading. HDPE pipe has been specified for all conveyances. All drainage structures have been designed to handle flow from a 25-year storm.

Pretreatment: Onsite pretreatment is not required as there are no new pavement areas for vehicular traffic. All runoff is collected by roof drains, yard drains, or sheet flow to the new pond. Existing paved surfaces were not able to be retrofitted for treatment.

Infiltration Pond: The Infiltration Pond has been designed in accordance with NHDES Alteration of Terrain, Env-Wq 1508.06 requirements. This uses natural on site soils that will have an infiltration rate of between 0.6 and 20 inches per hour. Test pits indicated an infiltration rate of around 2-4 inches per hour, and a 1 inch per hour design rate has been used. An underdrain located 2' below the pond bottom has been added to ensure that groundwater remains low and that the stormwater will infiltrate through the 2' of natural on-site soils and loam surface. Since there are no roadway or parking lot surfaces, a 1' minimum separation between the pond bottom and groundwater table is provided for treatment of roof, sidewalks, and yard drains. No forebay is necessary for these same reasons. Upstream a 12" perforated HDPE is provided to help capture and infiltrate roof and yard runoff as well. During times of high groundwater these perforated pipes may act as underdrains keeping the groundwater from the building footings.

The system is sized to treat the full Water Quality Volume (WQV) and the outlet structure is sized to control the flow of the 2-, 10-, 25-, and 50-year design storm. One foot of freeboard is provided from the top of berm to the peak elevation of the 50-year storm event. Per Appendix E of the New Hampshire Stormwater Manual, Volume 1, Infiltration Practices, have the following pollutant removal efficiencies, 90% Total Suspended Solids, 60% Total Nitrogen and 65% Total Phosphorus. These efficiencies meet the City of Dover requirements of 80%, 50% and 50% respectively.

Revision to Existing 18" RCP

An existing 18" RCP collects yard drainage and runoff from the abutting property to the north. This culvert is located within a drainage easement. To help mitigate peak flows an 18" HDPE tee is proposed to be added to this outlet. This tee will be fitted with a 18"x6" reducer to help control flows in small storm events. The top of the tee will be open to allow for larger flow events to be properly maintained. The peak elevation during a 50 year storm will have at least 1' of freeboard to any paved surfaces.

Erosion Control and Sediment Control: Temporary and permanent erosion control and sediment control measures are designed using Best Management Practices described by the New Hampshire Department of Environmental Services Stormwater Manual (Latest Revision). Additionally, temporary erosion control will be provided using wildlife friendly means such as mulch berms, Filtrexx Degradable woven silt socks and North American Green SC150BN filter fabric, consistent with New Hampshire Fish and Game, typical requirements.

3 Watershed Analysis

A. Pre-Development Watershed Conditions

The existing watershed includes mostly existing green space, primarily grassed with some shrubs and wooded areas with two discharge points and some small paved areas on the subject parcel and on the abutting parcel. There is a high point within the subject area which divides the stormwater flows toward two discharge points. The first is to the north and west to an existing 18" culvert, which enters the Martha's Way closed drainage system. Subcatchment ES1 flows to the culvert, and subcatchment ES3 flows northerly and reaches a grass lined swale between the subject and abutting parcel, which flows to the same 18" culvert. Included in this flow are some offsite drainage from the abutting properties courtyard to the north as well. The Martha's way drainage system is identified as Analysis Point A (AP-A). Approximately 1.72 acres of tributary area flows to this culvert.

The southerly portion of the site ES2 sheet flows south to the existing paved surfaces and then sheet flows to the green space beyond the existing paved surfaces and down to the Bellamy River. Approximately 0.79 acres of land flows to this analysis point.

These two analysis points were used to compare pre-development peak flow rates to the post development rates to ensure no increase in peak flow was incurred due to the improvements

B. Post-Development Watershed Conditions

The post development watershed is further divided by the proposed development into additional subcatchments areas as collected by roof drains, yard drains, and sheet flowing to the proposed perforated pipes and infiltration basin P1. As much area as possible was directed toward the new infiltration basin. Existing impervious surfaces and the existing southern lawn area will continue to flow southerly offsite, with decreased in peak flows.

Infiltration Pond P1

The site was designed to collect as much flow into yard drains, roof leaders, perforated pipes and sheet flow to a newly proposed shallow infiltration pond. This pond was located toward Martha's Way to allow for a connection into the existing Martha's Way drainage system. The groundwater is relatively high, therefore underdrains have been proposed to keep the groundwater table low enough to provide 2' of separation between the pond bottom and the underdrain outlet to allow for infiltration and treatment. An outlet structure is provided with a 1" wide vertical weir, located 0.4' off the bottom of the pond. The 0.4' of separation was provided to allow for the WQV to collect within the pond and infiltrate. Flows above the WQV will enter the outlet structure and then to the drainage system within Martha's Way. This stormwater feature provides both treatment and peak flow mitigation for the improvements. Since the runoff reaching this infiltration pond is 75% green space, and the impervious is primarily roofs, patios, sidewalks, sands, salts, heavy metals, and oils are not expected as this will be clean runoff. No parking surfaces are tributary to this stormwater feature. Therefore sediment forebays were omitted, and 2' of separation to water table is appropriate to provide treatment.

Existing 18" RCP – Inlet Modification.

As mentioned in the Design methodology section above, the peak flows could not be mitigated without modification to the 18" existing outlet in the smaller storms. This is due to the offsite flow reaching this point unrestricted. To mitigate this, an 18" Tee with a 6" reducer has been proposed which helps mitigate peak flows to below the existing levels for the small storms. Refer to the drainage details sheets for information on construction of this new tee inlet.

C. Post-Development Conclusion

The proposed development has been designed to collect and convey runoff from the site effectively as well as manage and permanently treat stormwater runoff from the development. Additionally, post-development peak flows from all required storm events have been reduced for all storms.

4 Design Summary

Peak Flows

Tables 4.1 through 4.4 below summarize the stormwater management data found in Appendix B. These tables compare the results of the HydroCAD stormwater calculations for the 2, 10, 25 and 50-year 24-hour storm events. The overall results indicate that for each storm event there is no increase in peak flow for any of the design storms for either Analysis Point AP-A and AP-B

TABLE 4.1
SUMMARY OF PEAK FLOWS (CFS)
2-YEAR DESIGN STORM

Analysis Point	Pre-Development	Post-Development	Difference
AP-A	1.79	1.28	-0.51
AP-B	0.24	0.23	-0.01

TABLE 4.2
SUMMARY OF PEAK FLOWS (CFS)
10-YEAR DESIGN STORM

Analysis Point	Pre-Development	Post-Development	Difference
AP-A	3.85	3.48	-0.37
AP-B	1.03	0.81	-0.22

TABLE 4.3 SUMMARY OF PEAK FLOWS (CFS) 25-YEAR DESIGN STORM			
Analysis Point	Pre-Development	Post-Development	Difference
AP-A	5.58	5.15	-0.43
AP-B	1.8	1.36	-0.44

TABLE 4.4 SUMMARY OF PEAK FLOWS (CFS) 50-YEAR DESIGN STORM			
Analysis Point	Pre-Development	Post-Development	Difference
AP-A	7.14	6.41	-0.73
AP-B	2.59	1.92	-0.67

Pond Freeboard Depths

Tables 4.5 below summarizes the peak elevations of each detention pond or underground detention system to demonstrate a minimum freeboard depth of 1-foot is achieved, from the peak elevation of the 50-year storm event to the top of the berm or top of the underground practice.

TABLE 4.5 PEAK POND ELEVATIONS 50-YEAR DESIGN STORM			
Detention Pond	Peak Elevation	Berm Elevation or Top of Practice	Freeboard
P1	93.3	94.3	1.0
18" Culvert	92.75	93.75	1.0

Pollutant Removal

Per Appendix E of the New Hampshire Stormwater Manual, Volume 1, Infiltration Ponds, have the following pollutant removal efficiencies, 90% Total Suspended Solids, 65% Total Nitrogen and 65% Total Phosphorus. These efficiencies meet the City of Dover requirements of 80%, 50% and 50% respectively.

5 Construction Sequence | Erosion Control

Silt fence/filter socks shall be placed prior to any construction activities being undertaken on-site. Site construction activities shall be limited to construction of any temporary diversions or sedimentation basins necessary to provide stormwater control during construction. All catch basins will be equipped with dandy socks prior to construction activities. All conveyances shall be seeded and stabilized prior to full-scale site construction activities and the direction of stormwater flows. Use jute matting to stabilize all ditch lines and disturbed soils receiving concentrated runoff prior to the establishment of vegetation.

All stockpile areas are to be stabilized with temporary seeding and silt fencing, as necessary, to control and prevent the erosion of these materials.

During construction and immediately following a rain event, an inspection shall be made of all erosion control measures to verify integrity and perform repairs. Repairs shall be made within 24 hours of the event.

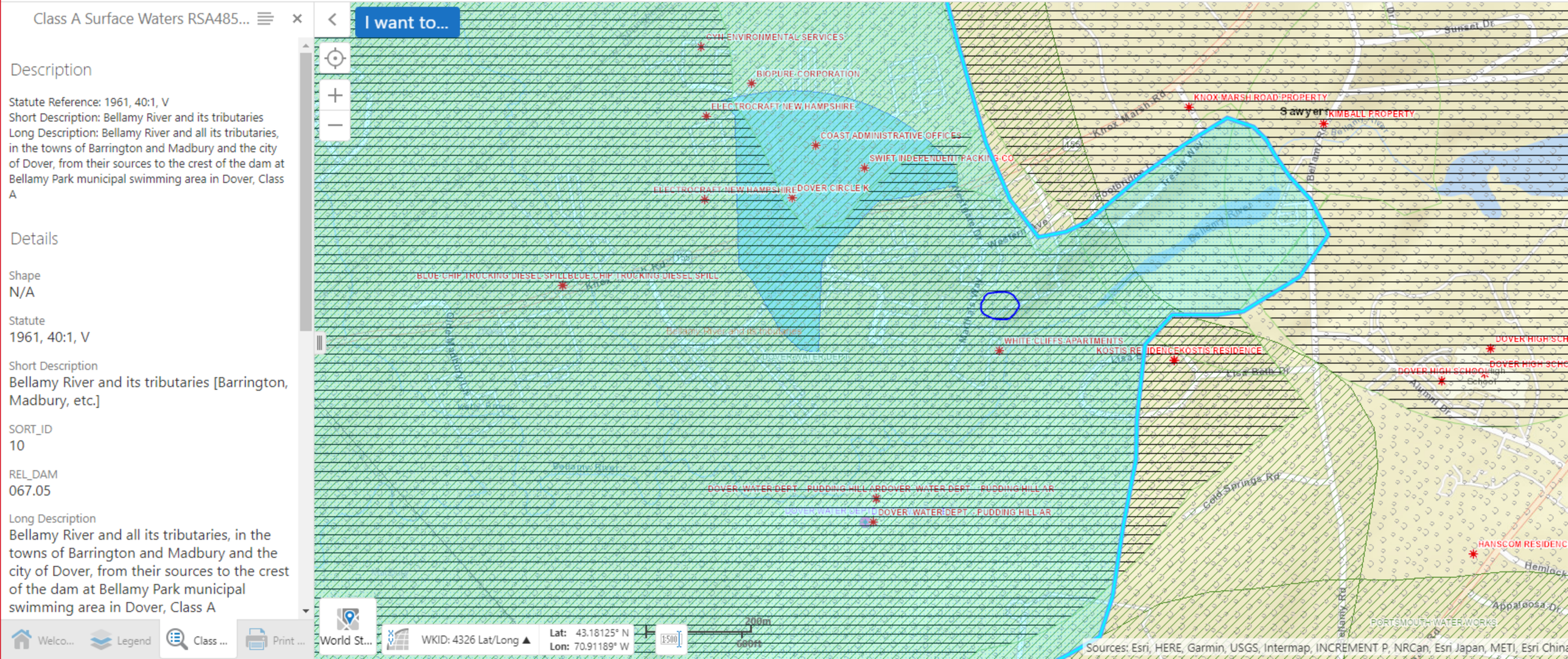
Dewatering operations shall be controlled to avoid erosion or sedimentation of abutting properties and wetland areas by implementing temporary settling basins with gravel check dams, the proposed detention basin, or commercially available dewatering products.

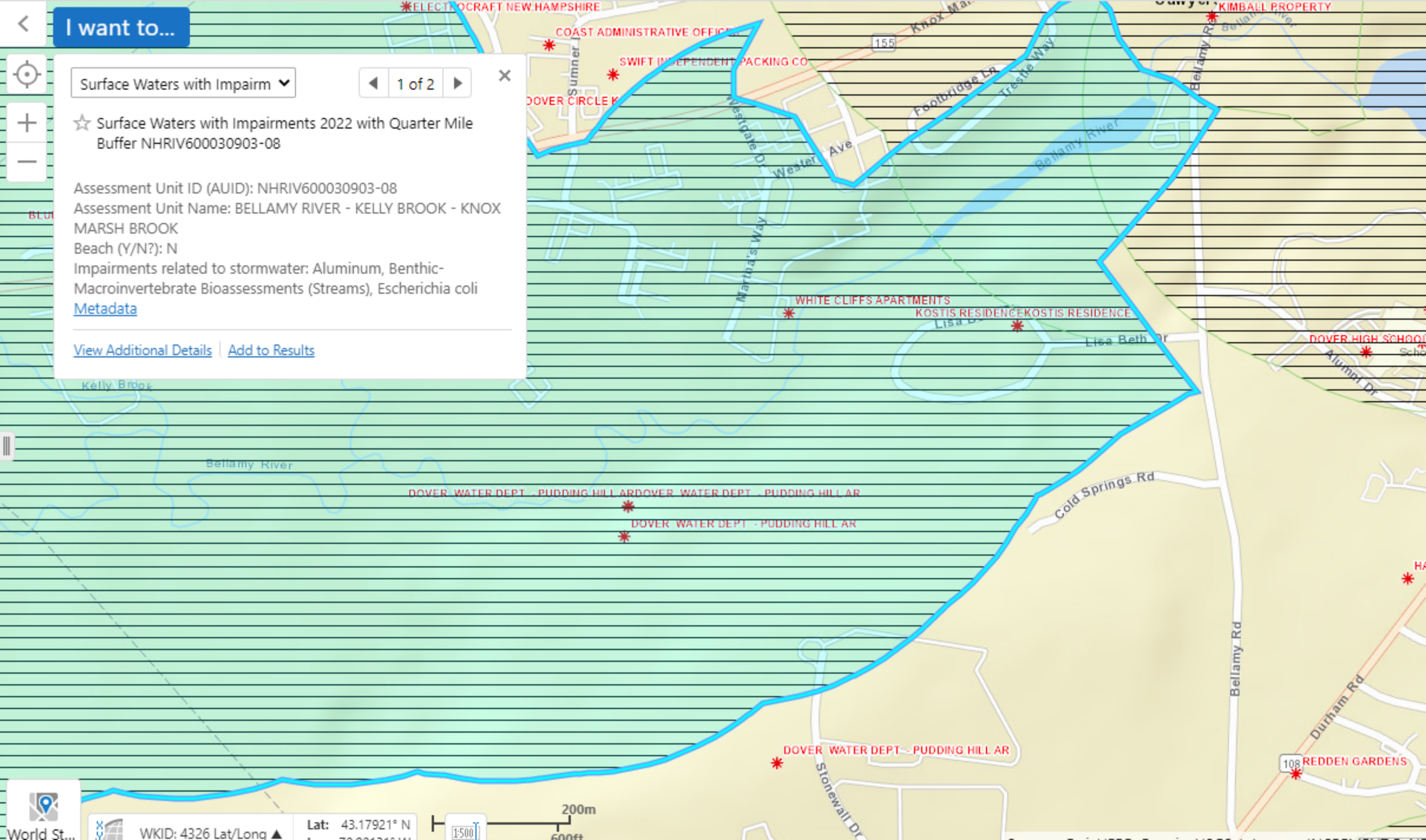
All drainage pretreatment, filtration and detention areas are to be stabilized prior to directing stormwater flows to them.

See detail plans for full Construction Sequence.

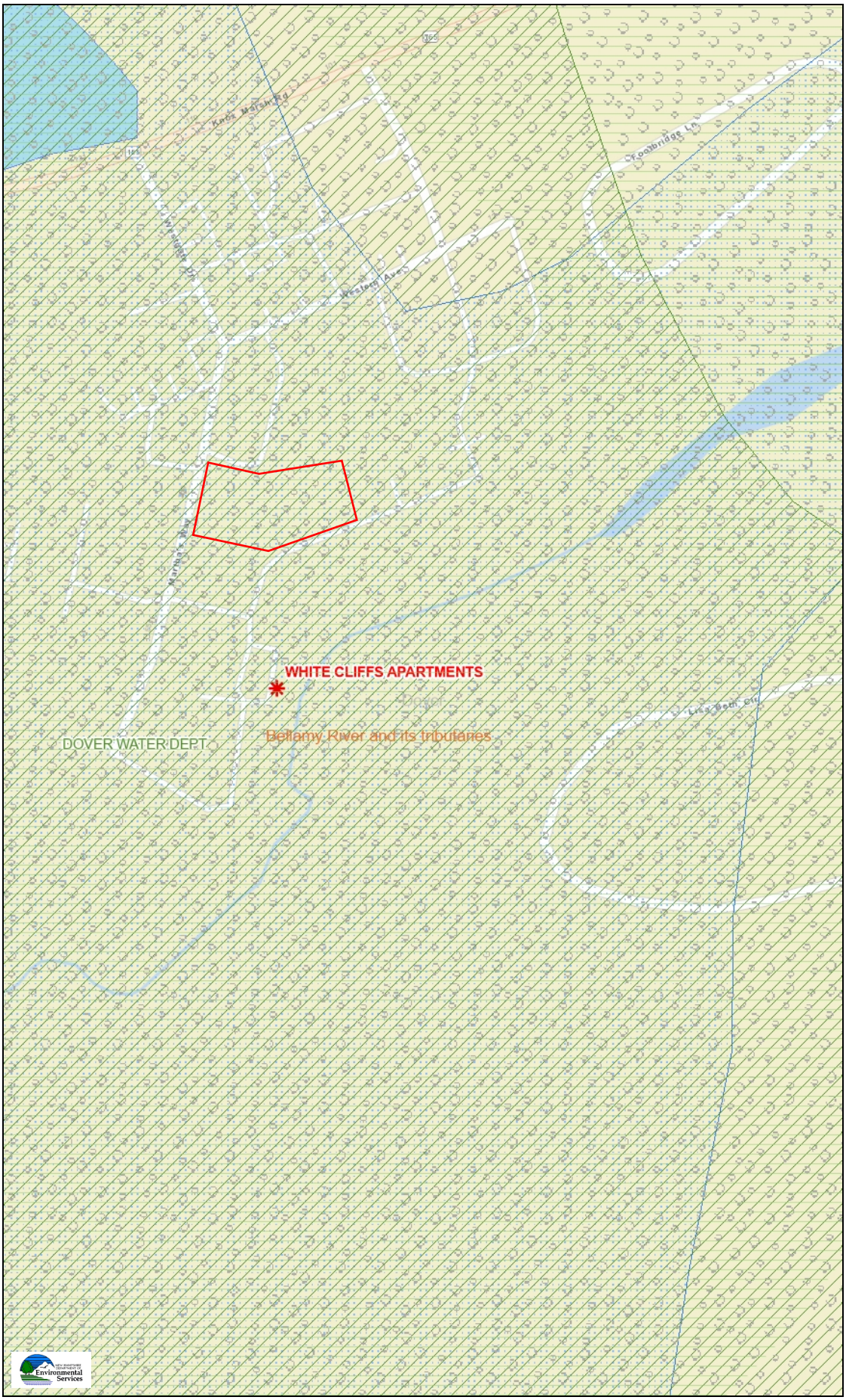
Appendix A
Supporting Correspondence

- Web GIS – "Surface Water Impairments"
- Web GIS – "AOT Screening Layers"
- NHB Data Check Results and Correspondence
- NRCS Web Soil Survey Map
- GES Site Specific Soil Survey Report and Map
- Ksat Values
- Aerial Map
- Site Photos


Class A Surface Waters RSA485...
Description
Statute Reference: 1961, 40:1, V
Short Description: Bellamy River and its tributaries
Long Description: Bellamy River and all its tributaries, in the towns of Barrington and Madbury and the city of Dover, from their sources to the crest of the dam at Bellamy Park municipal swimming area in Dover, Class A
Details
Shape
N/A
Statute
1961, 40:1, V
Short Description
Bellamy River and its tributaries [Barrington, Madbury, etc.]
SORT_ID
10
REL_DAM
067.05
Long Description
Bellamy River and all its tributaries, in the towns of Barrington and Madbury and the city of Dover, from their sources to the crest of the dam at Bellamy Park municipal swimming area in Dover, Class A
I want to...
CYN ENVIRONMENTAL SERVICES
BIOPURE CORPORATION
ELECTROCRAFT NEW HAMPSHIRE
COAST ADMINISTRATIVE OFFICES
SWIFT INDEPENDENT PACKING CO
ELECTROCRAFT NEW HAMPSHIRE
DOVER CIRCLE K
BLUE CHIP TRUCKING DIESEL SPILL
BLUE CHIP TRUCKING DIESEL SPILL
KNOX MARSH ROAD PROPERTY
KIMBALL PROPERTY
WHITE CLIFFS APARTMENTS
KOSTIS RESIDENCE
KOSTIS RESIDENCE
DOVER HIGH SCH
DOVER HIGH SCHOOL
DOVER WATER DEPT - PUDDING HILL AR
DOVER WATER DEPT - PUDDING HILL AR
DOVER WATER DEPT - PUDDING HILL AR
HANSCOM RESIDENC
PORTSMOUTH WATER WORKS
Knox Marsh Rd
Sunset Dr
Bellamy Rd
Western Ave
Cold Springs Rd
Lisa Beth Dr
Hemlock
Appaloosa Dr
Sawyer
Welco...
Legend
Class ...
Print ...
World St...
WKID: 4326 Lat/Long
Lat: 43.18125° N
Lon: 70.91189° W
200m
600ft
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China


I want to...
Surface Waters with Impairm
1 of 2
Surface Waters with Impairments 2022 with Quarter Mile Buffer NHRIV600030903-08
Assessment Unit ID (AUID): NHRIV600030903-08
Assessment Unit Name: BELLAMY RIVER - KELLY BROOK - KNOX MARSH BROOK
Beach (Y/N?): N
Impairments related to stormwater: Aluminum, Benthic-Macroinvertebrate Bioassessments (Streams), Escherichia coli
Metadata
View Additional Details
Add to Results
ELECTROCRAFT NEW HAMPSHIRE
COAST ADMINISTRATIVE OFFICE
SWIFT INDEPENDENT PACKING CO
DOVER CIRCLE K
KIMBALL PROPERTY
WHITE CLIFFS APARTMENTS
KOSTIS RESIDENCE
KOSTIS RESIDENCE
DOVER HIGH SCHOOL
DOVER WATER DEPT - PUDDING HILL AR
DOVER WATER DEPT - PUDDING HILL AR
DOVER WATER DEPT - PUDDING HILL AR
REDDEN GARDENS
Bellamy River
Kelly Brook
Cold Springs Rd
Bellamy Rd
Durham Rd
Sumner Ln
Westdale Dr
Martha's Way
Western Ave
Footbridge Ln
Trestle Way
Knox Marsh
Lisa Beth Dr
Alumni Dr
Stonewall Dr
155
108
World St...
WKID: 4326 Lat/Long
Lat: 43.17921° N
200m
600ft

Map By



Legend

- Surface Waters with Impairn 2022 with Quarter Mile Buffe
- Remediation Sites
- Coastal and Great Bay Regi Communities
- Designated Rivers Quarterm Buffer
- Public Water Supply Wells
- Groundwater Classification GA1
- Groundwater Classification GA2
- Water Supply Intake Protect Areas
- Wellhead Protection Areas
- Class A Lakes with a Quarte Buffer
- Class A - All Features
- All Lakes, with a Quarter Mil Buffer
- Outstanding Resource Wate Watersheds
- Watersheds with Chloride Impairments

Map Scale

1: 3,247

© NH DES, http://des.nh.gov

Map Generated: 3/14/2023

Notes

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Strafford County, New Hampshire



November 29, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface..... 2
Soil Map..... 5
Soil Map.....6
Legend.....7
Map Unit Legend..... 8
Map Unit Descriptions..... 8
Strafford County, New Hampshire.....10
HcB—Hollis-Charlton fine sandy loams, 3 to 8 percent slopes..... 10
ScA—Scantic silt loam, 0 to 3 percent slopes..... 11
WdC—Windsor loamy sand, 8 to 15 percent slopes.....12
Soil Information for All Uses.....15
Soil Properties and Qualities..... 15
Soil Physical Properties..... 15
Saturated Hydraulic Conductivity (Ksat), Standard Classes..... 15
Soil Qualities and Features.....19
Hydrologic Soil Group..... 19
Hydrologic Soil Group..... 23
Depth to Bedrock.....27
Water Features..... 31
Depth to Water Table.....31

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 23, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	0.5	18.3%
ScA	Scantic silt loam, 0 to 3 percent slopes	1.0	35.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	1.3	45.9%
Totals for Area of Interest		**2.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Strafford County, New Hampshire

HcB—Hollis-Charlton fine sandy loams, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9d7j
Elevation: 0 to 1,020 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 120 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Hollis and similar soils: 55 percent
Charlton and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Parent material: Till

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 18 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Charlton

Setting

Parent material: Till

Typical profile

H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 36 inches: fine sandy loam
H3 - 36 to 40 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Not named

Percent of map unit: 5 percent
Hydric soil rating: No

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

ScA—Scantic silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9d8s
Elevation: 0 to 260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Scantic and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Marine terraces

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 23 inches: silty clay loam
H3 - 23 to 40 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Swanton

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Biddeford

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

Not named wet

Percent of map unit: 5 percent
Landform: Marine terraces
Hydric soil rating: Yes

WdC—Windsor loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svkq
Elevation: 0 to 1,260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
Ap - 1 to 11 inches: loamy sand
Bw - 11 to 31 inches: loamy sand
C - 31 to 65 inches: sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Kames, outwash plains, eskers, deltas
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Saturated Hydraulic Conductivity (Ksat), Standard Classes

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits. The classes are:

Very low: 0.00 to 0.01

Low: 0.01 to 0.1

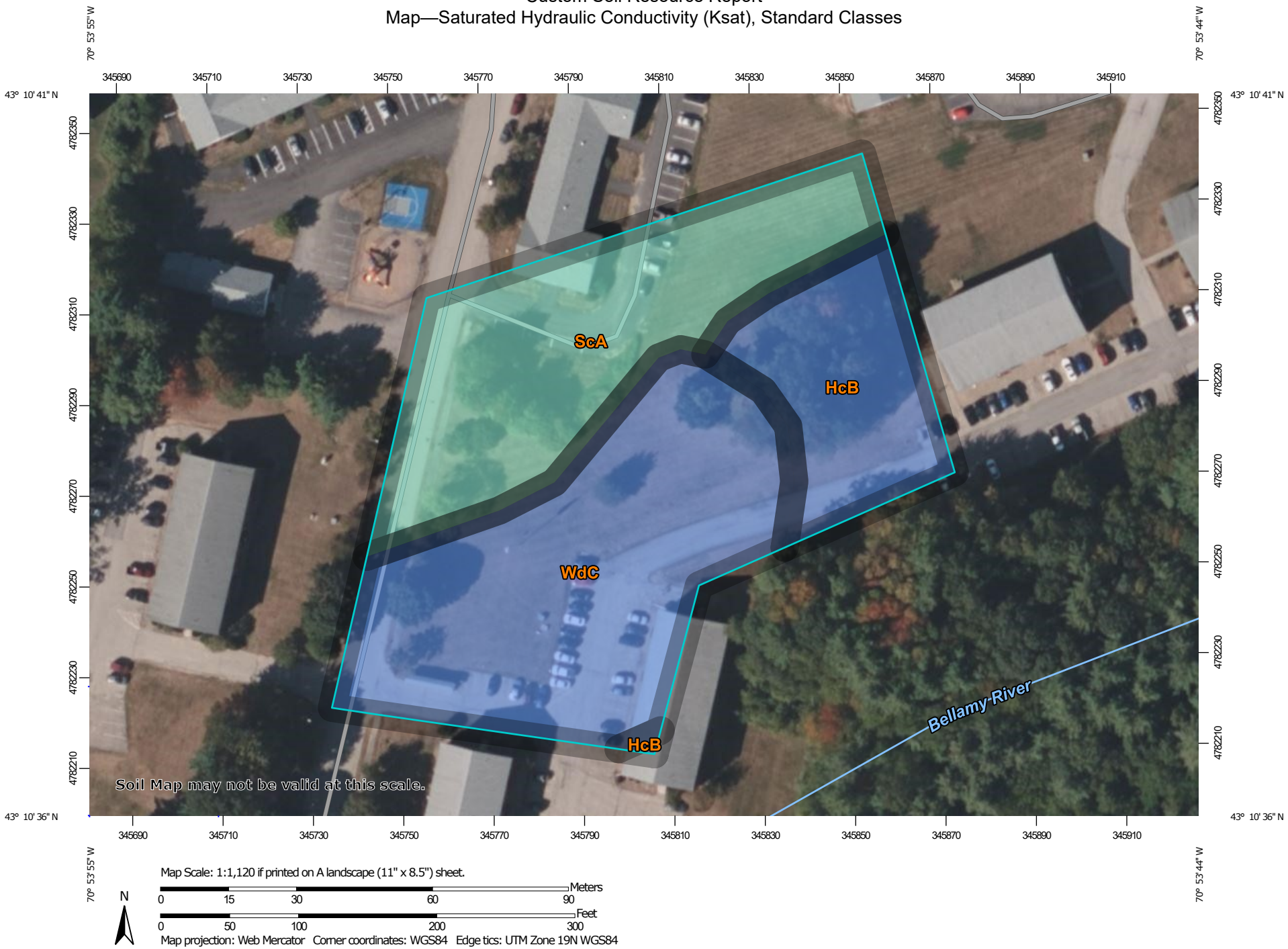
Moderately low: 0.1 to 1.0

Moderately high: 1 to 10

High: 10 to 100

Very high: 100 to 705

Map—Saturated Hydraulic Conductivity (Ksat), Standard Classes



Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Lines
- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Points
- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 23, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Saturated Hydraulic Conductivity (Ksat), Standard Classes

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	23.2833	0.5	18.3%
ScA	Scantic silt loam, 0 to 3 percent slopes	3.3860	1.0	35.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	100.0000	1.3	45.9%
Totals for Area of Interest			**2.7**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat), Standard Classes

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 60

Units of Measure: Inches

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 23, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	D	0.5	18.3%
ScA	Scantic silt loam, 0 to 3 percent slopes	C/D	1.0	35.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	A	1.3	45.9%
Totals for Area of Interest			**2.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at

or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.



Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 23, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	D	0.5	18.3%
ScA	Scantic silt loam, 0 to 3 percent slopes	C/D	1.0	35.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	A	1.3	45.9%
Totals for Area of Interest			**2.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Depth to Bedrock

The term bedrock in soil survey refers to a continuous root and water restrictive layer of rock that occurs within the soil profile.

There are many types of restrictions that can occur within the soil profile but this theme only includes the three restrictions that use the term bedrock. These are:

1) Lithic Bedrock

2) Paralithic Bedrock

3) Densic Bedrock

Lithic bedrock and paralithic bedrock are comprised of igneous, metamorphic, and sedimentary rocks, which are coherent and consolidated into rock through pressure, heat, cementation, or fusion. Lithic bedrock represents the hardest type of bedrock, with a hardness of strongly coherent to indurated. Paralithic bedrock has a hardness of extremely weakly coherent to moderately coherent. It can occur as a thin layer of weathered bedrock above harder lithic bedrock. Paralithic bedrock can also be much thicker, extending well below the soil profile.

Densic bedrock represents a unique kind of bedrock recognized within the soil survey. It is non-coherent and consolidated, dense root restrictive material, formed by pressure, heat, and dewatering of earth materials or sediments. Densic bedrock differs from densic materials, which formed under the compaction of glaciers, mudflows, and or human-caused compaction.

If more than one type of bedrock is described for an individual soil type, the depth to the shallowest one is given. If no bedrock is described in a map unit, it is represented by the "greater than 200" depth class.

Depth to bedrock is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.


70° 53' 55" W
70° 53' 44" W
43° 10' 41" N
43° 10' 36" N
345690
345710
345730
345750
345770
345790
345810
345830
345850
345870
345890
345910
4782350
4782330
4782310
4782290
4782270
4782250
4782230
4782210
ScA
HcB
WdC
HcB
Bellamy River
Soil Map may not be valid at this scale.
Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 15 30 60 90
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 23, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Bedrock

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	38	0.5	18.3%
ScA	Scantic silt loam, 0 to 3 percent slopes	>200	1.0	35.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	>200	1.3	45.9%
Totals for Area of Interest			**2.7**	**100.0%**

Rating Options—Depth to Bedrock

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Water Features

Water Features include ponding frequency, flooding frequency, and depth to water table.

Depth to Water Table

"Water table" refers to a saturated zone in the soil. It occurs during specified months. Estimates of the upper limit are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

This attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Map—Depth to Water Table



Map Scale: 1:1,120 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Lines

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Soil Rating Points

0 - 25

25 - 50

50 - 100

100 - 150

150 - 200

> 200

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 23, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Depth to Water Table

Map unit symbol	Map unit name	Rating (centimeters)	Acres in AOI	Percent of AOI
HcB	Hollis-Charlton fine sandy loams, 3 to 8 percent slopes	>200	0.5	18.3%
ScA	Scantic silt loam, 0 to 3 percent slopes	15	1.0	35.8%
WdC	Windsor loamy sand, 8 to 15 percent slopes	>200	1.3	45.9%
Totals for Area of Interest			**2.7**	**100.0%**

Rating Options—Depth to Water Table

Units of Measure: centimeters

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Interpret Nulls as Zero: No

Beginning Month: January

Ending Month: December

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Occum	1	0.6	2.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	mesic	loamy	no	loamy over loamy sand
Suncook	2	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	mesic	sandy	no	occasionally flooded
Lim	3	0.6	2.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Pootatuck	4	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	mesic	loamy	no	single grain in C
Rippowam	5	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	mesic	loamy	no	
Saco	6	0.6	2.0	6.00	20.0	D	6	Flood Plain (Bottom Land)	mesic	silty	no	strata
Hadley	8	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand
Winooski	9	0.6	6.0	0.60	6.0	B		Flood Plain (Bottom Land)	mesic	silty over loamy	no	
Merrimac	10	2.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	gravelly sand	no	loamy cap
Gloucester	11	6.0	20.0	6.00	20.0	A	1	Sandy Till	mesic	sandy-skeletal	no	loamy cap
Hinckley	12	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	
Sheepscot	14	6.0	20.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly coarse sand
Searsport	15	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	frigid	sandy	no	organic over sand
Saugatuck	16	0.06	0.2	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	yes	ortstein
Colton, gravelly	21	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	gravelly surface
Colton	22	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	
Masardis	23	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	yes	slate, loamy cap
Agawam	24	6.0	20.0	20.00	100.0	B	2	Outwash and Stream Terraces	mesic	loamy over sandy	no	loamy over sand/gravel
Windsor	26	6.0	20.0	6.00	20.0	A	1	Outwash and Stream Terraces	mesic	sandy	no	
Groveton	27	0.6	2.0	0.60	6.0	B	2	Outwash and Stream Terraces	frigid	loamy	yes	loamy over sandy
Madawaska	28	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Woodbridge	29	0.6	2.0	0.00	0.6	C	3	Firm, platy, loamy till	mesic	loamy	no	sandy loam in Cd
Unadilla	30	0.6	2.0	2.00	20.0	B	2	Terraces and glacial lake plains	mesic	silty	no	silty over gravelly
Hartland	31	0.6	2.0	0.20	2.0	B	2	Terraces and glacial lake plains	mesic	silty	no	very fine sandy loam
Boxford	32	0.1	0.2	0.00	0.2	C	3	Silt and Clay Deposits	mesic	fine	no	silty clay loam
Scitico	33	0.0	0.2	0.00	0.2	C	5	Silt and Clay Deposits	mesic	fine	no	
Wareham	34	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	mesic	sandy	no	
Champlain	35	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	gravelly sand	no	
Adams	36	6.0	20.0	20.00	99.0	A	1	Outwash and Stream Terraces	frigid	sandy	yes	
Melrose	37	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	frigid	loamy over clayey	no	silty clay loam in C
Eldridge	38	6.0	20.0	0.06	0.6	C	3	Sandy/loamy over silt/clay	mesic	sandy over loamy	no	
Millis	39					C	3	Firm, platy, sandy till	frigid	loamy	yes	loamy sand in Cd
Canton	42	2.0	6.0	6.00	20.0	B	2	Loose till, sandy textures	mesic	loamy over sandy	no	loamy over loamy sand
Montauk	44	0.6	6.0	0.06	0.6	C	3	Firm, platy, sandy till	mesic	loamy	no	loamy sand in Cd
Henniker	46	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	no	loamy sand in Cd
Madawaska, aquentic	48	0.6	2.0	6.00	20.0	B	3	Outwash and Stream Terraces	frigid	loamy over sandy	yes	sandy or sandy-skeletal
Whitman	49	0.0	0.2	0.00	0.2	D	6	Firm, platy, loamy till	mesic	loamy	no	mucky loam
Hermon	55	2.0	20.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	loamy cap
Becket	56	0.6	2.0	0.06	0.6	C	3	Firm, platy, sandy till	frigid	loamy	yes	gravelly sandy loam in Cd
Waumbeck	58	2.0	20.0	6.00	20.0	B	3	Loose till, sandy textures	frigid	sandy-skeletal	yes	very cobbly loamy sand
Charlton	62	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	mesic	loamy	no	fine sandy loam
Paxton	66	0.6	2.0	0.00	0.2	C	3	Firm, platy, loamy till	mesic	loamy	no	
Sutton	68	0.6	6.0	0.60	6.0	B	3	Loose till, loamy textures	mesic	loamy	no	
Berkshire	72	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	yes	fine sandy loam
Marlow	76	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	fine sandy loam in Cd
Peru	78	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	yes	
Thorndike	84	0.6	2.0	0.60	2.0	C/D	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	less than 20 in. deep
Hollis	86	0.6	6.0	0.60	6.0	C/D	4	Loose till, bedrock	mesic	loamy	no	less than 20 in. deep
Winnecook	88	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Chatfield	89	0.6	6.0	0.60	6.0	B	4	Loose till, bedrock	mesic	loamy	no	20 to 40 in. deep
Hogback	91	2.0	6.0	2.00	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Lyman	92	2.0	6.0	2.00	6.0	A/D	4	Loose till, bedrock	frigid	loamy	yes	less than 20 in. deep
Woodstock	93	2.0	6.0	2.00	6.0	C/D	4	Loose till, bedrock	frigid	loamy	no	less than 20 in. deep
Rawsonville	98	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep
Tunbridge	99	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	yes	20 to 40 in. deep

Soil Series	legend number	Ksat low - B in/hr	Ksat high - B in/hr	Ksat low - C in/hr	Ksat high - C in/hr	Hyd. Grp.	Group	Land Form	Temp.	Soil Textures	Spodosol ?	Other
Ondawa	101	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	loamy over loamy sand
Sunday	102	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	occasionally flooded
Winooski	103	0.6	6.0	0.60	6.0	B	3	Flood Plain (Bottom Land)	mesic	silty	no	very fine sandy loam
Podunk	104	0.6	6.0	6.00	20.0	B	3	Flood Plain (Bottom Land)	frigid	loamy	no	loamy to coarse sand in C
Rumney	105	0.6	6.0	6.00	20.0	C	5	Flood Plain (Bottom Land)	frigid	loamy	no	
Hadley	108	0.6	2.0	0.60	6.0	B	2	Flood Plain (Bottom Land)	mesic	silty	no	strata of fine sand, occ flooded
Limerick	109	0.6	2.0	0.60	2.0	C	5	Flood Plain (Bottom Land)	mesic	silty	no	
Scarboro	115	6.0	20.0	6.00	20.0	D	6	Outwash and Stream Terraces	mesic	sandy	no	organic over sand, non stony
Finch	116					C	3	Outwash and Stream Terraces	frigid	sandy	yes	cemented (ortstein)
Sudbury	118	2.0	6.0	2.00	20.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	loam over gravelly sand
Telos	123	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Chesuncook	126	0.6	2.0	0.02	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	yes	channery silt loam in Cd
Allagash	127	0.6	2.0	6.00	20.0	B	2	Outwash and Stream Terraces	frigid	loamy over sandy	yes	loamy over sandy
Elliottsville	128	0.6	2.0	0.60	2.0	B	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	20 to 40 in. deep
Hitchcock	130	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam to silt in C
Burnham	131	0.2	6.0	0.02	0.2	D	6	Firm, platy, silty till, schist & phylitte	frigid	loamy	no	organic over silt
Dartmouth	132	0.6	2.0	0.06	0.6	B	3	Terraces and glacial lake plains	mesic	silty	no	thin strata silty clay loam
Monson	133	0.6	2.0	0.60	2.0	D	4	Friable till, silty, schist & phyllite	frigid	loamy	yes	less than 20 in. deep
Maybid	134	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	mesic	fine	no	silt over clay
Shapleigh	136					C/D	4	Sandy Till	mesic	sandy	yes	less than 20 in. deep
Monadnock	142	0.6	2.0	2.00	6.0	B	2	Loose till, sandy textures	frigid	loamy over sandy, sandy-skeletal	yes	gravelly loamy sand in C
Acton	146	2.0	20.0	2.00	20.0	B	3	Loose till, sandy textures	mesic	sandy-skeletal	no	cobbly loamy sand
Vassalboro	150					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Success	154	2.0	6.0	6.00	20.0	A	1	Sandy Till	frigid	sandy-skeletal	yes	cemented
Canterbury	166	0.6	2.0	0.06	0.6	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Sunapee	168	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	
Waskish	195					D	6	Organic Materials - Freshwater	frigid	peat	no	deep organic
Ondawa	201	0.6	6.0	6.00	20.0	B	2	Flood Plain (Bottom Land)	frigid	loamy	no	occ flood, loamy over l. sand
Sunday	202	6.0	20.0	6.00	20.0	A	1	Flood Plain (Bottomland)	frigid	sandy	no	frequently flooded
Fryeburg	208	0.6	2.0	2.00	6.0	B	2	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Charles	209	0.6	100.0	0.60	100.0	C	5	Flood Plain (Bottom Land)	frigid	silty	no	
Warwick	210	2.0	6.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	loamy-skeletal	no	loamy over slate gravel
Naumburg	214	6.0	20.0	6.00	20.0	C	5	Outwash and Stream Terraces	frigid	sandy	yes	
Boscawen	220	6.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	frigid	sandy-skeletal	no	loamy cap
Bemis	224	0.6	0.2	0.00	0.2	C	5	Firm, platy, loamy till	cryic	loamy	no	
Bice	226	0.6	6.0	0.60	6.0	B	2	Loose till, loamy textures	frigid	loamy	no	sandy loam
Lanesboro	228	0.6	2.0	0.06	0.2	C	3	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	channery silt loam in Cd
Poocham	230	0.6	2.0	0.20	2.0	B	3	Terraces and glacial lake plains	mesic	silty	no	silt loam in C
Buxton	232	0.1	0.6	0.00	0.2	C	3	Silt and Clay Deposits	frigid	fine	no	silty clay
Scantic	233	0.0	0.2	0.00	0.2	D	5	Silt and Clay Deposits	frigid	fine	no	
Biddeford	234	0.0	0.2	0.00	0.2	D	6	Silt and Clay Deposits	frigid	fine	no	organic over clay
Buckland	237	0.6	2.0	0.06	0.2	C	3	Firm, platy, loamy till	frigid	loamy	no	loam in Cd
Elmridge	238	2.0	6.0	0.00	0.2	C	3	Sandy/loamy over silt/clay	mesic	loamy over clayey	no	
Brayton	240	0.6	2.0	0.06	0.6	C	5	Firm, platy, silty till, schist & phyllite	frigid	loamy	no	
Lyme	246	0.6	6.0	0.60	6.0	C	5	Loose till, sandy textures	frigid	loamy	no	
Millsite	251	0.6	6.0	0.60	6.0	C	4	Loose till, bedrock	frigid	loamy	no	20 to 40 in. deep
Macomber	252	0.6	2.0	0.60	2.0	C	4	Friable till, silty, schist & phyllite	frigid	loamy-skeletal	yes	20 to 40 in. deep
Lombard	259	0.6	6.0	2.00	20.0	C/D	2	Weathered bedrock, phyllite	frigid	loamy	no	very channery
Sunapee var	269	0.6	2.0	0.60	6.0	B	3	Loose till, loamy textures	frigid	loamy	yes	frigid dystrudept
Chatfield Var.	289	0.6	6.0	0.60	6.0	B	3	Loose till, bedrock	mesic	loamy	no	mwd to swpd
Greenwood	295					A/D	6	Organic Materials - Freshwater	frigid	hemic	no	deep organic
Catden	296					A/D	6	Organic Materials - Freshwater	mesic	sapric	no	deep organic
Lovewell	307	0.6	2.0	0.60	2.0	B	3	Flood Plain (Bottom Land)	frigid	silty	no	very fine sandy loam
Quonset	310	2.0	20.0	20.00	100.0	A	1	Outwash and Stream Terraces	mesic	sandy-skeletal	no	shale
Deerfield	313	6.0	20.0	20.00	100.0	B	3	Outwash and Stream Terraces	mesic	sandy	no	single grain in C

Restaurants | Hotels | Things to do | Transit | Parking | Pharmacies | ATMs

B

3

3

5

Marthas Way

Marthas Way

217

323

321

Marthas Way

White Cliffs at Dover

Bellamy River

Layers

3D

Google

Imagery ©2023 Maine GeoLibrary, Maxar Technologies, USDA/FPAC/GEO, Map data ©2023 United States Terms Privacy Send feedback 50 ft







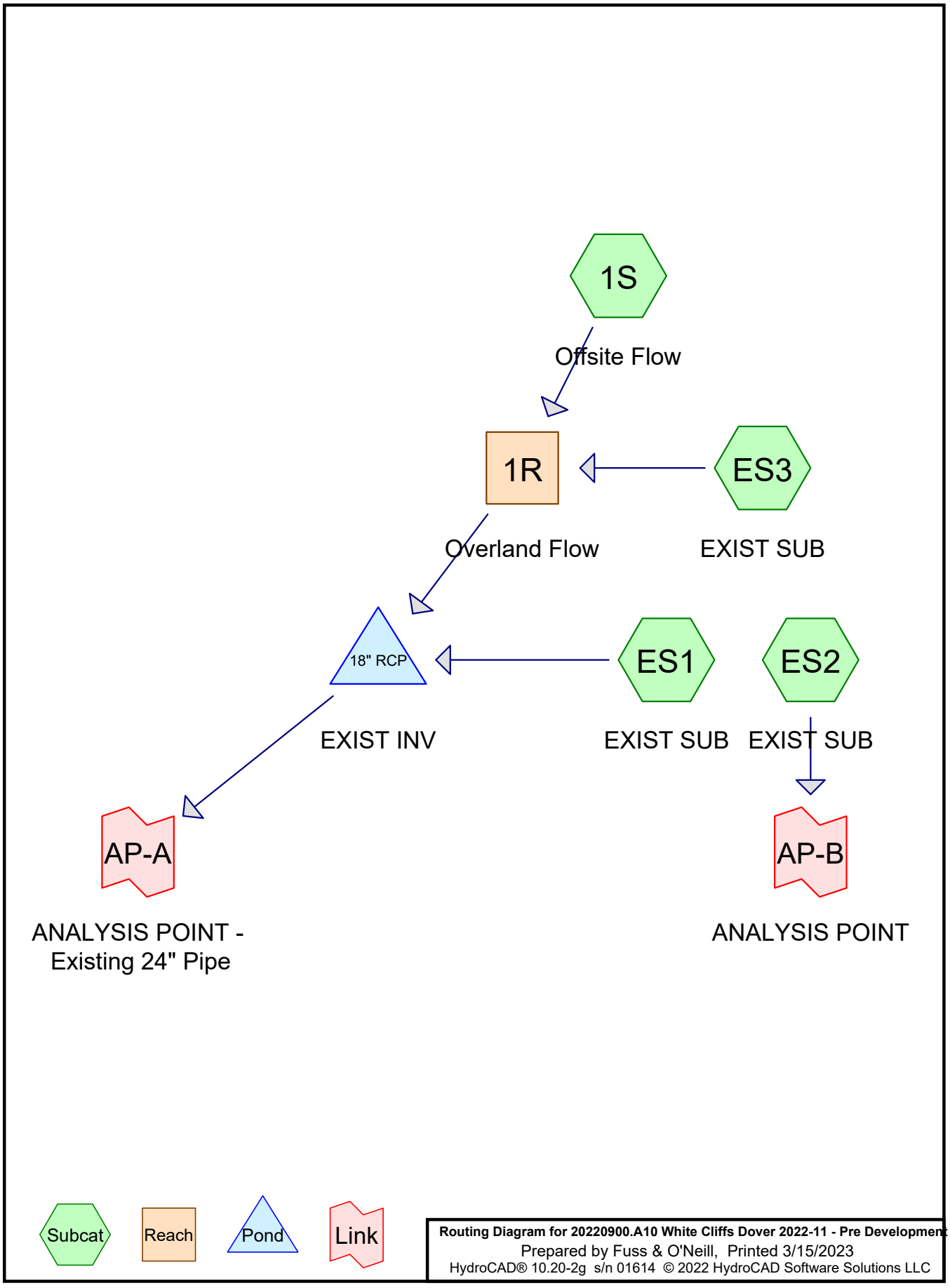



KUBOTA



Appendix B
Drainage Analysis

- Pre-Development 2-, 10-, 25- and 50-Year Node Listing
- Pre-Development 10 and 25-Year Full Summary and Report
- Post-Development 2-, 10-, 25- and 50-Year Node Listing
- Post-Development 10 and 25-Year Full Summary and Report
- Peak Pond Elevations 50-Year Calculations



Routing Diagram for 20220900.A10 White Cliffs Dover 2022-11 - Pre Development

Prepared by Fuss & O'Neill, Printed 3/15/2023

HydroCAD® 10.20-2g s/n 01614 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=1.64"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=1.04 cfs 0.103 af

SubcatchmentES1: EXIST SUB Runoff Area=28,190 sf 6.31% Impervious Runoff Depth=0.76"
Flow Length=350' Tc=15.4 min CN=64 Runoff=0.35 cfs 0.041 af

SubcatchmentES2: EXIST SUB Runoff Area=34,434 sf 18.46% Impervious Runoff Depth=0.49"
Flow Length=160' Tc=9.5 min CN=58 Runoff=0.24 cfs 0.032 af

SubcatchmentES3: EXIST SUB Runoff Area=14,130 sf 0.00% Impervious Runoff Depth=1.44"
Flow Length=140' Tc=12.8 min CN=76 Runoff=0.42 cfs 0.039 af

Reach 1R: Overland Flow Avg. Flow Depth=0.24' Max Vel=2.25 fps Inflow=1.46 cfs 0.142 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=1.45 cfs 0.142 af

Pond 18" RCP: EXIST INV Peak Elev=91.11' Storage=129 cf Inflow=1.79 cfs 0.182 af
18.0" Round Culvert n=0.011 L=58.0' S=0.0138 '/' Outflow=1.79 cfs 0.182 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=1.79 cfs 0.182 af
Primary=1.79 cfs 0.182 af

Link AP-B: ANALYSISPOINT Inflow=0.24 cfs 0.032 af
Primary=0.24 cfs 0.032 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.215 af Average Runoff Depth = 1.03"
86.59% Pervious = 2.175 ac 13.41% Impervious = 0.337 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=3.18"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.04 cfs 0.199 af

SubcatchmentES1: EXIST SUB Runoff Area=28,190 sf 6.31% Impervious Runoff Depth=1.87"
Flow Length=350' Tc=15.4 min CN=64 Runoff=1.00 cfs 0.101 af

SubcatchmentES2: EXIST SUB Runoff Area=34,434 sf 18.46% Impervious Runoff Depth=1.42"
Flow Length=160' Tc=9.5 min CN=58 Runoff=1.03 cfs 0.093 af

SubcatchmentES3: EXIST SUB Runoff Area=14,130 sf 0.00% Impervious Runoff Depth=2.90"
Flow Length=140' Tc=12.8 min CN=76 Runoff=0.88 cfs 0.078 af

Reach 1R: Overland Flow Avg. Flow Depth=0.34' Max Vel=2.77 fps Inflow=2.89 cfs 0.277 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=2.89 cfs 0.277 af

Pond 18" RCP: EXIST INV Peak Elev=91.44' Storage=277 cf Inflow=3.90 cfs 0.378 af
18.0" Round Culvert n=0.011 L=58.0' S=0.0138 '/' Outflow=3.85 cfs 0.378 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=3.85 cfs 0.378 af
Primary=3.85 cfs 0.378 af

Link AP-B: ANALYSISPOINT Inflow=1.03 cfs 0.093 af
Primary=1.03 cfs 0.093 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.472 af Average Runoff Depth = 2.25"
86.59% Pervious = 2.175 ac 13.41% Impervious = 0.337 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=4.47"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.86 cfs 0.280 af

SubcatchmentES1: EXIST SUB Runoff Area=28,190 sf 6.31% Impervious Runoff Depth=2.91"
Flow Length=350' Tc=15.4 min CN=64 Runoff=1.62 cfs 0.157 af

SubcatchmentES2: EXIST SUB Runoff Area=34,434 sf 18.46% Impervious Runoff Depth=2.33"
Flow Length=160' Tc=9.5 min CN=58 Runoff=1.80 cfs 0.153 af

SubcatchmentES3: EXIST SUB Runoff Area=14,130 sf 0.00% Impervious Runoff Depth=4.15"
Flow Length=140' Tc=12.8 min CN=76 Runoff=1.25 cfs 0.112 af

Reach 1R: Overland Flow Avg. Flow Depth=0.41' Max Vel=3.06 fps Inflow=4.08 cfs 0.392 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=4.08 cfs 0.392 af

Pond 18" RCP: EXIST INV Peak Elev=91.69' Storage=435 cf Inflow=5.69 cfs 0.549 af
18.0" Round Culvert n=0.011 L=58.0' S=0.0138 '/' Outflow=5.58 cfs 0.549 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=5.58 cfs 0.549 af
Primary=5.58 cfs 0.549 af

Link AP-B: ANALYSISPOINT Inflow=1.80 cfs 0.153 af
Primary=1.80 cfs 0.153 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.702 af Average Runoff Depth = 3.35"
86.59% Pervious = 2.175 ac 13.41% Impervious = 0.337 ac

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=5.70"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=3.62 cfs 0.356 af

SubcatchmentES1: EXIST SUB Runoff Area=28,190 sf 6.31% Impervious Runoff Depth=3.95"
Flow Length=350' Tc=15.4 min CN=64 Runoff=2.22 cfs 0.213 af

SubcatchmentES2: EXIST SUB Runoff Area=34,434 sf 18.46% Impervious Runoff Depth=3.27"
Flow Length=160' Tc=9.5 min CN=58 Runoff=2.59 cfs 0.215 af

SubcatchmentES3: EXIST SUB Runoff Area=14,130 sf 0.00% Impervious Runoff Depth=5.35"
Flow Length=140' Tc=12.8 min CN=76 Runoff=1.61 cfs 0.145 af

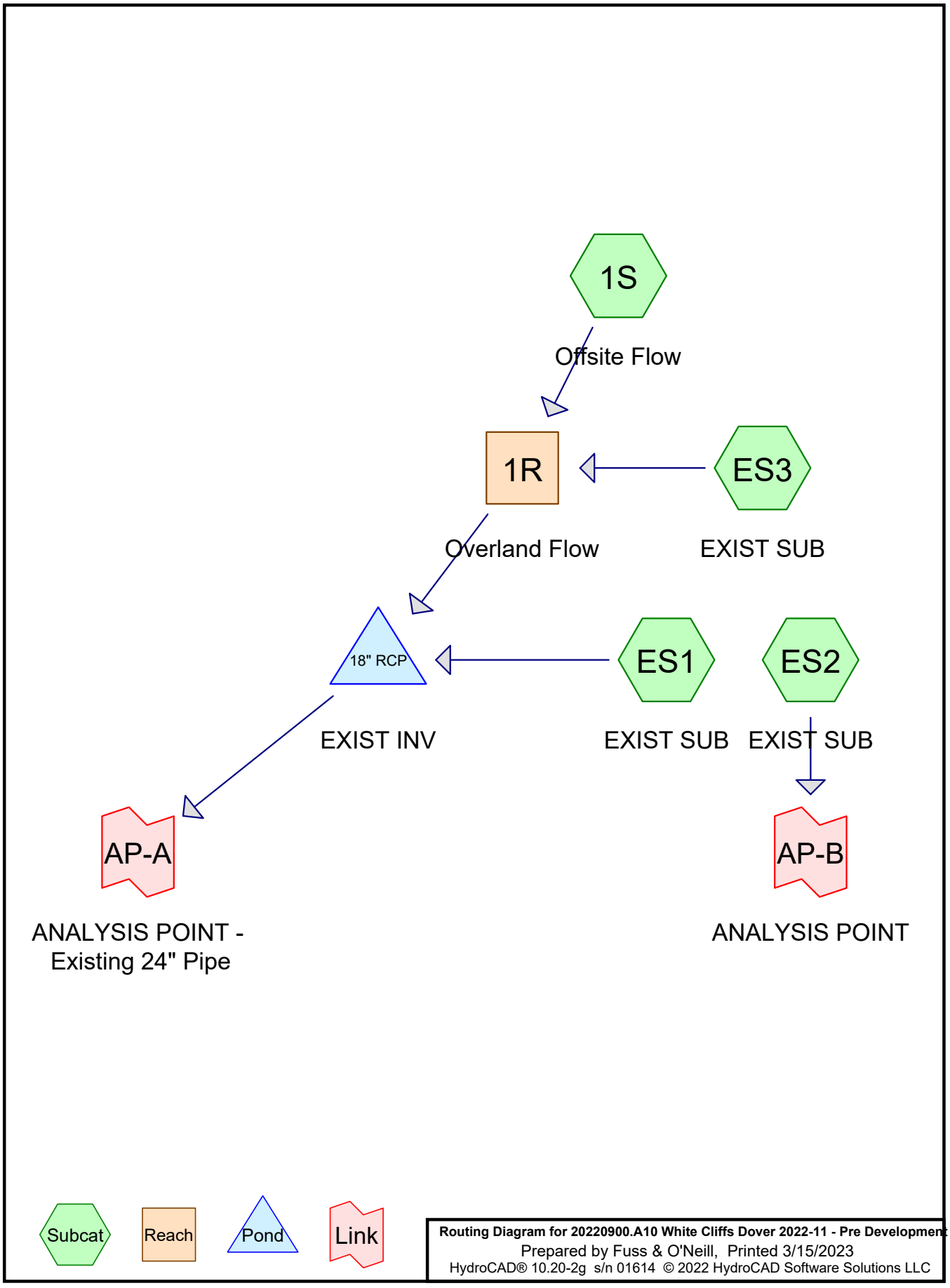
Reach 1R: Overland Flow Avg. Flow Depth=0.47' Max Vel=3.27 fps Inflow=5.18 cfs 0.501 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=5.18 cfs 0.501 af

Pond 18" RCP: EXIST INV Peak Elev=91.94' Storage=645 cf Inflow=7.40 cfs 0.714 af
18.0" Round Culvert n=0.011 L=58.0' S=0.0138 '/' Outflow=7.14 cfs 0.714 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=7.14 cfs 0.714 af
Primary=7.14 cfs 0.714 af

Link AP-B: ANALYSISPOINT Inflow=2.59 cfs 0.215 af
Primary=2.59 cfs 0.215 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.929 af Average Runoff Depth = 4.44"
86.59% Pervious = 2.175 ac 13.41% Impervious = 0.337 ac



Routing Diagram for 20220900.A10 White Cliffs Dover 2022-11 - Pre Development

Prepared by Fuss & O'Neill, Printed 3/15/2023

HydroCAD® 10.20-2g s/n 01614 © 2022 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	10-Year	Type III 24-hr		Default	24.00	1	5.44	2
2	25-Year	Type III 24-hr		Default	24.00	1	6.88	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.750	79	1 acre lots, 20% imp, HSG C (1S)
0.615	39	>75% Grass cover, Good, HSG A (ES1, ES2)
0.363	74	>75% Grass cover, Good, HSG C (ES1, ES2, ES3)
0.128	80	>75% Grass cover, Good, HSG D (ES1, ES2, ES3)
0.134	98	Offsite Driveway (ES2)
0.031	98	Offsite Parking (ES1)
0.010	98	Paved parking, HSG A (ES2)
0.012	98	Paved parking, HSG C (ES1, ES2)
0.053	79	Woods, Fair, HSG D (ES2)
0.060	30	Woods, Good, HSG A (ES1, ES2)
0.127	70	Woods, Good, HSG C (ES1, ES3)
0.229	77	Woods, Good, HSG D (ES1, ES3)
2.512	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.685	HSG A	ES1, ES2
0.000	HSG B	
1.252	HSG C	1S, ES1, ES2, ES3
0.411	HSG D	ES1, ES2, ES3
0.165	Other	ES1, ES2
2.512		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.750	0.000	0.000	0.750	1 acre lots, 20% imp	1S
0.615	0.000	0.363	0.128	0.000	1.106	>75% Grass cover, Good	ES1, ES2, ES3
0.000	0.000	0.000	0.000	0.134	0.134	Offsite Driveway	ES2
0.000	0.000	0.000	0.000	0.031	0.031	Offsite Parking	ES1
0.010	0.000	0.012	0.000	0.000	0.022	Paved parking	ES1, ES2
0.000	0.000	0.000	0.053	0.000	0.053	Woods, Fair	ES2
0.060	0.000	0.127	0.229	0.000	0.416	Woods, Good	ES1, ES2, ES3
0.685	**0.000**	**1.252**	**0.411**	**0.165**	**2.512**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	18" RCP	90.50	89.70	58.0	0.0138	0.011	0.0	18.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=3.18"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.04 cfs 0.199 af

SubcatchmentES1: EXIST SUB Runoff Area=28,190 sf 6.31% Impervious Runoff Depth=1.87"
Flow Length=350' Tc=15.4 min CN=64 Runoff=1.00 cfs 0.101 af

SubcatchmentES2: EXIST SUB Runoff Area=34,434 sf 18.46% Impervious Runoff Depth=1.42"
Flow Length=160' Tc=9.5 min CN=58 Runoff=1.03 cfs 0.093 af

SubcatchmentES3: EXIST SUB Runoff Area=14,130 sf 0.00% Impervious Runoff Depth=2.90"
Flow Length=140' Tc=12.8 min CN=76 Runoff=0.88 cfs 0.078 af

Reach 1R: Overland Flow Avg. Flow Depth=0.34' Max Vel=2.77 fps Inflow=2.89 cfs 0.277 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=2.89 cfs 0.277 af

Pond 18" RCP: EXIST INV Peak Elev=91.44' Storage=277 cf Inflow=3.90 cfs 0.378 af
18.0" Round Culvert n=0.011 L=58.0' S=0.0138 '/' Outflow=3.85 cfs 0.378 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=3.85 cfs 0.378 af
Primary=3.85 cfs 0.378 af

Link AP-B: ANALYSISPOINT Inflow=1.03 cfs 0.093 af
Primary=1.03 cfs 0.093 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.472 af Average Runoff Depth = 2.25"
86.59% Pervious = 2.175 ac 13.41% Impervious = 0.337 ac

Summary for Subcatchment 1S: Offsite Flow

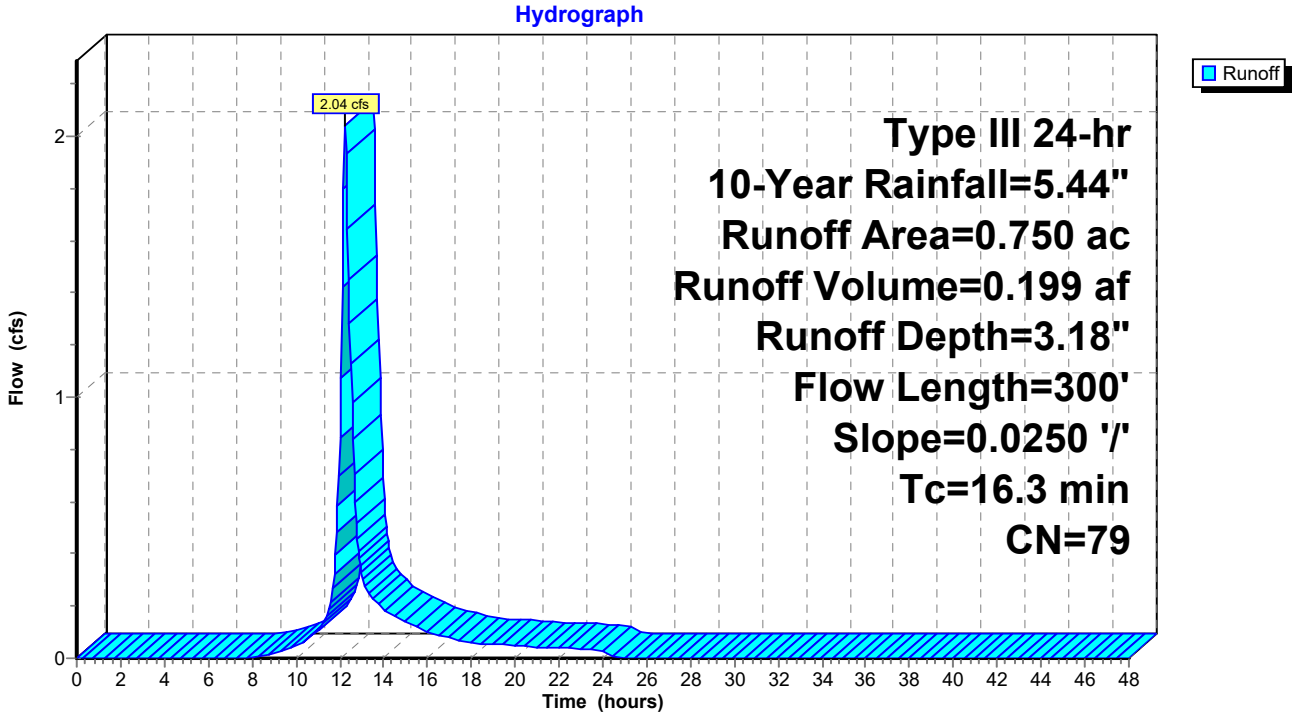
Runoff = 2.04 cfs @ 12.22 hrs, Volume= 0.199 af, Depth= 3.18"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.44"

Area (ac)	CN	Description
0.750	79	1 acre lots, 20% imp, HSG C
0.600		80.00% Pervious Area
0.150		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
3.0	200	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	300	Total			

Subcatchment 1S: Offsite Flow



Summary for Subcatchment ES1: EXIST SUB

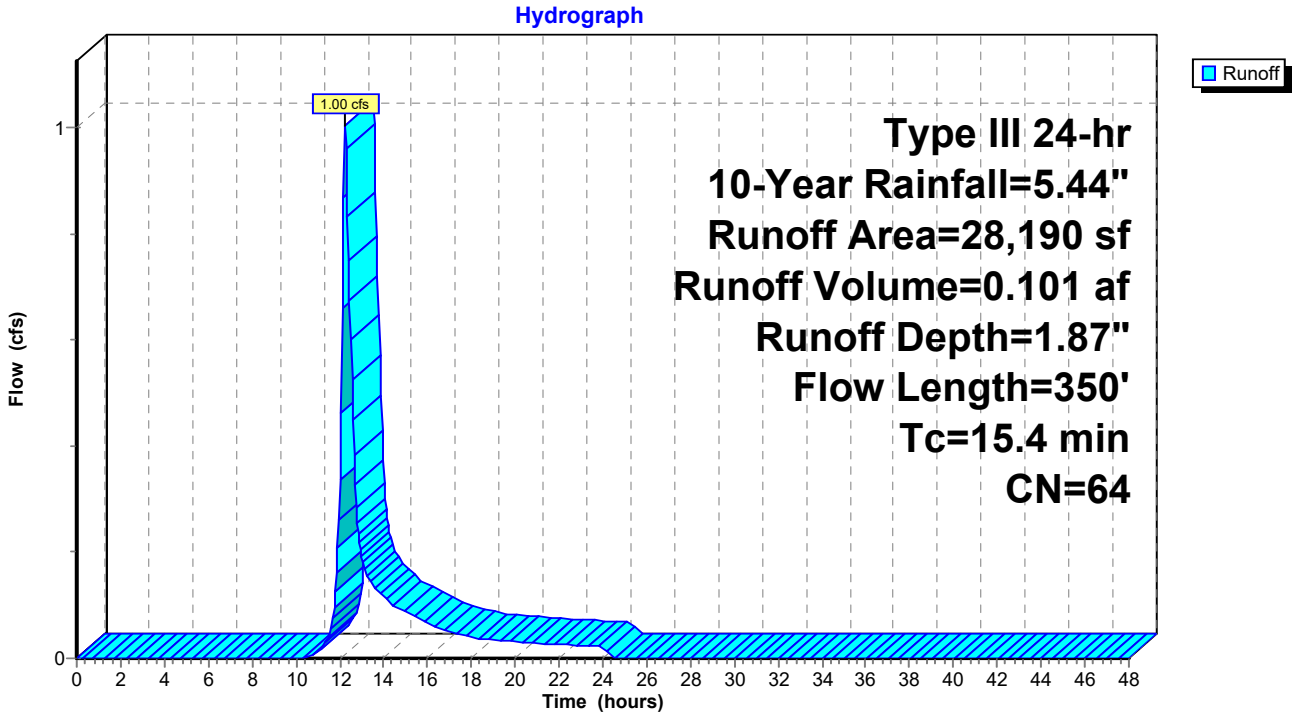
Runoff = 1.00 cfs @ 12.23 hrs, Volume= 0.101 af, Depth= 1.87"
Routed to Pond 18" RCP : EXIST INV

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
	1,215	30	Woods, Good, HSG A
	7,075	39	>75% Grass cover, Good, HSG A
*	1,345	98	Offsite Parking
	435	98	Paved parking, HSG C
	10,895	74	>75% Grass cover, Good, HSG C
	370	74	>75% Grass cover, Good, HSG C
	5,130	70	Woods, Good, HSG C
	820	80	>75% Grass cover, Good, HSG D
	905	77	Woods, Good, HSG D
	28,190	64	Weighted Average
	26,410		93.69% Pervious Area
	1,780		6.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	80	0.0625	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.3	120	0.0460	1.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	150	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.4	350	Total			

Subcatchment ES1: EXIST SUB



Summary for Subcatchment ES2: EXIST SUB

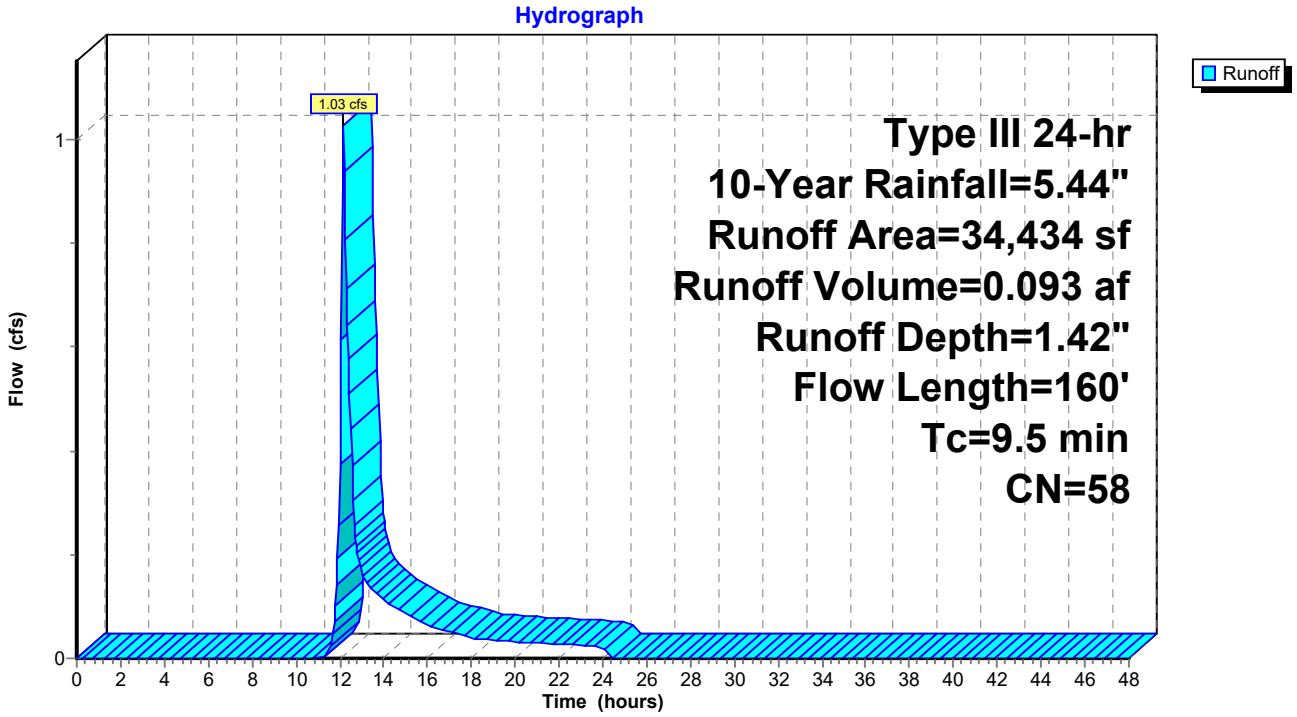
Runoff = 1.03 cfs @ 12.15 hrs, Volume= 0.093 af, Depth= 1.42"
Routed to Link AP-B : ANALYSIS POINT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
	1,395	30	Woods, Good, HSG A
	19,599	39	>75% Grass cover, Good, HSG A
	115	39	>75% Grass cover, Good, HSG A
	429	98	Paved parking, HSG A
	230	74	>75% Grass cover, Good, HSG C
	80	74	>75% Grass cover, Good, HSG C
	85	98	Paved parking, HSG C
	2,320	79	Woods, Fair, HSG D
	4,340	80	>75% Grass cover, Good, HSG D
*	5,841	98	Offsite Driveway
	34,434	58	Weighted Average
	28,079		81.54% Pervious Area
	6,355		18.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	40	0.0375	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.3	120	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.5	160	Total			

Subcatchment ES2: EXIST SUB



Summary for Subcatchment ES3: EXIST SUB

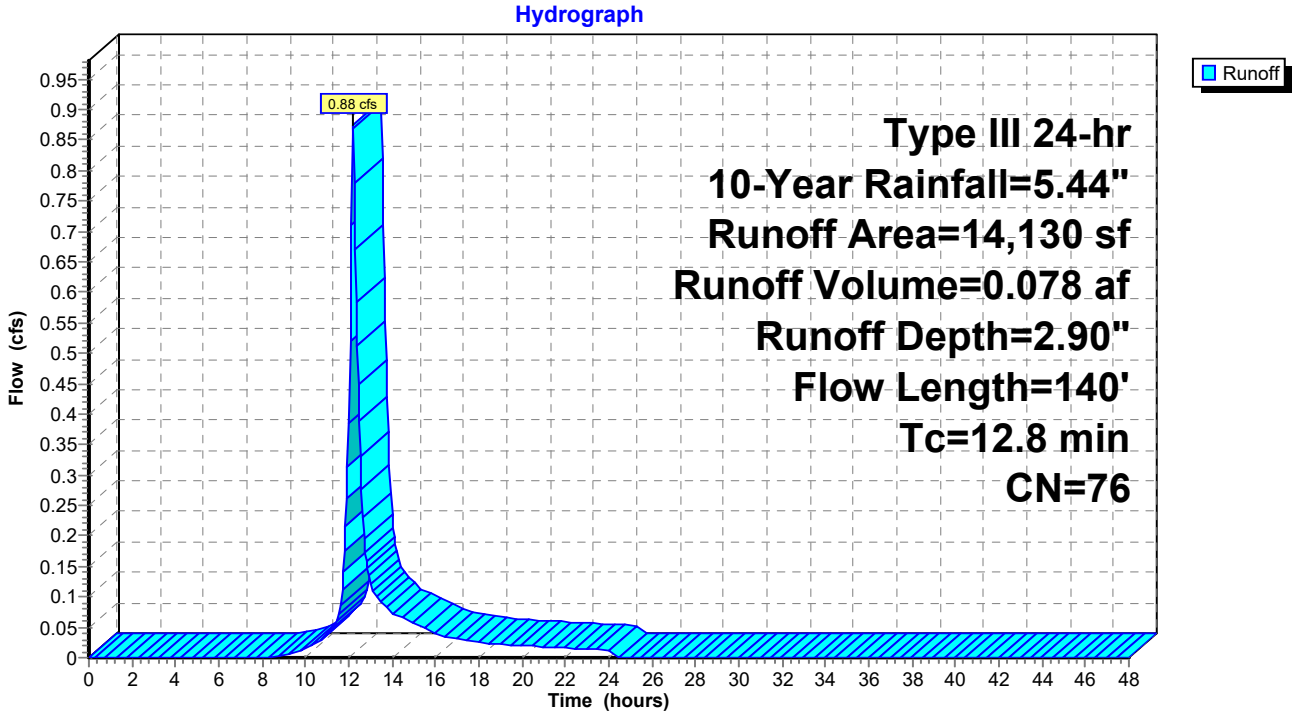
Runoff = 0.88 cfs @ 12.18 hrs, Volume= 0.078 af, Depth= 2.90"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.44"

Area (sf)	CN	Description
4,230	74	>75% Grass cover, Good, HSG C
400	70	Woods, Good, HSG C
425	80	>75% Grass cover, Good, HSG D
9,075	77	Woods, Good, HSG D
14,130	76	Weighted Average
14,130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0900	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	40	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	140	Total			

Subcatchment ES3: EXIST SUB



Summary for Reach 1R: Overland Flow

Inflow Area = 1.074 ac, 13.96% Impervious, Inflow Depth = 3.10" for 10-Year event
Inflow = 2.89 cfs @ 12.21 hrs, Volume= 0.277 af
Outflow = 2.89 cfs @ 12.22 hrs, Volume= 0.277 af, Atten= 0%, Lag= 0.4 min
Routed to Pond 18" RCP : EXIST INV

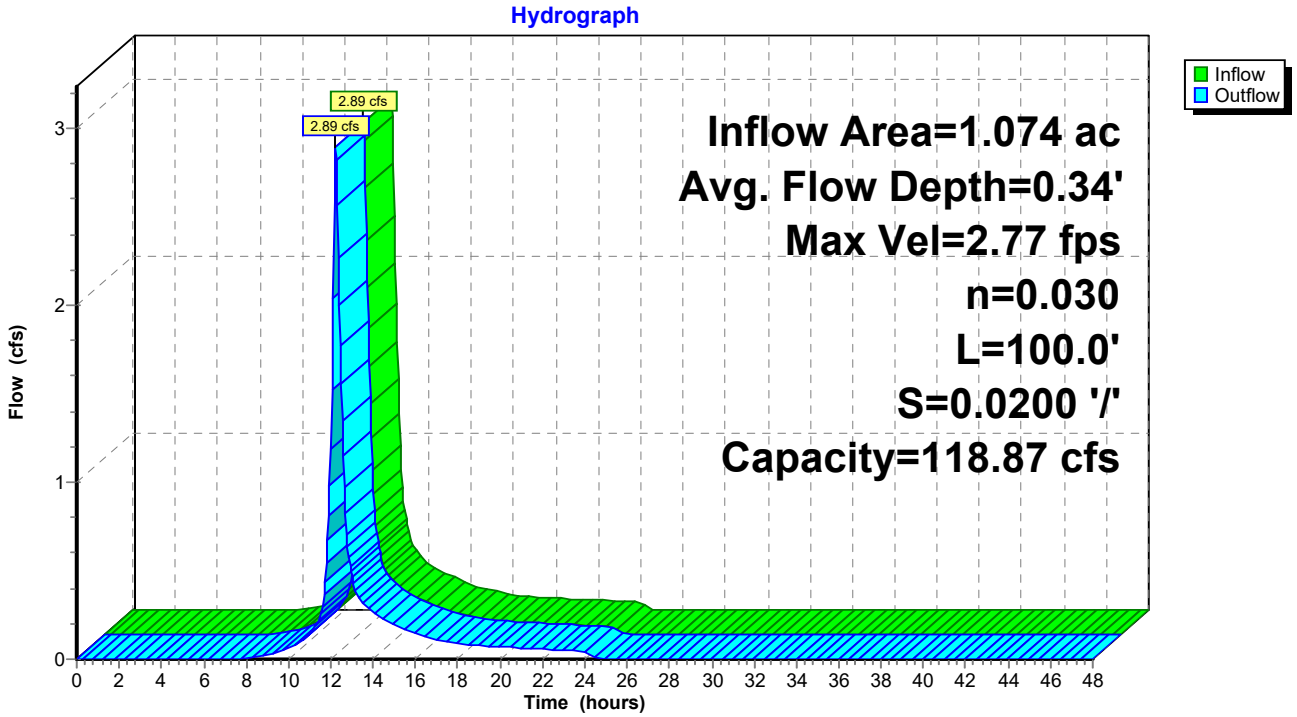
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.77 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 1.7 min

Peak Storage= 104 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 4.06'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 118.87 cfs

2.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0200 '/'
Inlet Invert= 93.00', Outlet Invert= 91.00'



Reach 1R: Overland Flow



Summary for Pond 18" RCP: EXIST INV

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.10' @ 12.25 hrs

Inflow Area = 1.722 ac, 11.09% Impervious, Inflow Depth = 2.64" for 10-Year event
Inflow = 3.90 cfs @ 12.22 hrs, Volume= 0.378 af
Outflow = 3.85 cfs @ 12.25 hrs, Volume= 0.378 af, Atten= 1%, Lag= 1.6 min
Primary = 3.85 cfs @ 12.25 hrs, Volume= 0.378 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 91.44' @ 12.25 hrs Surf.Area= 548 sf Storage= 277 cf
Flood Elev= 92.00' Surf.Area= 985 sf Storage= 699 cf

Plug-Flow detention time= 1.7 min calculated for 0.378 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (843.6 - 841.9)

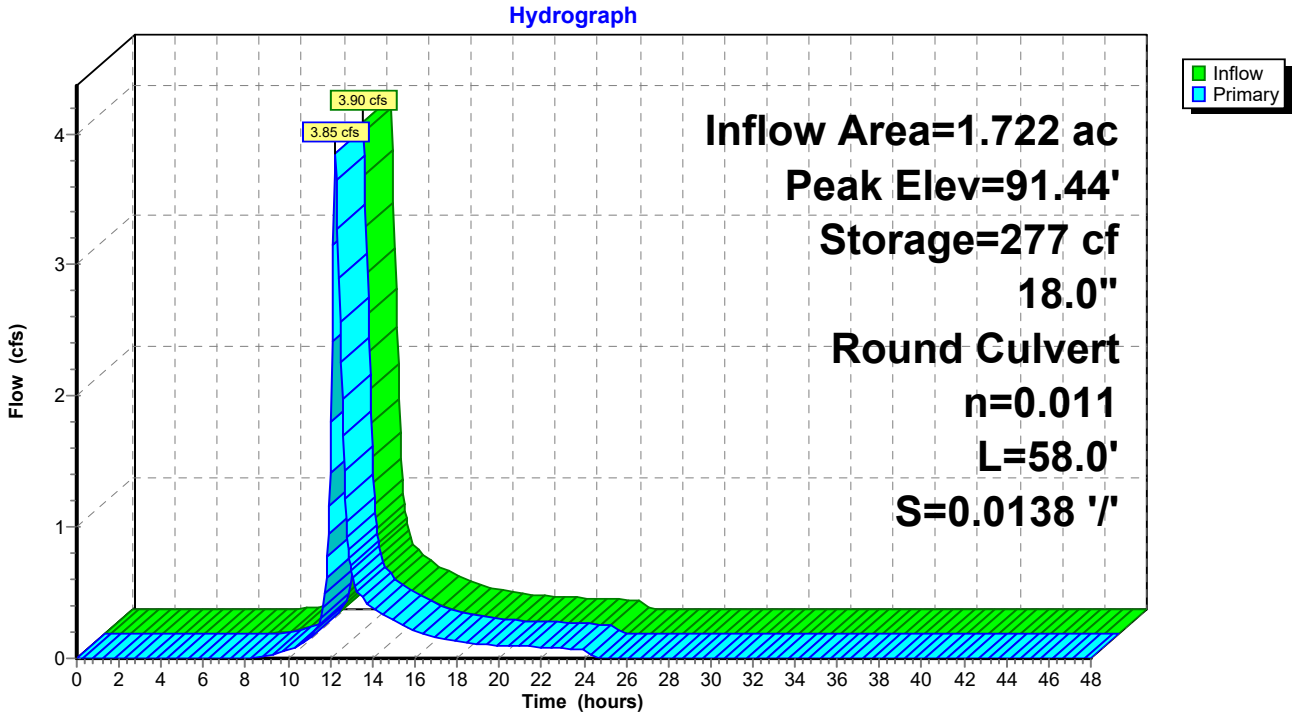
Volume	Invert	Avail.Storage	Storage Description
#1	90.50'	2,981 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
90.50	100	40.0	0	0	100
92.00	985	225.0	699	699	4,006
93.00	3,900	435.0	2,282	2,981	15,041

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	**18.0" Round Culvert** L= 58.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.50' / 89.70' S= 0.0138 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=3.84 cfs @ 12.25 hrs HW=91.44' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.84 cfs @ 3.30 fps)

Pond 18" RCP: EXIST INV

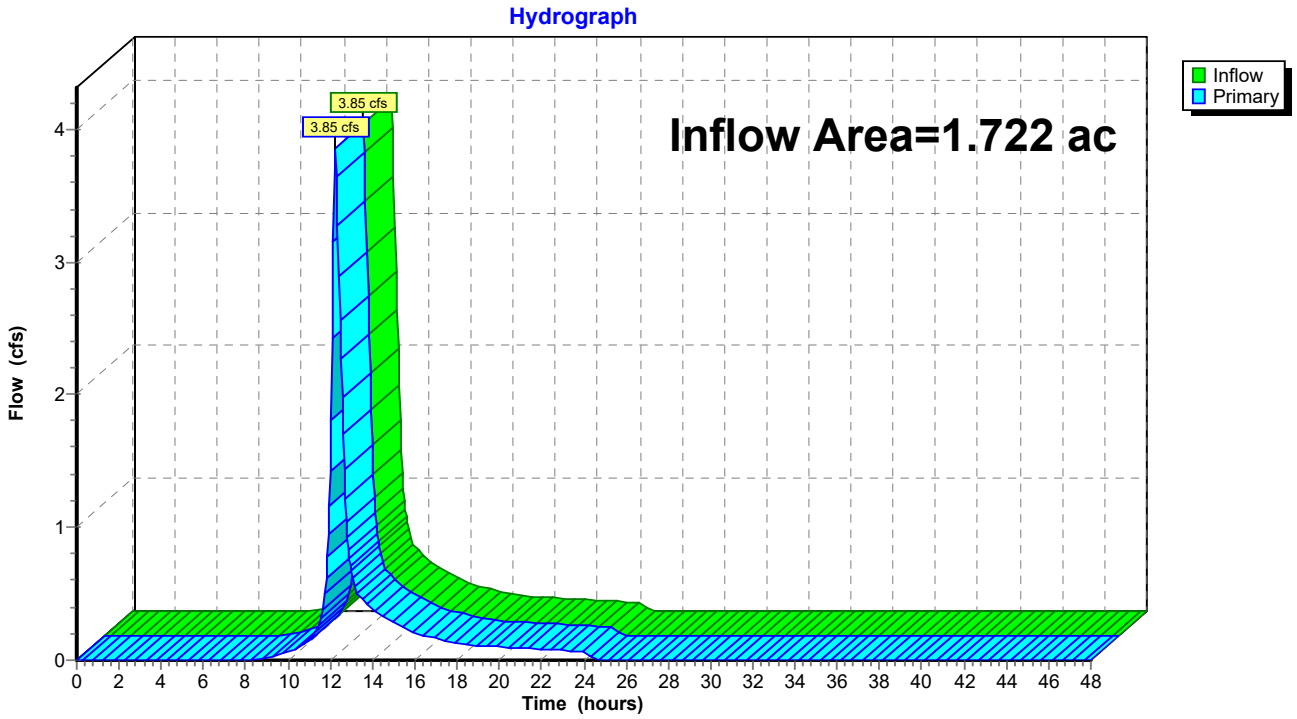


Summary for Link AP-A: ANALYSIS POINT - Existing 24" Pipe

Inflow Area = 1.722 ac, 11.09% Impervious, Inflow Depth = 2.64" for 10-Year event
Inflow = 3.85 cfs @ 12.25 hrs, Volume= 0.378 af
Primary = 3.85 cfs @ 12.25 hrs, Volume= 0.378 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-A: ANALYSIS POINT - Existing 24" Pipe

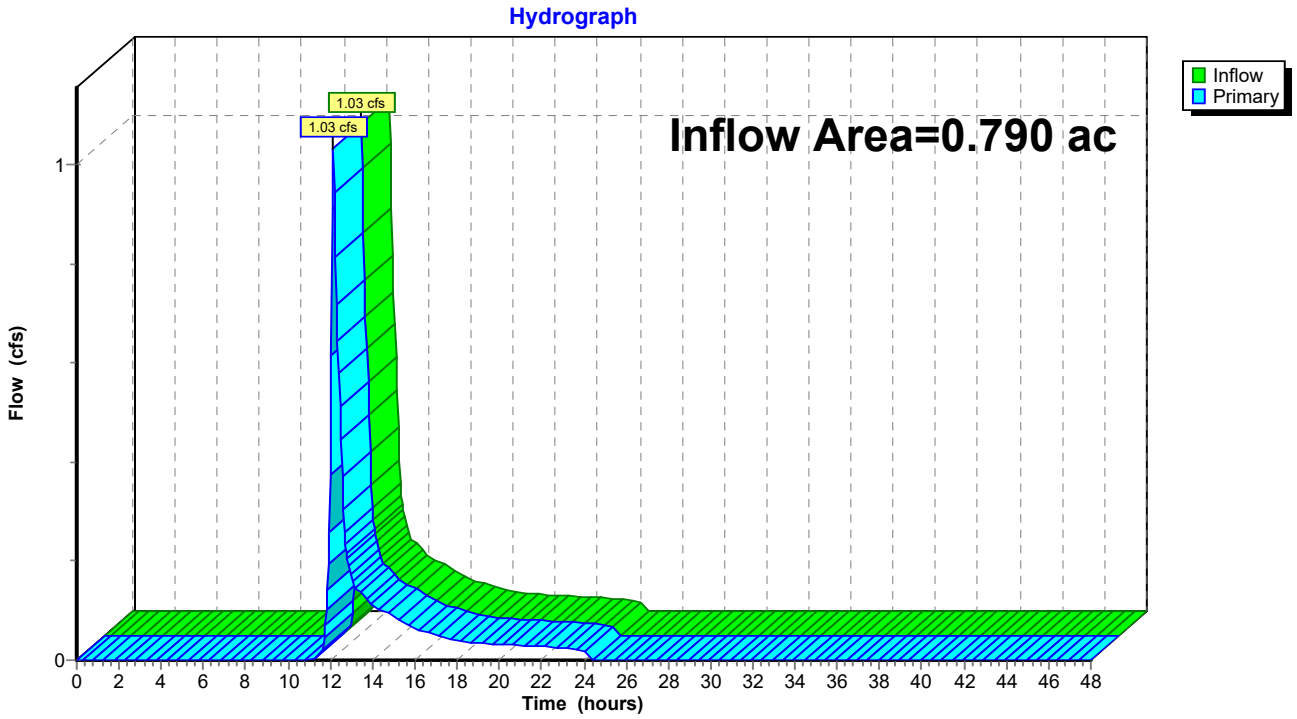


Summary for Link AP-B: ANALYSIS POINT

Inflow Area = 0.790 ac, 18.46% Impervious, Inflow Depth = 1.42" for 10-Year event
Inflow = 1.03 cfs @ 12.15 hrs, Volume= 0.093 af
Primary = 1.03 cfs @ 12.15 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-B: ANALYSIS POINT



Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=4.47"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.86 cfs 0.280 af

SubcatchmentES1: EXIST SUB Runoff Area=28,190 sf 6.31% Impervious Runoff Depth=2.91"
Flow Length=350' Tc=15.4 min CN=64 Runoff=1.62 cfs 0.157 af

SubcatchmentES2: EXIST SUB Runoff Area=34,434 sf 18.46% Impervious Runoff Depth=2.33"
Flow Length=160' Tc=9.5 min CN=58 Runoff=1.80 cfs 0.153 af

SubcatchmentES3: EXIST SUB Runoff Area=14,130 sf 0.00% Impervious Runoff Depth=4.15"
Flow Length=140' Tc=12.8 min CN=76 Runoff=1.25 cfs 0.112 af

Reach 1R: Overland Flow Avg. Flow Depth=0.41' Max Vel=3.06 fps Inflow=4.08 cfs 0.392 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=4.08 cfs 0.392 af

Pond 18" RCP: EXIST INV Peak Elev=91.69' Storage=435 cf Inflow=5.69 cfs 0.549 af
18.0" Round Culvert n=0.011 L=58.0' S=0.0138 '/' Outflow=5.58 cfs 0.549 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=5.58 cfs 0.549 af
Primary=5.58 cfs 0.549 af

Link AP-B: ANALYSISPOINT Inflow=1.80 cfs 0.153 af
Primary=1.80 cfs 0.153 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.702 af Average Runoff Depth = 3.35"
86.59% Pervious = 2.175 ac 13.41% Impervious = 0.337 ac

Summary for Subcatchment 1S: Offsite Flow

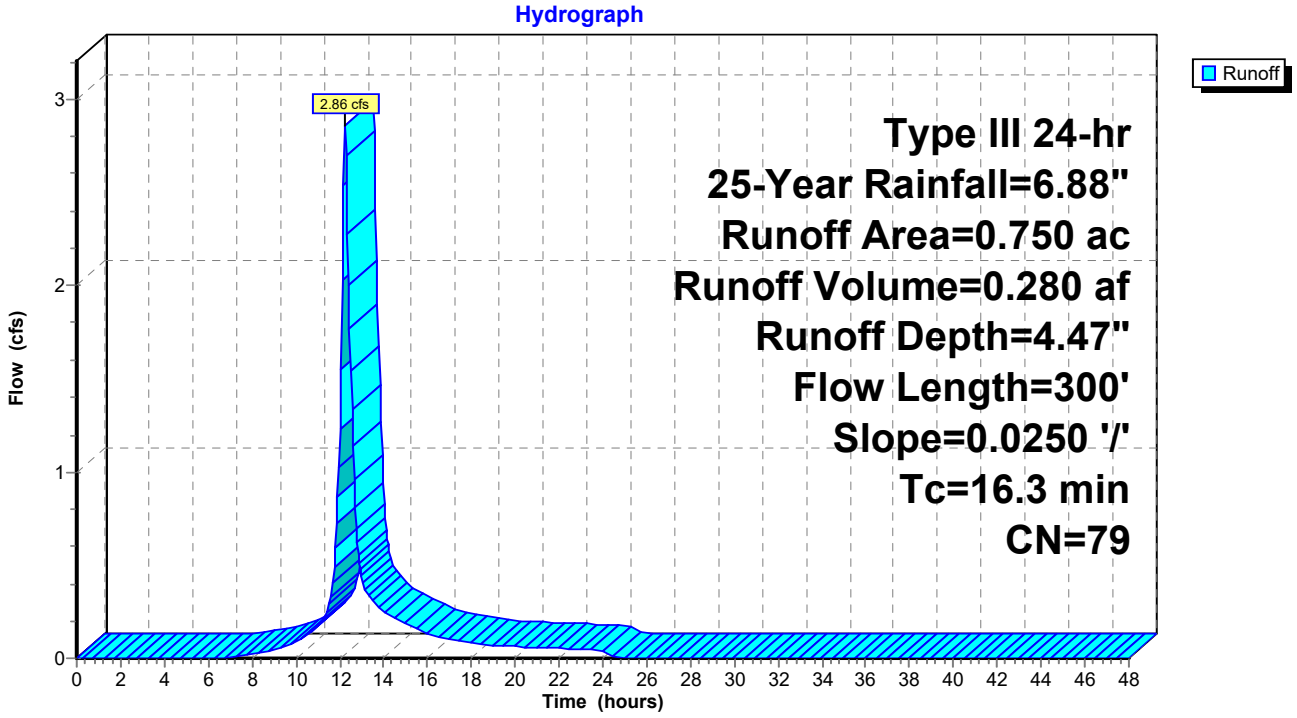
Runoff = 2.86 cfs @ 12.22 hrs, Volume= 0.280 af, Depth= 4.47"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.88"

Area (ac)	CN	Description
0.750	79	1 acre lots, 20% imp, HSG C
0.600		80.00% Pervious Area
0.150		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
3.0	200	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	300	Total			

Subcatchment 1S: Offsite Flow



Summary for Subcatchment ES1: EXIST SUB

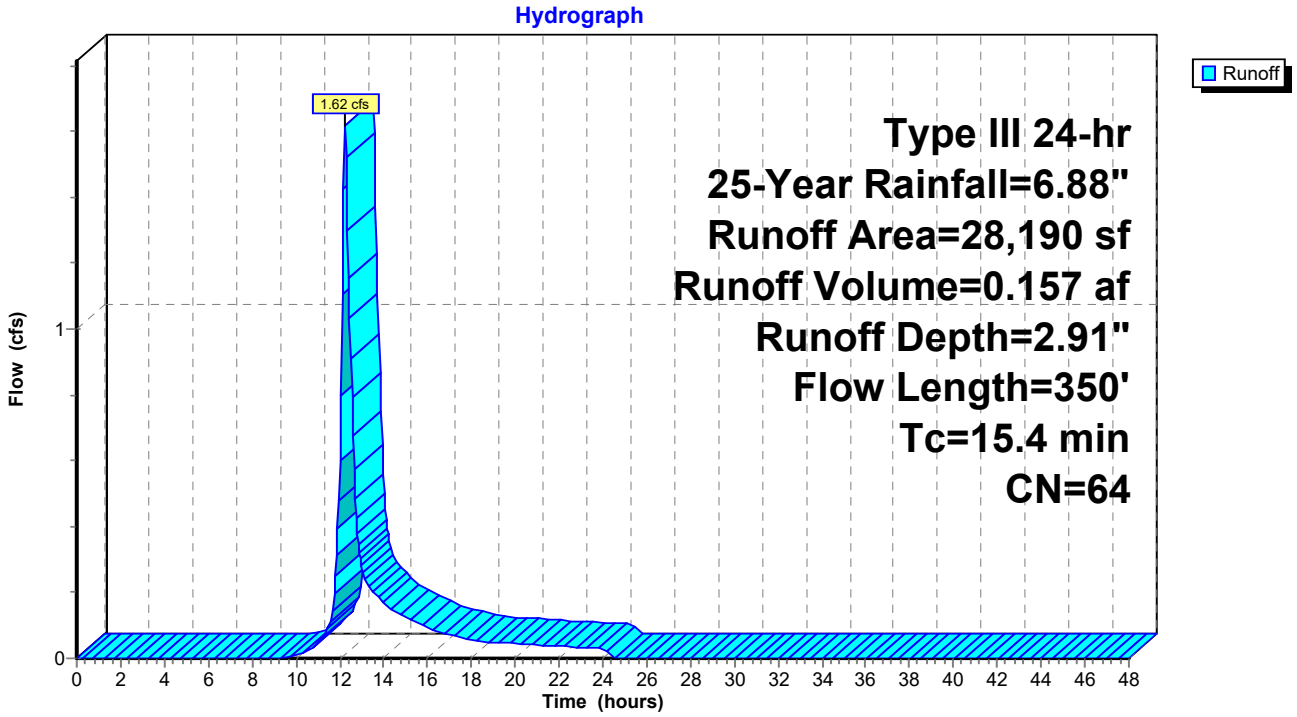
Runoff = 1.62 cfs @ 12.22 hrs, Volume= 0.157 af, Depth= 2.91"
Routed to Pond 18" RCP : EXIST INV

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
	1,215	30	Woods, Good, HSG A
	7,075	39	>75% Grass cover, Good, HSG A
*	1,345	98	Offsite Parking
	435	98	Paved parking, HSG C
	10,895	74	>75% Grass cover, Good, HSG C
	370	74	>75% Grass cover, Good, HSG C
	5,130	70	Woods, Good, HSG C
	820	80	>75% Grass cover, Good, HSG D
	905	77	Woods, Good, HSG D
	28,190	64	Weighted Average
	26,410		93.69% Pervious Area
	1,780		6.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	80	0.0625	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.3	120	0.0460	1.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.5	150	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
15.4	350	Total			

Subcatchment ES1: EXIST SUB



Summary for Subcatchment ES2: EXIST SUB

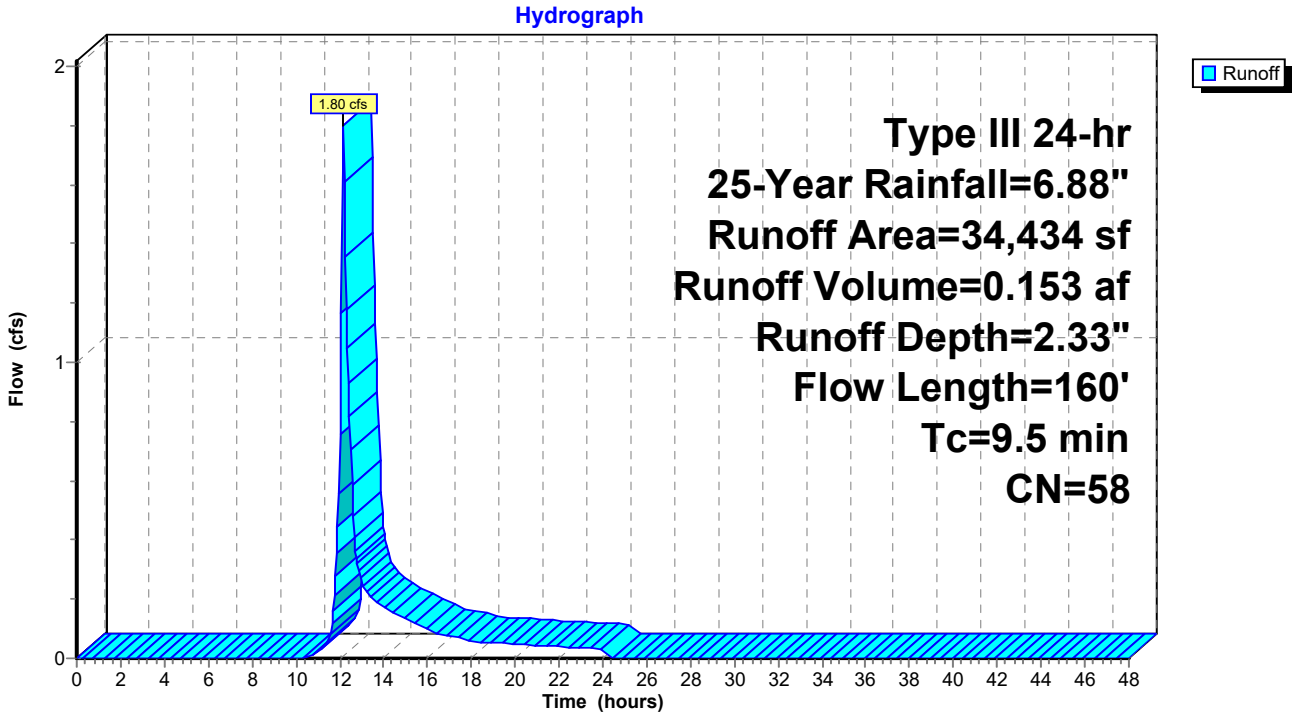
Runoff = 1.80 cfs @ 12.15 hrs, Volume= 0.153 af, Depth= 2.33"
Routed to Link AP-B : ANALYSIS POINT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
	1,395	30	Woods, Good, HSG A
	19,599	39	>75% Grass cover, Good, HSG A
	115	39	>75% Grass cover, Good, HSG A
	429	98	Paved parking, HSG A
	230	74	>75% Grass cover, Good, HSG C
	80	74	>75% Grass cover, Good, HSG C
	85	98	Paved parking, HSG C
	2,320	79	Woods, Fair, HSG D
	4,340	80	>75% Grass cover, Good, HSG D
*	5,841	98	Offsite Driveway
	34,434	58	Weighted Average
	28,079		81.54% Pervious Area
	6,355		18.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	40	0.0375	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.3	120	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.5	160	Total			

Subcatchment ES2: EXIST SUB



Summary for Subcatchment ES3: EXIST SUB

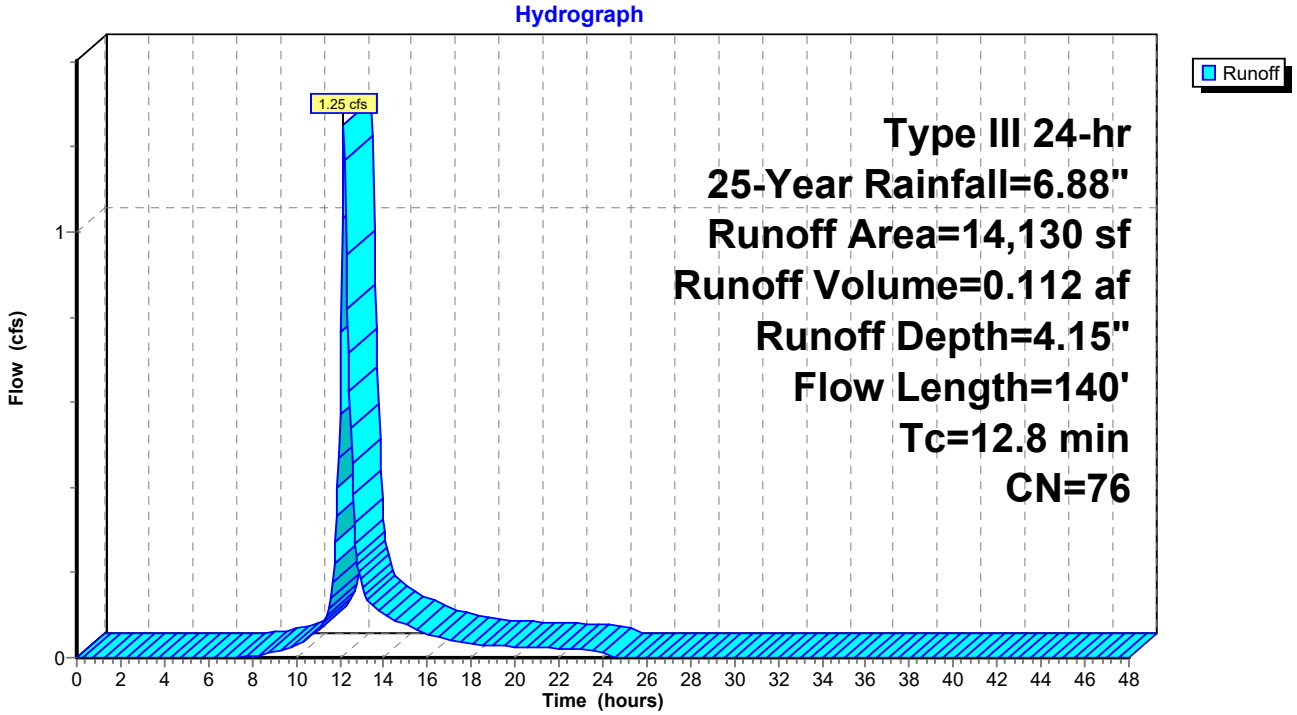
Runoff = 1.25 cfs @ 12.18 hrs, Volume= 0.112 af, Depth= 4.15"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=6.88"

Area (sf)	CN	Description
4,230	74	>75% Grass cover, Good, HSG C
400	70	Woods, Good, HSG C
425	80	>75% Grass cover, Good, HSG D
9,075	77	Woods, Good, HSG D
14,130	76	Weighted Average
14,130		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0900	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	40	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
12.8	140	Total			

Subcatchment ES3: EXIST SUB



Summary for Reach 1R: Overland Flow

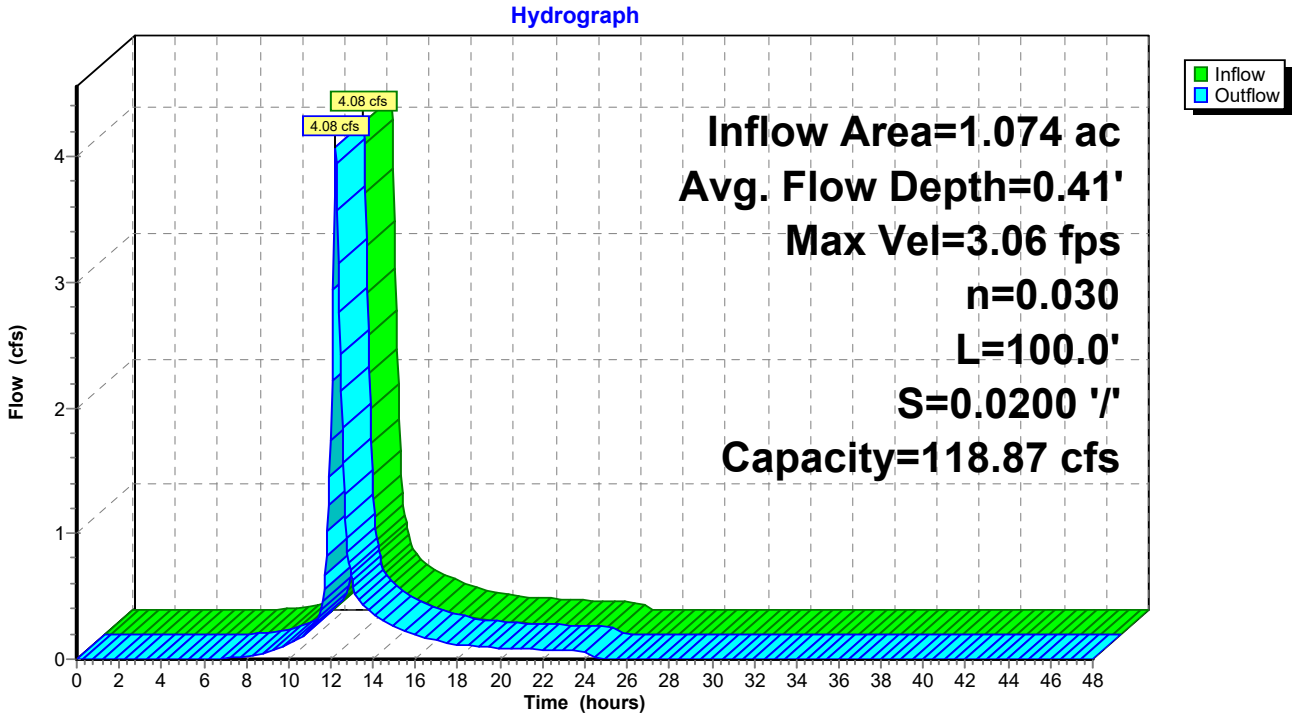
Inflow Area = 1.074 ac, 13.96% Impervious, Inflow Depth = 4.38" for 25-Year event
Inflow = 4.08 cfs @ 12.21 hrs, Volume= 0.392 af
Outflow = 4.08 cfs @ 12.21 hrs, Volume= 0.392 af, Atten= 0%, Lag= 0.4 min
Routed to Pond 18" RCP : EXIST INV

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.06 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 1.6 min

Peak Storage= 133 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 4.47'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 118.87 cfs

2.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0200 '/'
Inlet Invert= 93.00', Outlet Invert= 91.00'





Summary for Pond 18" RCP: EXIST INV

[62] Hint: Exceeded Reach 1R OUTLET depth by 0.28' @ 12.25 hrs

Inflow Area = 1.722 ac, 11.09% Impervious, Inflow Depth = 3.83" for 25-Year event
Inflow = 5.69 cfs @ 12.22 hrs, Volume= 0.549 af
Outflow = 5.58 cfs @ 12.25 hrs, Volume= 0.549 af, Atten= 2%, Lag= 1.9 min
Primary = 5.58 cfs @ 12.25 hrs, Volume= 0.549 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 91.69' @ 12.25 hrs Surf.Area= 727 sf Storage= 435 cf
Flood Elev= 92.00' Surf.Area= 985 sf Storage= 699 cf

Plug-Flow detention time= 1.6 min calculated for 0.548 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (833.3 - 831.7)

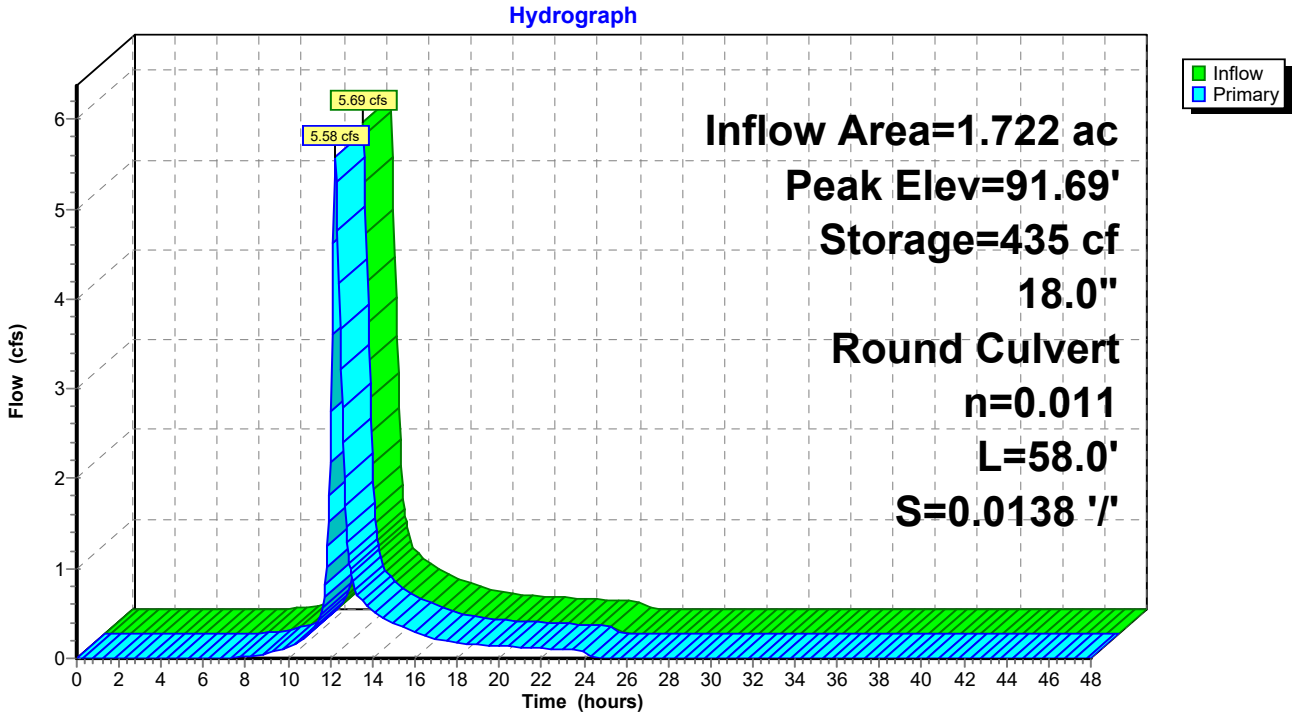
Volume	Invert	Avail.Storage	Storage Description
#1	90.50'	2,981 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
90.50	100	40.0	0	0	100
92.00	985	225.0	699	699	4,006
93.00	3,900	435.0	2,282	2,981	15,041

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	**18.0" Round Culvert**
			L= 58.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 90.50' / 89.70' S= 0.0138 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf

Primary OutFlow Max=5.57 cfs @ 12.25 hrs HW=91.69' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 5.57 cfs @ 3.71 fps)

Pond 18" RCP: EXIST INV

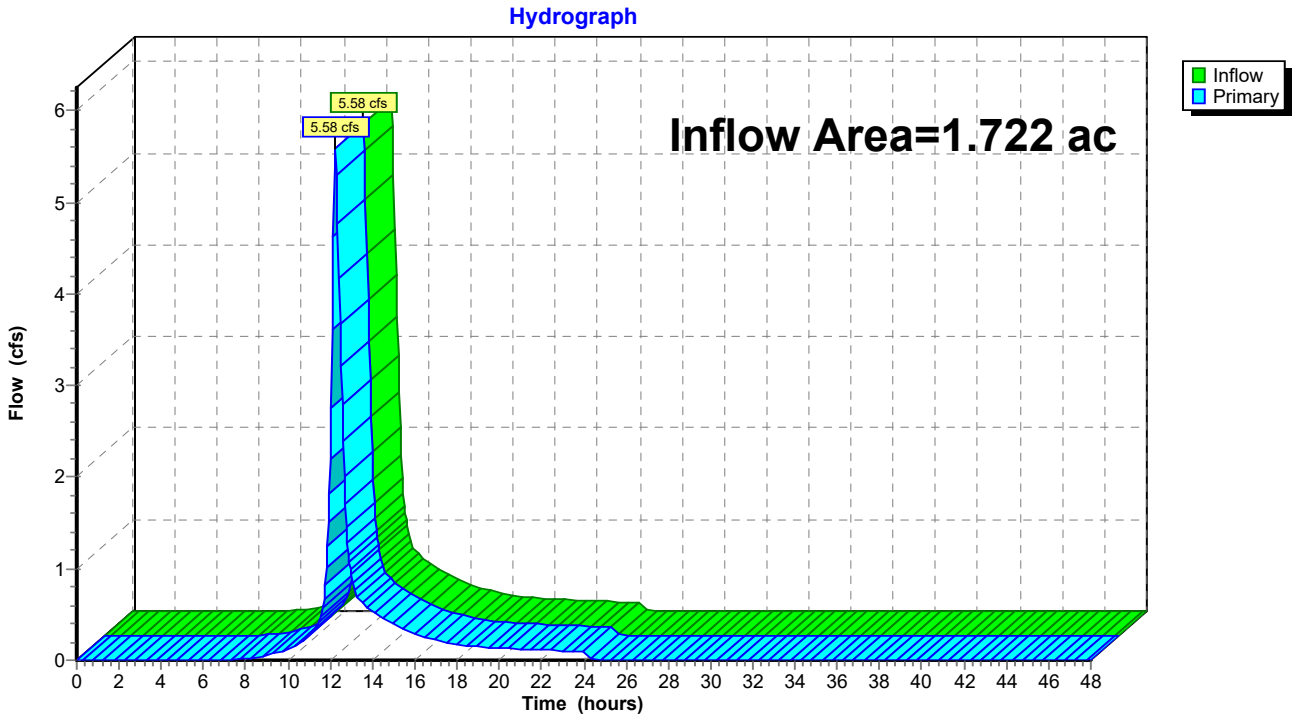


Summary for Link AP-A: ANALYSIS POINT - Existing 24" Pipe

Inflow Area = 1.722 ac, 11.09% Impervious, Inflow Depth = 3.83" for 25-Year event
Inflow = 5.58 cfs @ 12.25 hrs, Volume= 0.549 af
Primary = 5.58 cfs @ 12.25 hrs, Volume= 0.549 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-A: ANALYSIS POINT - Existing 24" Pipe

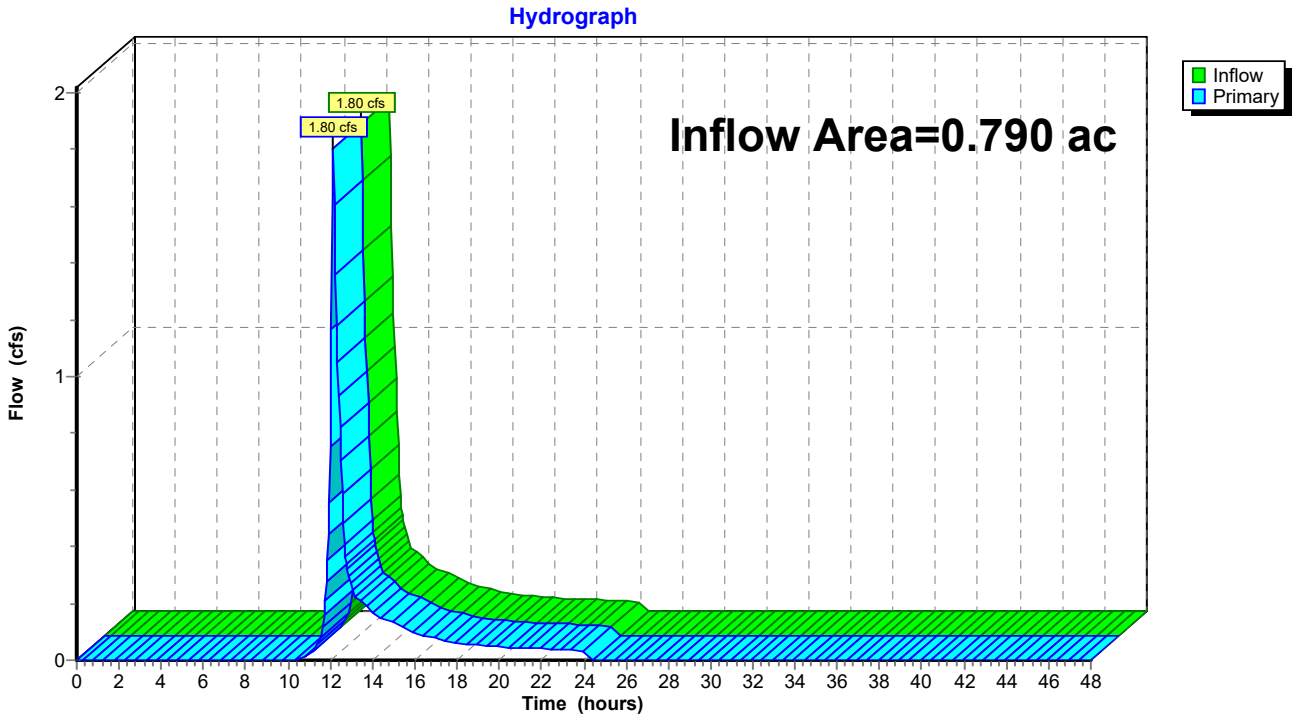


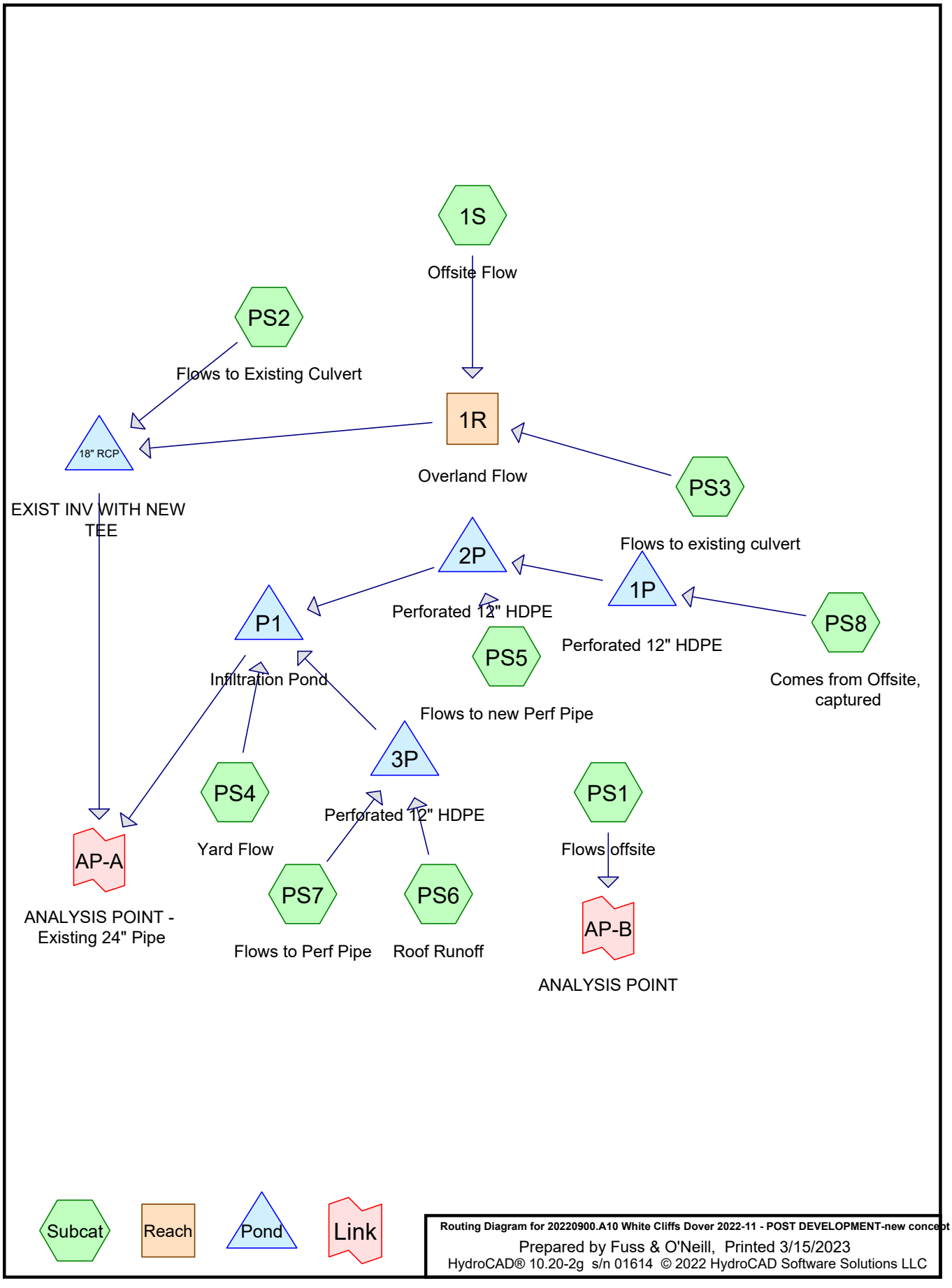
Summary for Link AP-B: ANALYSIS POINT

Inflow Area = 0.790 ac, 18.46% Impervious, Inflow Depth = 2.33" for 25-Year event
Inflow = 1.80 cfs @ 12.15 hrs, Volume= 0.153 af
Primary = 1.80 cfs @ 12.15 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-B: ANALYSIS POINT





Routing Diagram for 20220900.A10 White Cliffs Dover 2022-11 - POST DEVELOPMENT-new concept

Prepared by Fuss & O'Neill, Printed 3/15/2023

HydroCAD® 10.20-2g s/n 01614 © 2022 HydroCAD Software Solutions LLC

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=1.64"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=1.03 cfs 0.103 af

SubcatchmentPS1: Flows offsite Runoff Area=21,922 sf 35.15% Impervious Runoff Depth=0.58"
Flow Length=120' Slope=0.0200 '/' Tc=6.0 min CN=60 Runoff=0.23 cfs 0.024 af

SubcatchmentPS2: Flows to Existing Runoff Area=4,585 sf 18.39% Impervious Runoff Depth=1.57"
Tc=6.0 min CN=78 Runoff=0.18 cfs 0.014 af

SubcatchmentPS3: Flows to existing Runoff Area=20,859 sf 6.11% Impervious Runoff Depth=1.51"
Flow Length=241' Tc=13.5 min CN=77 Runoff=0.64 cfs 0.060 af

SubcatchmentPS4: Yard Flow Runoff Area=11,138 sf 11.48% Impervious Runoff Depth=1.13"
Tc=6.0 min CN=71 Runoff=0.30 cfs 0.024 af

SubcatchmentPS5: Flows to new Perf Pipe Runoff Area=9,756 sf 44.37% Impervious Runoff Depth=1.01"
Flow Length=265' Tc=26.2 min CN=69 Runoff=0.15 cfs 0.019 af

SubcatchmentPS6: Roof Runoff Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.009 af

SubcatchmentPS7: Flows to Perf Pipe Runoff Area=1,351 sf 56.70% Impervious Runoff Depth=1.19"
Tc=6.0 min CN=72 Runoff=0.04 cfs 0.003 af

SubcatchmentPS8: Comes from Offsite, Runoff Area=5,781 sf 0.00% Impervious Runoff Depth=1.44"
Flow Length=160' Tc=9.5 min CN=76 Runoff=0.18 cfs 0.016 af

Reach 1R: Overland Flow Avg. Flow Depth=0.26' Max Vel=2.34 fps Inflow=1.67 cfs 0.163 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=1.66 cfs 0.163 af

Pond 1P: Perforated 12" HDPE Peak Elev=92.29' Storage=95 cf Inflow=0.18 cfs 0.016 af
Outflow=0.20 cfs 0.016 af

Pond 2P: Perforated 12" HDPE Peak Elev=92.29' Storage=207 cf Inflow=0.29 cfs 0.035 af
Outflow=0.25 cfs 0.035 af

Pond 3P: Perforated 12" HDPE Peak Elev=92.29' Storage=111 cf Inflow=0.14 cfs 0.012 af
Outflow=0.13 cfs 0.012 af

Pond 18" RCP: EXIST INV WITH NEW TEE Peak Elev=92.20' Storage=662 cf Inflow=1.77 cfs 0.177 af
Outflow=1.23 cfs 0.177 af

Pond P1: Infiltration Pond Peak Elev=92.29' Storage=1,032 cf Inflow=0.44 cfs 0.071 af
Outflow=0.06 cfs 0.071 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=1.28 cfs 0.247 af
Primary=1.28 cfs 0.247 af

Link AP-B: ANALYSISPOINT Inflow=0.23 cfs 0.024 af
Primary=0.23 cfs 0.024 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.271 af Average Runoff Depth = 1.30"
77.98% Pervious = 1.959 ac 22.02% Impervious = 0.553 ac

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=3.18"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.02 cfs 0.199 af

SubcatchmentPS1: Flows offsite Runoff Area=21,922 sf 35.15% Impervious Runoff Depth=1.57"
Flow Length=120' Slope=0.0200 '/' Tc=6.0 min CN=60 Runoff=0.81 cfs 0.066 af

SubcatchmentPS2: Flows to Existing Runoff Area=4,585 sf 18.39% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=78 Runoff=0.36 cfs 0.027 af

SubcatchmentPS3: Flows to existing Runoff Area=20,859 sf 6.11% Impervious Runoff Depth=3.00"
Flow Length=241' Tc=13.5 min CN=77 Runoff=1.29 cfs 0.120 af

SubcatchmentPS4: Yard Flow Runoff Area=11,138 sf 11.48% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=71 Runoff=0.69 cfs 0.052 af

SubcatchmentPS5: Flows to new Perf Pipe Runoff Area=9,756 sf 44.37% Impervious Runoff Depth=2.28"
Flow Length=265' Tc=26.2 min CN=69 Runoff=0.35 cfs 0.043 af

SubcatchmentPS6: Roof Runoff Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=5.20"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

SubcatchmentPS7: Flows to Perf Pipe Runoff Area=1,351 sf 56.70% Impervious Runoff Depth=2.54"
Tc=6.0 min CN=72 Runoff=0.09 cfs 0.007 af

SubcatchmentPS8: Comes from Offsite, Runoff Area=5,781 sf 0.00% Impervious Runoff Depth=2.90"
Flow Length=160' Tc=9.5 min CN=76 Runoff=0.38 cfs 0.032 af

Reach 1R: Overland Flow Avg. Flow Depth=0.37' Max Vel=2.87 fps Inflow=3.30 cfs 0.319 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=3.29 cfs 0.319 af

Pond 1P: Perforated 12" HDPE Peak Elev=92.81' Storage=147 cf Inflow=0.38 cfs 0.032 af
Outflow=0.35 cfs 0.032 af

Pond 2P: Perforated 12" HDPE Peak Elev=92.81' Storage=320 cf Inflow=0.59 cfs 0.075 af
Outflow=0.56 cfs 0.075 af

Pond 3P: Perforated 12" HDPE Peak Elev=92.81' Storage=172 cf Inflow=0.24 cfs 0.020 af
Outflow=0.23 cfs 0.020 af

Pond 18" RCP: EXIST INV WITH NEW TEE Peak Elev=92.56' Storage=1,021 cf Inflow=3.51 cfs 0.346 af
Outflow=3.39 cfs 0.346 af

Pond P1: Infiltration Pond Peak Elev=92.81' Storage=2,307 cf Inflow=1.40 cfs 0.147 af
Outflow=0.19 cfs 0.147 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=3.48 cfs 0.493 af
Primary=3.48 cfs 0.493 af

Link AP-B: ANALYSISPOINT

Inflow=0.81 cfs 0.066 af
Primary=0.81 cfs 0.066 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.558 af Average Runoff Depth = 2.67"
77.98% Pervious = 1.959 ac 22.02% Impervious = 0.553 ac

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=4.47"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.83 cfs 0.280 af

Subcatchment PS1: Flows offsite Runoff Area=21,922 sf 35.15% Impervious Runoff Depth=2.52"
Flow Length=120' Slope=0.0200 '/' Tc=6.0 min CN=60 Runoff=1.36 cfs 0.106 af

Subcatchment PS2: Flows to Existing Runoff Area=4,585 sf 18.39% Impervious Runoff Depth=4.37"
Tc=6.0 min CN=78 Runoff=0.50 cfs 0.038 af

Subcatchment PS3: Flows to existing Runoff Area=20,859 sf 6.11% Impervious Runoff Depth=4.26"
Flow Length=241' Tc=13.5 min CN=77 Runoff=1.83 cfs 0.170 af

Subcatchment PS4: Yard Flow Runoff Area=11,138 sf 11.48% Impervious Runoff Depth=3.62"
Tc=6.0 min CN=71 Runoff=1.02 cfs 0.077 af

Subcatchment PS5: Flows to new Perf Pipe Runoff Area=9,756 sf 44.37% Impervious Runoff Depth=3.42"
Flow Length=265' Tc=26.2 min CN=69 Runoff=0.53 cfs 0.064 af

Subcatchment PS6: Roof Runoff Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=6.64"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af

Subcatchment PS7: Flows to Perf Pipe Runoff Area=1,351 sf 56.70% Impervious Runoff Depth=3.73"
Tc=6.0 min CN=72 Runoff=0.13 cfs 0.010 af

Subcatchment PS8: Comes from Offsite, Runoff Area=5,781 sf 0.00% Impervious Runoff Depth=4.15"
Flow Length=160' Tc=9.5 min CN=76 Runoff=0.54 cfs 0.046 af

Reach 1R: Overland Flow Avg. Flow Depth=0.44' Max Vel=3.17 fps Inflow=4.64 cfs 0.450 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=4.64 cfs 0.450 af

Pond 1P: Perforated 12" HDPE Peak Elev=93.22' Storage=177 cf Inflow=0.54 cfs 0.046 af
Outflow=0.51 cfs 0.046 af

Pond 2P: Perforated 12" HDPE Peak Elev=93.22' Storage=385 cf Inflow=0.87 cfs 0.110 af
Outflow=0.76 cfs 0.110 af

Pond 3P: Perforated 12" HDPE Peak Elev=93.22' Storage=207 cf Inflow=0.32 cfs 0.027 af
Outflow=0.29 cfs 0.027 af

Pond 18" RCP: EXIST INV WITH NEW TEE Peak Elev=92.68' Storage=1,170 cf Inflow=4.93 cfs 0.488 af
Outflow=4.98 cfs 0.488 af

Pond P1: Infiltration Pond Peak Elev=93.22' Storage=3,428 cf Inflow=1.97 cfs 0.214 af
Outflow=0.40 cfs 0.214 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=5.15 cfs 0.702 af
Primary=5.15 cfs 0.702 af

Link AP-B: ANALYSISPOINT

Inflow=1.36 cfs 0.106 af
Primary=1.36 cfs 0.106 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.807 af Average Runoff Depth = 3.86"
77.98% Pervious = 1.959 ac 22.02% Impervious = 0.553 ac

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=5.70"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=3.58 cfs 0.356 af

SubcatchmentPS1: Flows offsite Runoff Area=21,922 sf 35.15% Impervious Runoff Depth=3.49"
Flow Length=120' Slope=0.0200 '/' Tc=6.0 min CN=60 Runoff=1.92 cfs 0.146 af

SubcatchmentPS2: Flows to Existing Runoff Area=4,585 sf 18.39% Impervious Runoff Depth=5.59"
Tc=6.0 min CN=78 Runoff=0.64 cfs 0.049 af

SubcatchmentPS3: Flows to existing Runoff Area=20,859 sf 6.11% Impervious Runoff Depth=5.47"
Flow Length=241' Tc=13.5 min CN=77 Runoff=2.33 cfs 0.218 af

SubcatchmentPS4: Yard Flow Runoff Area=11,138 sf 11.48% Impervious Runoff Depth=4.76"
Tc=6.0 min CN=71 Runoff=1.34 cfs 0.101 af

SubcatchmentPS5: Flows to new Perf Pipe Runoff Area=9,756 sf 44.37% Impervious Runoff Depth=4.53"
Flow Length=265' Tc=26.2 min CN=69 Runoff=0.71 cfs 0.085 af

SubcatchmentPS6: Roof Runoff Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=7.97"
Tc=6.0 min CN=98 Runoff=0.23 cfs 0.021 af

SubcatchmentPS7: Flows to Perf Pipe Runoff Area=1,351 sf 56.70% Impervious Runoff Depth=4.88"
Tc=6.0 min CN=72 Runoff=0.17 cfs 0.013 af

SubcatchmentPS8: Comes from Offsite, Runoff Area=5,781 sf 0.00% Impervious Runoff Depth=5.35"
Flow Length=160' Tc=9.5 min CN=76 Runoff=0.69 cfs 0.059 af

Reach 1R: Overland Flow Avg. Flow Depth=0.50' Max Vel=3.39 fps Inflow=5.89 cfs 0.575 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=5.89 cfs 0.575 af

Pond 1P: Perforated 12" HDPE Peak Elev=93.36' Storage=187 cf Inflow=0.69 cfs 0.059 af
Outflow=0.64 cfs 0.059 af

Pond 2P: Perforated 12" HDPE Peak Elev=93.36' Storage=407 cf Inflow=1.12 cfs 0.144 af
Outflow=0.99 cfs 0.144 af

Pond 3P: Perforated 12" HDPE Peak Elev=93.31' Storage=215 cf Inflow=0.40 cfs 0.033 af
Outflow=0.34 cfs 0.033 af

Pond 18" RCP: EXIST INV WITH NEW TEE Peak Elev=92.75' Storage=1,267 cf Inflow=6.27 cfs 0.624 af
Outflow=6.09 cfs 0.624 af

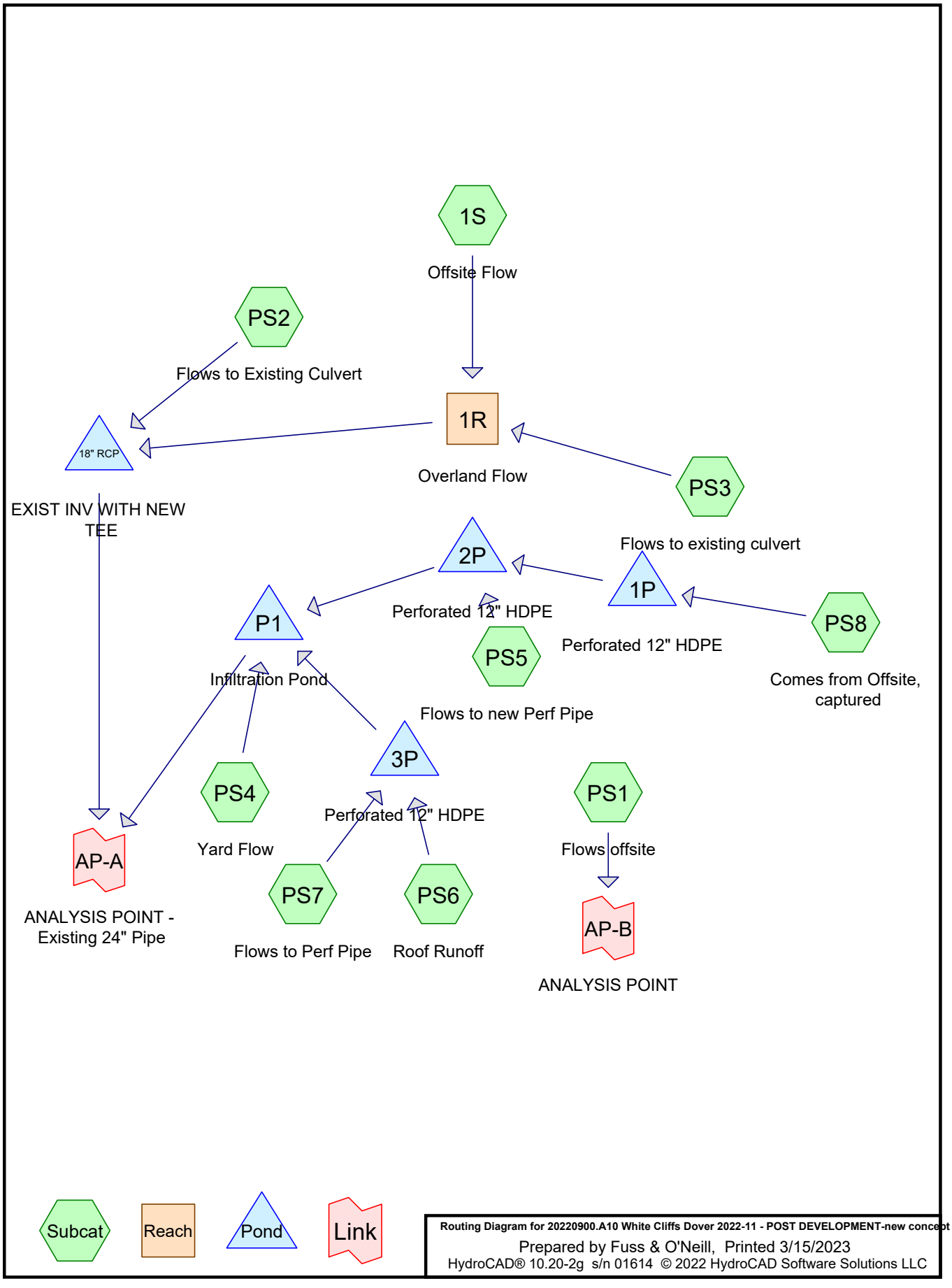
Pond P1: Infiltration Pond Peak Elev=93.31' Storage=3,708 cf Inflow=2.52 cfs 0.278 af
Outflow=1.37 cfs 0.279 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=6.41 cfs 0.902 af
Primary=6.41 cfs 0.902 af

Link AP-B: ANALYSISPOINT

Inflow=1.92 cfs 0.146 af
Primary=1.92 cfs 0.146 af

Total Runoff Area = 2.512 ac Runoff Volume = 1.049 af Average Runoff Depth = 5.01"
77.98% Pervious = 1.959 ac 22.02% Impervious = 0.553 ac



Routing Diagram for 20220900.A10 White Cliffs Dover 2022-11 - POST DEVELOPMENT-new concept

Prepared by Fuss & O'Neill, Printed 3/15/2023

HydroCAD® 10.20-2g s/n 01614 © 2022 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.750	79	1 acre lots, 20% imp, HSG C (1S)
0.482	39	>75% Grass cover, Good, HSG A (PS1, PS4, PS5, PS7)
0.477	74	>75% Grass cover, Good, HSG C (PS2, PS3, PS4, PS5)
0.109	80	>75% Grass cover, Good, HSG D (PS3, PS8)
0.108	98	Amenity Building Roof (PS4, PS5, PS6, PS7)
0.018	98	Future Outdoor amenity (PS5)
0.049	98	New Sidewalks (PS1, PS4, PS7)
0.141	98	Offsite Driveway (PS1)
0.030	98	Offsite Parking (PS2, PS3)
0.032	98	Patio (PS3, PS5)
0.011	98	Paved parking, HSG A (PS1)
0.014	98	Paved parking, HSG C (PS2, PS4)
0.057	70	Woods, Good, HSG C (PS3, PS8)
0.235	77	Woods, Good, HSG D (PS3)
2.512	**73**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.492	HSG A	PS1, PS4, PS5, PS7
0.000	HSG B	
1.297	HSG C	1S, PS2, PS3, PS4, PS5, PS8
0.344	HSG D	PS3, PS8
0.379	Other	PS1, PS2, PS3, PS4, PS5, PS6, PS7
2.512		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.750	0.000	0.000	0.750	1 acre lots, 20% imp	1S
0.482	0.000	0.477	0.109	0.000	1.067	>75% Grass cover, Good	PS1, PS2, PS3, PS4, PS5, PS7, PS8
0.000	0.000	0.000	0.000	0.108	0.108	Amenity Building Roof	PS4, PS5, PS6, PS7
0.000	0.000	0.000	0.000	0.018	0.018	Future Outdoor amenity	PS5
0.000	0.000	0.000	0.000	0.049	0.049	New Sidewalks	PS1, PS4, PS7
0.000	0.000	0.000	0.000	0.141	0.141	Offsite Driveway	PS1
0.000	0.000	0.000	0.000	0.030	0.030	Offsite Parking	PS2, PS3
0.000	0.000	0.000	0.000	0.032	0.032	Patio	PS3, PS5
0.011	0.000	0.014	0.000	0.000	0.024	Paved parking	PS1, PS2, PS4
0.000	0.000	0.057	0.235	0.000	0.292	Woods, Good	PS3, PS8
0.492	**0.000**	**1.297**	**0.344**	**0.379**	**2.512**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	18" RCP	90.50	89.70	58.0	0.0138	0.011	0.0	18.0	0.0
2	P1	88.28	88.18	16.0	0.0062	0.013	0.0	18.0	0.0

Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=3.18"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.02 cfs 0.199 af

SubcatchmentPS1: Flows offsite Runoff Area=21,922 sf 35.15% Impervious Runoff Depth=1.57"
Flow Length=120' Slope=0.0200 '/' Tc=6.0 min CN=60 Runoff=0.81 cfs 0.066 af

SubcatchmentPS2: Flows to Existing Runoff Area=4,585 sf 18.39% Impervious Runoff Depth=3.09"
Tc=6.0 min CN=78 Runoff=0.36 cfs 0.027 af

SubcatchmentPS3: Flows to existing Runoff Area=20,859 sf 6.11% Impervious Runoff Depth=3.00"
Flow Length=241' Tc=13.5 min CN=77 Runoff=1.29 cfs 0.120 af

SubcatchmentPS4: Yard Flow Runoff Area=11,138 sf 11.48% Impervious Runoff Depth=2.45"
Tc=6.0 min CN=71 Runoff=0.69 cfs 0.052 af

SubcatchmentPS5: Flows to new Perf Pipe Runoff Area=9,756 sf 44.37% Impervious Runoff Depth=2.28"
Flow Length=265' Tc=26.2 min CN=69 Runoff=0.35 cfs 0.043 af

SubcatchmentPS6: Roof Runoff Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=5.20"
Tc=6.0 min CN=98 Runoff=0.16 cfs 0.014 af

SubcatchmentPS7: Flows to Perf Pipe Runoff Area=1,351 sf 56.70% Impervious Runoff Depth=2.54"
Tc=6.0 min CN=72 Runoff=0.09 cfs 0.007 af

SubcatchmentPS8: Comes from Offsite, Runoff Area=5,781 sf 0.00% Impervious Runoff Depth=2.90"
Flow Length=160' Tc=9.5 min CN=76 Runoff=0.38 cfs 0.032 af

Reach 1R: Overland Flow Avg. Flow Depth=0.37' Max Vel=2.87 fps Inflow=3.30 cfs 0.319 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=3.29 cfs 0.319 af

Pond 1P: Perforated 12" HDPE Peak Elev=92.81' Storage=147 cf Inflow=0.38 cfs 0.032 af
Outflow=0.35 cfs 0.032 af

Pond 2P: Perforated 12" HDPE Peak Elev=92.81' Storage=320 cf Inflow=0.59 cfs 0.075 af
Outflow=0.56 cfs 0.075 af

Pond 3P: Perforated 12" HDPE Peak Elev=92.81' Storage=172 cf Inflow=0.24 cfs 0.020 af
Outflow=0.23 cfs 0.020 af

Pond 18" RCP: EXIST INV WITH NEW TEE Peak Elev=92.56' Storage=1,021 cf Inflow=3.51 cfs 0.346 af
Outflow=3.39 cfs 0.346 af

Pond P1: Infiltration Pond Peak Elev=92.81' Storage=2,307 cf Inflow=1.40 cfs 0.147 af
Outflow=0.19 cfs 0.147 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=3.48 cfs 0.493 af
Primary=3.48 cfs 0.493 af

Link AP-B: ANALYSISPOINT

Inflow=0.81 cfs 0.066 af
Primary=0.81 cfs 0.066 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.558 af Average Runoff Depth = 2.67"
77.98% Pervious = 1.959 ac 22.02% Impervious = 0.553 ac

Summary for Subcatchment 1S: Offsite Flow

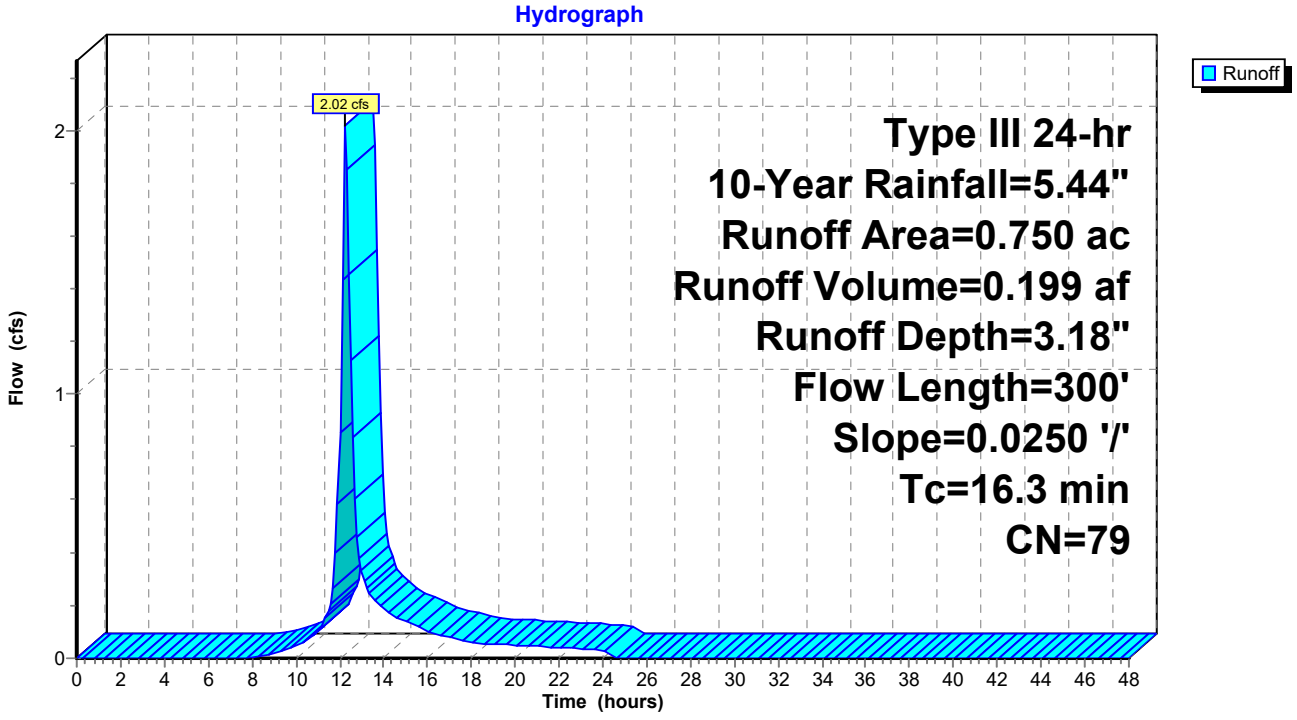
Runoff = 2.02 cfs @ 12.23 hrs, Volume= 0.199 af, Depth= 3.18"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

Area (ac)	CN	Description
0.750	79	1 acre lots, 20% imp, HSG C
0.600		80.00% Pervious Area
0.150		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
3.0	200	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	300	Total			

Subcatchment 1S: Offsite Flow



Summary for Subcatchment PS1: Flows offsite

[49] Hint: Tc<2dt may require smaller dt

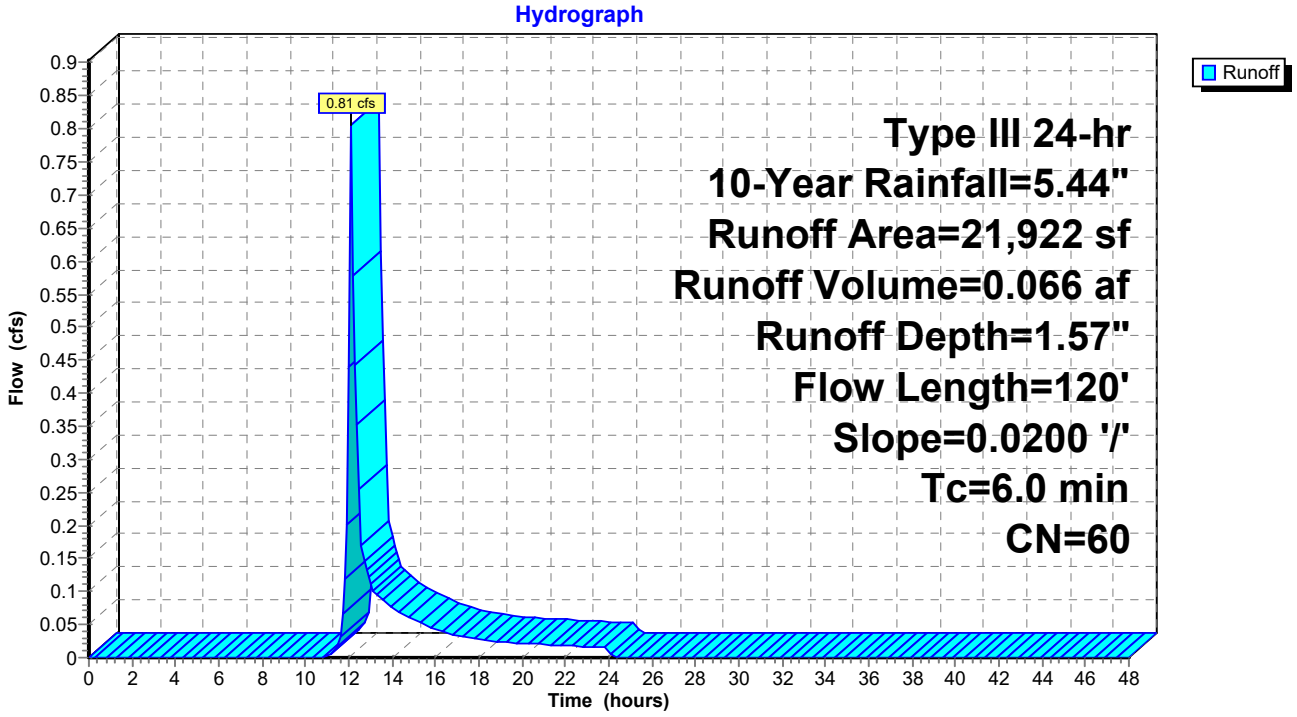
Runoff = 0.81 cfs @ 12.11 hrs, Volume= 0.066 af, Depth= 1.57"
Routed to Link AP-B : ANALYSIS POINT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
*	6,146	98	Offsite Driveway
	13,547	39	>75% Grass cover, Good, HSG A
	461	98	Paved parking, HSG A
*	1,098	98	New Sidewalks
	670	39	>75% Grass cover, Good, HSG A
	21,922	60	Weighted Average
	14,217		64.85% Pervious Area
	7,705		35.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	120	Total, Increased to minimum Tc = 6.0 min			

Subcatchment PS1: Flows offsite



Summary for Subcatchment PS2: Flows to Existing Culvert

[49] Hint: Tc<2dt may require smaller dt

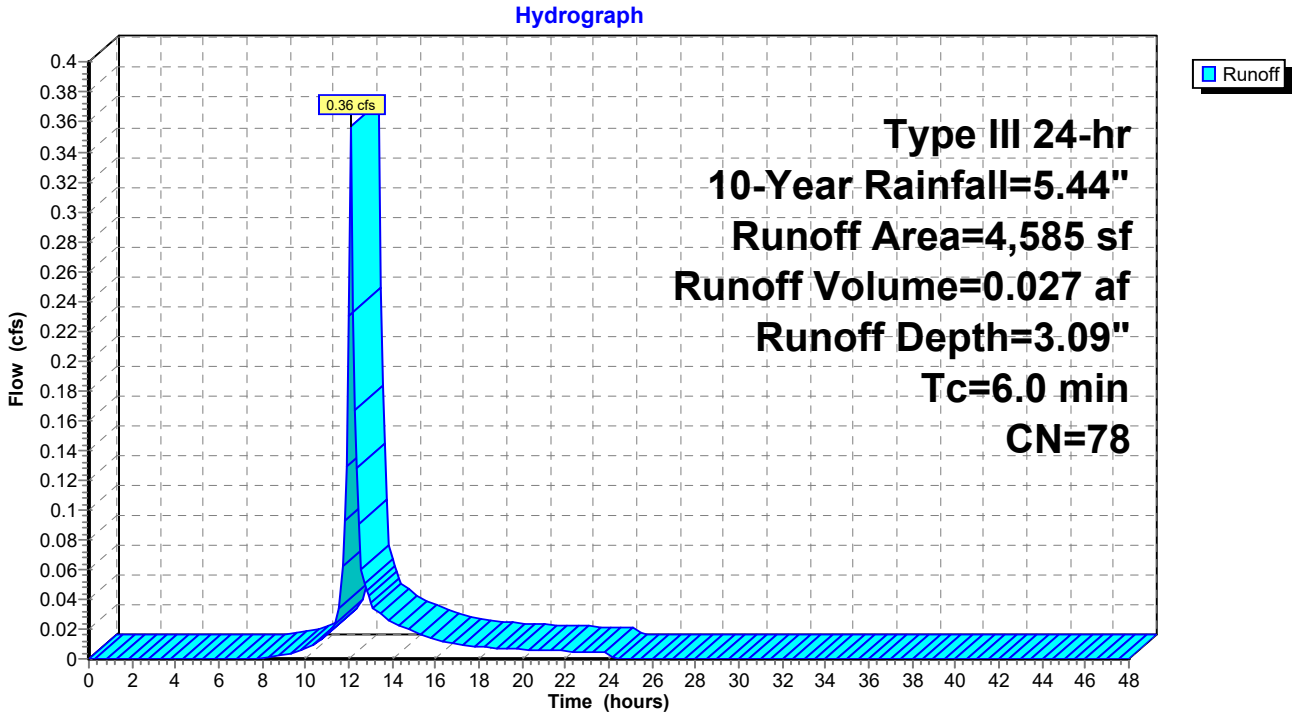
Runoff = 0.36 cfs @ 12.10 hrs, Volume= 0.027 af, Depth= 3.09"
Routed to Pond 18" RCP : EXIST INV WITH NEW TEE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
*	738	98	Offsite Parking
	105	98	Paved parking, HSG C
	3,682	74	>75% Grass cover, Good, HSG C
	60	74	>75% Grass cover, Good, HSG C
	4,585	78	Weighted Average
	3,742		81.61% Pervious Area
	843		18.39% Impervious Area

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

Subcatchment PS2: Flows to Existing Culvert



Summary for Subcatchment PS3: Flows to existing culvert

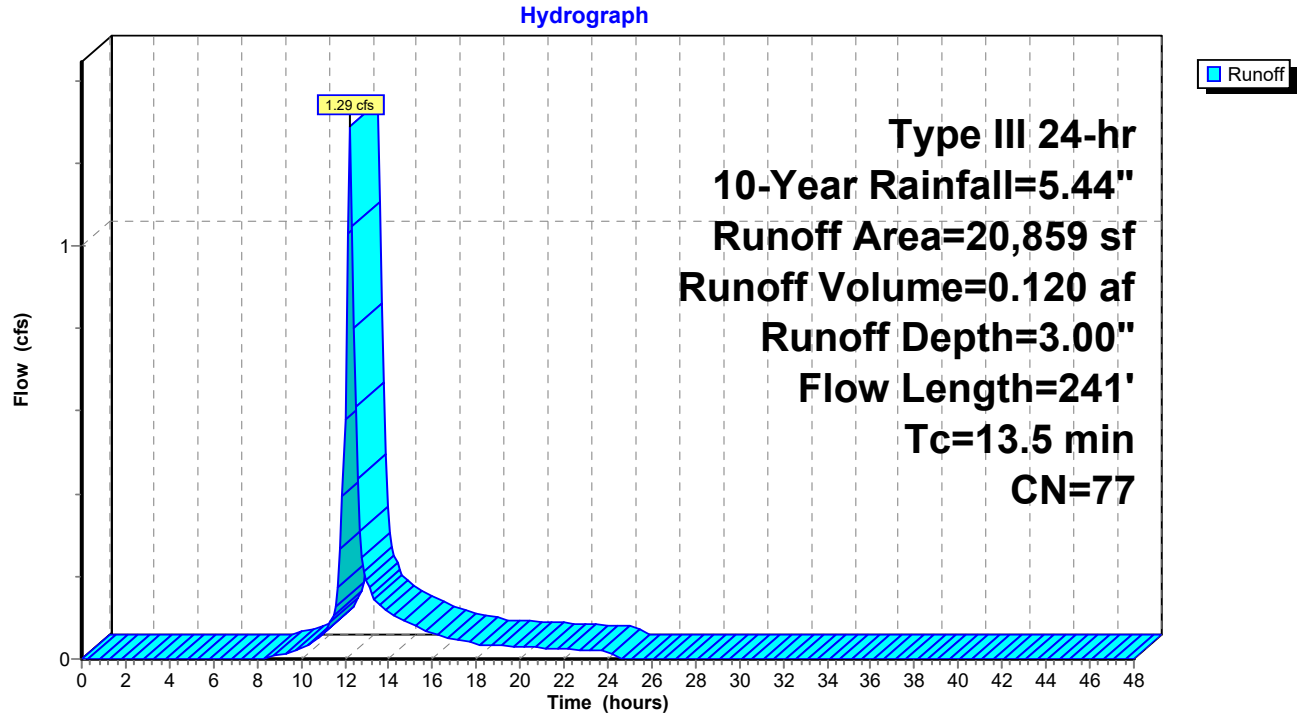
Runoff = 1.29 cfs @ 12.20 hrs, Volume= 0.120 af, Depth= 3.00"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
	10,243	77	Woods, Good, HSG D
	381	70	Woods, Good, HSG C
*	572	98	Offsite Parking
	7,918	74	>75% Grass cover, Good, HSG C
*	703	98	Patio
	1,042	80	>75% Grass cover, Good, HSG D
	20,859	77	Weighted Average
	19,584		93.89% Pervious Area
	1,275		6.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	85	0.0900	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
3.0	156	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	241	Total			

Subcatchment PS3: Flows to existing culvert



Summary for Subcatchment PS4: Yard Flow

[49] Hint: Tc<2dt may require smaller dt

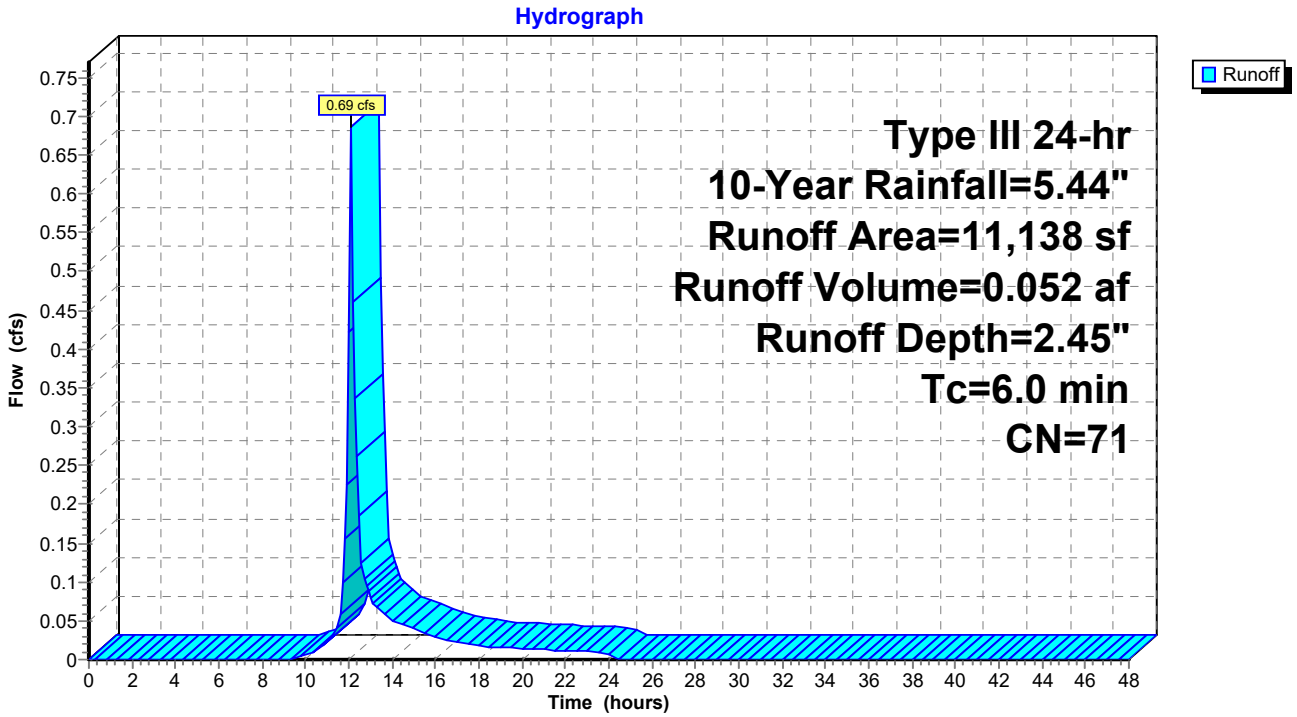
Runoff = 0.69 cfs @ 12.10 hrs, Volume= 0.052 af, Depth= 2.45"
Routed to Pond P1 : Infiltration Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
	490	98	Paved parking, HSG C
	8,026	74	>75% Grass cover, Good, HSG C
	1,833	39	>75% Grass cover, Good, HSG A
*	55	98	Amenity Building Roof
*	734	98	New Sidewalks
	11,138	71	Weighted Average
	9,859		88.52% Pervious Area
	1,279		11.48% Impervious Area

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

Subcatchment PS4: Yard Flow



Summary for Subcatchment PS5: Flows to new Perf Pipe

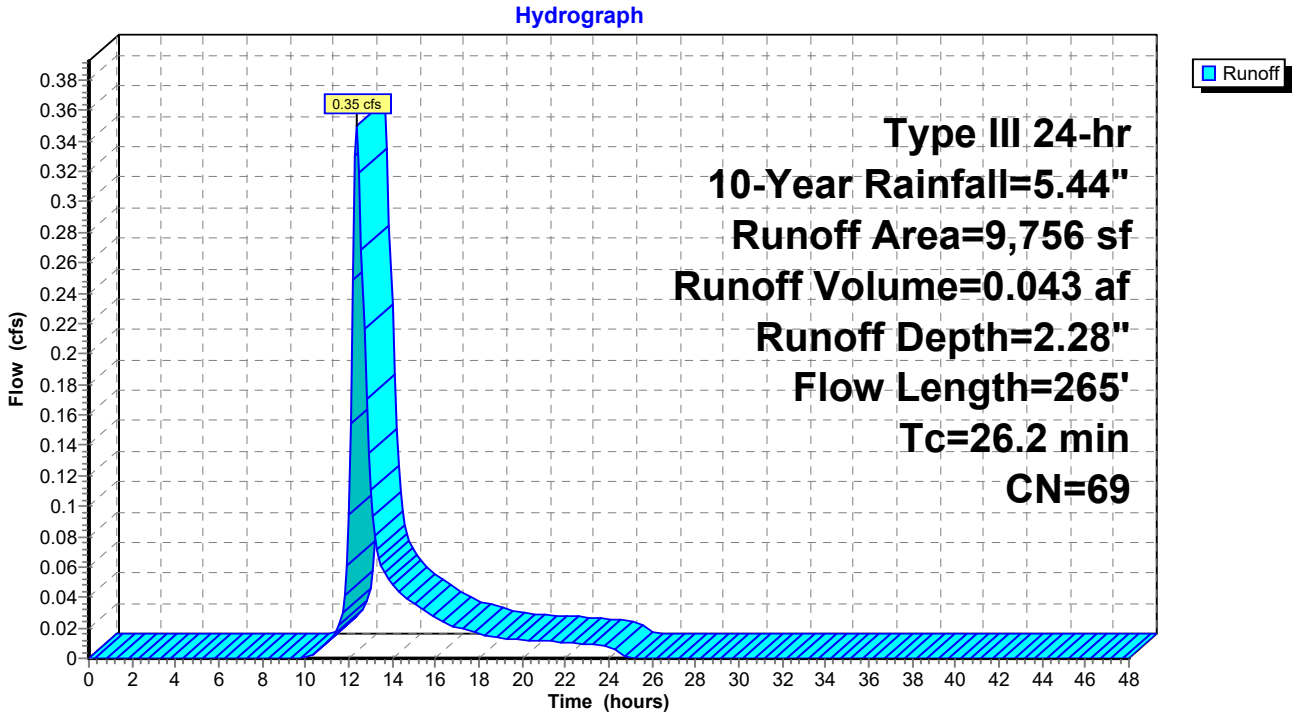
Runoff = 0.35 cfs @ 12.39 hrs, Volume= 0.043 af, Depth= 2.28"
Routed to Pond 2P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
*	800	98	Future Outdoor amenity
*	2,826	98	Amenity Building Roof
	1,087	74	>75% Grass cover, Good, HSG C
	4,340	39	>75% Grass cover, Good, HSG A
*	703	98	Patio
	9,756	69	Weighted Average
	5,427		55.63% Pervious Area
	4,329		44.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.3	75	0.0100	0.05		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.10"
1.8	75	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	65	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.2	265	Total			

Subcatchment PS5: Flows to new Perf Pipe



Summary for Subcatchment PS6: Roof Runoff

[49] Hint: Tc<2dt may require smaller dt

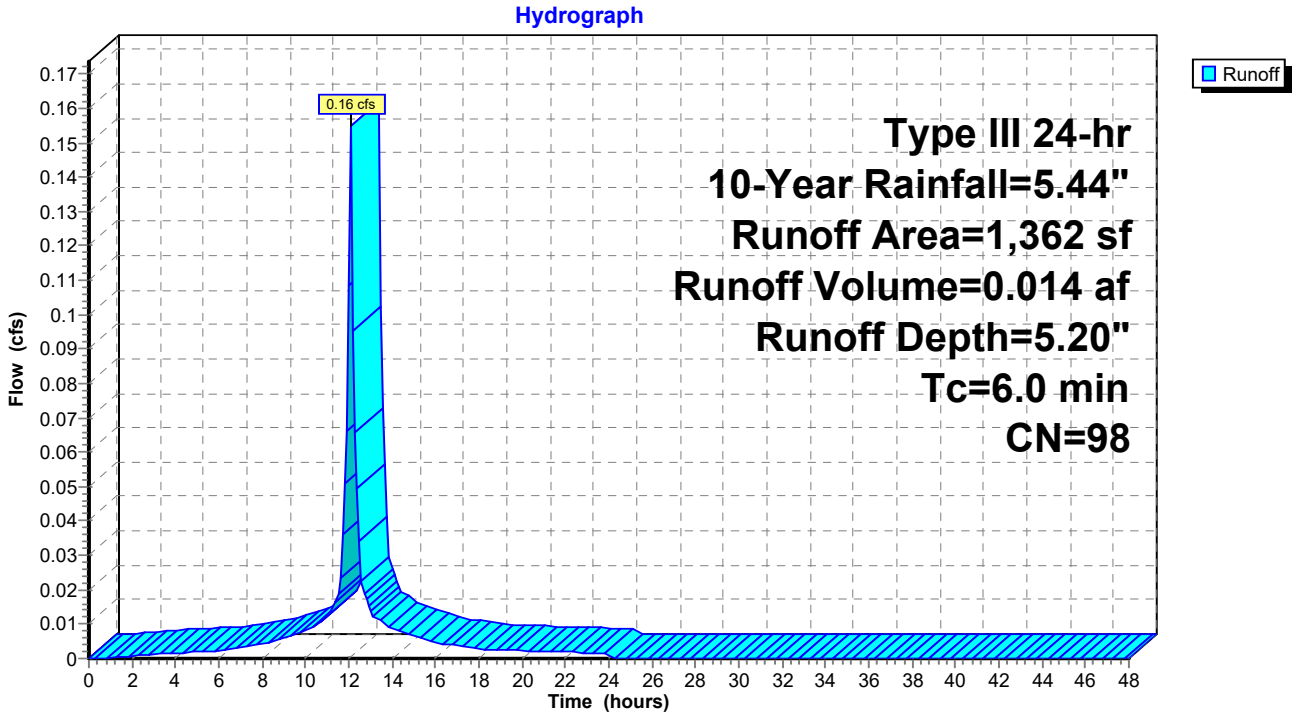
Runoff = 0.16 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 5.20"
Routed to Pond 3P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
*	1,362	98	Amenity Building Roof
	1,362		100.00% Impervious Area

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

Subcatchment PS6: Roof Runoff



Summary for Subcatchment PS7: Flows to Perf Pipe

[49] Hint: Tc<2dt may require smaller dt

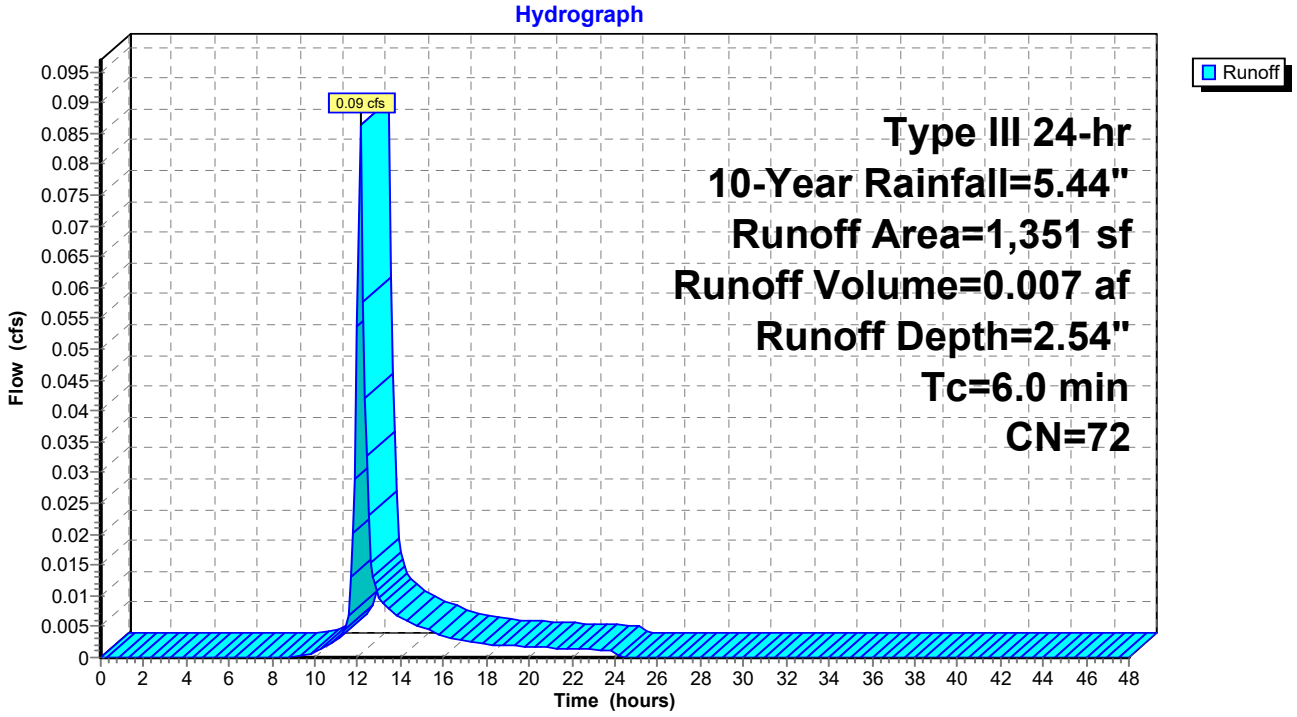
Runoff = 0.09 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 2.54"
Routed to Pond 3P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

	Area (sf)	CN	Description
*	450	98	Amenity Building Roof
	585	39	>75% Grass cover, Good, HSG A
*	316	98	New Sidewalks
	1,351	72	Weighted Average
	585		43.30% Pervious Area
	766		56.70% Impervious Area

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

Subcatchment PS7: Flows to Perf Pipe



Summary for Subcatchment PS8: Comes from Offsite, captured

[49] Hint: Tc<2dt may require smaller dt

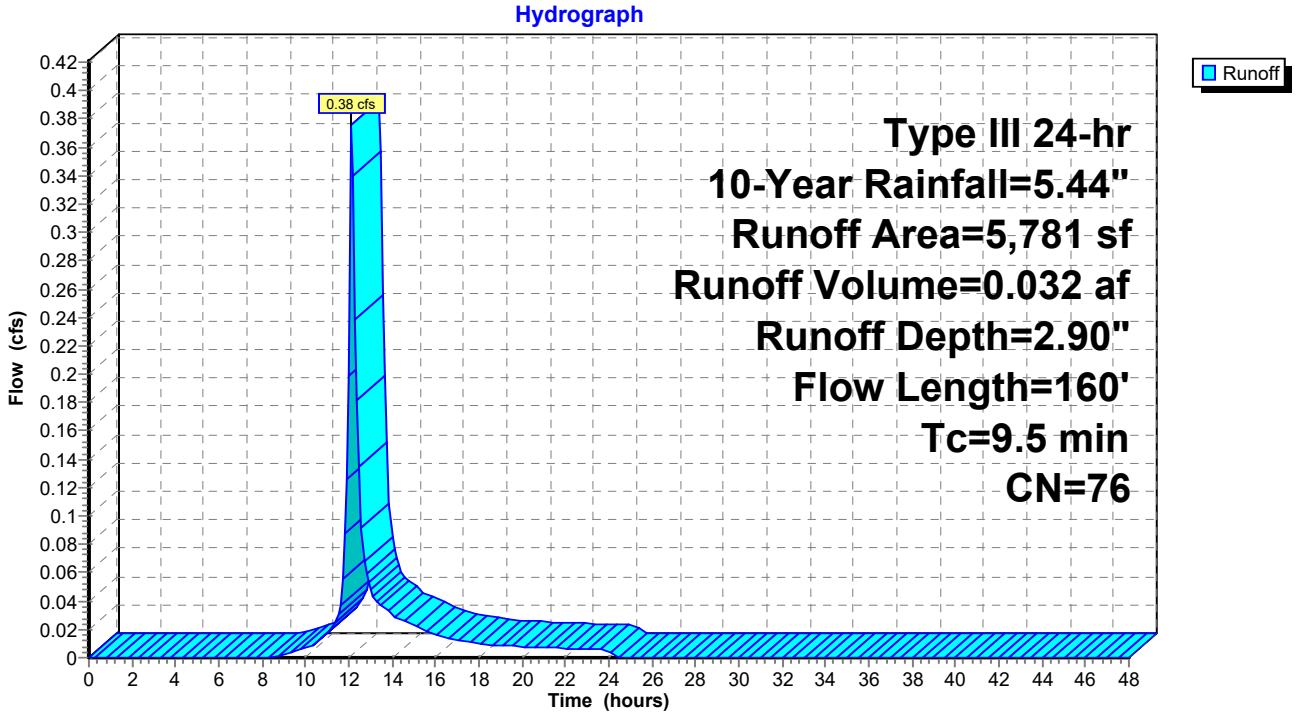
Runoff = 0.38 cfs @ 12.14 hrs, Volume= 0.032 af, Depth= 2.90"
Routed to Pond 1P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 10-Year Rainfall=5.44"

Area (sf)	CN	Description
3,695	80	>75% Grass cover, Good, HSG D
2,086	70	Woods, Good, HSG C
5,781	76	Weighted Average
5,781		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	40	0.0375	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.3	120	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.5	160	Total			

Subcatchment PS8: Comes from Offsite, captured



Summary for Reach 1R: Overland Flow

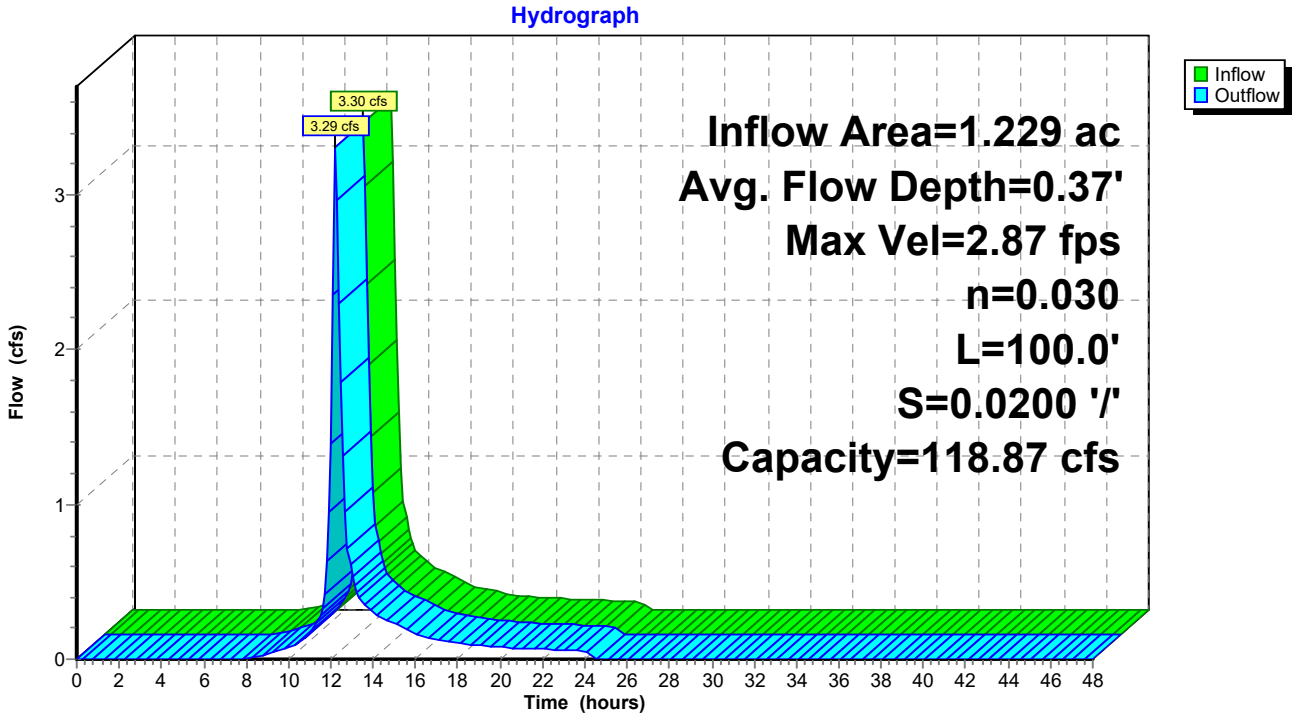
Inflow Area = 1.229 ac, 14.59% Impervious, Inflow Depth = 3.11" for 10-Year event
Inflow = 3.30 cfs @ 12.22 hrs, Volume= 0.319 af
Outflow = 3.29 cfs @ 12.23 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.4 min
Routed to Pond 18" RCP : EXIST INV WITH NEW TEE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.87 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 1.7 min

Peak Storage= 114 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.37' , Surface Width= 4.21'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 118.87 cfs

2.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0200 '/'
Inlet Invert= 93.00', Outlet Invert= 91.00'





Summary for Pond 1P: Perforated 12" HDPE

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=38)

Inflow Area = 0.133 ac, 0.00% Impervious, Inflow Depth = 2.90" for 10-Year event
Inflow = 0.38 cfs @ 12.14 hrs, Volume= 0.032 af
Outflow = 0.35 cfs @ 12.14 hrs, Volume= 0.032 af, Atten= 8%, Lag= 0.4 min
Primary = 0.35 cfs @ 12.14 hrs, Volume= 0.032 af
Routed to Pond 2P : Perforated 12" HDPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.81' @ 13.57 hrs Surf.Area= 180 sf Storage= 147 cf

Plug-Flow detention time= 75.9 min calculated for 0.032 af (100% of inflow)
Center-of-Mass det. time= 76.9 min (908.5 - 831.7)

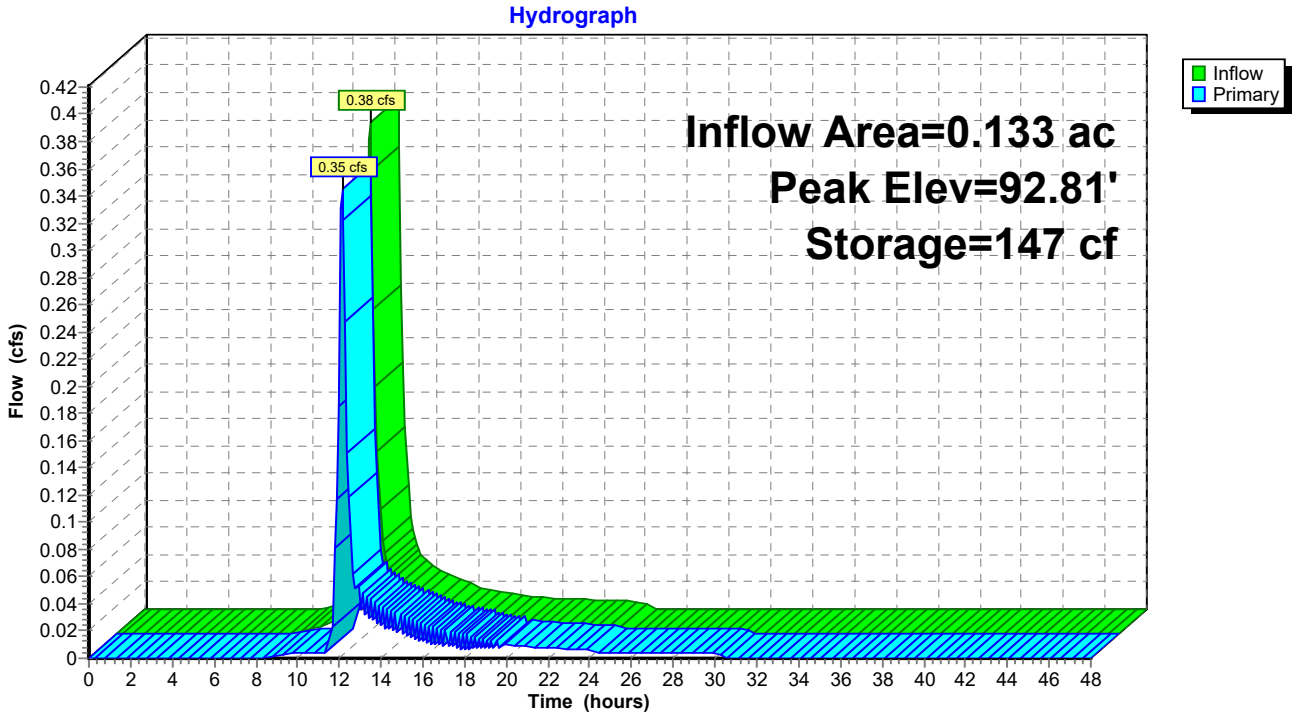
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	188 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 540 cf Overall - 71 cf Embedded = 469 cf x 40.0% Voids
#2	92.00'	46 cf	**12.0" Round Pipe Storage** Inside #1 L= 58.0' 71 cf Overall - 1.5" Wall Thickness = 46 cf
		233 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	180	0	0
94.00	180	540	540

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	91.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=92.33' TW=92.35' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.00 cfs)

Pond 1P: Perforated 12" HDPE



Summary for Pond 2P: Perforated 12" HDPE

[78] Warning: Submerged Pond 1P Primary device # 2 by 1.81'
[80] Warning: Exceeded Pond 1P by 0.59' @ 30.20 hrs (0.00 cfs 0.061 af)

Inflow Area = 0.357 ac, 27.86% Impervious, Inflow Depth = 2.51" for 10-Year event
Inflow = 0.59 cfs @ 12.26 hrs, Volume= 0.075 af
Outflow = 0.56 cfs @ 12.22 hrs, Volume= 0.075 af, Atten= 4%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.22 hrs, Volume= 0.075 af
Routed to Pond P1 : Infiltration Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.81' @ 13.48 hrs Surf.Area= 390 sf Storage= 320 cf

Plug-Flow detention time= 76.7 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 77.0 min (960.4 - 883.4)

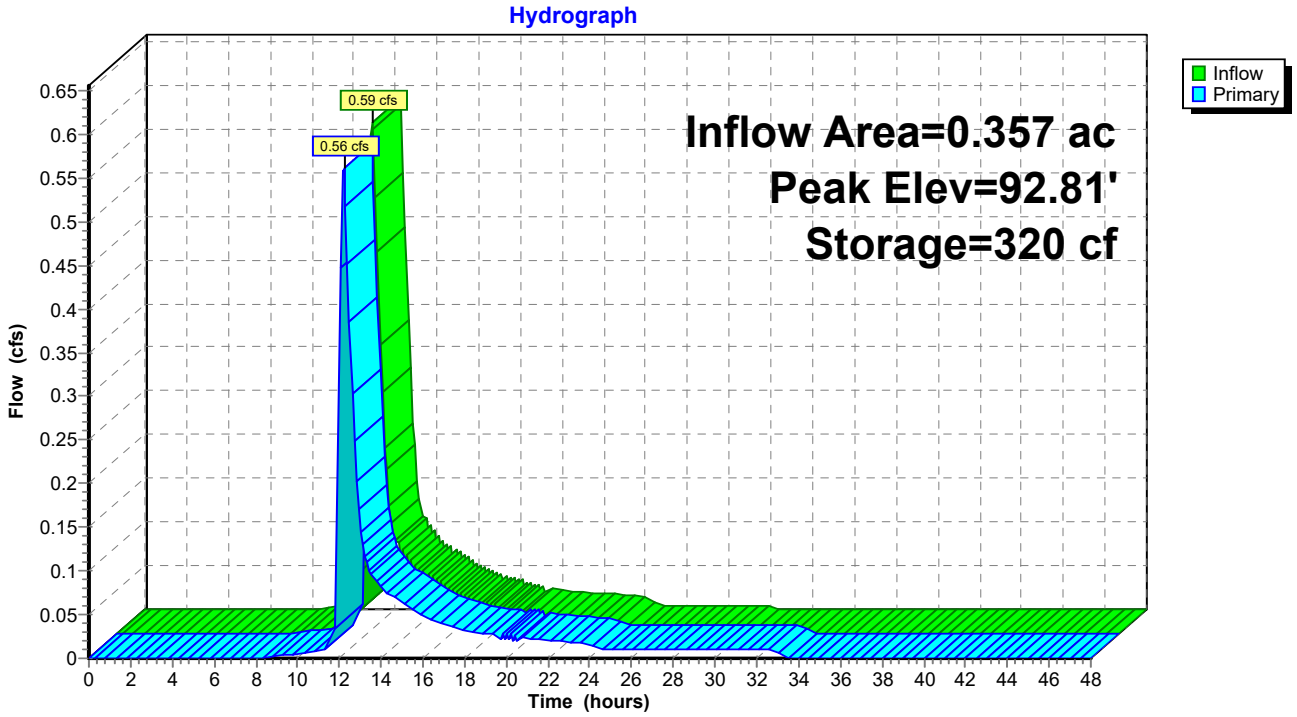
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	404 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,170 cf Overall - 160 cf Embedded = 1,010 cf x 40.0% Voids
#2	92.00'	102 cf	**12.0" Round Pipe Storage** Inside #1 L= 130.0' 160 cf Overall - 1.5" Wall Thickness = 102 cf
		506 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	390	0	0
94.00	390	1,170	1,170

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	91.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.22 cfs @ 12.22 hrs HW=92.38' TW=92.36' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.21 cfs @ 0.76 fps)
└—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 2P: Perforated 12" HDPE



Summary for Pond 3P: Perforated 12" HDPE

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=19)

Inflow Area = 0.062 ac, 78.44% Impervious, Inflow Depth = 3.88" for 10-Year event
Inflow = 0.24 cfs @ 12.10 hrs, Volume= 0.020 af
Outflow = 0.23 cfs @ 12.11 hrs, Volume= 0.020 af, Atten= 5%, Lag= 0.9 min
Primary = 0.23 cfs @ 12.11 hrs, Volume= 0.020 af
Routed to Pond P1 : Infiltration Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.81' @ 13.48 hrs Surf.Area= 210 sf Storage= 172 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 138.9 min (915.5 - 776.6)

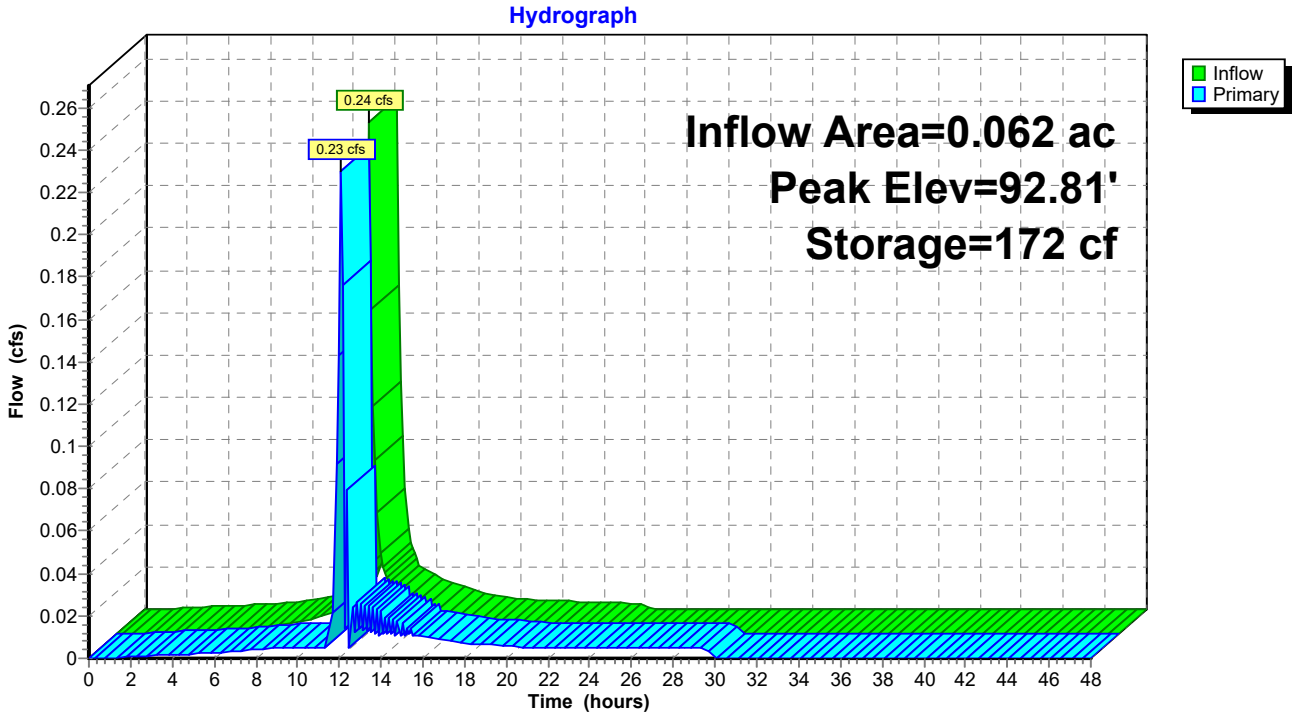
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	218 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 630 cf Overall - 86 cf Embedded = 544 cf x 40.0% Voids
#2	92.00'	55 cf	**12.0" Round Pipe Storage** Inside #1 L= 70.0' 86 cf Overall - 1.5" Wall Thickness = 55 cf
		273 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	210	0	0
94.00	210	630	630

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	91.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.18 cfs @ 12.11 hrs HW=92.23' TW=92.15' (Dynamic Tailwater)
1=Orifice/Grate (Orifice Controls 0.18 cfs @ 1.32 fps)
2=Exfiltration (Exfiltration Controls 0.00 cfs)

Pond 3P: Perforated 12" HDPE



Summary for Pond 18" RCP: EXIST INV WITH NEW TEE

[62] Hint: Exceeded Reach 1R OUTLET depth by 1.21' @ 12.30 hrs

Inflow Area = 1.334 ac, 14.89% Impervious, Inflow Depth = 3.11" for 10-Year event
Inflow = 3.51 cfs @ 12.22 hrs, Volume= 0.346 af
Outflow = 3.39 cfs @ 12.27 hrs, Volume= 0.346 af, Atten= 3%, Lag= 3.1 min
Primary = 3.39 cfs @ 12.27 hrs, Volume= 0.346 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.56' @ 12.27 hrs Surf.Area= 1,176 sf Storage= 1,021 cf
Flood Elev= 93.70' Surf.Area= 2,270 sf Storage= 3,023 cf

Plug-Flow detention time= 5.7 min calculated for 0.346 af (100% of inflow)
Center-of-Mass det. time= 4.3 min (836.0 - 831.7)

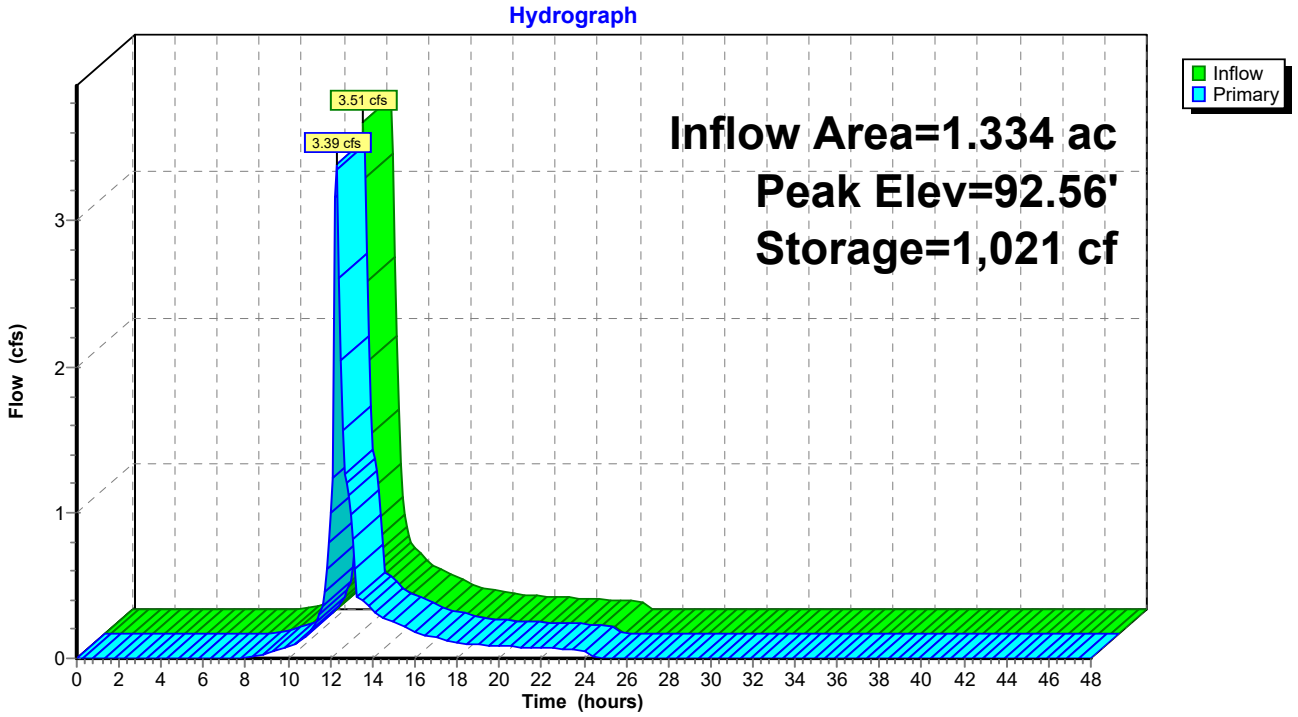
Volume	Invert	Avail.Storage	Storage Description
#1	90.50'	3,746 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
90.50	100	40.0	0	0	100
92.00	666	214.0	512	512	3,622
93.00	1,679	309.0	1,134	1,646	7,585
94.00	2,550	315.0	2,099	3,746	8,016

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	**18.0" Round Culvert** L= 58.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.50' / 89.70' S= 0.0138 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	90.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.30'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.29 cfs @ 12.27 hrs HW=92.55' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.29 cfs of 9.71 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.35 cfs @ 6.90 fps)
  └─**3=Orifice/Grate** (Weir Controls 1.94 cfs @ 1.64 fps)

Pond 18" RCP: EXIST INV WITH NEW TEE



Summary for Pond P1: Infiltration Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=8)
[78] Warning: Submerged Pond 2P Primary device # 2 by 1.81'
[80] Warning: Exceeded Pond 2P by 0.80' @ 0.00 hrs (0.01 cfs 0.068 af)
[78] Warning: Submerged Pond 3P Primary device # 2 by 1.81'
[80] Warning: Exceeded Pond 3P by 0.89' @ 29.80 hrs (0.00 cfs 0.111 af)

Inflow Area = 0.675 ac, 26.32% Impervious, Inflow Depth = 2.62" for 10-Year event
Inflow = 1.40 cfs @ 12.13 hrs, Volume= 0.147 af
Outflow = 0.19 cfs @ 13.38 hrs, Volume= 0.147 af, Atten= 87%, Lag= 75.1 min
Primary = 0.19 cfs @ 13.38 hrs, Volume= 0.147 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.81' @ 13.38 hrs Surf.Area= 2,616 sf Storage= 2,307 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 207.3 min (1,119.0 - 911.7)

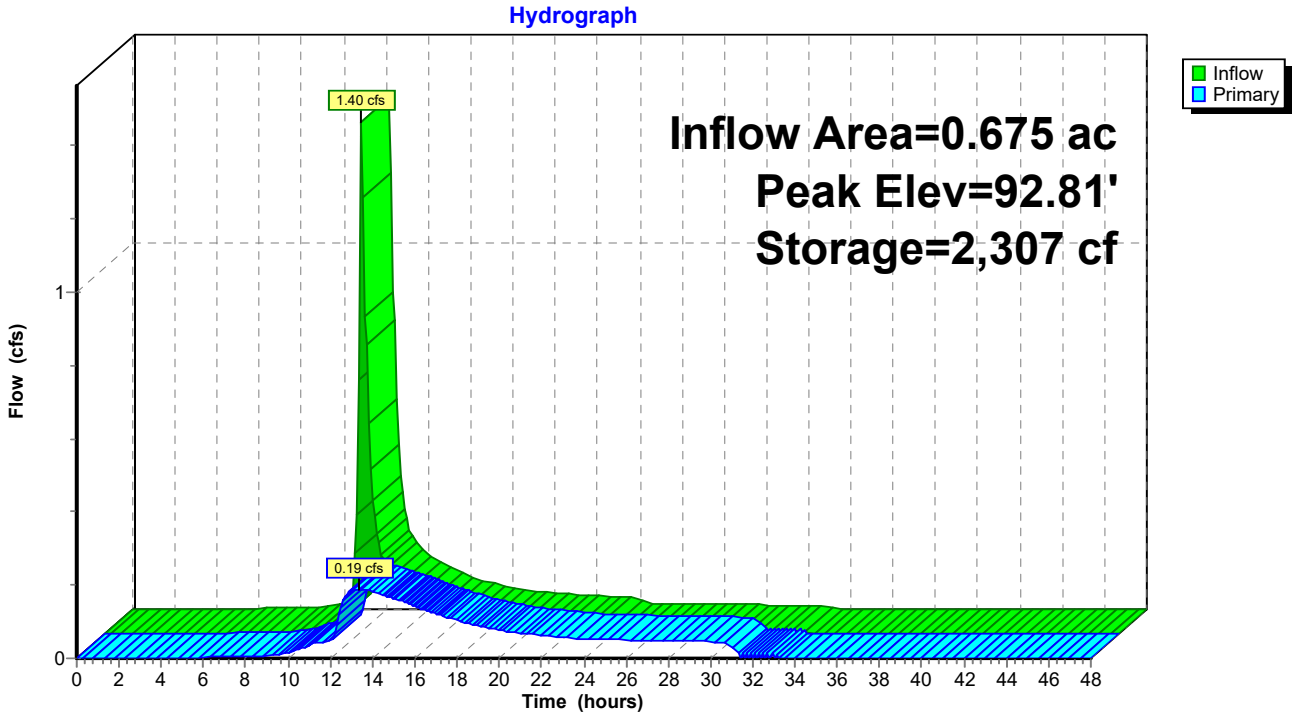
Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	8,219 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	1,900	0	0
92.00	2,100	400	400
94.00	3,375	5,475	5,875
94.50	6,000	2,344	8,219

Device	Routing	Invert	Outlet Devices
#1	Device 3	93.20'	**24.0" x 24.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#2	Device 3	92.20'	**1.0" W x 12.0" H Vert. 1" Weir** C= 0.600 Limited to weir flow at low heads
#3	Primary	88.28'	**18.0" Round Culvert** L= 16.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 88.28' / 88.18' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	91.80'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.19 cfs @ 13.38 hrs HW=92.81' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Passes 0.19 cfs of 14.59 cfs potential flow)
├**1=Top of Structure** (Controls 0.00 cfs)
├**2=1" Weir** (Orifice Controls 0.13 cfs @ 2.50 fps)
└**4=Exfiltration** (Exfiltration Controls 0.06 cfs)

Pond P1: Infiltration Pond

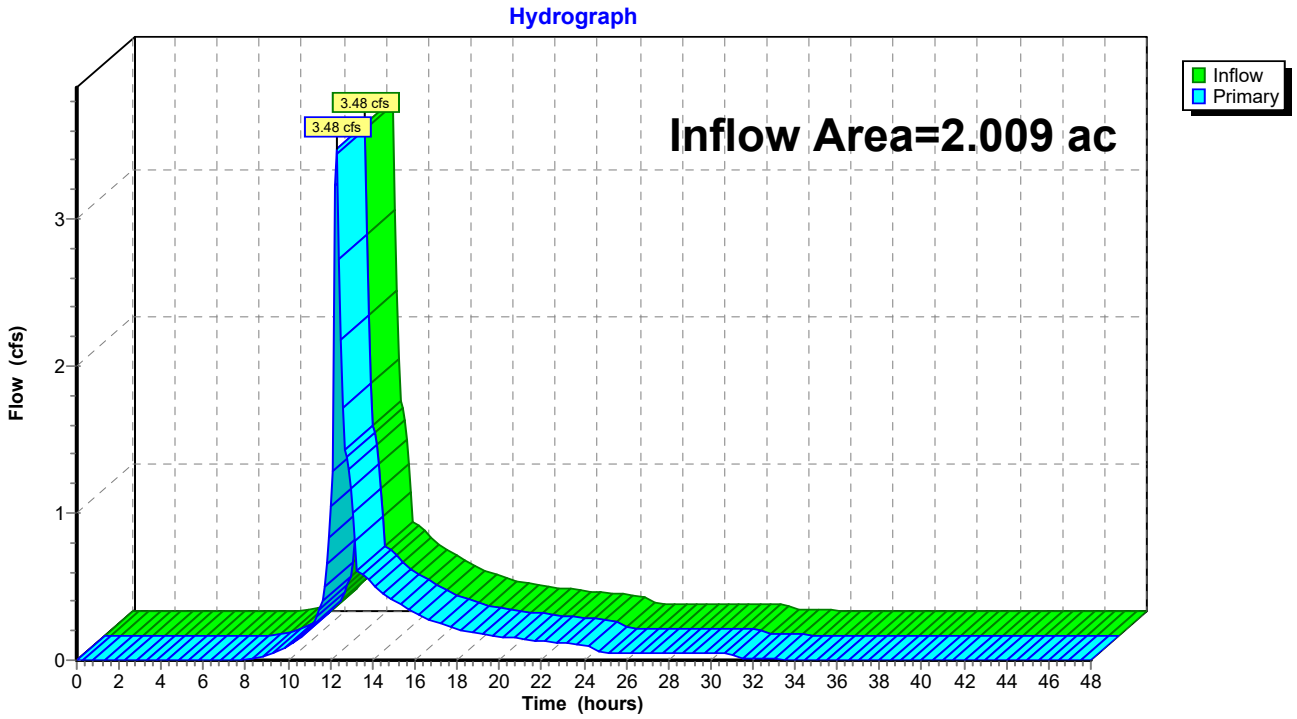


Summary for Link AP-A: ANALYSIS POINT - Existing 24" Pipe

Inflow Area = 2.009 ac, 18.73% Impervious, Inflow Depth = 2.94" for 10-Year event
Inflow = 3.48 cfs @ 12.27 hrs, Volume= 0.493 af
Primary = 3.48 cfs @ 12.27 hrs, Volume= 0.493 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs

Link AP-A: ANALYSIS POINT - Existing 24" Pipe

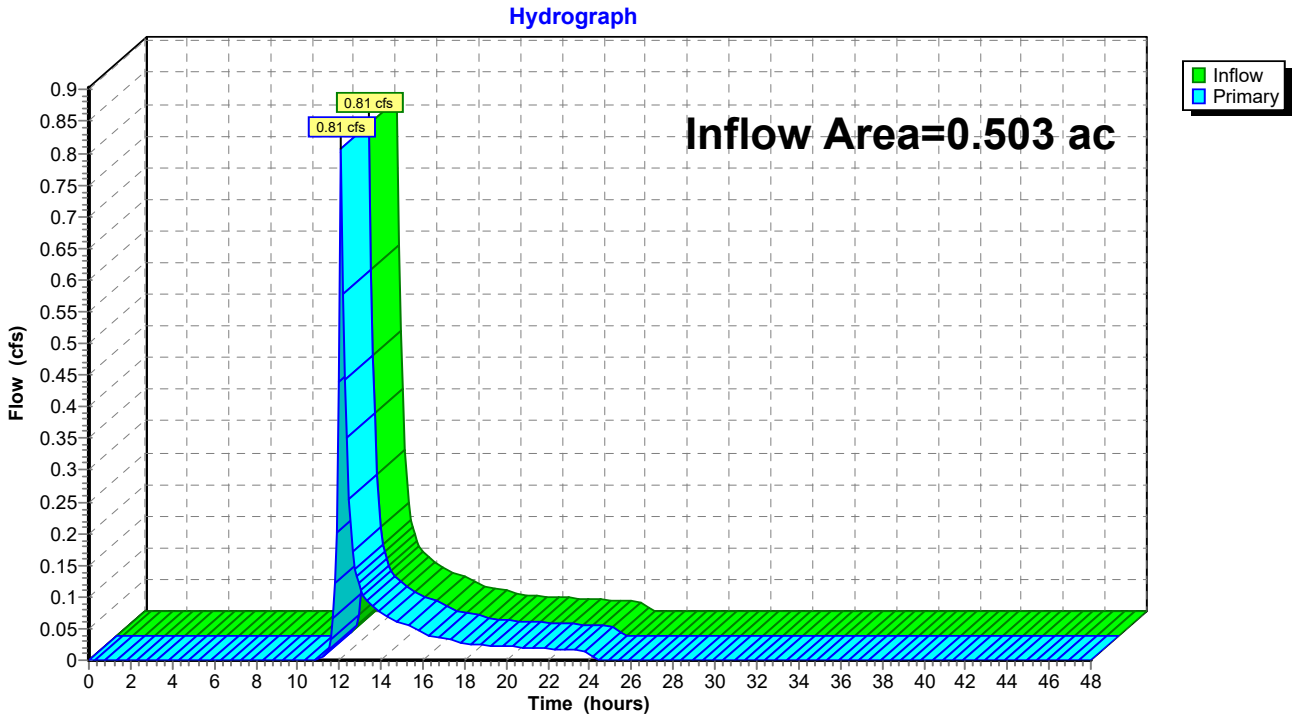


Summary for Link AP-B: ANALYSIS POINT

Inflow Area = 0.503 ac, 35.15% Impervious, Inflow Depth = 1.57" for 10-Year event
Inflow = 0.81 cfs @ 12.11 hrs, Volume= 0.066 af
Primary = 0.81 cfs @ 12.11 hrs, Volume= 0.066 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs

Link AP-B: ANALYSIS POINT



Time span=0.00-48.00 hrs, dt=0.10 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Offsite Flow Runoff Area=0.750 ac 20.00% Impervious Runoff Depth=4.47"
Flow Length=300' Slope=0.0250 '/' Tc=16.3 min CN=79 Runoff=2.83 cfs 0.280 af

Subcatchment PS1: Flows offsite Runoff Area=21,922 sf 35.15% Impervious Runoff Depth=2.52"
Flow Length=120' Slope=0.0200 '/' Tc=6.0 min CN=60 Runoff=1.36 cfs 0.106 af

Subcatchment PS2: Flows to Existing Runoff Area=4,585 sf 18.39% Impervious Runoff Depth=4.37"
Tc=6.0 min CN=78 Runoff=0.50 cfs 0.038 af

Subcatchment PS3: Flows to existing Runoff Area=20,859 sf 6.11% Impervious Runoff Depth=4.26"
Flow Length=241' Tc=13.5 min CN=77 Runoff=1.83 cfs 0.170 af

Subcatchment PS4: Yard Flow Runoff Area=11,138 sf 11.48% Impervious Runoff Depth=3.62"
Tc=6.0 min CN=71 Runoff=1.02 cfs 0.077 af

Subcatchment PS5: Flows to new Perf Pipe Runoff Area=9,756 sf 44.37% Impervious Runoff Depth=3.42"
Flow Length=265' Tc=26.2 min CN=69 Runoff=0.53 cfs 0.064 af

Subcatchment PS6: Roof Runoff Runoff Area=1,362 sf 100.00% Impervious Runoff Depth=6.64"
Tc=6.0 min CN=98 Runoff=0.20 cfs 0.017 af

Subcatchment PS7: Flows to Perf Pipe Runoff Area=1,351 sf 56.70% Impervious Runoff Depth=3.73"
Tc=6.0 min CN=72 Runoff=0.13 cfs 0.010 af

Subcatchment PS8: Comes from Offsite, Runoff Area=5,781 sf 0.00% Impervious Runoff Depth=4.15"
Flow Length=160' Tc=9.5 min CN=76 Runoff=0.54 cfs 0.046 af

Reach 1R: Overland Flow Avg. Flow Depth=0.44' Max Vel=3.17 fps Inflow=4.64 cfs 0.450 af
n=0.030 L=100.0' S=0.0200 '/' Capacity=118.87 cfs Outflow=4.64 cfs 0.450 af

Pond 1P: Perforated 12" HDPE Peak Elev=93.22' Storage=177 cf Inflow=0.54 cfs 0.046 af
Outflow=0.51 cfs 0.046 af

Pond 2P: Perforated 12" HDPE Peak Elev=93.22' Storage=385 cf Inflow=0.87 cfs 0.110 af
Outflow=0.76 cfs 0.110 af

Pond 3P: Perforated 12" HDPE Peak Elev=93.22' Storage=207 cf Inflow=0.32 cfs 0.027 af
Outflow=0.29 cfs 0.027 af

Pond 18" RCP: EXIST INV WITH NEW TEE Peak Elev=92.68' Storage=1,170 cf Inflow=4.93 cfs 0.488 af
Outflow=4.98 cfs 0.488 af

Pond P1: Infiltration Pond Peak Elev=93.22' Storage=3,428 cf Inflow=1.97 cfs 0.214 af
Outflow=0.40 cfs 0.214 af

Link AP-A: ANALYSISPOINT - Existing 24" Pipe Inflow=5.15 cfs 0.702 af
Primary=5.15 cfs 0.702 af

Link AP-B: ANALYSISPOINT

Inflow=1.36 cfs 0.106 af
Primary=1.36 cfs 0.106 af

Total Runoff Area = 2.512 ac Runoff Volume = 0.807 af Average Runoff Depth = 3.86"
77.98% Pervious = 1.959 ac 22.02% Impervious = 0.553 ac

Summary for Subcatchment 1S: Offsite Flow

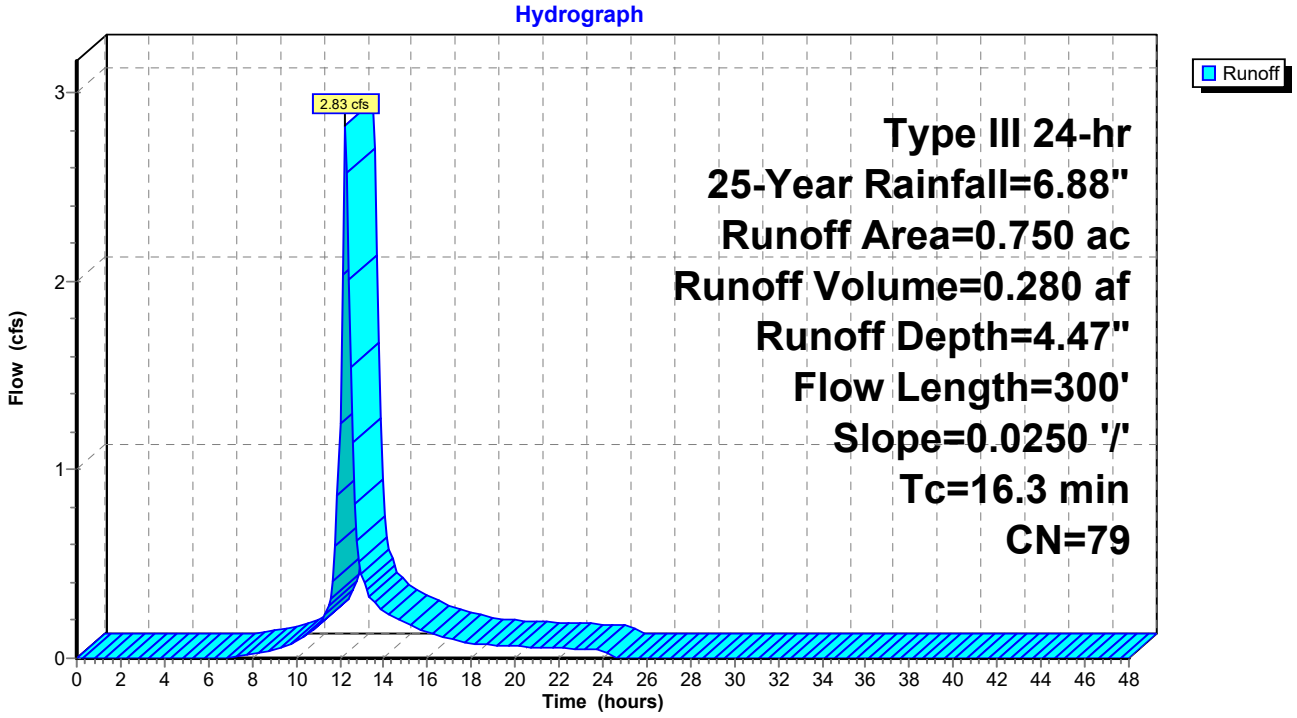
Runoff = 2.83 cfs @ 12.23 hrs, Volume= 0.280 af, Depth= 4.47"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

Area (ac)	CN	Description
0.750	79	1 acre lots, 20% imp, HSG C
0.600		80.00% Pervious Area
0.150		20.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0250	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
3.0	200	0.0250	1.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	300	Total			

Subcatchment 1S: Offsite Flow



Summary for Subcatchment PS1: Flows offsite

[49] Hint: Tc<2dt may require smaller dt

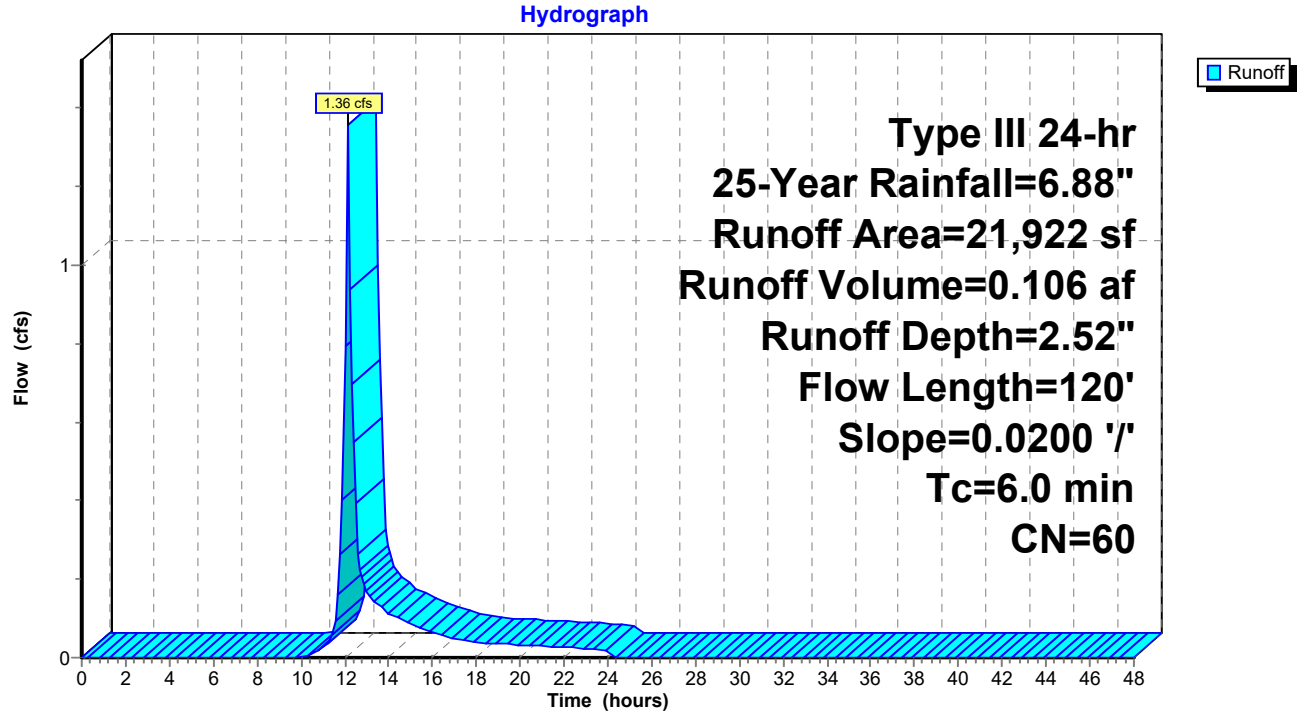
Runoff = 1.36 cfs @ 12.11 hrs, Volume= 0.106 af, Depth= 2.52"
Routed to Link AP-B : ANALYSIS POINT

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
*	6,146	98	Offsite Driveway
	13,547	39	>75% Grass cover, Good, HSG A
	461	98	Paved parking, HSG A
*	1,098	98	New Sidewalks
	670	39	>75% Grass cover, Good, HSG A
	21,922	60	Weighted Average
	14,217		64.85% Pervious Area
	7,705		35.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	120	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
2.0	120	Total, Increased to minimum Tc = 6.0 min			

Subcatchment PS1: Flows offsite



Summary for Subcatchment PS2: Flows to Existing Culvert

[49] Hint: Tc<2dt may require smaller dt

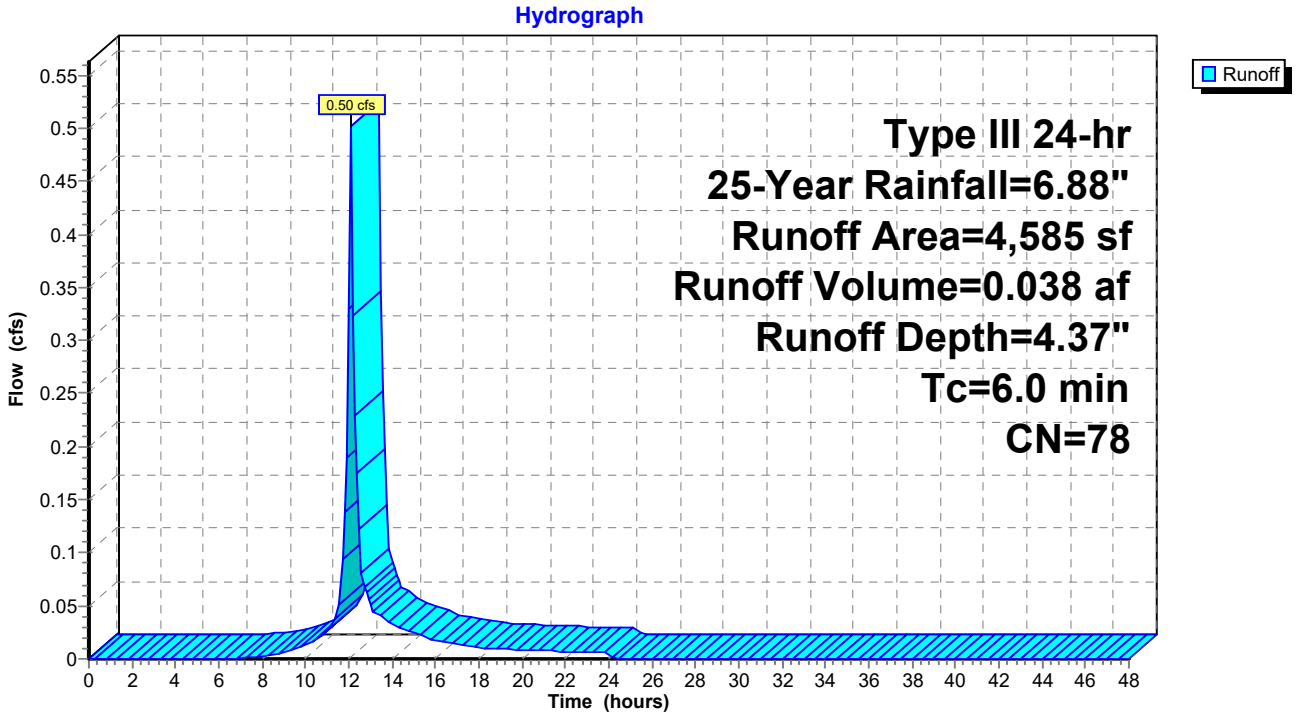
Runoff = 0.50 cfs @ 12.10 hrs, Volume= 0.038 af, Depth= 4.37"
Routed to Pond 18" RCP : EXIST INV WITH NEW TEE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
*	738	98	Offsite Parking
	105	98	Paved parking, HSG C
	3,682	74	>75% Grass cover, Good, HSG C
	60	74	>75% Grass cover, Good, HSG C
	4,585	78	Weighted Average
	3,742		81.61% Pervious Area
	843		18.39% Impervious Area

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

Subcatchment PS2: Flows to Existing Culvert



Summary for Subcatchment PS3: Flows to existing culvert

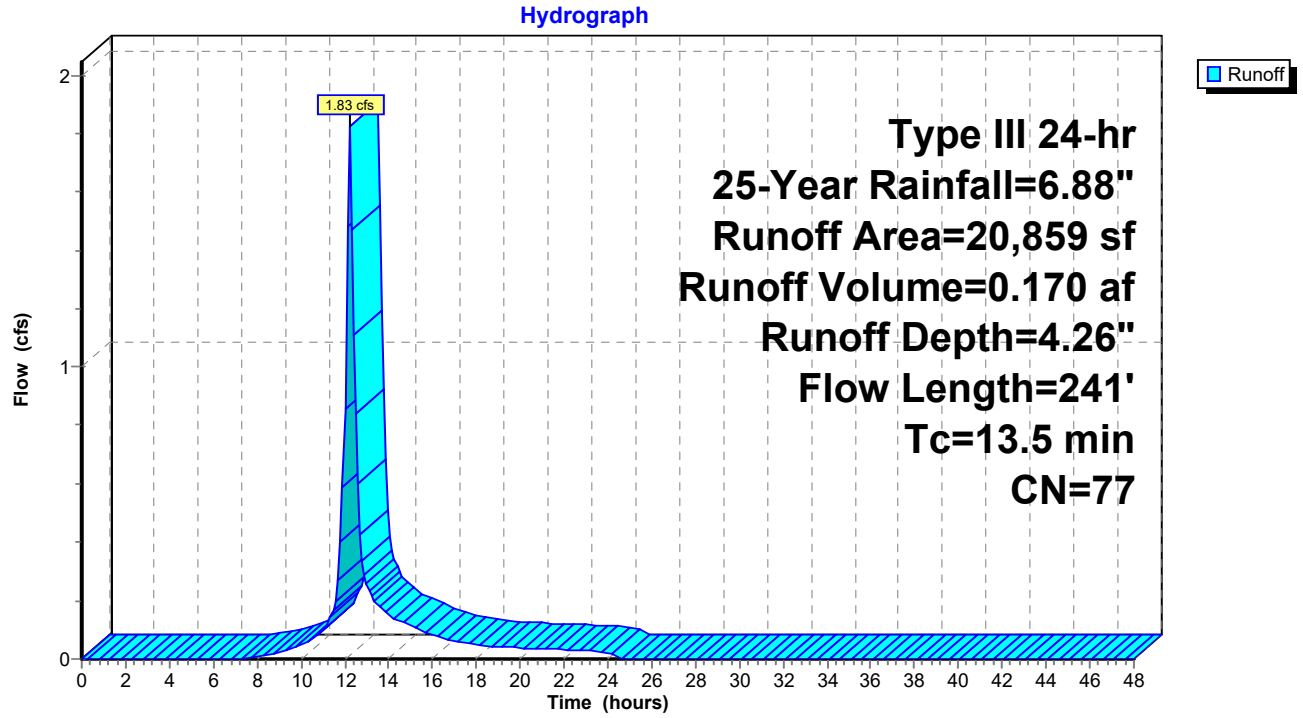
Runoff = 1.83 cfs @ 12.20 hrs, Volume= 0.170 af, Depth= 4.26"
Routed to Reach 1R : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
	10,243	77	Woods, Good, HSG D
	381	70	Woods, Good, HSG C
*	572	98	Offsite Parking
	7,918	74	>75% Grass cover, Good, HSG C
*	703	98	Patio
	1,042	80	>75% Grass cover, Good, HSG D
	20,859	77	Weighted Average
	19,584		93.89% Pervious Area
	1,275		6.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.5	85	0.0900	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
3.0	156	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
13.5	241	Total			

Subcatchment PS3: Flows to existing culvert



Summary for Subcatchment PS4: Yard Flow

[49] Hint: Tc<2dt may require smaller dt

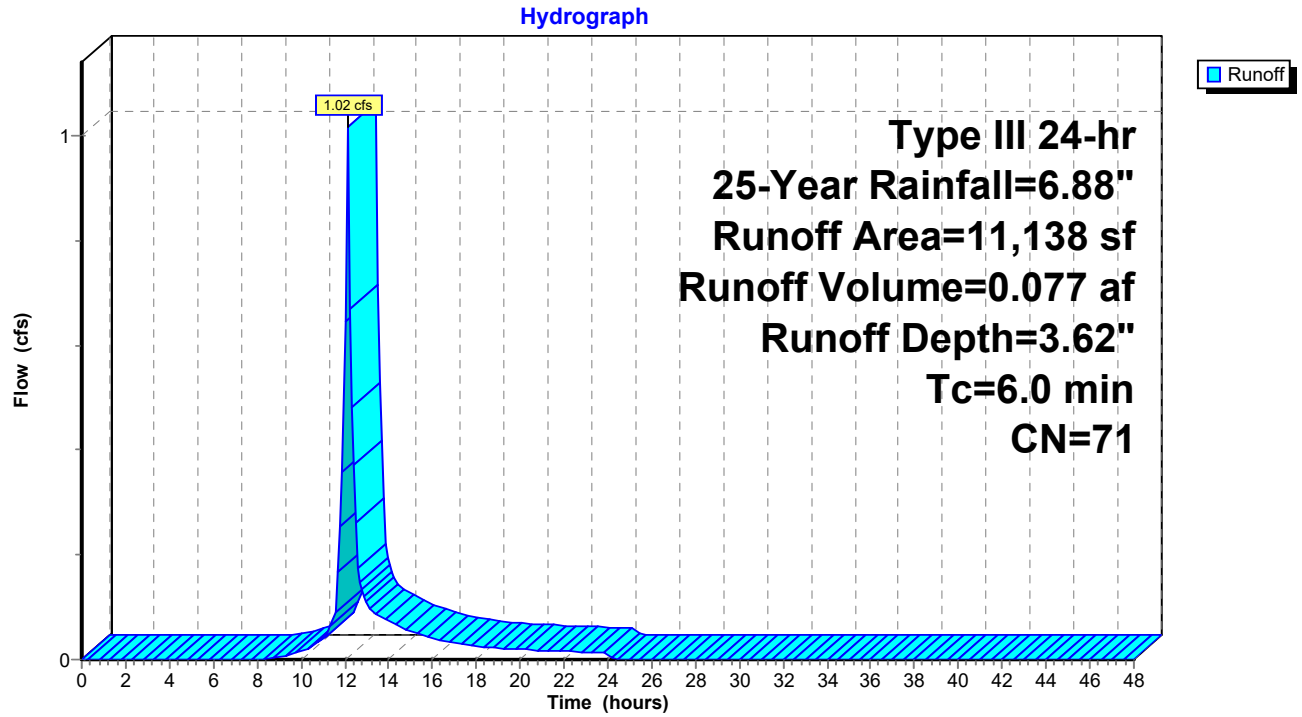
Runoff = 1.02 cfs @ 12.10 hrs, Volume= 0.077 af, Depth= 3.62"
Routed to Pond P1 : Infiltration Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
	490	98	Paved parking, HSG C
	8,026	74	>75% Grass cover, Good, HSG C
	1,833	39	>75% Grass cover, Good, HSG A
*	55	98	Amenity Building Roof
*	734	98	New Sidewalks
	11,138	71	Weighted Average
	9,859		88.52% Pervious Area
	1,279		11.48% Impervious Area

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

Subcatchment PS4: Yard Flow



Summary for Subcatchment PS5: Flows to new Perf Pipe

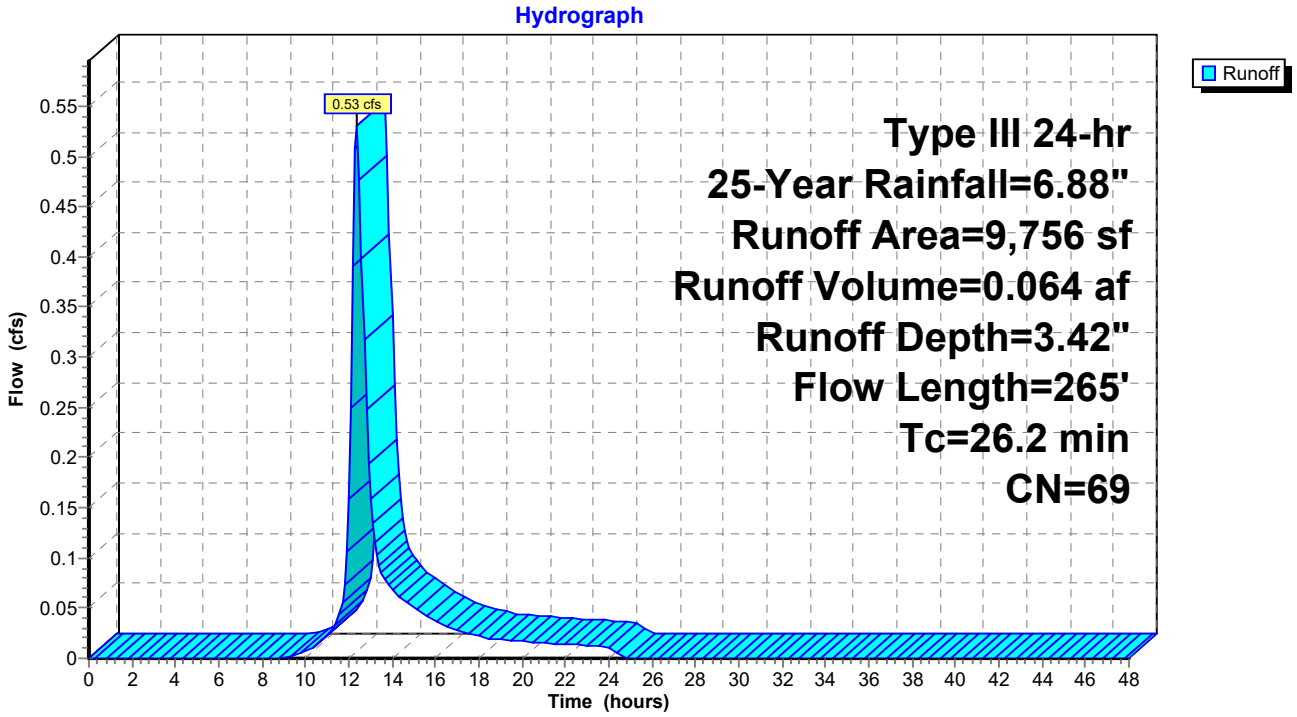
Runoff = 0.53 cfs @ 12.38 hrs, Volume= 0.064 af, Depth= 3.42"
Routed to Pond 2P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
*	800	98	Future Outdoor amenity
*	2,826	98	Amenity Building Roof
	1,087	74	>75% Grass cover, Good, HSG C
	4,340	39	>75% Grass cover, Good, HSG A
*	703	98	Patio
	9,756	69	Weighted Average
	5,427		55.63% Pervious Area
	4,329		44.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.3	75	0.0100	0.05		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 3.10"
1.8	75	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.4	65	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
26.2	265	Total			

Subcatchment PS5: Flows to new Perf Pipe



Summary for Subcatchment PS6: Roof Runoff

[49] Hint: Tc<2dt may require smaller dt

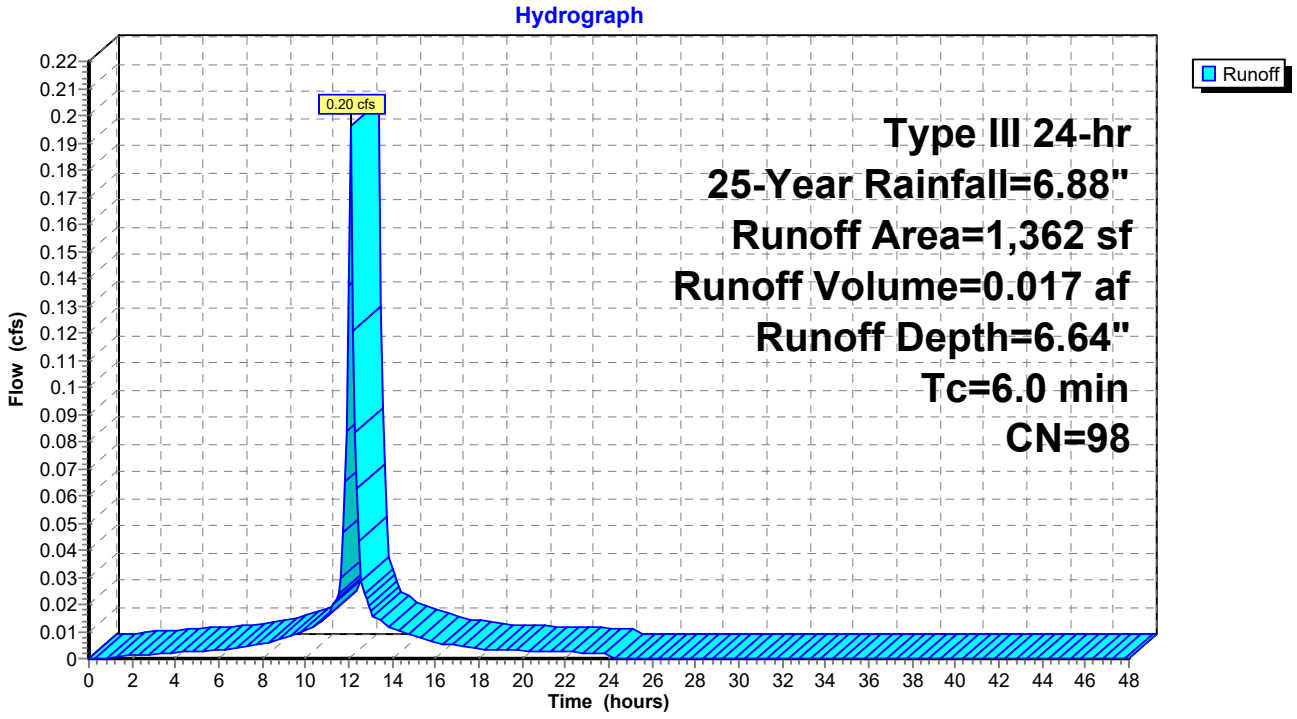
Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 6.64"
Routed to Pond 3P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
*	1,362	98	Amenity Building Roof
	1,362		100.00% Impervious Area

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

Subcatchment PS6: Roof Runoff



Summary for Subcatchment PS7: Flows to Perf Pipe

[49] Hint: Tc<2dt may require smaller dt

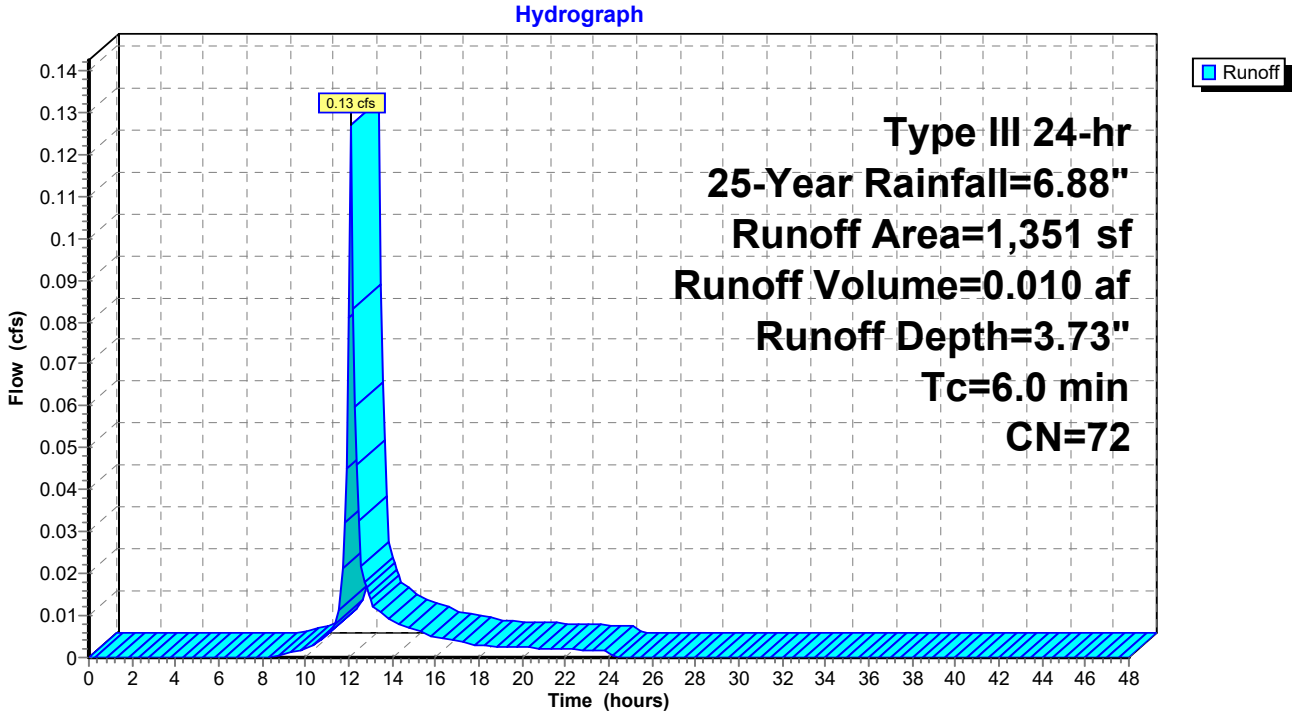
Runoff = 0.13 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 3.73"
Routed to Pond 3P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

	Area (sf)	CN	Description
*	450	98	Amenity Building Roof
	585	39	>75% Grass cover, Good, HSG A
*	316	98	New Sidewalks
	1,351	72	Weighted Average
	585		43.30% Pervious Area
	766		56.70% Impervious Area

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

Subcatchment PS7: Flows to Perf Pipe



Summary for Subcatchment PS8: Comes from Offsite, captured

[49] Hint: Tc<2dt may require smaller dt

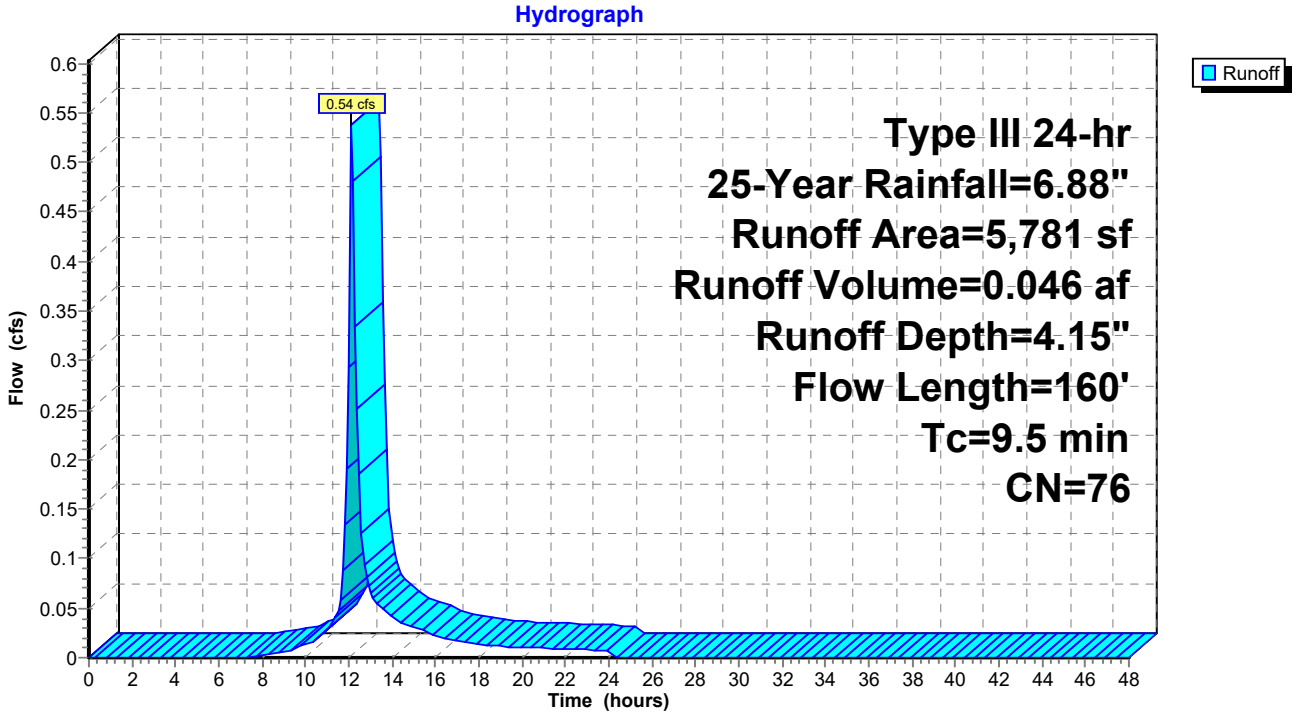
Runoff = 0.54 cfs @ 12.13 hrs, Volume= 0.046 af, Depth= 4.15"
Routed to Pond 1P : Perforated 12" HDPE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Type III 24-hr 25-Year Rainfall=6.88"

Area (sf)	CN	Description
3,695	80	>75% Grass cover, Good, HSG D
2,086	70	Woods, Good, HSG C
5,781	76	Weighted Average
5,781		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	40	0.0375	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
1.3	120	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.5	160	Total			

Subcatchment PS8: Comes from Offsite, captured



Summary for Reach 1R: Overland Flow

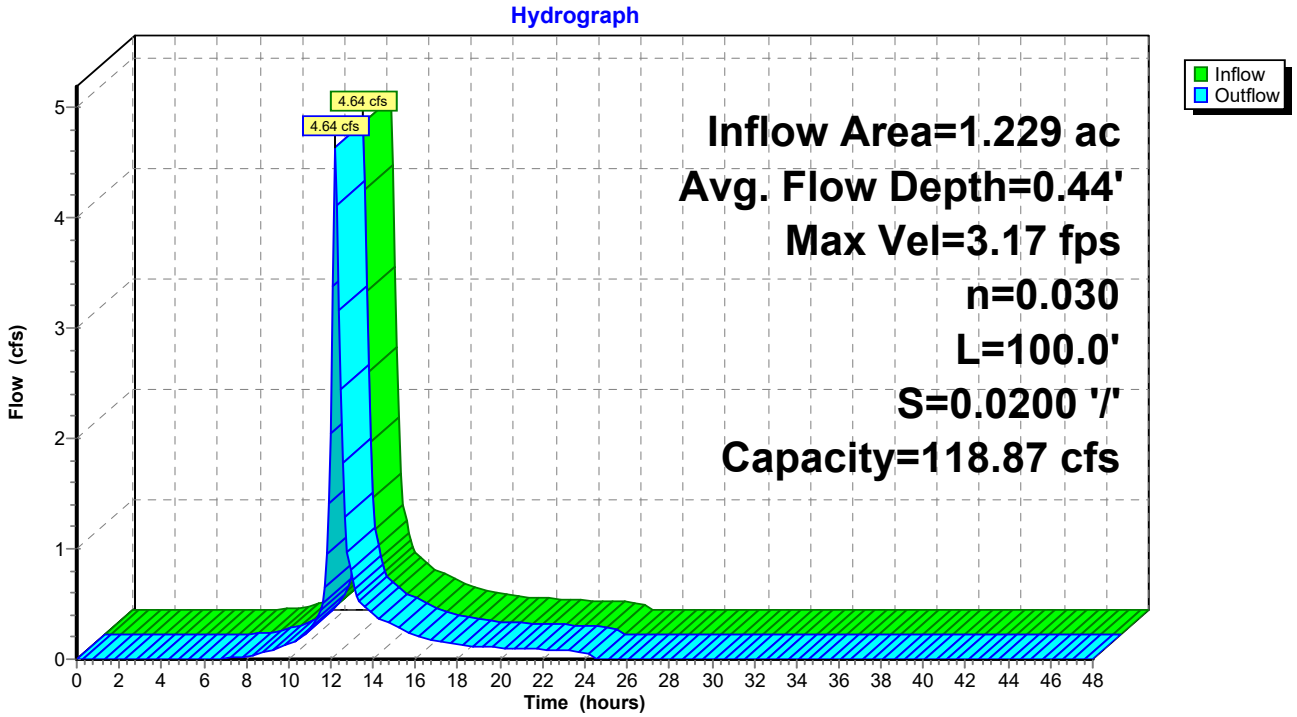
Inflow Area = 1.229 ac, 14.59% Impervious, Inflow Depth = 4.39" for 25-Year event
Inflow = 4.64 cfs @ 12.22 hrs, Volume= 0.450 af
Outflow = 4.64 cfs @ 12.22 hrs, Volume= 0.450 af, Atten= 0%, Lag= 0.4 min
Routed to Pond 18" RCP : EXIST INV WITH NEW TEE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Max. Velocity= 3.17 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 1.5 min

Peak Storage= 146 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.44' , Surface Width= 4.64'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 118.87 cfs

2.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 14.00'
Length= 100.0' Slope= 0.0200 '/'
Inlet Invert= 93.00', Outlet Invert= 91.00'





Summary for Pond 1P: Perforated 12" HDPE

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=55)

Inflow Area = 0.133 ac, 0.00% Impervious, Inflow Depth = 4.15" for 25-Year event
Inflow = 0.54 cfs @ 12.13 hrs, Volume= 0.046 af
Outflow = 0.51 cfs @ 12.14 hrs, Volume= 0.046 af, Atten= 4%, Lag= 0.5 min
Primary = 0.51 cfs @ 12.14 hrs, Volume= 0.046 af
Routed to Pond 2P : Perforated 12" HDPE

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 93.22' @ 13.13 hrs Surf.Area= 180 sf Storage= 177 cf

Plug-Flow detention time= 63.5 min calculated for 0.046 af (100% of inflow)
Center-of-Mass det. time= 63.1 min (884.5 - 821.4)

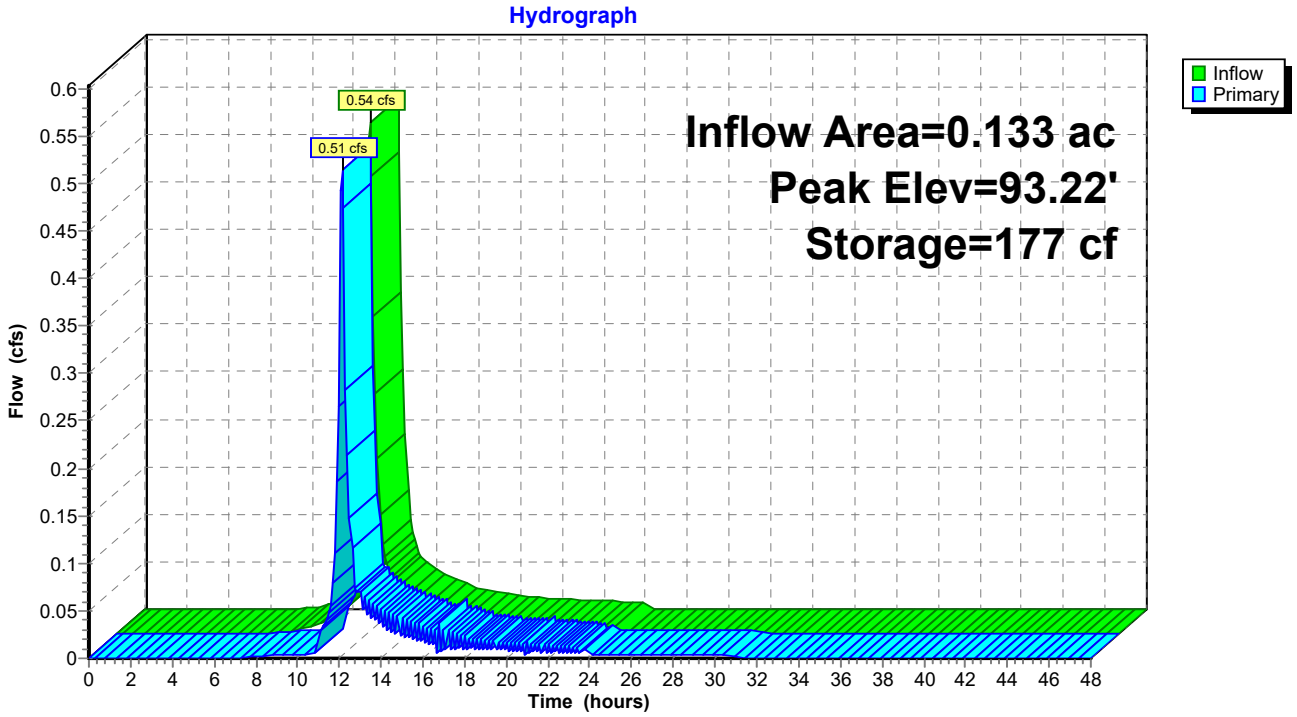
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	188 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 540 cf Overall - 71 cf Embedded = 469 cf x 40.0% Voids
#2	92.00'	46 cf	**12.0" Round Pipe Storage** Inside #1 L= 58.0' 71 cf Overall - 1.5" Wall Thickness = 46 cf
		233 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	180	0	0
94.00	180	540	540

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	91.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 12.14 hrs HW=92.44' TW=92.48' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.00 cfs)

Pond 1P: Perforated 12" HDPE



Summary for Pond 2P: Perforated 12" HDPE

[78] Warning: Submerged Pond 1P Primary device # 2 by 2.22'
[80] Warning: Exceeded Pond 1P by 0.63' @ 30.80 hrs (0.00 cfs 0.101 af)

Inflow Area = 0.357 ac, 27.86% Impervious, Inflow Depth = 3.69" for 25-Year event
Inflow = 0.87 cfs @ 12.21 hrs, Volume= 0.110 af
Outflow = 0.76 cfs @ 12.21 hrs, Volume= 0.110 af, Atten= 12%, Lag= 0.0 min
Primary = 0.76 cfs @ 12.21 hrs, Volume= 0.110 af
Routed to Pond P1 : Infiltration Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 93.22' @ 13.03 hrs Surf.Area= 390 sf Storage= 385 cf

Plug-Flow detention time= 61.3 min calculated for 0.109 af (100% of inflow)
Center-of-Mass det. time= 61.6 min (927.6 - 866.0)

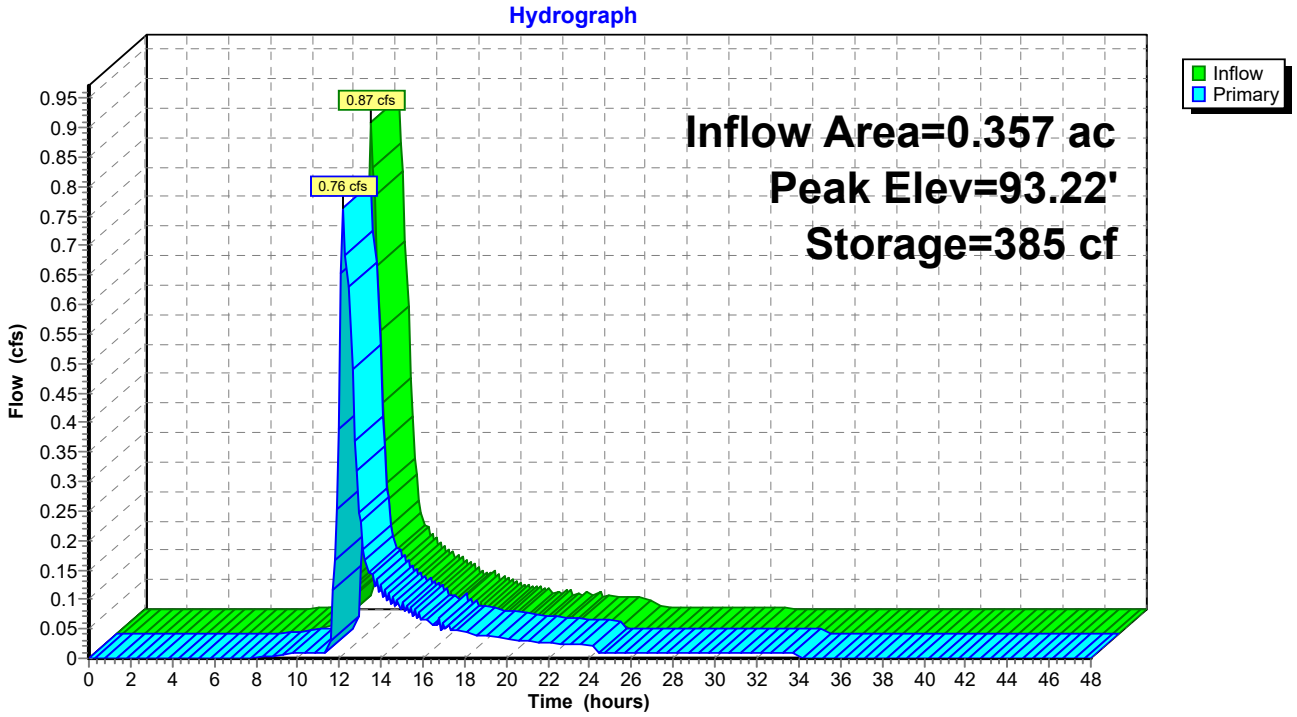
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	404 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 1,170 cf Overall - 160 cf Embedded = 1,010 cf x 40.0% Voids
#2	92.00'	102 cf	**12.0" Round Pipe Storage** Inside #1 L= 130.0' 160 cf Overall - 1.5" Wall Thickness = 102 cf
		506 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	390	0	0
94.00	390	1,170	1,170

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	91.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.01 cfs @ 12.21 hrs HW=92.58' TW=92.70' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.01 cfs)

Pond 2P: Perforated 12" HDPE



Summary for Pond 3P: Perforated 12" HDPE

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=26)

Inflow Area = 0.062 ac, 78.44% Impervious, Inflow Depth = 5.19" for 25-Year event
Inflow = 0.32 cfs @ 12.10 hrs, Volume= 0.027 af
Outflow = 0.29 cfs @ 12.09 hrs, Volume= 0.027 af, Atten= 10%, Lag= 0.0 min
Primary = 0.29 cfs @ 12.09 hrs, Volume= 0.027 af
Routed to Pond P1 : Infiltration Pond

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 93.22' @ 13.02 hrs Surf.Area= 210 sf Storage= 207 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 124.4 min (897.6 - 773.2)

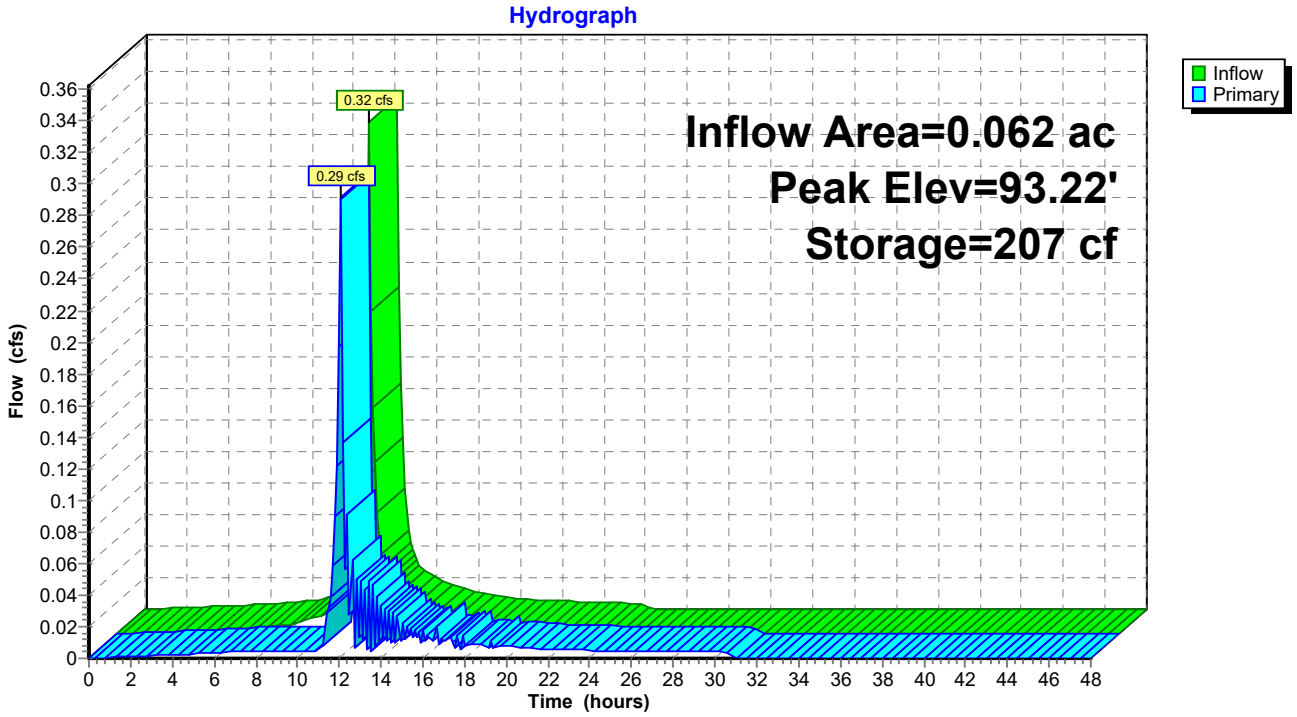
Volume	Invert	Avail.Storage	Storage Description
#1	91.00'	218 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 630 cf Overall - 86 cf Embedded = 544 cf x 40.0% Voids
#2	92.00'	55 cf	**12.0" Round Pipe Storage** Inside #1 L= 70.0' 86 cf Overall - 1.5" Wall Thickness = 55 cf
		273 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.00	210	0	0
94.00	210	630	630

Device	Routing	Invert	Outlet Devices
#1	Primary	92.00'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	91.00'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=92.29' TW=92.42' (Dynamic Tailwater)
1=Orifice/Grate (Controls 0.00 cfs)
2=Exfiltration (Exfiltration Controls 0.00 cfs)

Pond 3P: Perforated 12" HDPE



Summary for Pond 18" RCP: EXIST INV WITH NEW TEE

[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[62] Hint: Exceeded Reach 1R OUTLET depth by 1.24' @ 12.30 hrs

Inflow Area = 1.334 ac, 14.89% Impervious, Inflow Depth = 4.39" for 25-Year event
Inflow = 4.93 cfs @ 12.21 hrs, Volume= 0.488 af
Outflow = 4.98 cfs @ 12.24 hrs, Volume= 0.488 af, Atten= 0%, Lag= 1.4 min
Primary = 4.98 cfs @ 12.24 hrs, Volume= 0.488 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.68' @ 12.24 hrs Surf.Area= 1,305 sf Storage= 1,170 cf
Flood Elev= 93.70' Surf.Area= 2,270 sf Storage= 3,023 cf

Plug-Flow detention time= 5.4 min calculated for 0.488 af (100% of inflow)
Center-of-Mass det. time= 3.9 min (825.7 - 821.8)

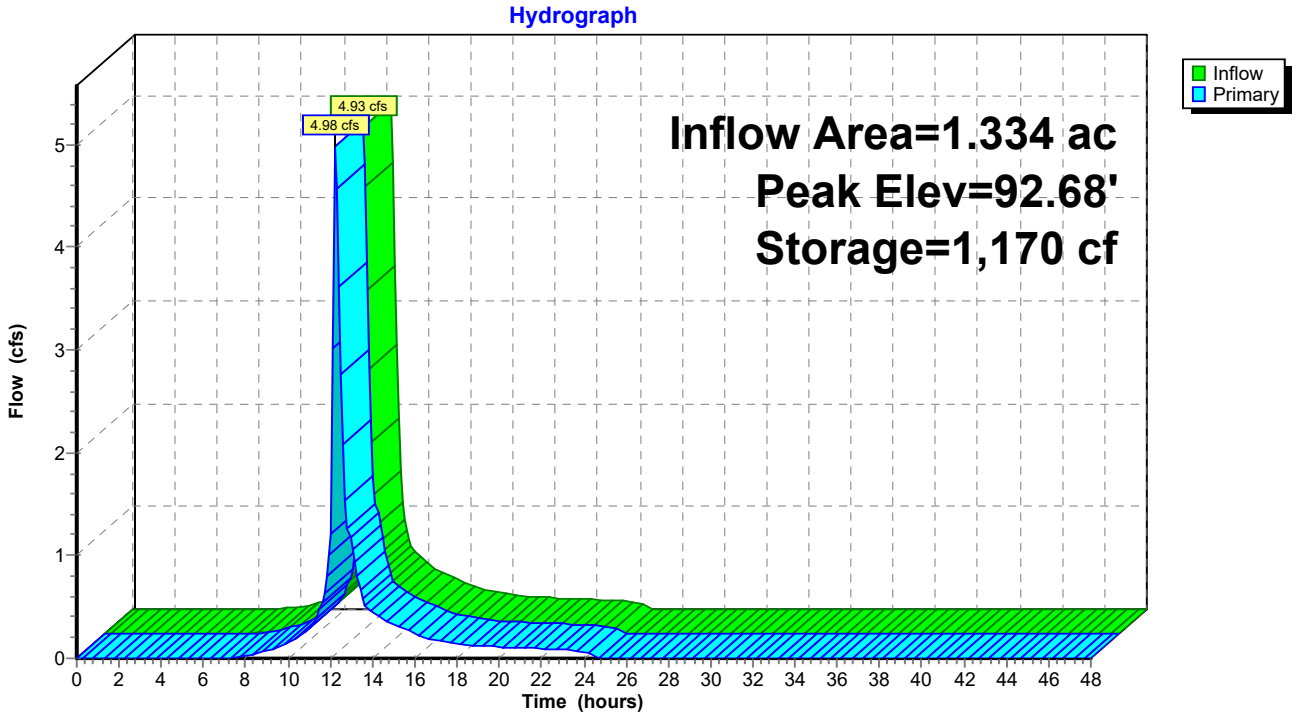
Volume	Invert	Avail.Storage	Storage Description
#1	90.50'	3,746 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
90.50	100	40.0	0	0	100
92.00	666	214.0	512	512	3,622
93.00	1,679	309.0	1,134	1,646	7,585
94.00	2,550	315.0	2,099	3,746	8,016

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	**18.0" Round Culvert** L= 58.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.50' / 89.70' S= 0.0138 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	90.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.30'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.73 cfs @ 12.24 hrs HW=92.66' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Passes 4.73 cfs of 10.11 cfs potential flow)
↑**2=Orifice/Grate** (Orifice Controls 1.39 cfs @ 7.08 fps)
3=Orifice/Grate (Weir Controls 3.34 cfs @ 1.97 fps)

Pond 18" RCP: EXIST INV WITH NEW TEE



Summary for Pond P1: Infiltration Pond

[78] Warning: Submerged Pond 2P Primary device # 2 by 2.22'
[80] Warning: Exceeded Pond 2P by 0.80' @ 0.00 hrs (0.01 cfs 0.097 af)
[78] Warning: Submerged Pond 3P Primary device # 2 by 2.22'
[80] Warning: Exceeded Pond 3P by 0.91' @ 30.60 hrs (0.00 cfs 0.134 af)

Inflow Area = 0.675 ac, 26.32% Impervious, Inflow Depth = 3.80" for 25-Year event
Inflow = 1.97 cfs @ 12.11 hrs, Volume= 0.214 af
Outflow = 0.40 cfs @ 12.94 hrs, Volume= 0.214 af, Atten= 80%, Lag= 49.6 min
Primary = 0.40 cfs @ 12.94 hrs, Volume= 0.214 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 93.22' @ 12.94 hrs Surf.Area= 2,876 sf Storage= 3,428 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 190.0 min (1,078.4 - 888.4)

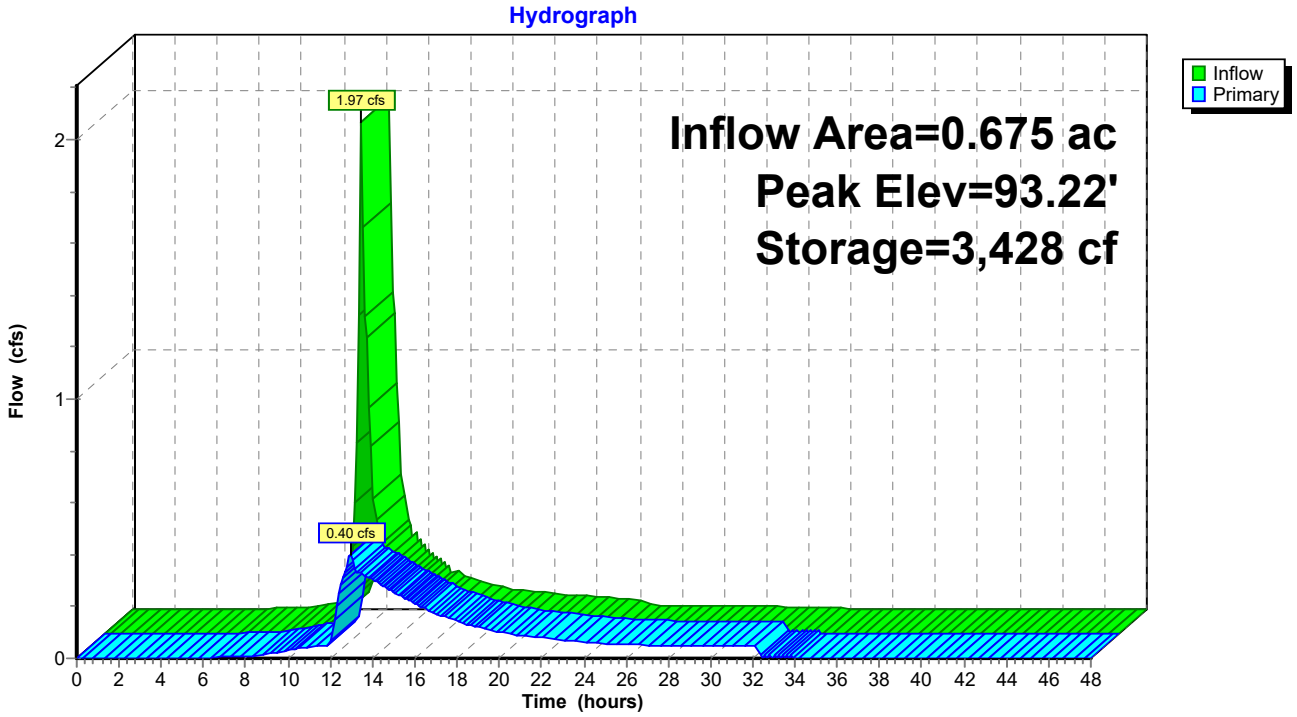
Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	8,219 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	1,900	0	0
92.00	2,100	400	400
94.00	3,375	5,475	5,875
94.50	6,000	2,344	8,219

Device	Routing	Invert	Outlet Devices
#1	Device 3	93.20'	**24.0" x 24.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#2	Device 3	92.20'	**1.0" W x 12.0" H Vert. 1" Weir** C= 0.600 Limited to weir flow at low heads
#3	Primary	88.28'	**18.0" Round Culvert** L= 16.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 88.28' / 88.18' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	91.80'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=0.39 cfs @ 12.94 hrs HW=93.22' TW=0.00' (Dynamic Tailwater)
└**3=Culvert** (Passes 0.39 cfs of 15.36 cfs potential flow)
├**1=Top of Structure** (Weir Controls 0.05 cfs @ 0.41 fps)
├**2=1" Weir** (Orifice Controls 0.27 cfs @ 3.28 fps)
└**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond P1: Infiltration Pond

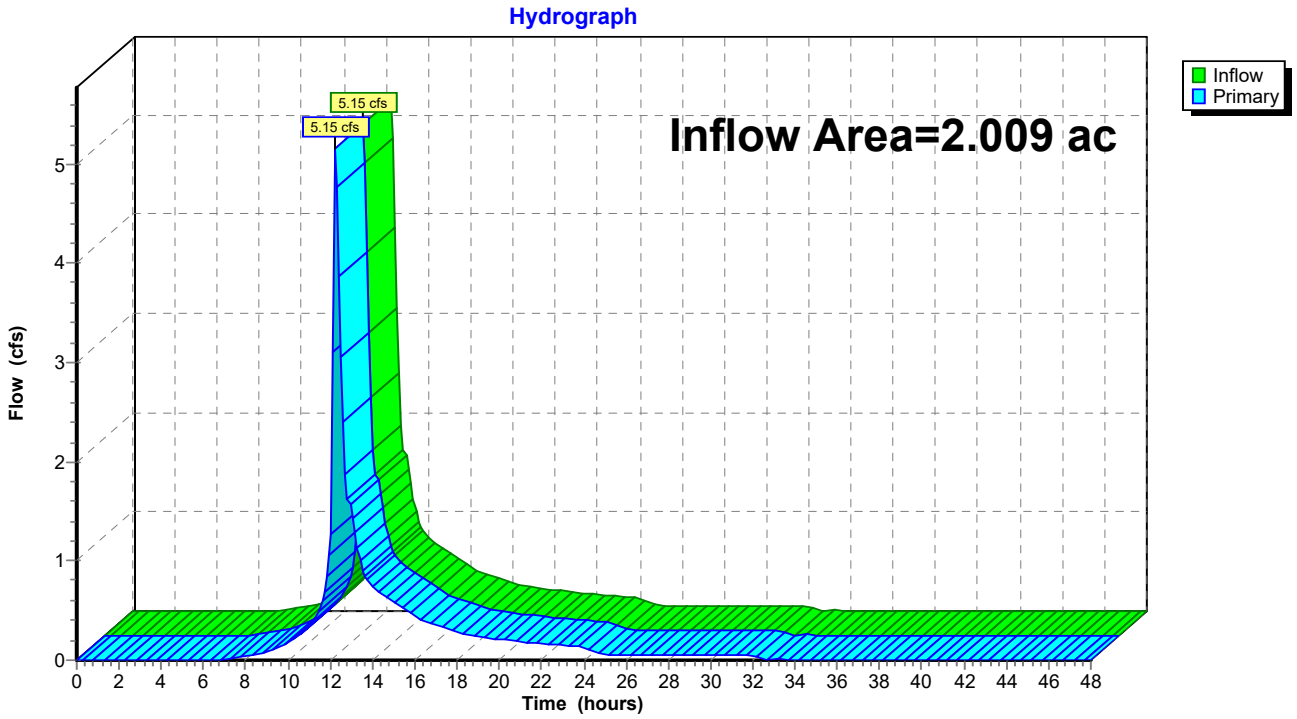


Summary for Link AP-A: ANALYSIS POINT - Existing 24" Pipe

Inflow Area = 2.009 ac, 18.73% Impervious, Inflow Depth = 4.19" for 25-Year event
Inflow = 5.15 cfs @ 12.24 hrs, Volume= 0.702 af
Primary = 5.15 cfs @ 12.24 hrs, Volume= 0.702 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs

Link AP-A: ANALYSIS POINT - Existing 24" Pipe

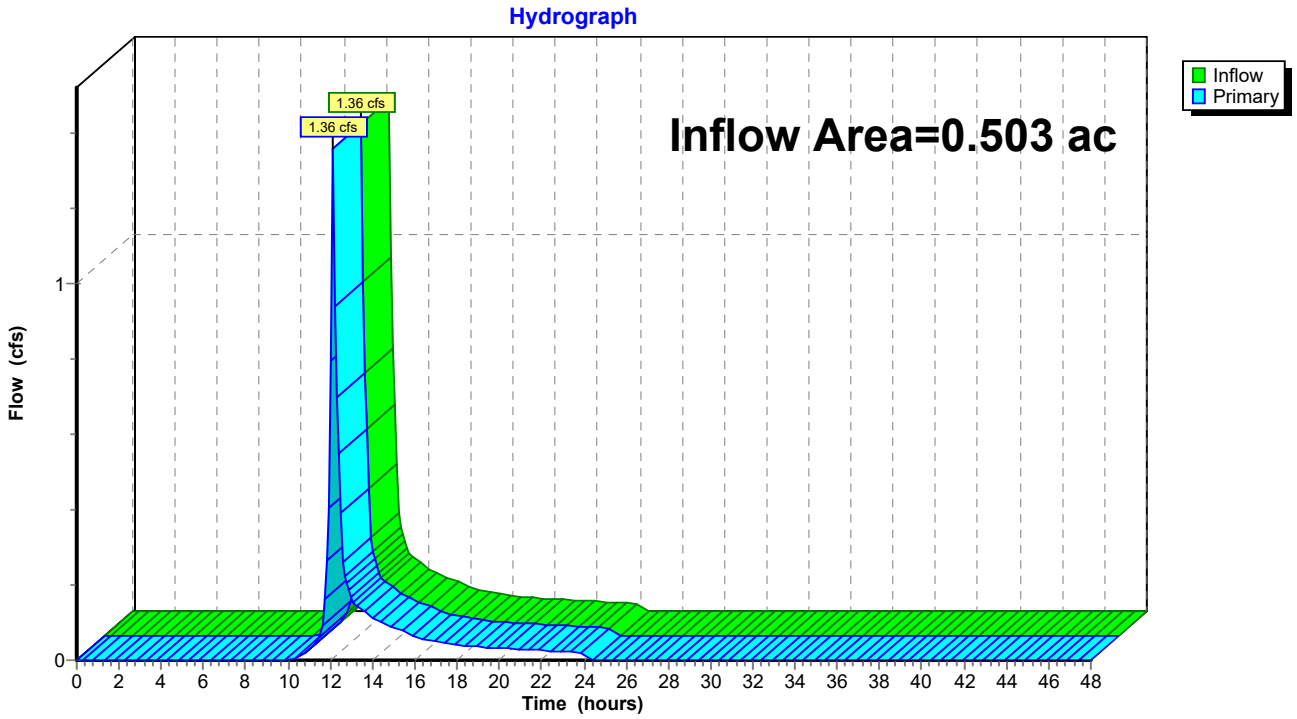


Summary for Link AP-B: ANALYSIS POINT

Inflow Area = 0.503 ac, 35.15% Impervious, Inflow Depth = 2.52" for 25-Year event
Inflow = 1.36 cfs @ 12.11 hrs, Volume= 0.106 af
Primary = 1.36 cfs @ 12.11 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs

Link AP-B: ANALYSIS POINT



Summary for Pond 18" RCP: EXIST INV WITH NEW TEE

Inflow Area = 1.334 ac, 14.89% Impervious, Inflow Depth = 5.61" for 50-Year event
Inflow = 6.27 cfs @ 12.21 hrs, Volume= 0.624 af
Outflow = 6.09 cfs @ 12.24 hrs, Volume= 0.624 af, Atten= 3%, Lag= 1.7 min
Primary = 6.09 cfs @ 12.24 hrs, Volume= 0.624 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 92.75' @ 12.24 hrs Surf.Area= 1,385 sf Storage= 1,267 cf
Flood Elev= 93.75' Surf.Area= 2,315 sf Storage= 3,138 cf

Plug-Flow detention time= 3.7 min calculated for 0.622 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (818.5 - 814.7)

Volume	Invert	Avail.Storage	Storage Description
#1	90.50'	3,746 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
90.50	100	40.0	0	0	100
92.00	666	214.0	512	512	3,622
93.00	1,679	309.0	1,134	1,646	7,585
94.00	2,550	315.0	2,099	3,746	8,016

Device	Routing	Invert	Outlet Devices
#1	Primary	90.50'	**18.0" Round Culvert** L= 58.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 90.50' / 89.70' S= 0.0138 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#2	Device 1	90.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	92.30'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.91 cfs @ 12.24 hrs HW=92.74' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.91 cfs of 10.39 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.41 cfs @ 7.21 fps)
  └─**3=Orifice/Grate** (Weir Controls 4.50 cfs @ 2.17 fps)

Summary for Pond P1: Infiltration Pond

Inflow Area = 0.675 ac, 26.32% Impervious, Inflow Depth = 4.95" for 50-Year event
Inflow = 2.52 cfs @ 12.12 hrs, Volume= 0.278 af
Outflow = 1.37 cfs @ 12.47 hrs, Volume= 0.279 af, Atten= 46%, Lag= 21.4 min
Primary = 1.37 cfs @ 12.47 hrs, Volume= 0.279 af
Routed to Link AP-A : ANALYSIS POINT - Existing 24" Pipe

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.10 hrs
Peak Elev= 93.31' @ 12.47 hrs Surf.Area= 2,937 sf Storage= 3,708 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 162.9 min (1,034.2 - 871.3)

Volume	Invert	Avail.Storage	Storage Description
#1	91.80'	8,219 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.80	1,900	0	0
92.00	2,100	400	400
94.00	3,375	5,475	5,875
94.50	6,000	2,344	8,219

Device	Routing	Invert	Outlet Devices
#1	Device 3	93.20'	**24.0" x 24.0" Horiz. Top of Structure** C= 0.600 Limited to weir flow at low heads
#2	Device 3	92.20'	**1.0" W x 12.0" H Vert. 1" Weir** C= 0.600 Limited to weir flow at low heads
#3	Primary	88.28'	**18.0" Round Culvert** L= 16.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 88.28' / 88.18' S= 0.0062 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	91.80'	**1.000 in/hr Exfiltration over Surface area**

Primary OutFlow Max=1.34 cfs @ 12.47 hrs HW=93.31' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 1.34 cfs of 15.53 cfs potential flow)
  ├─**1=Top of Structure** (Weir Controls 0.97 cfs @ 1.09 fps)
  ├─**2=1" Weir** (Orifice Controls 0.30 cfs @ 3.64 fps)
  └─**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Appendix C
Additional Drainage Report Material

- BMP Worksheets
    - P1 Infiltration Pond
- Inspection and Maintenance Manual
- Winter Maintenance and Salt Minimization
- Extreme Precipitation Table

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration Pond - P1**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.68	ac	A = Area draining to the practice	
0.18	ac	A_I = Impervious area draining to the practice	
0.26	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.29	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.19	ac-in	WQV= 1" x Rv x A	
704	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
176	cf	25% x WQV (check calc for sediment forebay volume)	
Roof/yard runoff		Method of pretreatment? (not required for clean or roof runoff)	
n/a	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
833	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
1,900	sf	A_{SA} = Surface area of the bottom of the pond	
1.00	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
4.4	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**< 72-hrs**
91.80	feet	E_{BTM} = Elevation of the bottom of the basin	
89.80	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
86.00	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
2.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
5.8	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
n/a	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
n/a	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
n/a	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
n/a		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
0.1	:1	If a basin is proposed, pond side slopes.	**≥3:1**
92.81	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
93.31	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
94.30	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes:

Underdrains designed to keep water table low to allow for infiltration and treatment. No parking lot runoff will enter the enter the system, entirely roof drain, yard drains, and some sidewalks being collected by this system. 2' separation is max possible, and is appropriate since runoff will be clean and not contain oils, sand, salt, or other pollutants.

Pond P1: Infiltration Pond - 20220900.A10 White Cliffs Dover 2022-11 - POST DEVELOPMENT-new concept

Summary | Hydrograph | Discharge | Storage | Events | Sizing

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.80	1,900	0
91.90	2,000	195
92.00	2,100	400
92.10	2,164	613
92.20	2,228	833
92.30	2,291	1,059
92.40	2,355	1,291
92.50	2,419	1,530
92.60	2,482	1,775
92.70	2,546	2,026
92.80	2,610	2,284
92.90	2,674	2,548
93.00	2,738	2,819
93.10	2,801	3,096
93.20	2,865	3,379
93.30	2,929	3,669
93.40	2,992	3,965
93.50	3,056	4,267
93.60	3,120	4,576
93.70	3,184	4,891
93.80	3,247	5,213
93.90	3,311	5,541
94.00	3,375	5,875
94.10	3,900	6,239
94.20	4,425	6,655
94.30	4,950	7,124
94.40	5,475	7,645
94.50	**6,000**	**8,219**

Inspection & Maintenance (I&M) Manual for Stormwater Best Management Practices

March 15, 2023

White Cliffs at Dover – Amenities Building Improvements

Tax Map H Lot 41-P
510 Martha's Way
Dover, New Hampshire

The purpose of this Inspection and Maintenance manual is to assist the responsible parties for maintaining and understanding the functions of the Stormwater Best Management Practices.

Party Responsible for Reporting, Inspection, & Maintenance during construction:

Brady Sullivan Properties
670 Commercial St
Manchester NH
Barry Donahoe
603.716.6486
Bdonohoe@bradysullivan.com

Party Responsible for Reporting, Inspection, & Maintenance after construction completion:

Brady Sullivan Properties
670 Commercial St
Manchester NH
Patrick LaCroix
603.622.6223
PLacroix@bradysullivan.com

Stormwater BMP's on Site

- Yard Drains /Outlet Structures/Pipes
- Perforated Infiltration Trenches
- Infiltration Pond

Recommended Maintenance for specific BMP's

Yard Drains/ Outlet Structures/Pipes

- Drainage structures may require frequent maintenance. Depending on location, this may require several cleanings of the sumps each year. At a minimum, it is recommended that structures be inspected at least twice annually, once following snow-melt and once following leaf-drop, and cleaned as indicated by inspection.
- Sediment should be removed when it approaches half the sump depth, use vacuum truck.
- If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other method and disposed in conformance with applicable state and federal regulations.
- Remove all debris from pipe inlets and outlets.

Perforated Infiltration Trenches

- Inspect every 6 months during the first year of operation. Adjust the inspection interval based on previous observations of sediment accumulation and high water elevations. Inspect at least twice annually and after rainfall exceeding 2.5 inches within a 24 hour period.
- Remove trash and debris at inspection.
- At least once annually, inspect for drawdown time. If system does not drain within 72 hours following rainfall event, then a qualified professional should assess the condition to determine measures required to restore filtration function.
- Conduct Jetting and vactoring annually or when inspection shows that maintenance is necessary.
    - Step 1 -Inspect ports
        - Remove/open lid yard drains and inspect sumps, remove sediment once 50% full.
        - Lower camera into perforated pipes for visual inspection of pipes
        - If sediment is present, jet to keep clean and clean up jetted material

- Step 2 – Replace all covers, grates, filters, and lids; record observations and actions

Infiltration Pond

Maintenance of Bioretention systems can typically be performed as part of standard landscaping. Regular inspection and maintenance is critical to the effective operation of Bioretention systems to insure they remain clear of leaves and debris and that they remain free draining.

The most common maintenance activity is the removal of sediment and organic debris from the system and any structures. Visual inspections shall be routine and shall include looking for standing water, accumulated leaves, holes in the soil media, signs of plant distress and debris and sediment accumulation.

Vegetation coverage is integral to the performance of the system, including infiltration rate and nutrient uptake. Vegetation care is important to system productivity and health.

- Inspect at least twice annually and after rainfall exceeding 2.5 inches within a 24-hour period.
- Remove trash and debris at inspection.
- At least once annually and after every major storm in the first few months, inspect for drawdown time. IA record should be kept of the time to drain for the system completely after a storm even. The system should drain within 72 hours.
    - Check to insure the filter surface remains well draining after storm events.
    - If filter bed is clogged, draining poorly or standing water covers more than 50% of the surface 48 hours after a precipitation event, then remove top few inches of discolored material. Till or rake remaining material, as needed.
- Inspect vegetation annually or as needed and maintain in healthy condition including pruning, removal and replacement of dead or diseased vegetation and removal of invasive species.
    - Vegetation should cover greater than 75% of the system and should be cared for as needed.
- Conduct periodic mowing of embankments (generally two or more times per year) to control growth of woody vegetation on embankments;
- Check inlets and outlets for leaves and debris, quarterly, initially and then annually at a minimum thereafter.
    - Rake in and around the system to clear it of debris. Also clear the inlet and overflow if obstructed.
- Check for animal burrows and short circuiting in the system, quarterly initially and then annually at a minimum thereafter.
    - Soil erosion from short circuiting or animal borrows should be repaired when they occur. The holes should be filled and lightly compacted.

- Inspect inlets and outlets to ensure good condition and no evidence of deterioration. Check to see if high-flow bypass is functioning, quarterly initially and then annually at a minimum thereafter.
    - Repair or replace any damage structural parts, inlets, outlets, sidewalls, trash racks, etc.

Control of Invasive Species

During inspection of on-site stormwater best management practices, inspect for the presence of invasive plants and remove in a safe manner as described by the "University of New Hampshire Cooperative Extension Methods for Disposing of Non-Native Invasive Plants" a copy of which is attached to this Manual and can be downloaded at https://extension.unh.edu/resources/files/resource000988_rep1720.pdf

Required Submittals

None

FUSS & O'NEILL

Inspection Checklist

Date of Inspection: _____

(Make additional copies of this sheet for each inspection)

Yard Drains / Outlet Structures/Pipes

☐ Check sump, remove sediment when half the sump depth, use vacuum truck

☐ Check rims, inlets and outlets, remove debris and/or overgrown vegetation

☐ Check pipes and remove any blockages

☐ Remove floating hydrocarbons (petroleum and natural gas)

Underground Bioretention System

☐ Remove trash and debris

☐ Check drawdown time annually.

☐ Inspect yard drains, remove sediment as warranted.

☐ Conduct Jetting and Vactoring annually or as warranted by inspection

Infiltration Pond

Initial Inspection after seeding

☐ Plants are stable, roots not exposed.

☐ Surface is at design level, no evidence of preferential flows/shoving.

☐ Inlet and outlet/bypass are functional.

Debris Cleanup (1 time/year minimum, Spring/Fall)

☐ Remove Trash and debris

☐ Litter, leaves and dead vegetation removed from the system

☐ Prune/ mow vegetation

Standing Water (1 time/year and/or after large storm events)

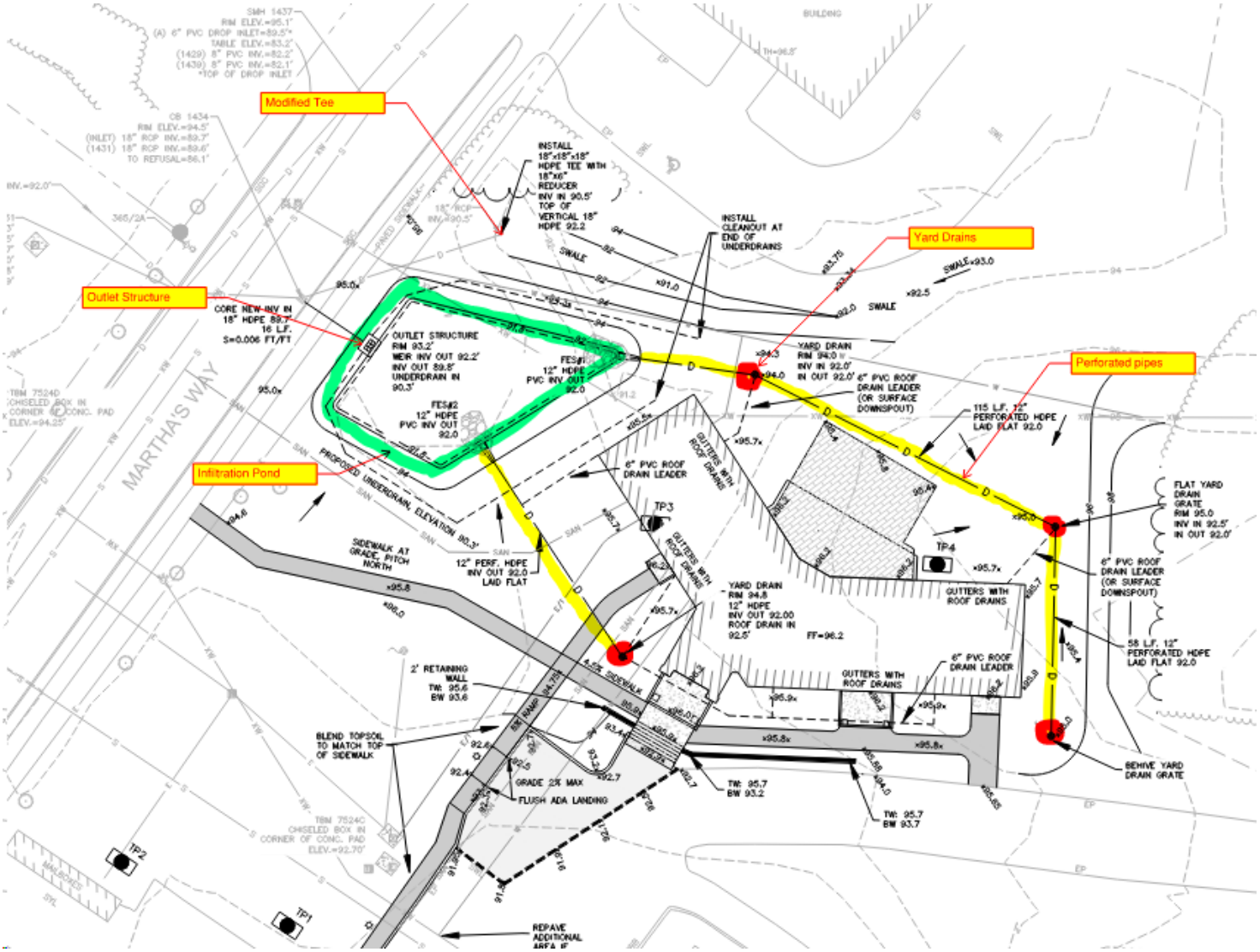
☐ Check drawdown time, no evidence of standing water after 24-48 hours since rainfall

Vegetation Condition and Coverage

☐ Vegetation condition good with good coverage (typically > 75%)

☐ Check for loss of vegetation and reseed as needed

☐ Check for the presence of invasive species and remove per UNH Cooperative Extension Methods for disposal


Modified Tee
Outlet Structure
Infiltration Pond
Yard Drains
Perforated pipes
INSTALL 18"x18"x18" HDPE TEE WITH 18"x6" REDUCER INV IN 90.5' TOP OF VERTICAL 18" HDPE 92.2
INSTALL CLEANOUT AT END OF UNDERDRAINS
CORE NEW INV IN 18" HDPE 89.7' 16 L.F. S=0.006 FT/FT
OUTLET STRUCTURE RIM 93.2' WEIR INV OUT 92.2' INV OUT 89.8' UNDERDRAIN IN 90.3'
FES#1 12" HDPE PVC INV OUT 92.0
FES#2 12" HDPE PVC INV OUT 92.0
PROPOSED UNDERDRAIN, ELEVATION 90.3'
12" PERF. HDPE INV OUT 92.0 LAID FLAT
YARD DRAIN RIM 94.0 W INV IN 92.0' INV IN 92.0' OUT 92.0' 6" PVC ROOF DRAIN LEADER (OR SURFACE DOWNSPOUT)
115 L.F. 12" PERFORATED HDPE LAID FLAT 92.0
6" PVC ROOF DRAIN LEADER
GUTTERS WITH ROOF DRAINS
YARD DRAIN RIM 94.8 12" HDPE INV OUT 92.00 ROOF DRAIN IN 92.5'
FF=96.2
FLAT YARD DRAIN GRATE RIM 95.0 INV IN 92.5' IN OUT 92.0'
6" PVC ROOF DRAIN LEADER (OR SURFACE DOWNSPOUT)
58 L.F. 12" PERFORATED HDPE LAID FLAT 92.0
BEEHIVE YARD DRAIN GRATE
SIDEWALK AT GRADE, PITCH NORTH
2' RETAINING WALL TW: 95.6 BW 93.6
4.5% SIDEWALK
BLEND TOPSOIL TO MATCH TOP OF SIDEWALK
GRADE 2% MAX
FLUSH ADA LANDING
TW: 95.7 BW 93.2
TW: 95.7 BW 93.7
REPAVE ADDITIONAL AREA IF
MARTHA'S WAY
TP1
TP2
TP3
TP4

FUSS & O'NEILL

Inspection and Maintenance Log (Make additional copies of this sheet for each inspection)		
Date of Inspection:		
BMP / Location	Inspection Notes	Maintenance Action
Yard Drains		
Perforated Pipes		
Infiltration Pond		
Flared End Sections		
Riprap Aprons		

FUSS & O'NEILL

Deicing Log

Date	Amount of Deicing Salt applied

WINTER MAINTENANCE AND SALT MINIMIZATION PLAN FOR White Cliffs at Dover – Amenities Building Improvements

Tax Map H Lot 41-P
510 Martha's Way
Dover, New Hampshire

Prepared For:
Brady Sullivan Properties
670 Commercial St
Manchester NH 03101

March 2023

Prepared by:

540 No Commercial Street
Manchester, NH
03101
t 603.668.8223
800.286.2469
f 603.668.8802

www.fando.com

California
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

Winter Maintenance and Salt Minimization Plan
White Cliffs at Dover – Amenities Building Improvements
Tax Map H Lot 41-P
510 Martha's Way
Dover, New Hampshire

PROJECT AREA DESCRIPTION

The property is the existing White Cliffs at Dover Apartment Complex. Improvements proposed include the addition of a 4,000 s.f. amenities building with associated walk walks, stairs, and minor parking improvements. The property is located at 510 Martha's Way, north of the Bellamy River. The specific parcel the amenities building will be located on is Map H Lot 41-P, which contains 2 apartment buildings, however the building will be shared with all residential units within the complex.

Proposed stormwater improvements consist of roof leaders, yard drains, perforated pipes, and an infiltration basin to capture nearly all the runoff from new impervious surfaces.

The Bellamy River watershed has been identified as being within the "class A Lakes with a quarter mile buffer" and "wellhead protection" areas. Based on studies by the NHDES and US EPA the source of one of the impairments has been linked to the use of de-icing, anti-icing and pretreatment materials applied during winter maintenance of roadways and other paved surfaces.

The presence of snow and ice on drive aisles, parking lots, and walkways creates a public safety concern; hence the need for the use of salt and other de-icing measures. Salt however, and specifically chloride, can have a negative impact to plants, animals, birds and groundwater. The objective of this Winter Maintenance and Salt Minimization Plan is to reduce the amount of chloride entering the groundwater and other environmentally significant areas while still maintaining roadway and site safety.

RESPONSIBILITY

The responsible party will employ or contract grounds crews and related winter maintenance crews will be responsible for implementing and complying with the Winter Maintenance and Salt Minimization Plan, reviewing the success of the Plan and continuing to update the Plan as new requirements, practices and products are developed. A copy of this Plan shall be given to all personnel that are involved/contracted with winter maintenance of the development's winter maintenance for mandatory implementation.

CERTIFICATIONS

All Salt Applicators shall be current UNHT2 Green SnowPro Certified applicators or equivalent. In addition, a NHDES Salt Applicator Certification is recommended, but not required. Information on these certifications can be found in the links provided below:

- https://t2.unh.edu/green-snowpro-certification
- https://www.des.nh.gov/organization/divisions/water/wmb/was/salt-reduction-initiative/salt-applicator-certification.htm

WEATHER MONITORING

Winter maintenance contractors and salt applicators employed shall monitor storm events using National Weather Service (http://www.noaa.gov), local TV stations and website weather information. All vehicles used for the application of road salt or brining and pre-wetting solution shall be equipped with an annually calibrated air and ground surface temperature monitor. Air and ground temperatures shall be monitored throughout the day to ensure that the operators are making informed decisions as to when and to what extent materials are applied to the drive aisles, parking lots and sidewalks.

PRETREATMENT AND TREATMENT OF PARKING LOTS AND ROADWAYS

Apply pre-wetted de-icer, salt brine or liquid de-icers to parking lots and roadways prior frost or snow accumulation to prevent icing. Pre-wetting paved areas has been shown to limit the amount of salt needed in most snow storms. Salt brine or liquid de-icers shall not be applied before a rainstorm, but can be applied before a light freezing drizzle. For more information, refer to attached Anti-Icing and Pre-wetting NH Best Management Practices sheets from the Technology Transfer Center at UNH.

If snow accumulates prior to salting the parking lots and drive aisles upon the Folsom Road Office Development, the surfaces should be plowed before applying de-icers. Salt shall not be used to "burn-off snow". Only apply salt to pavement surface or icy surfaces to prevent or reduce icing. Pavement surface temperature shall be monitored in parking lots and roadways. If pavement temperature is below 15ºF, winter maintenance contractors shall only use pre-wetted salt or brining solution. Dry salt (sodium chloride) will not melt fast enough at these temperatures.

PRETREATMENT AND TREATMENT OF SIDEWALKS

Always remove snow prior to applying deicers to pedestrian access, including but not limited to sidewalks and building entries. It is strongly recommended that a pre-wetted salt or brining solution should be applied to sidewalks. For more information, refer to attached Anti-Icing, Pre-wetting and Brine Making NH Best Management Practices sheets from the Technology Transfer Center at UNH. For salt spreaders, drop spreaders are preferred, but if using a rotary spreader, shields must be installed to restrict the spread pattern to the sidewalk only.

PLOWING

Plow operations should be timed so as to allow maximum melting by salt before snow is plowed off the access road or parking areas. Snow piles shall not be located on top of catch basins or within swales and/or ponds. Within the commercial development, snow piles should be stored within the parking lot as much as possible so that solids can be recovered after the snow melts.

EQUIPMENT & EQUIPMENT CALIBRATION

Spreaders used upon shall be equipped with ground speed control applicators to regulate the amount of salt discharged consistently. All equipment utilized for the application of pre-wetted de-icer, liquid chemical and road salt aggregate should be calibrated each fall. Equipment should be checked after each storm and recalibrated if necessary. For more information, refer to attached Hydraulic-Run Spreader Calibration and Pony Motor-Run Spreader Calibration NH Best Management Practices sheets from the Technology Transfer Center at UNH.

DOCUMENTATION

All winter maintenance contractors shall record salt usage by vehicle for each storm and periodically compare the usage rates to confirm spreader calibrations. All winter maintenance contractors shall record storm response data, including date, air temperature, ground surface temperature, storm start and end time, snow fall total, salt usage, application rates, application times, and plow times to be compared and analyzed by the Applicators and property managers to improve the salt minimization process. The attached "checklist for snow and ice
Maintenance contractors" shall be used as a guide.

RELATED INFORMATION

Information from the State of NH Department of Environmental Services on Salt Reduction can be found in the link provided below:

- https://www.des.nh.gov/organization/divisions/water/wmb/was/salt-reduction-initiative/index.htm

ATTACHMENT B – SMART SALTING PRACTICES
A Checklist for snow and ice maintenance contractors.

Recommended Practice	**Check which response applies to current practices and anticipated site maintenance activities for job site.**				
	Already Do	**Will Do**	**Might Do**	**Will Not Do**	**If "Will Not Do"; State Reason Why?**
Use an application rate chart.					
Calibrate equipment each year.					
Learn about the deicer ingredients and use the appropriate one for the condition.					
Look for reasons if and why materials are leaking or spilling from vehicles and fix them (e.g. gaps, overfilling, etc.)					
Develop a comprehensive winter maintenance policy. Follow your policy.					
Measure and use pavement temperatures.					
Use anti-icing appropriately prior to the storm.					
Plow before applying deicers.					
Use wet materials (pre-wet or pre-treated)					
Don't apply sodium chloride (road salt) for pavement temperatures below 15°F					
Don't apply deicers for pavement temps under -10°F. It's too cold.					
Separate salt and sand. Use salt for melting, Use sand for traction.					
Apply Deicers in the center of the road or on the high side of the curve.					
Store the salt in a building or under secure cover.					
Store salt away from water flow and direct the water away from the storage area.					
Store snow away from lakes, ponds, and onsite wetlands.					
Sweep up sand, dispose of properly					
For each event, document what you did and how well it worked. Use this information to make improvements.					

Checklist is adapted from worksheet created by Fortin Consulting as a part of the Minnesota Pollution Control Agency Smart Salting Voluntary Certification Program.

Example: Step #1, blank calibration form

See the References and Resources section for a full size form to copy for calibration. This is how the empty form looks. (Keep a stack of these on a clipboard when ready to begin the calibration.)

CALIBRATION CHART FOR AUGER OR CONVEYOR SYSTEMS

DATE _____ **SPREADER #** _____ **MATERIAL** _____

SETTING	POUNDS PER MINUTE	5 MPH (x12)	10 MPH (x6)	15 MPH (x4)	20 MPH (x3)
1					
2					
3					

Figure 10: Blank calibration form

Example: Step #2, calibration form filled out during calibration

CALIBRATION CHART FOR AUGER OR CONVEYOR SYSTEMS

DATE 8-Aug-15 **SPREADER #** A4219 **MATERIAL** Rock Salt

SETTING	POUNDS PER MINUTE	5 MPH (x12)	10 MPH (x6)	15 MPH (x4)	20 MPH (x3)
1	10				
2	22				
3	34				

Figure 11: Example calibration form with discharge and header information filled out

Example: Step #3, calibration form ready to put in truck for road application
Back in the shop, do the calculations to fill in the rest of the blanks. Multiply the weight in column 2 with the multiplier in the top row. This provides the pounds per mile that needed to fill in the table.

CALIBRATION CHART FOR AUGER OR CONVEYOR SYSTEMS

DATE August 12, 2018 SPREADER # A4219 Rock Salt

SETTING	POUNDS PER MINUTE	5 MPH (x12)	10 MPH (x6)	15 MPH (x4)	20 MPH (x3)
1	10	*120	60	40	30
		**			
2	22	264	132	88	66
3	34	408	204	136	102

*top half of each row = lbs. /lane mile. To get this number, multiply lbs. /min by the factor shown for each speed.
**bottom half of each row = lbs. /1000 sq.ft. To find this, divide the number in the top half by 63.
Figure 12: Example calibration form with pounds per lane mile filled out

Some fish species are affected by concentrations of less than 1000 ppm NaCl, about 1 to 1.5 tablespoons of salt in 5 gallons of water.

Example: Step #4, calibration form ready to zip tie to hand spreader or put in truck for parking lot application.
Divide by 63 to convert pounds per lane mile to pounds per 1,000 square feet. This is very useful for parking lot and sidewalk applications.

CALIBRATION CHART FOR AUGER OR CONVEYOR SYSTEMS

DATE 8-Aug-15 **SPREADER #** A4219 **MATERIAL** Rock Salt

SETTING	POUNDS PER MINUTE	5 MPH (x12)	10 MPH (x6)	15 MPH (x4)	20 MPH (x3)
1	10	*120	60	40	30
		**1.9	1.0	0.6	0.5
2	22	264	132	88	66
		4.2	2.1	1.4	1.0
3	34	408	204	136	102
		6.5	3.2	2.2	1.6

* top half of each row = lbs/lane mile. To get this number, multiply lbs/min by the factor shown for each speed.

** bottom half of each row = lbs/1000 sq.ft. To find this, divide the number in the top half by 63.

Gravity Flow Equipment

This is applicable for equipment that does not have a motorized delivery system such as an auger. This type of equipment might be a pickup mounted spreader, gator mounted spreader or a hand push spreader. Gravity flow equipment is typically controlled by gate opening and speed of application.

Step 1: Calculate discharge rate

- Mark out a 10-foot stretch of pavement. (By increasing the size of the test area i.e., the longer the test area, the more accurate the results will be).
- Sweep it clean of sand or any other material.
- Using a constant speed, apply one pass of material to the test area.
- Measure the width the material is spread or bounces, in feet.
- Sweep up and weigh the material that is within the marked 10-foot stretch.
- Record the lever position/setting for the gate/chute. If there are no numbers for the positions, make permanent marks on the equipment to identify the positions.

- To improve accuracy, repeat this two more times and calculate the average weight of material applied.
- Record results in columns A, B, C, and D (Figure 14).

Step 2: Repeat step #1 for various settings.

Step 3: Fill out chart.

- Fill out columns E, F, and G (Figure 14).
- If using more than one type of material, repeat the test for each material.
- Place the completed calibration chart with the equipment.

Shortcuts:

- Put down a tarp over the application area; this makes it quicker to recover and weigh material.
- After the first pass, put a bag around spreader to catch discharge material. The first pass is needed to determine the spread width.

Calculate application rate:

- Equipment: _____Material: _____ Date: _____

A	B	C	D	E	F	G
Speed	Lever position or gate setting	Pounds spread in 10 feet*	Spread width in feet	Coverage area in square feet	Application rate in lbs./1000 ft^2 (1000/E x C)	Application rate in lbs./lane mile (12' width)
……..EXAMPLE……						
20 MPH	Half Closed	0.4 lbs.	13 Feet	130 Sq. Ft	3.1 lbs. per 1000 sq. ft.	196 lbs./mile

* If changing the test strip length, adjust the title in column C and the multiplier in column E.

Figure 14: Example calibration chart for gravity flow equipment

What if calibration is not a practice?

Even without calibrating the equipment, the amount of material to use can determine but will take more time to calculate. Know the material, the size of the area to be treated, and the pavement temperature, then consult the application rate chart (application rate section) and do the math. Without calibration, the way to evenly distribute the recommended amount across the maintenance area must be determined by the professional. This approach may work well for treating sidewalks using the "chicken feed" method. For example:

- 20°F degrees pavement temperature and rising
- Using dry salt
- Sidewalk is 2,000 square feet
- Table recommends 2.25 lbs. Per 1,000 square feet (for this situation)
- Measure about 4.5 lbs. Of salt
- Figure out a way to spread it evenly over the 2,000 sq. ft. surface

Sand fills in lake bottoms, accelerating the aging process of lakes. Lakes get shallower as they age, some eventually becoming wetlands.

Calibration Charts

Calibration Chart for Gravity Flow Equipment						
Vehicle or spreader number:					Date:	
Material Type:				Calibrated by:		
		A	B	C	D	E
Speed	Lever position or gate setting	Lbs. material recovered in 10 feet	Spread width in feet	Square feet covered with material (Bx10)	Application rate in lbs./1000 sq. ft. (1000/CxA)	Application rate in lbs./lane mile (12' width)(Dx63.4)

Figure 15: Blank calibration chart for gravity flow equipment

Calibration Chart for Auger or Conveyor Systems

Date _____ Spreader_____ Material_____

Setting	Pounds per Minute	Quantity / Area	5 MPH (x12)	10 MPH (x6)	15 MPH (x6)	20 MPH (x3)
1		Lbs./lane Mile				
		Lbs./1000 sq.ft.				
2		Lbs./lane Mile				
		Lbs./1000 sq.ft.				
3		Lbs./lane Mile				
		Lbs./1000 sq.ft.				
4		Lbs./lane Mile				
		Lbs./1000 sq.ft.				
5		Lbs./lane Mile				
		Lbs./1000 sq.ft.				
6		Lbs./lane Mile				
		Lbs./1000 sq.ft.				

Figure 16: Blank calibration chart for augured or conveyed manual controlled spreaders

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.898 degrees West
Latitude	43.177 degrees North
Elevation	0 feet
Date/Time	Mon, 21 Nov 2022 12:29:27 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.54	2.0	2.60	.86	**1yr**	2.30	2.75	3.15	3.87	4.44	**1yr**
2yr	0.32	0.49	0.61	0.81	1.01	1.29	**2yr**	0.88	1.17	1.50	1.91	2.4	3.14	.49	**2yr**	2.78	3.36	3.85	4.58	5.22	**2yr**
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.38	3.0	3.97	.47	**5yr**	3.51	4.30	4.92	5.79	6.55	**5yr**
10yr	0.40	0.63	0.80	1.09	1.42	1.84	**10yr**	1.22	1.69	2.18	2.82	3.6	4.74	.40	**10yr**	4.20	5.19	5.92	6.92	7.78	**10yr**
25yr	0.46	0.74	0.94	1.29	1.72	2.26	**25yr**	1.48	2.09	2.69	3.52	4.6	6.00	.92	**25yr**	5.31	6.66	7.57	8.75	9.78	**25yr**
50yr	0.51	0.83	1.06	1.48	1.99	2.66	**50yr**	1.72	2.46	3.17	4.18	5.4	7.17	.36	**50yr**	6.35	8.04	9.12	10.46	11.64	**50yr**
100yr	0.58	0.93	1.20	1.70	2.31	3.11	**100yr**	2.00	2.88	3.74	4.95	6.5	8.58	0.11	**100yr**	7.59	9.72	10.99	12.50	13.85	**100yr**
200yr	0.64	1.04	1.35	1.95	2.69	3.66	**200yr**	2.32	3.39	4.42	5.88	7.7	10.26	2.21	**200yr**	9.08	11.75	13.25	14.96	16.48	**200yr**
500yr	0.75	1.24	1.61	2.34	3.29	4.52	**500yr**	2.84	4.21	5.48	7.36	9.8	13.01	5.70	**500yr**	11.51	15.10	16.97	18.96	20.77	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.90	**1yr**	0.64	0.88	0.91	1.25	1.57	2.08	2.47	**1yr**	1.84	2.38	2.90	3.34	4.03	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.16	1.36	1.83	2.36	3.04	3.39	**2yr**	2.69	3.26	3.74	4.46	5.05	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.15	2.78	3.71	4.12	**5yr**	3.28	3.96	4.60	5.41	6.11	**5yr**
10yr	0.38	0.59	0.73	1.02	1.31	1.60	**10yr**	1.13	1.56	1.82	2.45	3.13	4.27	4.78	**10yr**	3.78	4.60	5.31	6.25	7.02	**10yr**
25yr	0.44	0.66	0.83	1.18	1.55	1.91	**25yr**	1.34	1.87	2.11	2.85	3.66	4.99	5.79	**25yr**	4.41	5.57	6.48	7.56	8.43	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.19	**50yr**	1.52	2.14	2.35	3.20	4.11	5.70	6.69	**50yr**	5.05	6.43	7.53	8.74	9.68	**50yr**
100yr	0.54	0.81	1.02	1.47	2.01	2.51	**100yr**	1.74	2.45	2.63	3.58	4.59	6.51	7.72	**100yr**	5.76	7.42	8.76	10.09	11.09	**100yr**
200yr	0.60	0.90	1.14	1.64	2.29	2.87	**200yr**	1.98	2.81	2.93	4.01	5.13	7.43	8.91	**200yr**	6.58	8.57	10.17	11.66	12.74	**200yr**
500yr	0.69	1.03	1.33	1.93	2.75	3.45	**500yr**	2.37	3.38	3.40	4.65	5.96	8.81	10.75	**500yr**	7.80	10.34	12.40	14.14	15.23	**500yr**

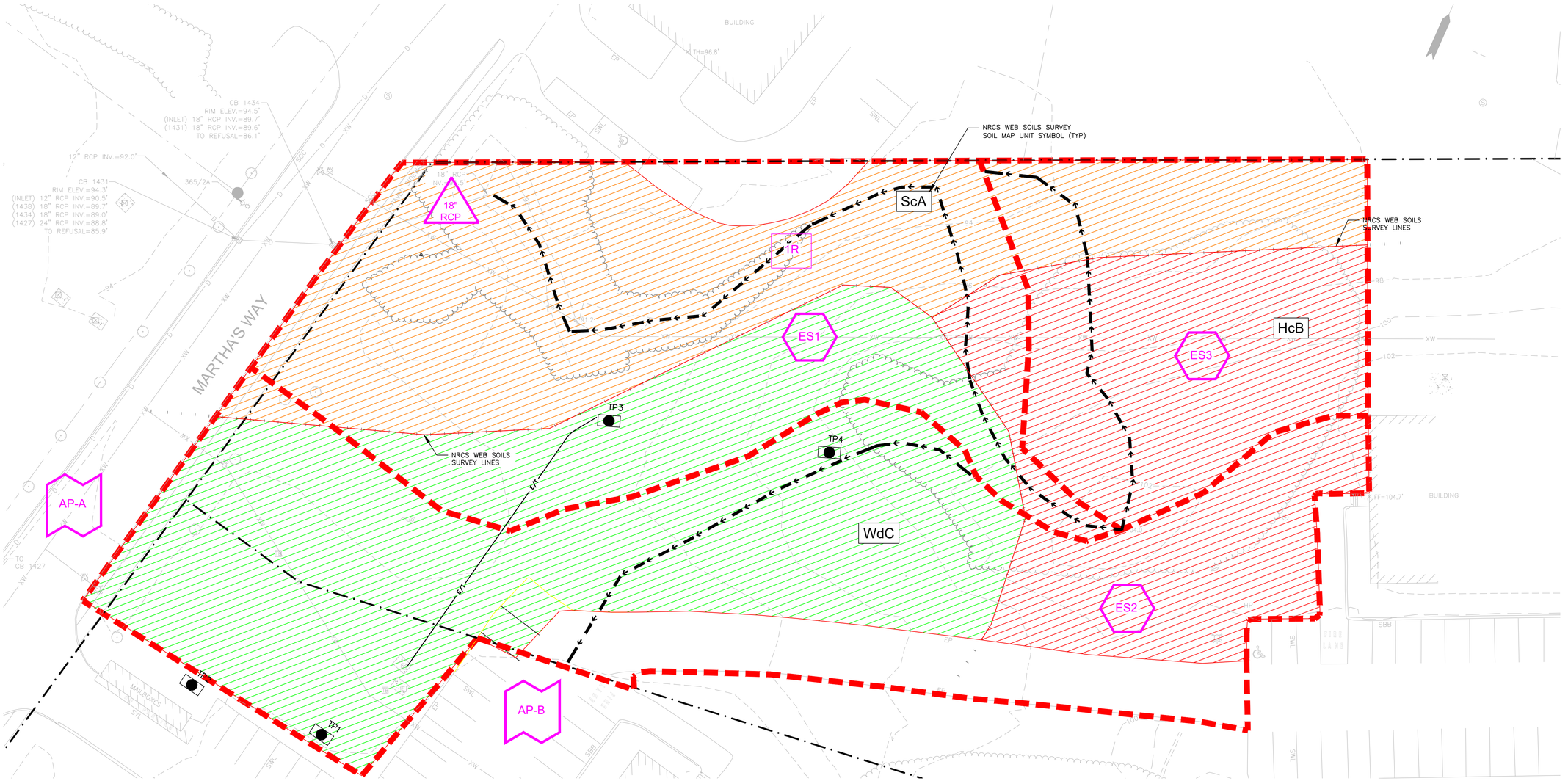
Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	**1yr**	0.75	1.05	1.24	1.74	2.21	2.85	3.06	**1yr**	2.53	2.95	3.40	4.20	4.79	**1yr**
2yr	0.33	0.51	0.62	0.84	1.04	1.25	**2yr**	0.90	1.22	1.48	1.95	2.51	3.27	3.61	**2yr**	2.89	3.47	3.98	4.73	5.42	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.58	**5yr**	1.13	1.55	1.85	2.50	3.20	4.23	4.82	**5yr**	3.74	4.64	5.25	6.20	6.97	**5yr**
10yr	0.46	0.70	0.87	1.21	1.57	1.92	**10yr**	1.35	1.88	2.23	3.04	3.85	5.20	6.02	**10yr**	4.61	5.78	6.60	7.61	8.49	**10yr**
25yr	0.55	0.84	1.05	1.50	1.97	2.47	**25yr**	1.70	2.42	2.87	3.96	4.95	7.02	8.07	**25yr**	6.21	7.76	8.80	10.01	11.07	**25yr**
50yr	0.64	0.97	1.21	1.74	2.34	2.99	**50yr**	2.02	2.92	3.49	4.82	6.00	8.67	10.10	**50yr**	7.67	9.72	10.98	12.31	13.53	**50yr**
100yr	0.74	1.12	1.41	2.03	2.79	3.61	**100yr**	2.41	3.53	4.23	5.90	7.29	10.71	12.65	**100yr**	9.47	12.16	13.67	15.16	16.55	**100yr**
200yr	0.86	1.30	1.64	2.38	3.32	4.37	**200yr**	2.86	4.28	5.14	7.22	8.85	13.27	15.85	**200yr**	11.74	15.24	17.04	18.65	20.28	**200yr**
500yr	1.05	1.57	2.01	2.93	4.16	5.61	**500yr**	3.59	5.49	6.64	9.44	11.45	17.64	21.37	**500yr**	15.61	20.55	22.83	24.58	26.54	**500yr**

Powered by ACIS Northeast Regional Climate Center

Appendix
D Plans

- Pre Development Watershed Plan – (WS-101)
- Post Development Watershed Plan – (WS-201)



PRE-DEVELOPMENT DRAINAGE AREA PLAN NOTES

1. THIS PLAN DEPICTS THE PRE-DEVELOPMENT SITE CONDITIONS OF THE SUBJECT PROPERTY LOCATED AT WHITE CLIFFS APARTMENTS, DOVER, NEW HAMPSHIRE.
2. CONTOUR INFORMATION DEPICTED ON THIS PLAN IS SHOWN PER GROUND SURVEY OF THE SUBJECT PROPERTY PERFORMED BY DOUCET SURVEY LLC.
3. SOIL INFORMATION ILLUSTRATED IS PER NRCS WEB SOILS SURVEY.
4. NO WETLANDS ARE LOCATED ON SITE.

LEGEND

SUBCATCHMENT BOUNDARY	
DRAINAGE AREA/SUBCATCHMENT ID	1S
POND/CATCH BASIN ID	C1
REACH/ANALYSIS POINT ID	AP2
NRCS SOIL SURVEY BOUNDARY	
NRCS SOIL TYPE	CfB
Tc (TIME OF CONCENTRATION)	

SOIL MAPPING LEGEND

NRCS SOIL DATA FROM WEB SOIL SURVEY

SYMBOL	SOIL NAME	HYDROLOGIC SOIL GROUP
HcB	HOLLIS-CHARLTON FINE SANDY LOAMS	D
ScA	SCANTIC SILT LOAM	C
WdA	WINDSOR LOAMY SAND	A

COLOR CODED LEGEND

SOIL GROUP A	
SOIL GROUP B	
SOIL GROUP C	
SOIL GROUP D	
IMPERVIOUS COVER	

No.	DESCRIPTION	DATE	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
GRAPHIC SCALE 20 10 0 20

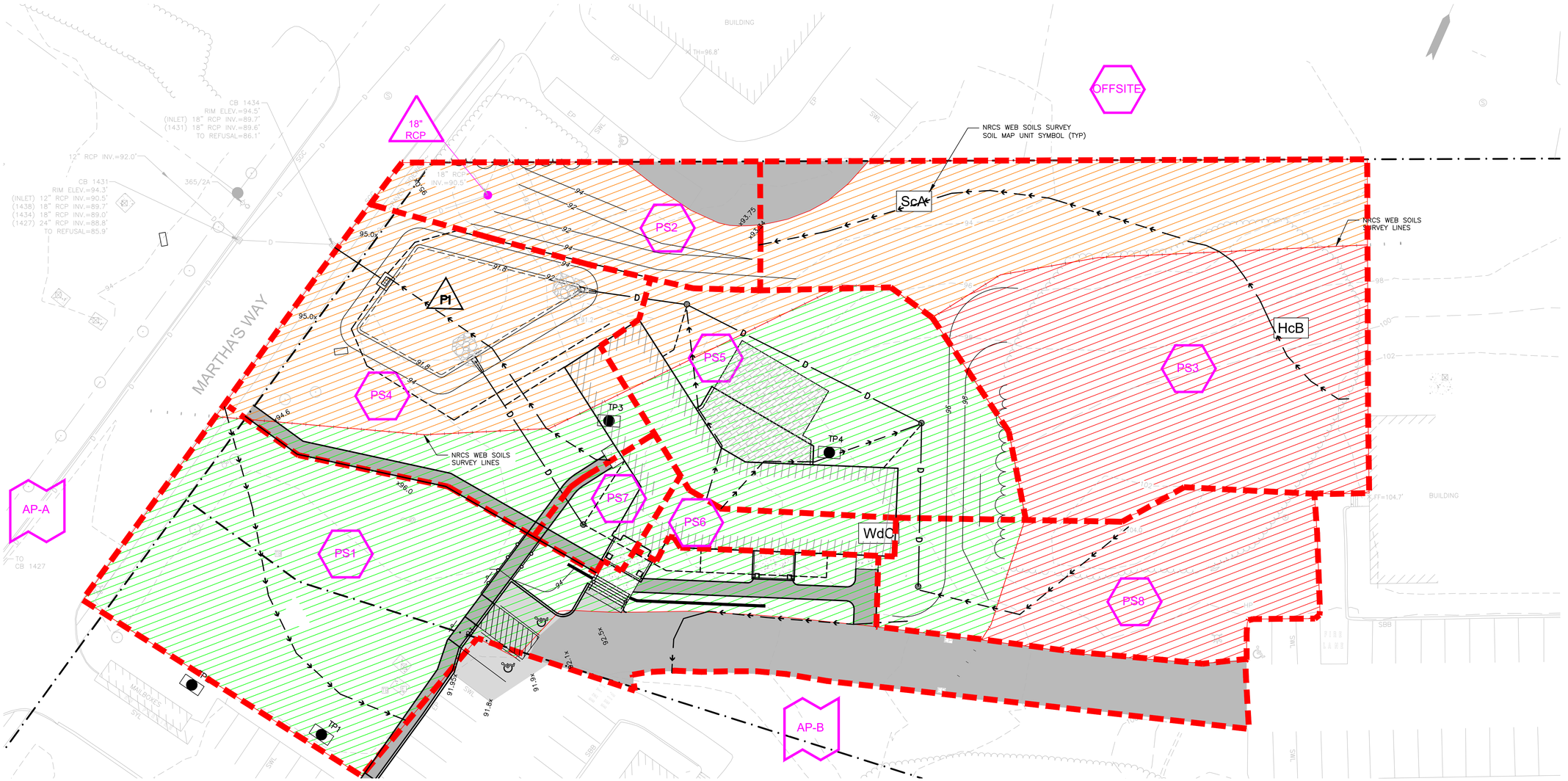
FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
PRE-DEVELOPMENT
WATERSHED PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

WS-101

File: J:\DWG\P20220900\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: WS-101 Plotted: 2023-03-15 4:23 PM Saved: 2023-03-13 12:34 PM User: BPratt
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
MS VIEW: LAYER STATE:



POST-DEVELOPMENT DRAINAGE AREA PLAN NOTES

1. THIS PLAN DEPICTS THE POST-DEVELOPMENT SITE CONDITIONS OF THE SUBJECT PROPERTY LOCATED AT WHITE CLIFFS APARTMENTS, DOVER, NEW HAMPSHIRE.
2. CONTOUR INFORMATION DEPICTED ON THIS PLAN IS SHOWN PER GROUND SURVEY OF THE SUBJECT PROPERTY PERFORMED BY DOUCET SURVEY LLC.
3. SOIL INFORMATION ILLUSTRATED IS PER NRCS WEB SOILS SURVEY.
4. NO WETLANDS ARE LOCATED ON SITE.

LEGEND

SUBCATCHMENT BOUNDARY	
DRAINAGE AREA/SUBCATCHMENT ID	1S
POND/CATCH BASIN ID	C1
REACH/ANALYSIS POINT ID	AP2
NRCS SOIL SURVEY BOUNDARY	
NRCS SOIL TYPE	CfB
Tc (TIME OF CONCENTRATION)	

SOIL MAPPING LEGEND

NRCS SOIL DATA FROM WEB SOIL SURVEY

SYMBOL	SOIL NAME	HYDROLOGIC SOIL GROUP
HcB	HOLLIS-CHARLTON FINE SANDY LOAMS	D
ScA	SCANTIC SILT LOAM	C
WdA	WINDSOR LOAMY SAND	A

COLOR CODED LEGEND

- SOIL GROUP A
- SOIL GROUP B
- SOIL GROUP C
- SOIL GROUP D
- IMPERVIOUS COVER

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
POST-DEVELOPMENT
WATERSHED PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

WS-201

File: J:\DWG\P2022\09000\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: WS-201 Plotted: 2023-03-15 4:23 PM Saved: 2023-03-13 12:34 PM User: BPratt
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
MS VIEW: LAYER STATE:

WHITE CLIFFS AT DOVER

TAX MAP G LOT 2-2

510 MARTHAS WAY · DOVER · NEW HAMPSHIRE

SITE IMPROVEMENTS FOR AMENITY BUILDING

FEBRUARY 24, 2023

PREPARED FOR

BRADY SULLIVAN PROPERTIES
670 N. COMMERCIAL ST,
MANCHESTER, NH 03101

PREPARED BY

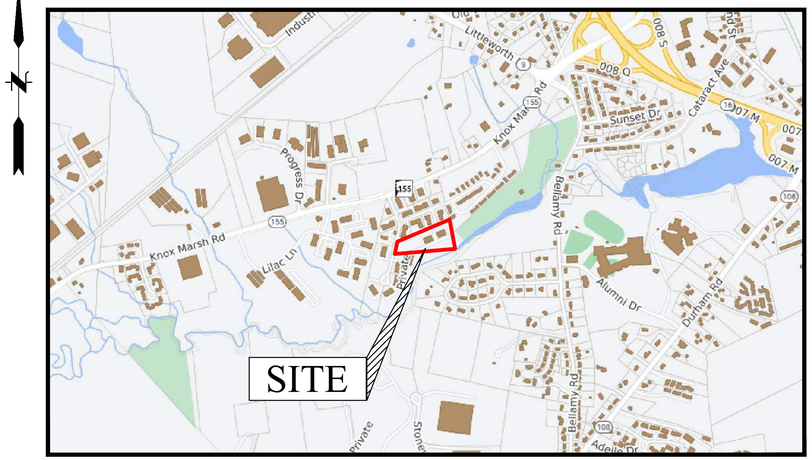
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

PROJECT TEAM

OWNER/ APPLICANT:
BRADY SULLIVAN PROPERTIES
670 N. COMMERCIAL ST
MANCHESTER, NH 03101
603.622.6223

CIVIL ENGINEER & LANDSCAPE ARCHITECT:
FUSS AND O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NH 03101
603.668.8223

SURVEYOR:
DOUCET SURVEY
102 KENT PLACE
NEWMARKET, NH 03857
603.659.6560



LOCATION MAP
SCALE: 1" = 1,000'

SHEET INDEX

SHEET NO.	SHEET NAME	REVISION DATE
GI-001	COVER SHEET	-
GI-101	GENERAL NOTES	-
GI-102	GENERAL NOTES	
1-3 OF 3	ALTA/NSPS LAND TITLE SURVEY PLAN	BY DOUCET SURVEY
1 OF 1	TOPOGRAPHIC PLAN	BY DOUCET SURVEY
EX-101	EXISTING CONDITIONS PLAN	-
CP-101	CIVIL DEMOLITION AND REMOVALS PLAN	-
CS-101	NEIGHBORHOOD SITE PLAN	-
C2-102	CIVIL SITE PLAN	-
CG-101	CIVIL GRADING, DRAINAGE, &	-
CE-101	CIVIL EROSION AND SEDIMENT CONTROL PLAN	-
CU-101	CIVIL UTILITY PLAN	-
CU-102	CIVIL SITE LIGHTING PLAN	-
LP-101	SITE PLANTING PLAN	-
LD-101	LANDSCAPE DETAILS	-
CD-501	CIVIL DETAILS - PAVEMENT, SIDEWALK, SIGNAGE & CURBING	-
CD-502	CIVIL DETAILS - STAIRS, CONCRETE & RETAINING WALLS	-
CD-503	CIVIL DETAILS - SITE LIGHTING	-
CD-504	CIVIL DETAILS - STORMWATER	-
CD-505	CIVIL DETAILS - STORMWATER POND	-
CD-506	CIVIL DETAILS - UTILITIES	-
CD-507	CIVIL DETAILS - EROSION CONTROL	-
CD-508	CIVIL DETAILS - EROSION CONTROL	-
CD-509	SIGNAGE DETAILS	BY FIRST SIGN
BY REFERENCE	ARCHITECTURAL PLANS UNDER SEPARATE COVER	BY BRADY SULLIVAN

SITE PLAN CONDITIONS OF APPROVAL

1. TO BE ADDED AFTER APPROVAL

OWNER'S SIGNATURE _____ DATE _____

DIG SAFE ME NH VT 811 1-888-DIG-SAFE UTILITIES UNDERGROUND PLANT DAMAGE PREVENTION SYSTEM

CONTACT DIG SAFE 72 HOURS PRIOR TO CONSTRUCTION

THE LOCATION OF ANY UTILITY INFORMATION SHOWN ON THIS PLAN IS APPROXIMATE. FUSS & O'NEILL MAKES NO CLAIM TO THE ACCURACY OR COMPLETENESS OF UTILITIES SHOWN. 72 HOURS PRIOR TO ANY EXCAVATION ON SITE, THE CONTRACTOR SHALL CONTACT DIG-SAFE AT 1-888-DIG-SAFE.

REQUIRED APPROVALS

	PERMIT #	DATE APPROVED	EXPIRATION DATE
PLANNING BOARD SITE PLAN	PENDING	PENDING	PENDING

#	DATE	DESCRIPTION	DES. BY	APPROVED

PLANNING FILE # PENDING
TAX MAP H LOT 41-P
BK 5058 PG 2408
STRAFFORD COUNTY

OWNER
BRADY SULLIVAN PROPERTIES
670 N. COMMERCIAL ST
MANCHESTER, NH 03101
603.622.6223

PROJ. No.: 20220900.A10
DATE: 2/24/2023

GI-001

File Path: J:\DWG\P2022\0900\A10\Civil\Plan\20220900.A10_COV01.dwg, Layout: GI-001, Plotted: Friday, March 10, 2023, User: bpratt Plotter: DWG TO PDF.PC3 CTB File: FO.STB

LEGEND

EXIST	PROP	
		PROPERTY LINE/RIGHT-OF-WAY
		CENTERLINE
	LOD	LIMIT OF DISTURBANCE
		EASEMENT
		BUILDING SETBACK
		STATE HIGHWAY BASELINE
10+00	10+00	BASELINE
		ZONING LINE
		EDGE OF WATER
WET		WETLAND LINE
		BUFFER ZONE
		WETLAND SYMBOL
		GRAVEL ROAD
		EDGE OF PAVEMENT
	BC	BITUMINOUS CURB
	CC	CONCRETE CURB
	SGC	SLOPED GRANITE CURB
	VGC	VERT. GRAN. CURB
		LIMIT OF CURB TYPE
		SAW CUT
MATCH LINE	SEE SHEET XXX-XX	MATCH LINE
SWL	SWL	SOLID WHITE LINE
SYL	SYL	SOLID YELLOW LINE
BWL	BWL	BROKEN WHITE LINE
BYL	BYL	BROKEN YELLOW LINE
SWCHL	SWCHL	SOLID WHITE CHANNELIZING LINE
SYCHL	SYCHL	SOLID YELLOW CHANNELIZING LINE
DYL	DYL	DOUBLE YELLOW LINE
STOP	STOP	STOP LINE
		GUARD RAIL
		STOCKADE FENCE
		WIRE FENCE
		CHAIN LINK FENCE
		TREE LINE
		SHRUB LINE
		STONE WALL
		RETAINING WALL
4	4	MINOR CONTOUR
20	20	MAJOR CONTOUR
TS	TS	TOP of SLOPE
BS	BS	BOTTOM of SLOPE
		BUILDING
		BOLLARD
		SIGN
PM	PM	DOUBLE SIGN
PM	PM	PARKING METER
10	10	PARKING COUNT
		CROSSWALK
		CONC. PAVEMENT
		HANDICAP RAMP
		HANDICAP PARKING
VAN	VAN	VAN-ACCESSIBLE HANDICAP PARKING
21.25 TC 21.25 BC	21.25 TC 21.25 BC	TOP & BOTTOM ELEVATION
21.25	21.25	SPOT ELEVATION w/LEADER
x21.25	x21.25	SPOT ELEVATION
		SOIL BORING
		MONITORING WELL
		TEST PIT LOCATION
		IRON PIPE
		DRILL HOLE
	IP	IRON PIN
		MONUMENT
		MAIL BOX
		CONTROL POINT
		SILT FENCE
		HAYBALES

LEGEND (CONT.)

	EXIST	PROP.
STORM DRAINAGE PIPE	D	
ROOF DRAIN		RD
FOUNDATION DRAIN		FD
SANITARY SEWER PIPE	S	
OVERHEAD WIRES	OHE	
WATER MAIN	W	W
UNDERGROUND GAS	G	G
UNDERGROUND TELEPHONE	T	T
UNDERGROUND ELECTRIC	UGE	E
FOUNDATION DRAIN	FD	FD
CABLE LINE	C	C
RIPRAP		
SANITARY MANHOLE	Ⓢ	Ⓢ
STORM MANHOLE	Ⓓ	Ⓓ
ELECTRIC MANHOLE	Ⓔ	Ⓔ
TELEPHONE MANHOLE	Ⓣ	Ⓣ
CATCH BASIN	⊠	▣
FLAT TOP CATCHBASIN	⊠	▣
DOUBLE CATCHBASIN	▥	▥
WATER VALVE	⊛	⊛
FIRE HYDRANT		
UTILITY POLE		
BOLLARD/POST	⊗	⊗
SIGN		
GAS GATE	GG	GG
LIGHTPOLE	☼	✸
FLARED END		
DECIDUOUS TREE		

TEST PIT DATA

TEST PITS LOGGED BY JONATHON HAVEY & BRIAN PRATT OF FUSS & O'NEILL 1/9/2023

TP1

O 0-6	Organic		
A 6-32	FSL	Granular	2.5 Y4/4
B 32-58	FSL	M/F	5Y 5/2

ESHWT 36"
SEEPS 48"
Water 58"
Shaley Ledge 40-58" Sloping Down

TP2

O 0-6	Organic		
A 6-32	FSL	Granular	2.5 Y4/4
B 32-58	FSL	M/F	5Y 5/2

ESHWT 36"
SEEPS 48"
Water 58"
Shaley Ledge 40-58"

TP3

O 0-6	Organic		
A 6-18	FSL	Granular	2.5 Y4/4
B 18-60	FSL	M/F	5Y 5/2

ESHWT 20"
SEEPS 48"
Water 58"
Shaley Ledge 55"

TP4

O 0-8"	Organic		
A 8-50"	FSL	Granular	2.5 Y4/4
B 50"-60"	FSL	M/F	5Y 5/2

ESHWT 55"
SEEPS
Water 60"
Ledge not observed

ABBREVIATIONS

GENERAL

APPROX.	APPROXIMATE
BIT.	BITUMINOUS
BW	BOTTOM OF WALL
CC	CONCRETE CURB
CCB	CAPE CODE BERM
CONC.	CONCRETE
ELEV	ELEVATION
EXIST	EXISTING
GC	GRANITE CURB
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
PCC	PRE CAST CONCRETE CURB
PROP	PROPOSED
REM	REMOVE
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
TOS	TOP OF SLOPE
TW	TOP OF WALL
TYP	TYPICAL
VGC	VERTICAL GRANITE CURB

UTILITY

CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HYD	HYDRANT
INV	INVERT ELEVATION
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UP	UTILITY POLE

GENERAL PLAN NOTES:

1. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SHOWN ON THE DRAWINGS TO SCALE OR TO THEIR ACTUAL DIMENSION OR LOCATION. COORDINATE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
2. DO NOT RELY SOLELY ON ELECTRONIC VERSIONS OF DRAWINGS, SPECIFICATIONS, AND DATA FILES THAT ARE PROVIDED BY THE ENGINEER. FIELD VERIFY LOCATION OF PROJECT FEATURES.
3. SITE WORK SHALL BE CONSTRUCTED FROM A COMPLETE SET OF PLANS, NOT ALL FEATURES ARE DETAILED ON EVERY PLAN. THE ENGINEER IS TO BE NOTIFIED OF ANY CONFLICT WITHIN THIS PLAN SET. ALL PLAN SHEETS WILL BE ON FILE AT THE TOWN OF DOVER.

REFERENCE PLANS:

1. ALTA AND TOPOGRAPHIC SURVEY PLANS BY DOUCET SURVEY, INCLUDED IN THIS PLAN SET
2. BELLAMY RIVER SUBDIVISION, WESTGATE DR, DOVER NH; SCALE 1"=50' REVISED JULY 6, 1984 BY ERIC MITCHELL. ON FILE AT THE CITY OF DOVER PLANNING DEPARTMENT

REGULATORY REQUIREMENTS

1. PROVIDE TRAFFIC SIGNAGE AND PAVEMENT MARKINGS IN CONFORMANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. ALL CONSTRUCTION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST OSHA STANDARDS, STATE AND LOCAL REQUIREMENTS, AND CITY OF DOVER REQUIREMENTS, POLICIES, AND SPECIFICATIONS.
3. CONTRACTOR TO CREATE TRAFFIC CONTROL PLAN FOR REVIEW AND APPROVAL WITH THE APPROPRIATE LOCAL AND/OR STATE AGENCIES PRIOR TO START OF CONSTRUCTION.

EROSION AND SEDIMENT CONTROL

1. INSTALL EROSION CONTROL MEASURES PRIOR TO STARTING ANY WORK ON THE SITE. REFER TO THE EROSION AND SEDIMENT CONTROL DRAWINGS.
2. IMPLEMENT ALL NECESSARY MEASURES REQUIRED TO CONTROL STORMWATER RUNOFF, DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE. PERFORM CORRECTIVE ACTION AS NEEDED FOR EROSION CLEANUP AND REPAIRS TO OFF SITE AREAS, IF ANY, AT NO COST TO OWNER.
3. INSTALL EROSION CONTROL BLANKETS ON ALL SLOPES 3:1 AND STEEPER.
4. INSPECT AND MAINTAIN EROSION CONTROL MEASURES PER THE SCHEDULE IN THE APPROVED SWPPP. DISPOSE OF SEDIMENT IN AN UPLAND AREA. DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
5. PERFORM CONSTRUCTION SEQUENCING IN SUCH A MANNER TO CONTROL EROSION AND TO MINIMIZE THE TIME THAT EARTH MATERIALS ARE EXPOSED BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED.
6. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROL MEASURES. CLEAN SEDIMENT AND DEBRIS FROM TEMPORARY MEASURES AND FROM PERMANENT STORM DRAIN.
7. PRIOR TO CONSTRUCTION, A CONSTRUCTION CIRCULATION PLAN SHALL BE PREPARED BY THE SITE CONTRACTOR WHICH DIRECTS CONSTRUCTION TRAFFIC TO EXIT VIA THE PROPOSED CONSTRUCTION ENTRANCE.

DEMOLITION

1. REMOVE AND DISPOSE OF EXISTING UTILITIES, FOUNDATIONS, PAVEMENT, UNSUITABLE MATERIAL, STUMPS, AND OTHER DEMOLITION DEBRIS AS DESCRIBED IN THE PLANS AND SPECIFICATIONS UNLESS OTHERWISE NOTED.
2. REMOVE AND DISPOSE OF EXISTING DEMOLITION MATERIALS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.
3. NO CHANGES ARE PROPOSED OUTSIDE OF THE VISIBLE CONTENT PRESENTED ON THIS PLAN.
4. ANY BUILDING TO BE REMOVED FROM THE SITE MUST HAVE A DEMOLITION PERMIT.
5. THE LIMITS OF CONSTRUCTION DISTURBANCE THAT ARE LOCATED WITHIN THE 50FT OF CONSERVATION AND WETLAND DISTRICTS SHALL BE STAKED, FLAGGED AND CLEARLY IDENTIFIED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS.

NHDES INVASIVE SPECIES NOTES

1. IF INVASIVE SPECIES ARE ENCOUNTERED ON SITE AND SHOULD BE REMOVED ACCORDING TO NHDES REQUIREMENTS.
2. THE CONTRACTOR SHALL TAKE STEPS TO PREVENT THE SPREAD OF INVASIVE PLANT, INSECT, AND FUNGAL SPECIES BY MEETING THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES. HTTP://GENCOURT.STATE.NH.US/RULES/STATE_AGENCIES/AGR3800.HTML

NPDES NOTES:

1. THIS PROJECT DISTURBS 35,000 ± SF (0.8 ± AC) OF LAND WHICH DOES NOT EXCEED THE NPDES THRESHOLD AMOUNT OF 43,560 SF (1 AC). THEREFORE, THE PROJECT WILL NOT BE REQUIRED TO OBTAIN NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT COVERAGE AS ISSUED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA). SHOULD THE PROJECT BE EXPANDED TO DISTURB MORE THAN 1 ACRE OF LAND, THEN THE OWNER/DEVELOPER AND "OPERATOR" (GENERAL CONTRACTOR) WOULD BE REQUIRED TO PREPARE AND SUBMIT A NOTICE OF INTENT (NOI) TO THE EPA PRIOR TO THE START OF CONSTRUCTION AND SHALL BE RESPONSIBLE FOR THE PREPARATION AND IMPLEMENTATION OF A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) MEETING THE REQUIREMENTS OF THE CURRENT NPDES PERMIT.
2. SHOULD THE PROJECT BE EXPANDED TO DISTURB MORE THAN 1 ACRE, A COPY OF THE NOI AND SWPPP SHALL BE PROVIDED TO THE TOWN PLANNING DEPT., ENGINEERING DEPT., OR DPW.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: VERT.: DATUM: HORZ.: VERT.: 0 GRAPHIC SCALE

FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fussoneill.com

BRADY SULLIVAN PROPERTIES
GENERAL NOTES
WHITE CLIFFS APARTMENTS
MARTHAS WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 2022-0900.A10
DATE: 2/24/2023

GI-101

File Path: J:\DWG\P2022\0900\A10\Civil\Plan\20220900.A10_GEN01.dwg Layout: GI-101 Plotted: Fri, March 10, 2023 - 11:29 AM User: bpratt
MS VIEW: LAYER STATE: Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB

DEMOLITION PLAN NOTES:

1. THE PURPOSE OF THE DEMOLITION PLAN IS TO DEPICT THE REQUIRED DEMOLITION RELATED TO THE CONSTRUCTION OF THE NEW AMENITIES BUILDING FOR WHITE CLIFFS AT DOVER APARTMENTS. DEMOLITION AND UTILITY RELOCATIONS REQUIRED.
2. THE SUBJECT PROPERTY IS LOCATED RM-SU ZONE PER THE CITY OF DOVER, GIS MAP, ZONING LAYER. PROPERTIES TO THE NORTH, SOUTH AND WEST ARE ALSO ZONED SUBURBAN DENSITY MULTI RESIDENTIAL DISTRICT (RM-SU). PROPERTY TO THE EAST IS ZONED R-20 ZONE
3. SUBJECT PARCEL IS NOT LOCATED WITHIN A FEDERALLY DESIGNATED FLOOD HAZARD AREA, COMMUNITY PANEL NUMBER 33017C0320E, DATED SEPTEMBER 30, 2015.
4. 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.
5. 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.
6. SITE CONSTRUCTION HOURS SHALL BE LIMITED TO MONDAY-FRIDAY, 7AM TO 6PM, SATURDAY AND SUNDAY 9AM -4PM. HOURS OF CONSTRUCTION MUST BE DOCUMENTED ON THE SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. SAID SIGNAGE MUST BE LOCATED AND APPROVED BY THE CITY ENGINEER OR PLANNING DIRECTOR.
7. COMMERCIAL VEHICLE ROUTE DURING CONSTRUCTION SHALL CONFORM TO DOVER CITY CODE OR BE COORDINATED WITH THE COMMUNITY SERVICES DIRECTOR.
8. SITE WORK SHALL BE CONSTRUCTED FROM A COMPLETE SET OF PLANS, NOT ALL FEATURES ARE DETAILED ON EVERY PLAN. THE ENGINEER IS TO BE NOTIFIED OF ANY CONFLICT WITHIN THIS PLAN SET. ALL PLAN SHEETS WILL BE ON FILE AT THE CITY OF DOVER PLANNING DEPARTMENT. SEE OTHER PLAN SHEETS FOR RELATED NOTES AND ASSOCIATED INFORMATION.
9. THIS PROPERTY WILL BE SERVICED BY MUNICIPAL WATER AND SEWER AND PRIVATE ELECTRIC, TELEPHONE , CABLE AND GAS SERVICES.
10. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE SITE AND EXISTING CONDITIONS SURROUNDING IT AND THEREON.
11. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE LOCATION OF EXISTING FEATURES BOTH ABOVE GROUND AND BELOW, NO GUARANTEE IS MADE BY THIS OFFICE OR INDIVIDUALS AS TO THE LOCATION OF EXISTING FEATURES. UNDERGROUND UTILITIES ARE APPROXIMATE BASED ON REFERENCE PLANS AND INFORMATION PROVIDED BY THE UTILITY COMPANIES.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION, SIZE AND ELEVATION OF ALL EXISTING UTILITIES SHOWN ON THESE PLANS PRIOR TO THE START OF ANY CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION BE AGREED TO BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT NEW HAMPSHIRE DIG SAFE, AT 1-888-DIG-SAFE, AT LEAST 72 HOURS BEFORE DIGGING.
13. IF ANY ERROR OR OMISSION IN THESE PLANS IS DISCOVERED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD IMMEDIATELY IN WRITING FOR DIRECTION ON HOW TO PROCEED. THE CONTRACTOR SHALL DISCONTINUE WORK IN THE AFFECTED PROJECT AREA UNTIL AGREEMENT HAS BEEN REACHED WITH THIS FIRM ON CORRECTIVE ACTION.
14. SEE DRAWING GI-101 FOR TEST PIT DATA.
15. SOILS ARE FROM THE NRCS WEB SOIL SURVEY.

NRCS SOIL DATA FROM WEB SOIL SURVEY:

SYMBOL	SOIL NAME	HYDROLOGIC SOIL GROUP
HcB	HOLLIS CHARLTON FINE SANDY LOAMS	D
ScA	SCANTIC SILT LOAM	C
WdB	WINDSOR LOAMY SAND	A

SITE PLAN NOTES:

1. THE PURPOSE OF THE SITE PLAN IS TO ILLUSTRATE THE PROPOSED SITE IMPROVEMENTS ASSOCIATED WITH THE CONSTRUCTION OF A NEW AMENITY BUILDING FOR THE WHITE CLIFFS AT DOVER APARTMENTS. THE AMENITY BUILDING IS A USE ACCESSORY TO THE RESIDENTIAL UNITS.
2. THE SUBJECT PROPERTY IS ZONED SUBURBAN DENSITY MULTI RESIDENTIAL DISTRICT (RM-SU)
3. REQUIREMENTS FOR THE RM-SU ZONING DISTRICT ARE AS FOLLOWS:

	REQUIRED	EXISTING	PROPOSED
MIN. LOT SIZE*	20,000 SF	4.65 AC	NO CHANGE
LOT FRONTAGE	100'	774.68'	NO CHANGE
MIN. FRONT SETBACK	50'	348'± (EXISTING BLDG)	81.9' (NEW BLDG)
MIN. SIDE SETBACK	20'	115'± (EXISTING BLDG)	36.2'± (NEW BLDG)
MIN. REAR SETBACK	20'	80.2' (EXISTING BLDG)	547'± (NEW BLDG)
MAX. LOT COVERAGE	40%	6.5% (13,250 S.F.)	8.8% (17,900 SF)
MAX. HEIGHT	40'	36' (EXISTING BLDG)	20.3' (NEW BLDG)

4. PARKING CALCULATIONS:

AMENITY BUILDING WILL BE USED BY EXISTING RESIDENTS OF THE APARTMENT COMPLEX. NO ADDITIONAL PARKING GENERATION EXPECTED. EXISTING PARKING LOT HAS CAPACITY FOR RESIDENTS THAT PARK AT BUILDING 4 PARKING LOT. 2 ADDITIONAL ADA SPACES PROVIDED AT MAIN ENTRY TO NEW AMENITY BUILDING. LOT IS NEAR PROPERTY LINE. PARKING IS SHARED BETWEEN MULTIPLE PARCELS. TOTAL OF 156 SPACES WITHIN 500 FEET OF AMENITY BUILDING ON SUBJECT AND ABUTTING PARCEL SHARED WITH MULTIPLE BUILDINGS AND WITH AMENITY BUILDING. PER THE TABLE OF PARKING REQUIREMENTS *"Where commercial and residential uses are co-located, only the residential parking shall be provided"*

EXISTING PARKING
TAX MAP 41-Q
71+/- SPACES EXIST
48 UNITS X 1.4 SPACES PER UNIT = 67.2 SPACES REQUIRED
0.5 VISITOR SPACES X 48 = 24
TOTAL PARKING REQUIRED PER CURRENT ORDINANCE = 115.2

TAX MAP 41-P
79+/- SPACES EXIST
48 UNITS X 1.4 SPACES PER UNIT = 67.2 SPACES REQUIRED
0.5 VISITOR SPACES X 48 = 24
TOTAL PARKING REQUIRED PER CURRENT ORDINANCE = 115.2

5. ALL PLAN SHEETS WILL BE ON FILE AT THE CITY OF DOVER PLANNING DEPARTMENT.
6. SITE WORK SHALL BE CONSTRUCTED FROM A COMPLETE SET OF PLANS, NOT ALL FEATURES ARE DETAILED ON EVERY PLAN. THE ENGINEER IS TO BE NOTIFIED OF ANY CONFLICT WITHIN THIS PLAN SET.
7. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT DEFICIENCIES EXIST IN THE APPROVED DRAWINGS, THE OWNER SHALL BE REQUIRED TO CORRECT THE DEFICIENCIES TO MEET THE REQUIREMENTS OF THE REGULATIONS AT NO EXPENSE TO THE CITY.
8. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE SITE AND EXISTING CONDITIONS SURROUNDING IT AND THEREON. THE CONTRACTOR SHALL ADVISE THE APPROPRIATE AUTHORITY OF HIS INTENTIONS AT LEAST 48 HOURS IN ADVANCE.
9. THE CONTRACTOR SHALL BID AND PERFORM THE WORK IN ACCORDANCE WILL ALL LOCAL, STATE AND NATIONAL CODES, SPECIFICATIONS, REGULATIONS, AND STANDARDS.
10. THE CONTRACTOR IS RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION AND FOR CONDITIONS AT THE SITE. THESE PLANS, PREPARED BY FUSS & O'NEILL, INC. DO NOT EXTEND TO OR INCLUDE SYSTEM PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR THEIR EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE SURVEYOR OR ENGINEER HERE ON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEM THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THESE PLANS. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEM WHICH MAY BE REQUIRED BY THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND/OR LOCAL REGULATIONS.
11. WRITTEN DIMENSIONS HAVE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS, IN CASE OF CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWING AND/OR SPECIFICATION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY FOR CLARIFICATIONS.
12. THE CONTRACTOR SHALL MAINTAIN EMERGENCY ACCESS TO ALL AREAS AFFECTED BY THEIR WORK AT ALL TIMES.
13. IF ANY ERROR OR OMISSION IN THESE PLANS IS DISCOVERED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD IMMEDIATELY IN WRITING FOR DIRECTION ON HOW TO PROCEED. THE CONTRACTOR SHALL DISCONTINUE WORK IN THE AFFECTED PROJECT AREA UNTIL AGREEMENT HAS BEEN REACHED WITH THIS FIRM ON CORRECTIVE ACTION.
14. 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 SPECIFICATIONS FOR CONSTRUCTION. THE MORE STRINGENT SPECIFICATIONS SHALL APPLY.
15. SNOW SHALL BE STORED IN OPEN AREAS ON SITES. SNOW SHALL NOT BLOCK SIGHT DISTANCES AND SHALL BE TRANSPORTED OFFSITE OR INTO OPEN AREAS IF NEEDED. OFFSITE TRANSPORT OF SNOW SHALL BE DONE SO IN ACCORDANCE WITH NHDES REGULATIONS.
16. THE SITE LAYOUT IS DESIGNED IN COMPLIANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. THE PROPOSED STRUCTURE WILL ALSO BE DESIGNED IN ACCORDANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS (I.E. IBC, ANSI-117.1) AND NH RSA 155-A:5.
17. SITE CONSTRUCTION SHALL NOT OCCUR ON SUNDAY.
18. BUILDING ADDRESSES (INCLUDING APT/UNIT NUMBERS IF APPLICABLE) SHALL BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT.
19. AS-BUILT PLANS OF THE SITE PLAN SHALL BE SUBMITTED ON PAPER AND IN DIGITAL FORMAT AUTOCAD DWG, AUTOCAD DXF OR ESRI FORMAT TO THE CITY OF DOVER ENGINEER'S OFFICE UPON COMPLETION OF PROJECT. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E. DIGITAL FILES SHALL BE GEO-REFERENCED TO NEW HAMPSHIRE STATE PLANE COORDINATES NAD83 AND SHALL BE EXPRESSED IN FEET.
20. IF APPLICABLE, SALT AND OTHER DEICING MATERIALS SHALL BE STORED UNDER COVER OR LOCATED SUCH THAT NO DIRECT DISCHARGES TO RECEIVING WATERS ARE POSSIBLE. SNOW STORAGE AREAS SHALL BE LOCATED SUCH THAT NO DIRECT DISCHARGES TO RECEIVING WATERS ARE POSSIBLE. SEE THE NHDES GUIDANCE FACT SHEET ON ROAD SALT AND SNOW DISPOSAL." AND THAT "SNOW STORAGE MAY BE PERMITTED ON ANY GRASSED OR NONLIVING LANDSCAPE AREA.

NEIGHBORHOOD SITE PLAN NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW AN AERIAL VIEW OF HOW THE PROJECT RELATES TO ABUTTING PROPERTIES AND USE.

GRADING AND DRAINAGE PLAN PLAN NOTES:

1. THE PURPOSE OF THE GRADING AND DRAINAGE PLAN IS TO ILLUSTRATE THE PROPOSED GRADING, DRAINAGE AND STORMWATER MANAGEMENT, ASSOCIATED WITH THE PROPOSED SITE IMPROVEMENTS FOR THE SUBJECT PARCEL.
2. SITE WORK SHALL BE CONSTRUCTED FROM A COMPLETE SET OF PLANS, NOT ALL FEATURES ARE DETAILED ON EVERY PLAN. THE ENGINEER IS TO BE NOTIFIED OF ANY CONFLICT WITHIN THIS PLAN SET. ALL PLAN SHEETS WILL BE ON FILE AT THE CITY OF DOVER.
3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE SITE AND EXISTING CONDITIONS SURROUNDING IT AND THEREON. THE CONTRACTOR SHALL ADVISE THE APPROPRIATE AUTHORITY OF HIS INTENTIONS AT LEAST 48 HOURS IN ADVANCE.
4. THE CONTRACTOR SHALL VERIFY TEMPORARY BENCH MARKS (TBM) IDENTIFIED ON REFERENCE PLANS PRIOR TO CONSTRUCTION AND NOTIFY THE CERTIFIED LAND SURVEYOR OF ANY DISCREPANCIES.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE LOCATION OF EXISTING FEATURES BOTH ABOVE GROUND AND BELOW, NO GUARANTEE IS MADE BY THIS OFFICE OR INDIVIDUALS OF LOCATION OF EXISTING FEATURES. UNDERGROUND UTILITIES ARE APPROXIMATE BASED ON REFERENCES LOCATED ON THE COVER SHEET.
6. ALL DRAINAGE STRUCTURES IN PAVEMENT SHALL HAVE RIMS SET TO FINISH GRADE REGARDLESS OF ANY ELEVATIONS OTHERWISE SHOWN, AS APPLICABLE.
7. DRAINAGE PIPE LENGTHS NOTED ARE MEASURED FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE UNLESS OTHERWISE NOTED.
8. THE CONTRACTOR SHALL STABILIZE ALL DITCHES, SWALES, AND PONDS PRIOR TO DIRECTING STORM WATER RUN-OFF TO THEM.
9. ALL EXCAVATIONS SHALL BE THOROUGHLY SECURED ON A DAILY BASIS BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION OPERATIONS IN THE IMMEDIATE AREA.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN IN THE PLANS THROUGHOUT THE DURATION OF THE PROJECT IN ACCORDANCE WITH APPLICABLE NHDES STANDARDS. THE LOCATIONS SHOWN ON THE PLANS AND DETAILS ARE PROVIDED AS A GUIDE ONLY. THE CONTRACTOR SHALL PROVIDE ADDITIONAL SEDIMENT AND EROSION CONTROLS AND MAINTAIN THEM IN A FUNCTIONING ORDER, AS REQUIRED BY THE ACTUAL SITE CONDITIONS.
11. IF, DURING CONSTRUCTION, IT BECOMES APPARENT THAT ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED TO STOP ANY EROSION ON THE CONSTRUCTION SITE, THE PROPERTY OWNER SHALL BE REQUIRED TO INSTALL THE NECESSARY EROSION PROTECTION AT NO EXPENSE TO THE CITY OF DOVER.
12. ALL PROPOSED AND EXISTING CATCH BASINS, OUTLET CONTROL STRUCTURES OR INLET PIPES, THAT MAY RECEIVE STORMWATER RUNOFF FROM THE DEVELOPMENT DURING CONSTRUCTION, SHOULD BE OUTFITTED WITH INLET PROTECTION.
13. INSTALL UNDERDRAIN IN ALL CUT SECTIONS. DAYLIGHT TO STORMWATER BASIN, SWALE, OR CONNECT TO CATCH BASIN, AS REQUIRED.
14. FLUSH CLEAN AND REMOVE ALL DEBRIS OF EXISTING AND PROPOSED CULVERTS DURING AND POST CONSTRUCTION.
15. INSPECT EXISTING CONDITION OF ALL PIPES/CULVERTS/HEADWALLS DURING CONSTRUCTION, REPLACE AS NECESSARY.
16. IF LEDGE IS DISCOVERED DURING EXCAVATION, REMOVE LEDGE A MINIMUM OF TWO (2) FEET BELOW GRAVELS AND REPLACE WITH SAND.
17. REMOVE ALL UNSUITABLE MATERIALS ENCOUNTERED DURING EXCAVATIONS AND REPLACE WITH SUITABLE FILL. CONTRACTOR TO COORDINATE ADDITIONAL TEST BORINGS, TEST PITS, AND COORDINATE WITH A GEOTECHNICAL ENGINEER, IF NECESSARY.
18. ALL RETAINING WALLS OVER FOUR FEET IN HEIGHT REQUIRES ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
19. ANY FENCE TALLER THAN SEVEN FEET REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
20. INSTALL EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1, IF APPLICABLE. ALL EROSION CONTROL BLANKETS SHALL BE WILDLIFE FRIENDLY WITH NO PLASTIC OR WELDS.
21. LOAM AND SEED ALL DISTURBED AREAS NOT OTHERWISE COVERED BY LANDSCAPE MATERIAL, MULCH, RIPRAP, BUILDING OR PAVEMENT, PER DETAIL LOCATED WITHIN THIS PLAN SET.
22. SEE OTHER PLAN SHEETS FOR RELATED NOTES AND ASSOCIATED INFORMATION.
23. FIRE DEPARTMENT ACCESS SHALL BE INSTALLED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF FIRE APPARATUS IN ALL WEATHER CONDITIONS AT ALL TIMES. ALL FIRE LANES ARE NON-DEMARCATED.
24. 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.

UTILITY PLAN NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW THE UTILITY SERVICE CONNECTIONS PROPOSED FOR THE DEVELOPMENT.
2. UTILITY LOCATIONS AS SHOWN ON THESE PLANS HAVE BEEN OBTAINED FROM VARIOUS SOURCES AND THEIR LOCATIONS ARE ONLY APPROXIMATE. BEFORE ANY CONSTRUCTION ACTIVITY BEGINS, THE CONTRACTOR SHALL CONTACT DIG-SAFE AT 1-888-DIG-SAFE AND FIELD VERIFY ALL UTILITY LOCATIONS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING AND DETERMINING THE LOCATION, SIZE AND ELEVATION OF ALL EXISTING UTILITIES SHOWN ON THESE PLANS PRIOR TO THE START OF ANY CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IN WRITING IF ANY UTILITIES FOUND INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTION SHALL BE AGREED TO BY THE ENGINEER BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT NEW HAMPSHIRE DIG SAFE, AT 1-888-DIG-SAFE, AT LEAST 72 HOURS BEFORE DIGGING.
4. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES OWNING UTILITIES, EITHER OVERHEAD OR UNDERGROUND, WITHIN THE CONSTRUCTION AREA. THE PROTECTION OR RELOCATION OF UTILITIES IS ULTIMATELY THE RESPONSIBILITY OF THE CONTRACTOR.
5. THE CONTRACTOR SHALL COORDINATE MATERIALS AND INSTALLATION SPECIFICATIONS WITH THE INDIVIDUAL UTILITY AGENCIES/COMPANIES, AND ARRANGE FOR ALL INSPECTIONS.
6. THE INSTALLATION OF ELECTRIC POWER, CABLE TELEVISION AND TELEPHONE LINES SHALL BE UNDERGROUND THROUGHOUT THE SITE FOR WHICH DEVELOPMENT IS PROPOSED.
7. COORDINATE WITH EVERSOURCE, UNITIL, CONSOLIDATED AND COMCAST FOR FINAL ELECTRICAL , GAS, TELEPHONE AND CABLE LAYOUTS AND INSTALLATION REQUIREMENTS.MEET CITY OF DOVER WATER DEPARTMENT REGULATIONS FOR ALL WATER CONNECTIONS, INSTALLATIONS AND MATERIALS.
8. PRIOR TO THE DATE OF APPROVAL OF THESE DESIGN PLANS; FINAL MECHANICAL, ELECTRICAL,PLUMBING (MEP), AND ARCHITECTURAL PLANS WERE NOT PROVIDED TO THE DESIGN ENGINEER. PRIOR TO CONSTRUCTION THE MEP CONTRACTORS AND ARCHITECTS ARE REQUIRED TO REVIEW, APPROVE, AND/OR AMEND ALL MEP AND ARCHITECTURAL DESIGN WITHIN THE BUILDINGS OR UPON THE SITE. INCLUDING BUT NOT LIMITED TO SIZES, MATERIALS, ELEVATIONS, AND OVERALL DESIGN. COORDINATE WITH THE MUNICIPALITY AND DESIGN ENGINEER FOR ALL PLAN REVISIONS.
9. APPROVED BACKFLOW PREVENTERS SHALL BE PROVIDED FOR DOMESTIC WATER LINES.
10. THE SECURITY SYSTEM SHALL BE INSTALLED AS REQUIRED BY CHAPTER 45, ARTICLE I, SECTION 45-2 OF THE CODE OF THE CITY OF DOVER.
11. COORDINATE WITH THE FIRE DEPARTMENT IF AN ANNUNCIATOR IS REQUIRED. COORDINATE WITH ARCHITECT AND MEP/PLUMBER FOR INTERNAL CONFIGURATION OF SERVICES AND METER LOCATIONS (TYP)
12. THE SUBJECT PARCEL WILL BE SERVICED BY MUNICIPAL WATER AND SEWER.
13. UTILITIES SHALL BE SUFFICIENTLY REMOTE FROM ONE ANOTHER (I.E. GAS AND ELECTRICITY)

LIGHTING PLAN NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW THE LIGHTING DESIGN FOR THE PROPOSED BUILDING, PARKING AND ACCESS AISLES.
2. REFER TO DETAIL DRAWING CD-503 FOR POLE BASE DETAIL & LIGHTING SPECIFICATIONS.
3. ALL PROPOSED LIGHTS ARE FULL CUT-OFF FIXTURES AND DARK SKY COMPLIANT, MEETING CHAPTER 153-14E. ALL LIGHTING IS DIRECTED ON SITE ONLY.ALL SITE LIGHTING IS TO COMPLY WITH ALL PROVISIONS OUTLINED WITHIN THE TOWN OF DOVER REGULATIONS.
4. LIGHTING DESIGN PROVIDED BY KEN SWEENEY OF EXPOSURE LIGHTING. SEE LIGHTING PLAN FOR CONTACT INFO
5. LIGHTING CONDUIT DESIGNED BY OTHERS.
6. THE PROFESSIONAL ENGINEER ENDORSEMENT BY F&O ON THIS SHEET DOES NOT INCLUDE DESIGN ENDORSEMENT OF THIS DETAILED INFORMATION. CONTACT EXPOSURE LIGHTING FOR ADDITIONAL INFORMATION.

EROSION AND SEDIMENT CONTROL PLAN NOTES:

1. THE PURPOSE OF THIS PLAN IS TO SHOW EROSION AND SEDIMENT CONTROL PRACTICES FOR THE PROPOSED DEVELOPMENT.
2. SEE EROSION AND SEDIMENT CONTROL NOTES ON GENERAL NOTES PLAN SHEET GI-001.
3. SEE EROSION AND SEDIMENT CONTROL DETAILS DETAIL PLAN SHEETS CD-507 AND CD-508.

STORMWATER MAINTENANCE NOTES:

INFILTRATION AREAS

1. THE BOTTOM, INTERIOR AND EXTERIOR SIDE SLOPES AND CREST OF EARTHEN DETENTION PONDS SHALL BE MOWED, AND THE VEGETATION MAINTAINED IN HEALTHY CONDITION, AS APPROPRIATE TO THE FUNCTION OF THE FACILITY AND TYPE OF VEGETATION.
2. VEGETATED EMBANKMENTS THAT SERVE AS "BERMS" THAT IMPOUND WATER SHALL BE MOWED AT LEAST ONCE ANNUALLY TO PREVENT THE ESTABLISHMENT OF WOODY VEGETATION.
3. EMBANKMENTS SHALL BE INSPECTED AT LEAST ANNUALLY 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.
4. INLET AND OUTLET PIPES, INLET AND OUTLET STRUCTURES, ENERGY DISSIPATION STRUCTURES OR PRACTICES AND OTHER STRUCTURAL APPURTENANCES SHOULD BE INSPECTED AT LEAST ANNUALLY BY A QUALIFIED PROFESSIONAL AND CORRECTIVE ACTION IMPLEMENTED AS INDICATED BY SUCH INSPECTION.
5. TRASH AND DEBRIS SHALL BE REMOVED FROM THE POND AND ANY INLET OR OUTLET STRUCTURES WHENEVER OBSERVED BY INSPECTION.
6. ACCUMULATED SEDIMENT SHOULD BE REMOVED WHEN IT SIGNIFICANTLY AFFECTS SEDIMENT FOREBAY AND/OR POND CAPACITY.

PIPES, INFILTRATION PIPES, YARD DRAINS, AND OUTLET STRUCTURES

- AT A MINIMUM, IT IS RECOMMENDED THAT STRUCTURES BE INSPECTED AT LEAST TWICE ANNUALLY, ONCE FOLLOWING SNOW-MELT AND ONCE FOLLOWING LEAF-DROP, AND CLEANED AS INDICATED BY INSPECTION.
- SEDIMENT SHOULD BE REMOVED WHEN IT APPROACHES HALF THE SUMP DEPTH.
- IF FLOATING HYDROCARBONS ARE OBSERVED DURING AN INSPECTION, THE MATERIAL SHOULD BE REMOVED IMMEDIATELY BY SKIMMING, ABSORBENT MATERIALS, OR OTHER METHOD AND DISPOSED IN CONFORMANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.
- REMOVE ALL DEBRIS FROM PIPE INLETS AND OUTLETS.
- MAINTAIN, REPAIR OR REPLACE INLET CONTROLS

PAVEMENT

1. AT A MINIMUM, CONSTRUCT ACCESSIBLE ROUTES AND PARKING SPACES IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: VERT.: DATUM: HORZ.: VERT.: 0 GRAPHIC SCALE

FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
GENERAL NOTES
WHITE CLIFFS APARTMENTS
MARTHAS WAY
TAX MAP H LOT 41-P
NEW HAMPSHIRE
DOVER

PROJ. No.: 2022-0900.A10
DATE: 2/24/2023

GI-102

File Path: J:\DWG\P2022\0900\A10\Civil\Plan\20220900.A10_GEN01.dwg Layout: GI-102 Plotted: Thu, March 16, 2023 - 12:29 PM User: bpratt
MS VIEW: LAYER STATE: Plotter: DWG TO PDF.PC3 CTB File: FO.STB

NOTES:

1. REFERENCE: TAX MAP H, LOTS 41–P, 41–Q, 41–R, 41–S & 41–T
WHITE CLIFFS AT DOVER
510 MARTHA'S WAY
DOVER, NH
D.S.I. PROJECT NO. 7524

2. TOTAL PARCEL AREAS: AS SHOWN (WHERE APPLICABLE, PARCEL AREAS ARE CALCULATED TO THE EDGE OF THE BELLAMY RIVER AS LOCATED IN DECEMBER 2021)

3. OWNER OF RECORD: M.S.M. BROTHERS, INC.
510 MARTHA'S WAY
DOVER, NH 03820
S.C.R.D. BOOK 1602 PAGE 365

4. FIELD SURVEY PERFORMED BY G.A.N. & T.M.H. (DOUCET SURVEY) DURING DECEMBER 2021 & JANUARY 2022 USING A TRIMBLE S7 TOTAL STATION AND A TRIMBLE R12 SURVEY GRADE GPS WITH A TRIMBLE TSC3 DATA COLLECTOR AND A SOKKIA B21 AUTO LEVEL. SITE CHECK PERFORMED ON 6/30/2022. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.

5. UAV (DRONE) FIELD SURVEY PERFORMED BY L.P.S. (DOUCET SURVEY) ON 11/30/2021 USING A DJI PHANTOM 4 RTK.
HORIZONTAL
THIS DATA SET WAS TESTED TO MEET ASPRS POSITIONAL ACCURACY STANDARDS FOR DIGITAL GEOSPATIAL DATA (2014) FOR A 2.5 cm RMSEx / RMSEy HORIZONTAL ACCURACY CLASS. ACTUAL POSITIONAL ACCURACY WAS FOUND TO BE RMSEx = 1.3 cm AND RMSEy = 1.9 cm WHICH EQUATES TO POSITIONAL HORIZONTAL ACCURACY = ± 3.9 cm AT 95% CONFIDENCE LEVEL.
VERTICAL
THIS DATA SET WAS TESTED TO MEET ASPRS POSITIONAL ACCURACY STANDARDS FOR DIGITAL GEOSPATIAL DATA (2014) FOR A 5 cm RMSEz VERTICAL ACCURACY CLASS. ACTUAL NVA ACCURACY WAS FOUND TO BE RMSEz = 4.5 cm, EQUATING TO ± 8.8 cm AT 95% CONFIDENCE LEVEL.

6. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2001) AND VERTICAL DATUM BASED ON NAVD88, BOTH DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.

7. THE PROPERTIES ARE LOCATED WITHIN AN AREA HAVING A ZONE DESIGNATION OF "X" & "AE" PER FIRM MAP #33017C0320E, DATED 9/30/15.

8. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 2' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.

9. ALL UNDERGROUND UTILITIES (ELECTRIC, GAS, TEL. WATER, SEWER DRAIN SERVICES) ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG–SAFE AT 1–888–DIG–SAFE.

10. THE INTENT OF THIS PLAN IS TO SHOW THE LOCATION OF BOUNDARIES IN ACCORDANCE WITH AND IN RELATION TO THE CURRENT LEGAL DESCRIPTION, AND IS NOT AN ATTEMPT TO DEFINE UNWRITTEN RIGHTS, DETERMINE THE EXTENT OF OWNERSHIP, OR DEFINE THE LIMITS OF TITLE.

11. WATER BOUNDARIES ARE DYNAMIC IN NATURE AND ARE SUBJECT TO CHANGE DUE TO NATURAL CAUSES SUCH AS EROSION OR ACCRETION.

12. INTENTIONALLY DELETED.

13. THIS SURVEY WAS PERFORMED IN WINTER CONDITIONS WITH SNOW COVER ON THE GROUND. A SITE CHECK IS RECOMMENDED IN THE SPRING IN ORDER TO ENSURE THE COMPLETENESS/ACCURACY OF THE INFORMATION SHOWN HEREON.

14. ACCORDING TO A "RESOLUTION" ACQUIRED FROM THE CITY OF DOVER PLANNING DEPARTMENT, MARTHA'S WAY IS AN ACCEPTED CITY STREET.

15. INTERIOR TRAILS ARE NOT SHOWN ON THIS PLAN.

16. CONTOURS GENERATED USING DATA COMPILED FROM UAV (DRONE) SURVEY (SEE NOTE 5). CONTOURS ARE ONLY SHOWN FOR THOSE AREAS UNOBSCURED BY VEGETATION.

17. NO EVIDENCE OF RECENT EARTH MOVING WORK WAS OBSERVED IN THE PROCESS OF CONDUCTING FIELD WORK. SOME EVIDENCE OF INTERIOR BUILDING RENOVATIONS WAS OBSERVED IN THE VICINITY OF BUILDINGS 1.

18. ACCORDING TO THE DOVER CITY CLERK AND CITY PLANNER, THERE ARE NO PROPOSED CHANGES IN STREET RIGHT OF WAY LINES FOR MARTHA'S WAY.

19. NO WETLAND FLAGS WERE OBSERVED IN THE PROCESS OF CONDUCTING THE FIELD WORK.

20. 310 PARKING SPACES WERE OBSERVED, PLUS 5 HANDICAP SPACES. IN SOME AREAS, PAINTED PARKING LINES WERE FAINT AND DIFFICULT TO DISCERN.

21. THE PROPERTY HAS DIRECT PHYSICAL ACCESS TO MARTHA'S WAY, A PUBLIC STREET (SEE NOTE 14 ABOVE).

REFERENCE PLANS:

1. "BELLAMY RIVER SUBDIVISION" DATED NOVEMBER, 1982 BY ERIC. C. MITCHELL, S.C.R.D. PLAN 24–69.
2. "LOT LAYOUT–PHASE 1, WESTGATE" DATED JANUARY 1970 BY MCKENNA ASSOCIATES, S.C.R.D. POCKET 12 FOLDER 1 PLAN 12.
3. "CORRECTED PLAN FOR WESTGATE VILLAGE: DATED FEBRUARY 1986 BY RICHARD P. MILLETE AND ASSOCIATES, S.C.R.D. PLAN 30A–40.
4. "REVISION V TO THE CONDOMINIUM SITE PLAN, TAX MAP H LOT 35–D, THE MEADOWS, INC." DATED NOVEMBER 15, 2013 BUT MSC, S.C.R.D. PLAN 106–68.
5. "DIVISION–PART OF FARM, SUMNER DAVIS" DATED DECEMBER 1976 BY G.L. DAVIS & ASSOCIATES, S.C.R.D. PLAN 17A–136.
6. "PLAN OF LAND, DOVER, NEW HAMPSHIRE FOR BENJAMIN L. ORCUTT" DATED OCTOBER 1965 BY JOHN W. DURGIN, S.C.R.D. POCKET 7 FOLDER 3 PLAN 21.
7. "VILLAGE AT BELLAMY COMMON SUBDIVISION PLAN" DATED SEPTEMBER 2004 BY CLD CONSULTING ENGINEERS, S.C.R.D. PLAN 77–26.

CURVE TABLE					
CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	18.20'	25.00'	41°42'41"	N56°43'53"W	17.80'
C2	60.67'	75.00'	46°20'54"	S59°02'59"E	59.03'
C3	81.13'	100.00'	46°28'55"	S02°39'33"W	78.92'
C4	154.93'	75.00'	118°21'28"	N38°35'49"E	128.82'
C5	116.24'	125.00'	53°16'56"	N38°40'30"E	112.10'
C6	50.02'	75.00'	38°12'46"	S46°12'35"W	49.10'
C7	32.86'	25.00'	75°18'34"	N64°45'30"E	30.55'
C8	42.35'	175.00'	13°51'58"	N18°58'01"E	42.25'

NOTES:

SCHEDULE B, PART II
EXCEPTIONS

1–6. [NOT SURVEY RELATED]

7. MATTERS SHOWN ON PLAN 24–69. ['RIGHT TO CONSTRUCT & MAINTAIN A PEDESTRIAN TRAIL FOR PUBLIC USE', 'CONSERVATION DISTRICT', '20' DRAINAGE & PEDESTRIAN EASEMENT' & 'DR EASE' SHOWN AFFECT THE PREMISES AND ARE DEPICTED HEREON. SEE REFERENCED PLAN FOR ALL OTHER SPECIFIC INFORMATION]

8. MATTERS SHOWNON PLAN #12, POCKET#12, FOLDER #1. [50' ROW FOR FUTURE STREET CONNECTION AFFECT THE SUBJECT PREMISES AND IS DEPICTED HEREON. SEE REFERENCED PLAN FOR ALL OTHER SPECIFIC INFORMATION]

9. MATTERS SHOWN ON PLAN 30A–40. [SEE REFERENCED PLAN FOR SPECIFIC INFORMATION]

10. SEWER EASEMENT TO CITY OF DOVER DESCRIBED IN DEED DATED JULY 29, 1958 AND RECORDED AT BOOK 691, PAGE 236. [AFFECTS THE SUBJECT PREMISES AND ITS' APPROXIMATE LOCATION IS DEPICTED HEREON. THE PLAN REFERENCED IN THE DOCUMENT WAS NOT PROVIDED TO DOUCET SURVEY.]

11. UTILITY EASEMENT TO PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE AND NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY DATED MAY 28, 1971 AND RECORDED AT BOOK 889, PAGE 261. [MAY AFFECT THE SUBJECT PREMISES, BUT THE LANGUAGE IN THE DOCUMENT IS NOT SPECIFIC ENOUGH TO DETERMINE]

12. UTILITY EASEMENT TO PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE AND NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANYDATED JANUARY 24, 1973 AND RECORDED AT BOOK 920, PAGE 146. [MAY AFFECT THE SUBJECT PREMISES, BUT THE LANGUAGE IN THE DOCUMENT IS NOT SPECIFIC ENOUGH TO DETERMINE]

13. TERMS AND CONDITIONS OF EASEMENT DEED DATED SEPTEMBER 29, 1983 AND RECORDED AT BOOK 1113, PAGE 331. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]

14. UTILITY EASEMENT TO PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE AND NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANYDATED NOVEMBER 16, 1984 AND RECORDED AT BOOK 1159, PAGE 678. [AFFECTS THE SUBJECT PREMISES AND IS BLANKET IN NATURE]

15. RIGHTS OF OTHERS IN AND TO THE BELLAMY RIVER. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]
a. RIGHTS OF OTHERS IN OR TO THE UNINTERRUPTED FLOW OF (NAME OF WATERWAY), BUT THIS POLICY DOES NOT INSURE ANY RIPARIAN RIGHTS OR EASEMENTS IN FAVOR OF THE OWNER OF THE PREMISES.
b. CLAIMS THAT SOME PORTION OF THE SUBJECT PREMISES HAS BEEN CREATED BY ARTIFICIAL MEANS, OR HAS ACCRETED TO ANY SUCH PORTION.
c. CLAIMS THAT SOME PORTION OF THE SUBJECT PREMISES HAS BEEN BROUGHT WITHIN THE BOUNDARIES THEREOF BY AVULSIVE MOVEMENT OR HAS BEEN FORMED BY ACCRETION TO SUCH PORTION.
d. TITLE TO SO MUCH OF THE PREMISES AS LIES WITHIN THE BED OR BOTTOM OF (NAME OF RIVER) ITS ARMS, BRANCHES OR TRIBUTARIES BY WHATEVER NAME CALLED IS NOT INSURED.
e. ANY AND ALL RIGHTS OF THE STATE OF NEW HAMPSHIRE IN AND TO NAVIGABLE WATERS AND RIGHTS OF THE UNITED STATES OF AMERICA ARISING PURSUANT TO THE COMMERCE CLAUSE OF THE UNITED STATES CONSTITUTION.
f. THIS POLICY DOES NOT INSURE ANY WHARVES, PIERS OR DOCKS ADJACENT TO OR UTILIZED IN CONNECTION WITH THE INSURED PREMISES OR ANY PERSONAL PROPERTY REFERRED TO IN DEEDS IN THE CHAIN OF TITLE OR EXHIBIT A HERETO OR AS DISCLOSED ON ANY PLAN(S) OF SURVEY(S) OF THE INSURED PREMISES.

16. TERMS AND CONDITIONS OF EASEMENT DEED FOR CONSTRUCTION AND MAINTENANCEOF ROAD AND UTILITY LINES RECITED IN DEED DATED OCTOBER 4, 1983 AND RECORDED AT BOOK 1113, PAGE 340. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]

17. ALTA/NSPS LAND TITLE SURVEY FOR M.S.M. BROTHERS, INC. 510 MARTHA'S WAY (TAX MAP H LOTS 41–P, 41–Q, 41–R, 41–S & 41–T) DOVER, NEW HAMPSHIRE, MADE BY DOUCET SURVEY LLC DATED JANUARY, 2022, AND DESIGNATED JOB NO. 7220.

ITEMS 1–17 ABOVE ARE FROM A COMMITMENT FOR TITLE INSURANCE ISSUED BY FIDELITY NATIONAL TITLE INSURANCE COMPANY, FILE NUMBER: 22CLT0058–NH, DATED JULY 15, 2022
[ITEMS IN BRACKETS ADDED BY DOUCET SURVEY]

THE PARCEL MAY ALSO BE SUBJECT TO AND/OR IN BENEFIT OF THE FOLLOWING, WHICH WERE FOUND BY DOUCET SURVEY DURING THE COURSE OF RESEARCH:

A. EASEMENT DEED FOR PARKING AREAS AND DRIVES IN DEED BOOK 1103, PAGE 431. [MAY AFFECT THE SUBJECT PREMISES, BUT THE LOT NAMED IN THE DEED DOES NOT MATCH ANY OF THE LOTS ON THE PLAN THAT IS REFERENCED]

B. EASEMENT DEED FOR PARKING AREAS AND DRIVES IN DEED BOOK 1100, PAGE 185. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]

C. EASEMENT DEED FOR INGRESS, EGRESS AND ROADWAY CONSTRUCTION IN DEED BOOK 1110, PAGE 186. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]

D. CONFIRMATORY EASEMENT DEED FOR PARKING AREAS AND DRIVES IN DEED BOOK 1113, PAGE 332. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]
E. EASEMENT DEED FOR INGRESS, EGRESS, AND PEDESTRIAN & VEHICULAR TRAFFIC IN DEED BOOK 1150, PAGE 578. [AFFECTS THE SUBJECT PREMISES AND IS DEPICTED HEREON]

LEGAL DESRIPTION BASED ON TITLE COMMITMENT:

TRACT I:
FIVE PARCELS OF LAND, WITH THE BUILDINGS THEREON, SITUATE IN DOVER, STRAFFORD COUNTY, NEW HAMPSHIRE, SHOWN AS LOTS H 41 1, H 41 2, H 41 3, H 4 1 4, AND H 41 5 SHOWN ON PLAN OF LAND ENTITLED, BELLAMY RIVER SUBDIVISION, WESTGATE DRIVE, DOVER, N.H. DATED NOVEMBER 1982 BY ERIC C. MITCHELL, L.L.S. AND RECORDED WITH THE STRAFFORD COUNTY REGISTRY OF DEEDS AS PLAN NO. 24–69.

TRACT II:
TOGETHER WITH EASEMENT APPURTENENT TO LOT H–41–5 RECITED IN DEED DATED OCTOBER 4, 1983 AND RECORDED AT BOOK 1113, PAGE 340.

LEGAL DESRIPTIONS BASED ON SURVEY:

Lot 41–P

Beginning at a point on the easterly side of Martha's Way in the City of Dover, County of Strafford, State of New Hampshire, said point being the southwesterly corner of the area herein described;
Thence N 12° 02' 02" E, a distance of 150.01' to a point;
Thence N 65° 48' 09" E, a distance of 736.79' to a point;
Thence S 14° 15' 41" E, a distance of 180.00' to a point;
Thence S 12° 03' 01" E, a distance of 115.34' to a point;
Thence S 13° 22' 01" E, a distance of 89.76' to a point;
Thence S 83° 30' 45" W, a distance of 748.40' to a point;
Thence N 77° 57' 58" W, a distance of 50.00' to the point of beginning.
Said area contains 4.65 acres.

Lot 41–Q

Beginning at a point on the easterly side of Martha's Way in the City of Dover, County of Strafford, State of New Hampshire, said point being the northwesterly corner of the area herein described;
Thence S 77° 57' 58" E, a distance of 50.00' to a point;
Thence N 83° 30' 45" E, a distance of 748.40' to a point;
Thence S 13° 22' 01" E, a distance of 69.18' to a point;
Thence continuing S 13° 22' 01" E, a distance of 11.0'+/– to the Cocheco River;
Thence generally westerly by the Cocheco River to a point;
Thence N 83° 32' 02" W, a distance of 1.0'+/– to a point;
Thence N 33° 27' 58" W, a distance of 199.94' to a point;
Thence N 72° 32' 58" W, a distance of 200.00' to a point;
Thence along a curve turning to the left with a delta of 13° 51' 58", a radius of 175.00' and a length of 42.35' to a point;
Thence N 12° 02' 02" E, a distance of 199.95' to the point of beginning;
Said area contains 4.4+/– acres.

Lot 41–R

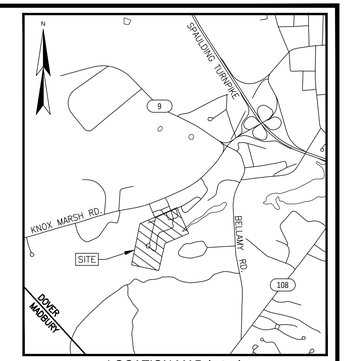
Beginning at a point on the westerly side of Martha's Way in the City of Dover, County of Strafford, State of New Hampshire, said point being the northeasterly corner of the area herein described;
Thence S 12° 02' 02" W, a distance of 300.02' to a point.
Thence along a curve turning to the right with a chord bearing of S 38° 40' 30" W, a delta of 53° 16' 56", a radius of 125.00' and a length of 116.24' to a point;
Thence along a curve turning to the left with a chord bearing of S 46° 12' 35" W, a delta of 38° 12' 46", a radius of 75.00' and a length of 50.02' to a point;
Thence along a curve turning to the right with a delta of 75° 18' 34", a radius of 25.00' and a length of 32.86' to a point;
Thence N 77° 35' 13" W, a distance of 125.34' to a point;
Thence N 12° 24' 47" E, a distance of 460.00' to a point;
Thence S 77° 35' 13" E, a distance of 224.45' to the point of beginning;
Said area contains 2.25 acres.

Lot 41–S

Beginning at a point on the southerly side of Martha's Way in the City of Dover, County of Strafford, State of New Hampshire, said point being the northeasterly corner of the area herein described;
Thence S 13° 57' 32" W, a distance of 357.17' to a point;
Thence S 59° 48' 58" E, a distance of 90.00' to a point;
Thence S 19° 32' 02" E, a distance of 4.0'+/– to the Cocheco River;
Thence in a generally westerly direction along the Cocheco River to a point
Thence N 12° 24' 47" E, a distance of 4.0'+/– to a point;
Thence continuing N 12° 24' 47" E, a distance of 441.07' to a point;
Thence S 77° 35' 13" E, a distance of 155.54' to a point;
Thence along a curve turning to the right with a chord bearing of S 56° 43' 53" E, a delta of 41° 42' 41", a radius of 25.00' and a length of 18.20' to a point.
Thence along a curve turning to the left with a chord bearing of S 59° 02' 59" E, a delta of 46° 20' 54", a radius of 75.00' and a length of 60.67' to the point of beginning;
Said area contains 2.4+/– acres.

Lot 41–T

Beginning at a point on the southerly side of Martha's Way in the City of Dover, County of Strafford, State of New Hampshire, said point being the northwesterly corner of the area herein described;
Thence along a curve turning to the left with a chord bearing of N 38° 35' 49" E, a delta of 118° 21' 28", a radius of 75.00' and a length of 154.93' to a point;
Thence along a curve turning to the right with a chord bearing of N 02° 39' 33" E, a delta of 46° 28' 55", a radius of 100.00' and a length of 81.13' to a point;
Thence S 72° 32' 58" E, a distance of 200.00' to a point;
Thence S 33° 27' 58" E, a distance of 199.94' to a point;
Thence continuing S 33° 27' 58" E, a distance of 1.0'+/– to the Cocheco River;
Thence in a generally southerly and westerly direction to a point;
Thence N 19° 32' 02" E, a distance of 4.0'+/– to a point;
Thence N 59° 48' 58" W, a distance of 90.00' to a point;
Thence N 13° 57' 32" E, a distance of 357.17' to the point of beginning.
Said area contains 4.7+/– acres.



LOCATION MAP (n.t.s.)

LEGEND

- EXISTING LOT LINE
- APPROXIMATE ABUTTERS LOT LINE
- EXISTING EASEMENT LINE
- 100 MAJOR CONTOUR LINE (SEE NOTE 16)
- 98 MINOR CONTOUR LINE (SEE NOTE 16)
- OHW OVERHEAD WIRE
- D DRAIN LINE
- S SEWER LINE
- TREE LINE
- SHRUB LINE
- EDGE OF RIVER (PRIMARY CHANNEL) LOCATED IN 12/21
- EDGE OF BACKWATER
- APPROX. FLOOD HAZARD BOUNDARY (SEE NOTE 7)
- TRAIL
- BOUND FOUND (BND. FND.)
- PIPE/ROD FOUND
- MONUMENT SET (AS NOTED)
- BARBED WIRE FOUND ON GROUND
- FENCE POST
- DRAIN MANHOLE
- CATCH BASIN
- SEWER MANHOLE
- FIRE HYDRANT
- PAD MOUNTED TRANSFORMER
- ELECTRIC BOX
- TELEPHONE BOX
- CABLE BOX
- UNIDENTIFIED UTILITY BOX
- STOCKADE FENCE
- SIGN
- FLAG POLE
- ROCK/BOULDER
- MAIL BOX
- UTILITY POLE W/LIGHT
- ACCESSIBLE PARKING SPACE
- CONIFEROUS TREE 10" DIA. OR GREATER
- DECIDUOUS TREE 10" DIA. OR GREATER
- TREE STUMP
- TYP. TYPICAL
- I.P.F. IRON PIPE FOUND
- R.S.S. RAILROAD SPIKE SET
- P.O.B. POINT OF BEGINNING FOR LEGAL DESCRIPTION
- (B) SCHEDULE B, PART II EXCEPTION

ALTA/NSPS LAND TITLE SURVEY
FOR
BRADY SULLIVAN PROPERTIES
510 MARTHA'S WAY
(TAX MAP H LOTS 41-P, 41-Q, 41-R, 41-S & 41-T)
DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	GAN	DATE:	JANUARY, 2022
CHECKED BY:	SVM	DRAWING NO.	7524A
JOB NO.	7524	SHEET	1 OF 3

PURSUANT TO RSA 676:18, III:

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000."

TO: BRADY SULLIVAN PROPERTIES

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARDS DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 1, 2, 3, 4, 5 (ONLY IN THOSE AREAS UNOBSCURED BY VEGETATION), 6(a) (NONE PROVIDED), 6(b) (NONE PROVIDED), 7(a), 7(b)(1), 7(b)2 (NONE SPECIFIED), 7(c), 8, 9, 10 (NONE DESIGNATED), 11(a) (NONE PROVIDED), 13, 14 (NONE SPECIFIED), 15, 16, 17, 18, 19 (NO AMOUNT SPECIFIED), & 20 (NONE SPECIFIED) OF TABLE A THEREOF.
THE FIELDWORK WAS COMPLETED DURING NOVEMBER & DECEMBER OF 2021 AND JANUARY 2022. A SITE WALK WAS CONDUCTED IN JUNE OF 2022.

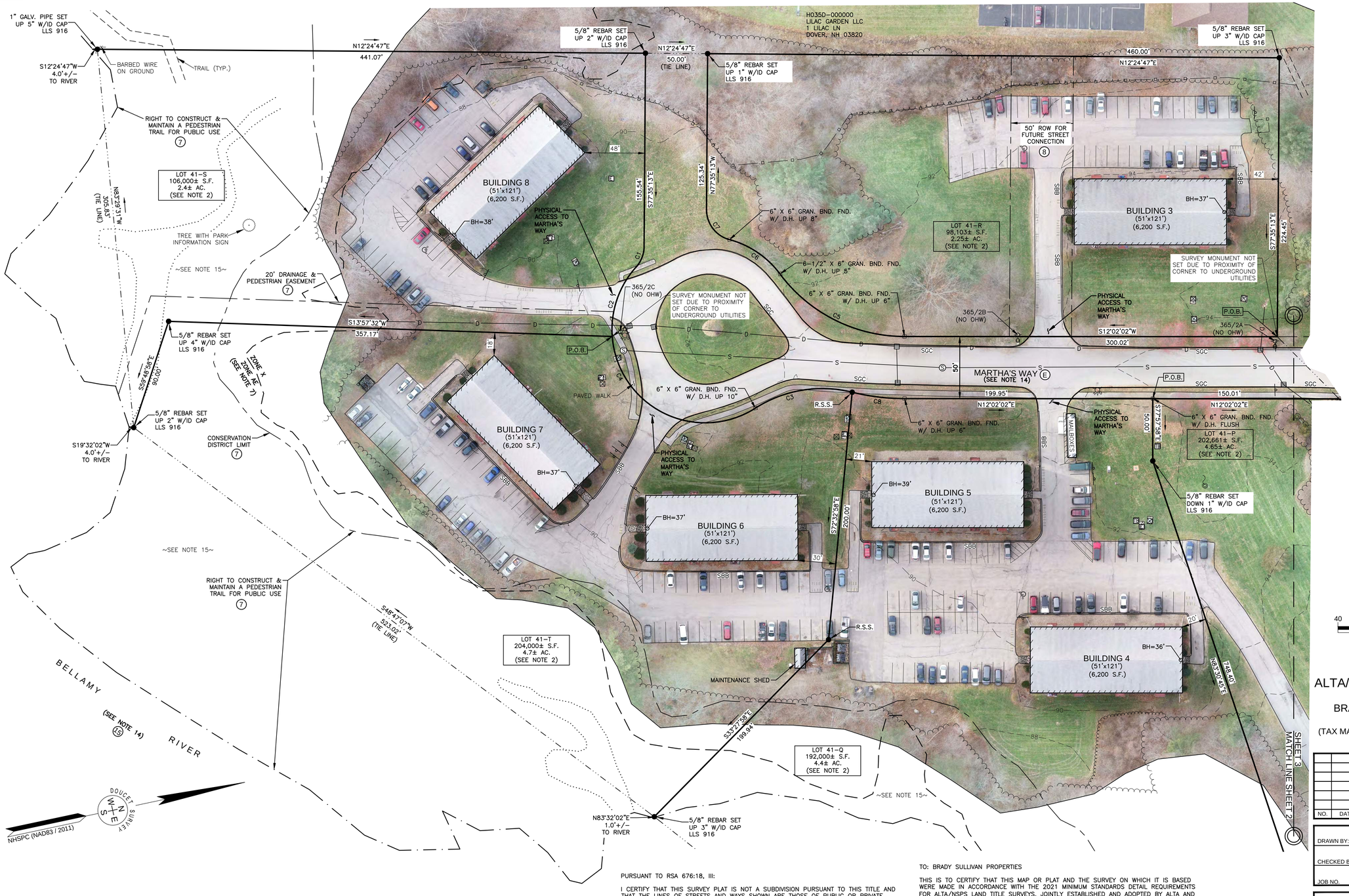
STEVEN V. MICHAUD
DATE: JULY 18, 2002

REGISTRATION NO. 916

STATE OF NEW HAMPSHIRE
NO. 916
STEVEN V. MICHAUD
LICENSED LAND SURVEYOR
SIGNATURE

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
Offices in Bedford & Keene, NH and Kennebunk, ME
http://www.doucetsurvey.com

FILE NAME: C:\Users\Steve\AppData\Local\Temp\AcPublish_28332\7524A ALTA.dwg LAYOUT NAME: Sheet 1-Notes PLOTTED: Wednesday, August 24, 2022 - 10:47am



40 0 40 80

SCALE: 1 INCH = 40 FT.

ALTA/NSPS LAND TITLE SURVEY

FOR

BRADY SULLIVAN PROPERTIES

510 MARTHA'S WAY

(TAX MAP H LOTS 41-P, 41-Q, 41-R, 41-S & 41-T)

DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	GAN	DATE:	JANUARY, 2022
CHECKED BY:	SVM	DRAWING NO.	7524A
JOB NO.	7524	SHEET	2 OF 3

PURSUANT TO RSA 676:18, III:

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000."

TO: BRADY SULLIVAN PROPERTIES

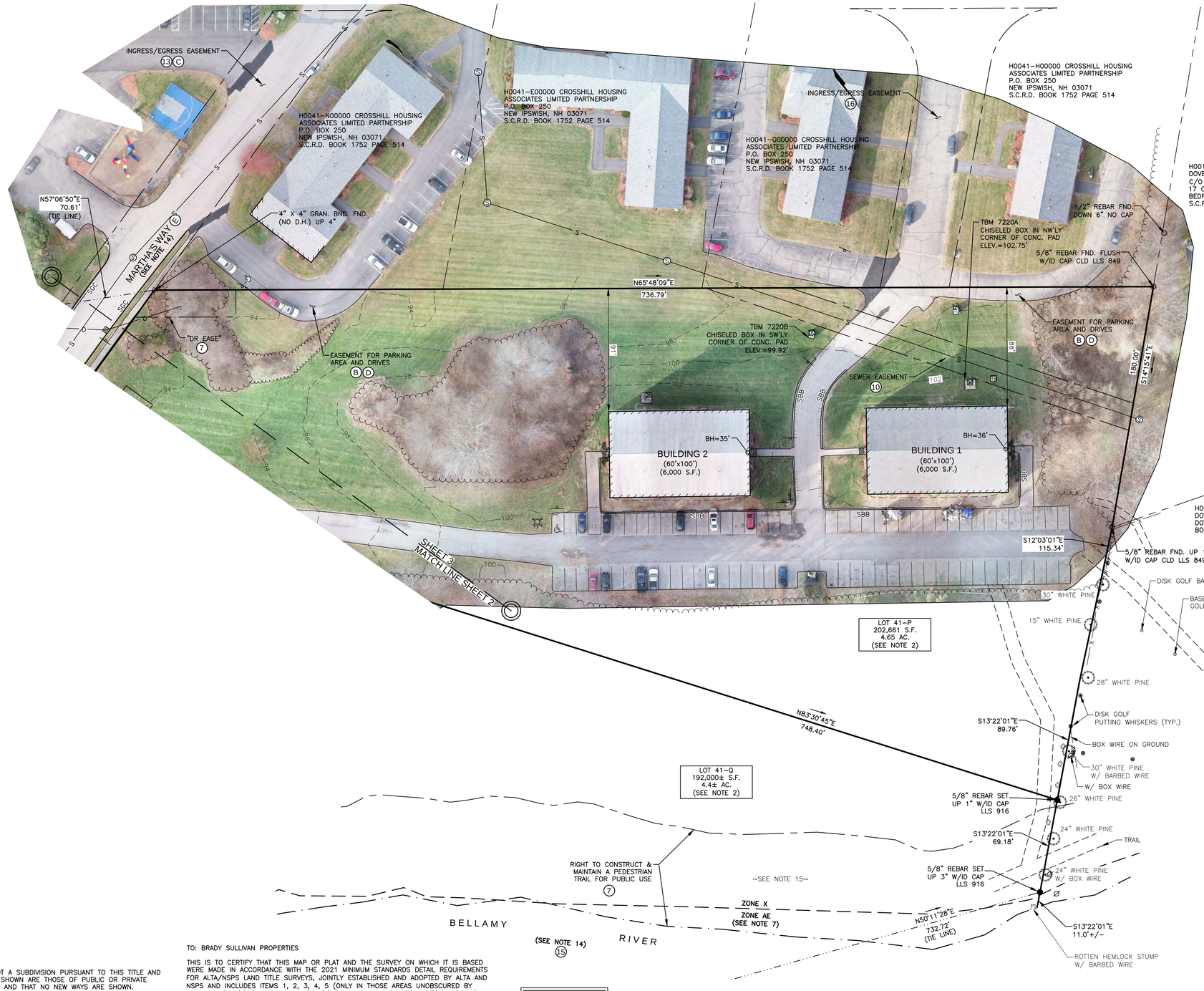
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARDS DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 1, 2, 3, 4, 5 (ONLY IN THOSE AREAS UNOBSCURED BY VEGETATION), 6(a) (NONE PROVIDED), 6(b) (NONE PROVIDED), 7(a), 7(b)(1), 7(b)2 (NONE SPECIFIED), 7(c), 8, 9, 10 (NONE DESIGNATED), 11(a) (NONE PROVIDED), 13, 14 (NONE SPECIFIED), 15, 16, 17, 18, 19 (NO AMOUNT SPECIFIED), & 20 (NONE SPECIFIED) OF TABLE A THEREOF.
THE FIELDWORK WAS COMPLETED DURING NOVEMBER & DECEMBER OF 2021 AND JANUARY 2022. A SITE WALK WAS CONDUCTED IN JUNE OF 2022.

STEVEN V. MICHAUD REGISTRATION NO. 916
DATE: JULY 18, 2002

STATE OF NEW HAMPSHIRE — LICENSED LAND SURVEYOR — NO. 916 — STEVEN V. MICHAUD — SIGNATURE

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
Offices in Bedford & Keene, NH and Kennebunk, ME
http://www.doucetsurvey.com

FILE NAME: C:\Users\SteveV\AppData\Local\Temp\AcPublish_28332\7524A ALTA.dwg LAYOUT NAME: Sheet 2 PLOTTED: Wednesday, August 24, 2022 - 10:47pm



20 0 20 40

SCALE: 1 INCH = 20 FT.

ALTA/NSPS LAND TITLE SURVEY

FOR

BRADY SULLIVAN PROPERTIES

510 MARTHA'S WAY

(TAX MAP H LOTS 41-P, 41-Q, 41-R, 41-S & 41-T)

DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	GAN	DATE:	JANUARY, 2022
CHECKED BY:	SVM	DRAWING NO.	7524A
JOB NO.	7524	SHEET	3 OF 3

PURSUANT TO RSA 676:18, III:

I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUBDIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN.

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000."

TO: BRADY SULLIVAN PROPERTIES

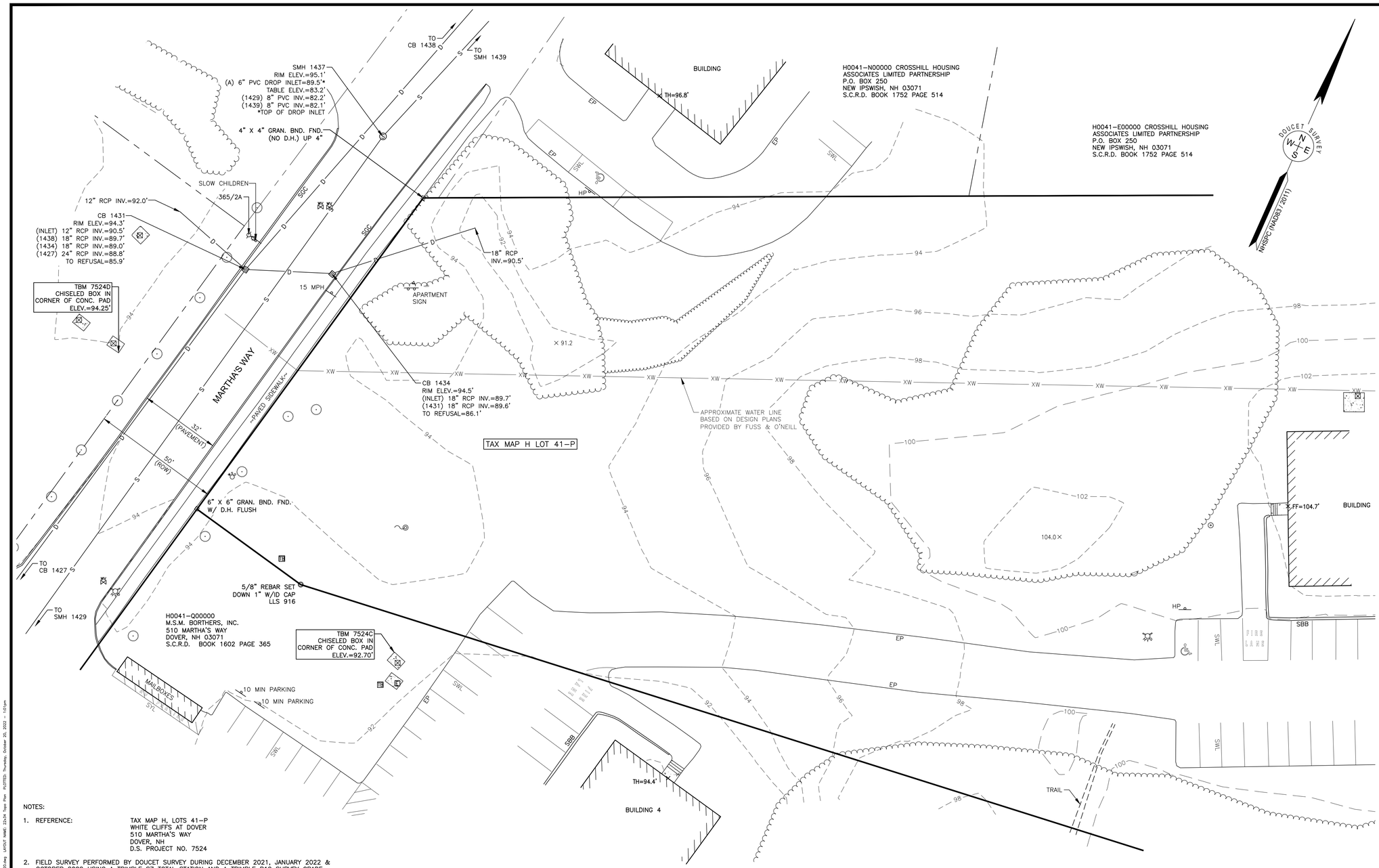
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARDS DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 1, 2, 3, 4, 5 (ONLY IN THOSE AREAS UNOBSCURED BY VEGETATION), 6(a) (NONE PROVIDED), 6(b) (NONE PROVIDED), 7(a), 7(b)(1), 7(b)2 (NONE SPECIFIED), 7(c), 8, 9, 10 (NONE DESIGNATED), 11(a) (NONE PROVIDED), 13, 14 (NONE SPECIFIED), 15, 16, 17, 18, 19 (NO AMOUNT SPECIFIED), & 20 (NONE SPECIFIED) OF TABLE A THEREOF.
THE FIELDWORK WAS COMPLETED DURING NOVEMBER & DECEMBER OF 2021 AND JANUARY 2022. A SITE WALK WAS CONDUCTED IN JUNE OF 2022.

STEVEN V. MICHAUD REGISTRATION NO. 916
DATE: JULY 18, 2002

STATE OF NEW HAMPSHIRE — NO. 916 STEVEN V. MICHAUD — LICENSED LAND SURVEYOR
SIGNATURE

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
Offices in Bedford & Keene, NH and Kennebunk, ME
http://www.doucetsurvey.com

FILE NAME: C:\Users\SteveV\Vaydon\Local\Temp\AcPublish_28332\7524A ALTA.dwg LAYOUT NAME: Sheet 3 PLOTTED: Wednesday, August 24, 2022 - 10:48am



LOCATION MAP (n.t.s.)

LEGEND

- EXISTING LOT LINE
- APPROXIMATE ABUTTERS LINE
- 100 MAJOR CONTOUR LINE
- 98 MINOR CONTOUR LINE
- D DRAIN LINE
- S SEWER LINE
- TREE LINE
- SHRUB LINE
- × 100.0 SPOT GRADE
- BOUND
- PIPE/ROD
- UTILITY POLE W/LIGHT
- GROUND LIGHT
- CATCH BASIN
- SEWER MANHOLE
- FIRE HYDRANT
- WATER GATE VALVE
- ELECTRIC BOX
- TELEPHONE BOX
- UNIDENTIFIED UTILITY BOX
- SIGN
- SIGN (TWO POSTS)
- POST
- FLAG POLE
- ACCESSIBLE PARKING SPACE
- DECIDUOUS TREE

BND. FND.	BOUND FOUND
CONC.	CONCRETE
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR ELEVATION
GRAN.	GRANITE
"HP"	HANDICAP PARKING SIGN
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
SBB	SLOPED BITUMINOUS BERM
SGC	SLOPED GRANITE CURB
SWL	SINGLE WHITE LINE
SYL	SINGLE YELLOW LINE
TH	THRESHOLD ELEVATION
(X)	INVERT I.D. CONNECTION UNKNOWN

20 0 20 40

SCALE: 1 INCH = 20 FT.

TOPOGRAPHIC PLAN

FOR

BRADY SULLIVAN PROPERTIES

MARTHA'S WAY

TAX MAP H LOT 41-P

DOVER, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	J.R.P.	DATE:	OCTOBER 14, 2022
CHECKED BY:	S.V.M.	DRAWING NO.	7524A
JOB NO.	7524	SHEET	1 OF 1

NOTES:

1. REFERENCE: TAX MAP H, LOTS 41-P
   WHITE CLIFFS AT DOVER
   510 MARTHA'S WAY
   DOVER, NH
   D.S. PROJECT NO. 7524

2. FIELD SURVEY PERFORMED BY DOUCET SURVEY DURING DECEMBER 2021, JANUARY 2022 & OCTOBER 2022 USING A TRIMBLE S7 TOTAL STATION AND A TRIMBLE R12 SURVEY GRADE GPS WITH A TRIMBLE TSC3 DATA COLLECTOR AND A SOKKIA B21 AUTO LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.

3. UAV (DRONE) FIELD SURVEY PERFORMED BY L.P.S. (DOUCET SURVEY) ON 11/30/2021 USING A DJI PHANTOM 4 RTK.
   HORIZONTAL
   THIS DATA SET WAS TESTED TO MEET ASPRS POSITIONAL ACCURACY STANDARDS FOR DIGITAL GEOSPATIAL DATA (2014) FOR A 2.5 cm RMSEx / RMSEy HORIZONTAL ACCURACY CLASS. ACTUAL POSITIONAL ACCURACY WAS FOUND TO BE RMSEx = 1.3 cm AND RMSEy = 1.9 cm WHICH EQUATES TO POSITIONAL HORIZONTAL ACCURACY = ± 3.9 cm AT 95% CONFIDENCE LEVEL.
   VERTICAL
   THIS DATA SET WAS TESTED TO MEET ASPRS POSITIONAL ACCURACY STANDARDS FOR DIGITAL GEOSPATIAL DATA (2014) FOR A 5 cm RMSEz VERTICAL ACCURACY CLASS. ACTUAL NVA ACCURACY WAS FOUND TO BE RMSEz = 4.5 cm, EQUATING TO ± 8.8 cm AT 95% CONFIDENCE LEVEL.

4. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2001) AND VERTICAL DATUM BASED ON NAVD88, BOTH DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.

5. VERTICAL DATUM IS BASED ON APPROXIMATE NAVD88(GEOID12A) (±.2') DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.

6. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 2' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.

7. ALL UNDERGROUND UTILITIES (ELECTRIC, GAS, TEL. WATER, SEWER DRAIN SERVICES) ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE AT 1-888-DIG-SAFE.

8. CONTOURS GENERATED USING A COMBINATION OF DATA COMPILED FROM UAV (DRONE) SURVEY (SEE NOTE 3) AND FROM AN ON-THE-GROUND TOPOGRAPHIC SURVEY PERFORMED IN OCTOBER, 2022.

9. FLOOD HAZARD ZONE:"X", PER FIRM MAP #33017C0320E, DATED 9/30/2015.

STATE OF NEW HAMPSHIRE — NO. 916 STEVEN V. MICHAUD — LICENSED LAND SURVEYOR

SIGNATURE

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
Offices in Bedford & Keene, NH and Kennebunk, ME
http://www.doucetsurvey.com

FILE NAME: Y:\PROJECTS\7524 CAD\MAILED DATA\DWG\7524-2022-10-20\7524_2022-10-20.dwg LAYOUT NAME: 22x34 Topo Plan PLOTTED: Thursday, October 20, 2022 - 1:01pm

NOTES:

ALL EXISTING CONDITIONS TAKEN FROM PLAN FROM DOUCET SURVEY. MINOR ADDITIONS INCLUDING SOILS, DIGSAFE MARKED UTILITIES, AND TEST PIT LOCATIONS ADDED

MARTHA'S WAY

SMH 1437
RIM ELEV.=95.1'
(A) 6" PVC DROP INLET=89.5'*
TABLE ELEV.=83.2'
(1429) 8" PVC INV.=82.2'
(1439) 8" PVC INV.=82.1'
*TOP OF DROP INLET

TO CB 1438

TO SMH 1439

CB 1434
RIM ELEV.=94.5'
(INLET) 18" RCP INV.=89.7'
(1431) 18" RCP INV.=89.6'
TO REFUSAL=86.1'

12" RCP INV.=92.0'

SLOW CHILDREN

365/2A

CB 1431
RIM ELEV.=94.3'
(INLET) 12" RCP INV.=90.5'
(1438) 18" RCP INV.=89.7'
(1434) 18" RCP INV.=89.0'
(1427) 24" RCP INV.=88.8'
TO REFUSAL=85.9'

15MPH

APARTMENT SIGN WITH LIGHTING

18" RCP INV.=90.5'

DRAINAGE EASEMENT

PAVED SIDEWALK

BUILDING

TH=96.8'

EP

SWL

HP

EASEMENT FOR PARKING AREA AND DRIVES

H0041–N00000 CROSSHILL HOUSING ASSOCIATES LIMITED PARTNERSHIP
P.O. BOX 250
NEW IPSWISH, NH 03071
S.C.R.D. BOOK 1752 PAGE 514

H0041–E00000 CROSSHILL HOUSING ASSOCIATES LIMITED PARTNERSHIP
P.O. BOX 250
NEW IPSWISH, NH 03071
S.C.R.D. BOOK 1752 PAGE 514

NRCS WEB SOILS SURVEY SOIL MAP UNIT SYMBOL (TYP)

ScA

HcB

WdC

NRCS WEB SOILS SURVEY LINES

APPROXIMATE WATER LINE BASED ON FIELD OBSERVATIONS OF WATER STRUCTURE LOCATION COMPARED TO DESIGN PLANS. CONFIRMATION REQUIRED

TAX MAP H
LOT 41–P
202,661± S.F.
4.65± AC.

TP1

TP2

TP3

TP4

TEST PIT (TYP)

POTENTIAL UNDER GROUND TELEPHONE OR ELECTRIC BASED ON FIELD OBSERVATIONS OF TELEPHONE BOX STRUCTURE LOCATION CONFIRMATION REQUIRED (TYP)

TBM 7524C
CHISELED BOX IN CORNER OF CONC. PAD
ELEV.=92.70'

H0041–Q00000
M.S.M. BORTHERS, INC.
510 MARTHA'S WAY
DOVER, NH 03071
S.C.R.D. BOOK 1602
PAGE 365

MAILBOXES

10 MIN PARKING

10 MIN PARKING

TO CB 1427

TO SMH 1429

TH=95.5'

BUILDING 4

TH=94.4'

FF=104.7'

BUILDING

SBB

TMS

TRAIL

× 104.0

× 91.2

94

96

98

100

102

1019

1009

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
EXISTING CONDITIONS PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CC-101

File: J:\DWG\P2022\09000\A10\Civil\Plan\20220920.A10_EXC01.dwg Layout: CC-101 EXCON Plotted: 2023-03-16 12:31 PM Saved: 2023-03-10 12:04 PM User: BPratt
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

NOTES:

1. REFER TO SHEET GI-101 FOR NOTES

REMOVE TREES

REMOVE APARTMENT SIGN WITH LIGHTING

SAWCUT AND REPLACE ASPHALT SIDEWALK FOR DRAIN LINE

SAWCUT AND REPLACE PAVEMENT FOR SEWER LINE

WATER LINE SHOWN IS APPROXIMATE AND BASED ON REFERENCE PLAN. ASSUMED 8" DI. POTENTIAL RELOCATION OF EXISTING WATER LINE MAY BE REQUIRED. CONTRACTOR TO CONFIRM LOCATION OF WATER MAIN PRIOR TO CONSTRUCTION.

STOCKPILE

REMOVE TREES

SAWCUT AND REMOVE ASPHALT

ADJUST SAWCUT LINE IN FIELD AS NECESSARY TO MATCH NEW PAVEMENT

SAWCUT CLEAN EDGE 6" FROM EDGE OF PAVEMENT FOR NEW CURBING

STOCKPILE

TAX MAP H
LOT 41-P
202,661± S.F.
4.65± AC.

MARTHA'S WAY

TP1 TP2 TP3 TP4

CB 1434
RIM ELEV.=94.5'
(INLET) 18" RCP INV.=89.7'
(1431) 18" RCP INV.=89.6'
TO REFUSAL=86.1'

CB 1431
RIM ELEV.=94.3'
(INLET) 12" RCP INV.=90.5'
(1438) 18" RCP INV.=89.7'
(1434) 18" RCP INV.=89.0'
(1427) 24" RCP INV.=88.8'
TO REFUSAL=85.9'

TBM 7524D
CHISELED BOX IN
CORNER OF CONC. PAD
ELEV.=94.25'

TBM 7524C
CHISELED BOX IN
CORNER OF CONC. PAD
ELEV.=92.70'

TO CB 1438

TO CB 1427

BUILDING

TH=96.8'

BUILDING 4

TH=94.4'

TH=95.5'

FF=104.7'

BUILDING

DRAINAGE EASEMENT

EASEMENT FOR PARKING AREA AND DRIVES

POWER DRIVEWAY

15MPH

365/2A

MAILBOXES

TRAIL

18" RCP INV.=90.5'

12" RCP INV.=92.0'

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fussoneill.com

BRADY SULLIVAN PROPERTIES
DEMOTION AND
REMOVALS PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CC-102

File: J:\DWG\P2022\20900\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: CC-102 DEMO Plotted: 2023-03-10 11:30 AM Saved: 2023-03-10 10:45 AM User: BPratt
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

NOTES:

1. REFER TO SHEET GI-101 FOR NOTES



BUILDING LOCATION PLAN

File: J:\DWG\P20220900\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: CS-101 NEIGHBORHOOD SITE PLAN Plotted: 2023-03-10 11:30 AM Saved: 2023-03-10 10:45 AM User: BPratt

MS VIEW: | LAYER STATE: | PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 30 VERT.: 30
DATUM: HORZ.: VERT.:
30 15 0 30
GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
NEIGHBORHOOD
SITE PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CS-101

NOTES:

1. REFER TO SHEET GI-101 FOR NOTES

NEW APARTMENT COMPLEX SIGN BY OTHERS (10' SETBACK REQUIRED)

SLOW CHILDREN

365/2A

MARTHA'S WAY

SSC

POWER SIDEWALK

PROPOSED TREELINE

PROPERTY LINE

DRAINAGE EASEMENT

EASEMENT FOR PARKING AREA AND DRIVES

35' REAR SETBACK

20' SIDE SETBACK

BUILDING SETBACK

BUILDING

TH=96.8'

EP

SWL

HP

56.7'

41.2'

61.9'

INFILTRATION BASIN

FRONT BUILDING SETBACK

NEW APARTMENT COMPLEX SIGN BY OTHERS (10' SETBACK REQUIRED)

LAWN

PATIO AND ANY FEATURES DETAILS TO BE PROVIDED BY OWNER/ARCHITECT

PROPOSED 30'±X36'± OUTDOOR PATIO

COVERED PATIO

POTENTIAL OUTDOOR AMENITIES AREA

PROPOSED 5' WIDE ASPHALT WALKWAY

PROPOSED 4,615±SF AMENITIES BUILDING FFE: 96.2

LAWN

ADA RAMP RAILING

ADA SIGN (VAN)

DECORATIVE LIGHT POLE

RAMP

PROPOSED 5' ASPHALT SIDEWALK WITH TIP DOWNS AND CURBING

SNOW STORAGE

ADA SIGN

RAMP

15' WIDE CAST IN PLACE CONCRETE STAIRS WITH RAILINGS

VARIABLE HEIGHT LANDSCAPE WALL (SMALL BLOCK)

PROPOSED 8' WIDE ASPHALT WALKWAY

PROPOSED 5' WIDE ASPHALT WALKWAY

SNOW STORAGE

36.9'

10'x20' ADA SPACES WITH 10'x20' ADA LOADING AREA

5' WIDE ASPHALT WALKWAY

DECORATIVE LIGHT POLE

VERTICAL GRANITE CURBING

MAILBOXES

10 MIN PARKING

10 MIN PARKING

SWL

SBB

TH=95.5'

BUILDING 4

TH=94.4'

TRAIL

TAX MAP H
LOT 41-P
202,661± S.F.
4.65± AC.

FF=104.7'

BUILDING

HP

SBB

SWL

EP

TWS

N

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20

DATUM: HORZ.: VERT.:

20 10 0 20

GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES

SITE PLAN

WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P

DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10

DATE: 02/24/2023

CS-102

File: J:\DWG\P2022\20900\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: CS-102 SITE Plotted: 2023-03-10 11:30 AM Saved: 2023-03-10 10:45 AM User: BPratt

MS VIEW: LAYER STATE: PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

NOTES:

1. REFER TO SHEET GI-101 FOR NOTES
2. MULTIPLE OPTIONS FOR UTILITY CONNECTIONS ARE SHOWN. CONTRACTOR TO PERFORM UTILITY LOCATIONS AND TEST PITTING DURING CONSTRUCTION TO DETERMINE BEST UTILITY CONNECTION OPTION

INSTALL 18"x18"x18" HDPE TEE WITH 18"X6" REDUCER INV IN 90.5' TOP OF VERTICAL 18" HDPE 92.2

INSTALL CLEANOUT AT END OF UNDERDRAINS

CORE NEW INV IN 18" HDPE 89.7' 16 L.F. S=0.006 FT/FT

OUTLET STRUCTURE RIM 93.2' WEIR INV OUT 92.2' INV OUT 89.8' UNDERDRAIN IN 90.3'

FES#1 12" HDPE PVC INV OUT 92.0

FES#2 12" HDPE PVC INV OUT 92.0

PROPOSED UNDERDRAIN, ELEVATION 90.3'

YARD DRAIN RIM 94.0 INV IN 92.0' 6" PVC ROOF DRAIN LEADER (OR SURFACE DOWNSPOUT)

115 L.F. 12" PERFORATED HDPE LAID FLAT 92.0

6" PVC ROOF DRAIN LEADER

GUTTERS WITH ROOF DRAINS

FLAT YARD DRAIN GRATE RIM 95.0 INV IN 92.5' IN OUT 92.0'

6" PVC ROOF DRAIN LEADER (OR SURFACE DOWNSPOUT)

YARD DRAIN RIM 94.8 12" HDPE INV OUT 92.00 ROOF DRAIN IN 92.5'

FF=96.2

58 L.F. 12" PERFORATED HDPE LAID FLAT 92.0

6" PVC ROOF DRAIN LEADER

GUTTERS WITH ROOF DRAINS

BEHIVE YARD DRAIN GRATE

SIDEWALK AT GRADE, PITCH NORTH

12" PERF. HDPE INV OUT 92.0 LAID FLAT

2' RETAINING WALL TW: 95.6 BW 93.6

4.5% SIDEWALK

8% RAMP

BLEND TOPSOIL TO MATCH TOP OF SIDEWALK

GRADE 2% MAX

FLUSH ADA LANDING

TW: 95.7 BW 93.2

TW: 95.7 BW 93.7

REPAVE ADDITIONAL AREA IF UTILITIES ARE CONNECTED HERE

TP1 TP2 TP3 TP4

MARTHA'S WAY

TAX MAP H LOT 41-P 202,661± S.F. 4.65± AC.

TBM 7524D CHISELED BOX IN CORNER OF CONC. PAD ELEV.=94.25'

TBM 7524C CHISELED BOX IN CORNER OF CONC. PAD ELEV.=92.70'

SMH 1437 RIM ELEV.=95.1' (A) 6" PVC DROP INLET=89.5'* TABLE ELEV.=83.2' (1429) 8" PVC INV.=82.2' (1439) 8" PVC INV.=82.1' *TOP OF DROP INLET

CB 1434 RIM ELEV.=94.5' (INLET) 18" RCP INV.=89.7' (1431) 18" RCP INV.=89.6' TO REFUSAL=86.1'

CB 1431 RIM ELEV.=94.3' (INLET) 12" RCP INV.=90.5' (1438) 18" RCP INV.=89.7' (1434) 18" RCP INV.=89.0' (1427) 24" RCP INV.=88.8' TO REFUSAL=85.9'

TO CB 1438 · TO SMH 1439 · TO CB 1427 · TO SMH 1429

BUILDING · TH=96.8' · BUILDING 4 · TH=94.4' · TH=95.5' · BUILDING · FF=104.7'

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
20 10 0 20 GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
GRADING AND DRAINAGE PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CG-101

File: J:\DWG\P2022\0900\A10\Civil\Plan\20220900.A10_STP01.dwg Layout: CG-101 GD Plotted: 2023-03-16 9:53 AM Saved: 2023-03-15 5:00 PM User: BPratt
MS VIEW: LAYER STATE: PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

NOTES:

1. REFER TO SHEET GI-101 FOR NOTES

INSTALL STONE CHECK DAMS DURING CONSTRUCTION

STABLIZE SWALE WITH NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS & MOIST SITES

PROVIDE PERIMETER CONTROLS AFTER SWALE CONSTRUCTION

STABLIZE POND WITH NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS & MOIST SITES

CONSTRUCTION ENTRANCE

LOAM AND SEED ALL LAWN AREAS

STOCKPILE

LOAM AND SEED ALL LAWN AREAS

STOCKPILE

STABILIZE 3:1 SLOPE WITH CONSERVATION SEED MIX

PROVIDE PERIMETER CONTROLS

MOVE PERIMETER CONTROLS TO BACK OF CURBING AFTER PAVEMENT IS INSTALLED

MARTHA'S WAY

SMH 1437
RIM ELEV.=95.1'
(A) 6" PVC DROP INLET=89.5'*
TABLE ELEV.=83.2'
(1429) 8" PVC INV.=82.2'
(1439) 8" PVC INV.=82.1'
*TOP OF DROP INLET

CB 1434
RIM ELEV.=94.5'
(INLET) 18" RCP INV.=89.7'
(1431) 18" RCP INV.=89.6'
TO REFUSAL=86.1'

CB 1431
RIM ELEV.=94.3'
(INLET) 12" RCP INV.=90.5'
(1438) 18" RCP INV.=89.7'
(1434) 18" RCP INV.=89.0'
(1427) 24" RCP INV.=88.8'
TO REFUSAL=85.9'

TBM 7524D
CHISELED BOX IN CORNER OF CONC. PAD
ELEV.=94.25'

TBM 7524C
CHISELED BOX IN CORNER OF CONC. PAD
ELEV.=92.70'

TAX MAP H
LOT 41-P
202,661± S.F.
4.65± AC.

BUILDING

TH=96.8'

TH=94.4'

TH=95.5'

BUILDING 4

TRAIL

SBB

TMS

HP

EP

SWL

MAILBOXES

TO CB 1438

TO SMH 1439

TO CB 1427

TO SMH 1429

FF=104.7'

× 104.0

365/2A

12" RCP INV.=92.0'

18" RCP INV.=90.5'

PAVED SIDEWALK

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
20 10 0 20
GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fussoneill.com

BRADY SULLIVAN PROPERTIES
EROSION & SEDIMENT CONTROL PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CE-101

File: J:\DWG\P2022\09000\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: CG-102 EC Plotted: 2023-03-10 11:31 AM Saved: 2023-03-10 10:45 AM User: BPratt
MS VIEW: LAYER STATE: PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

NOTES:

1. REFER TO SHEET GI-101 FOR NOTES

RELOCATE 8" WATER MAIN IF NECESSARY MAINTAIN 4' COVER

CONNECT WATER SERVICE, SIZE TBD BY MEP, FIRE PROTECTON ENGINEER & WATER DEPARTMENT. ASSUME DOMESTIC TAPPING SLEEVE (OR TEE IF BEING RELOCATED) 4' COVER REQUIRED

CONNECT TO EXISTING 8" SEWER MAIN WITH DROP WYE CONNECTION 82.2 PIPE INVERT

WATER LINE SHOWN IS APPROXIMATE AND BASED ON REFERENCE PLAN. ASSUMED 8" DI. POTENTIAL RELOCATION OF EXISTING WATER LINE MAY BE REQUIRED. CONTRACTOR TO CONFIRM LOCATION OF WATER MAIN PRIOR TO CONSTRUCTION.

OPTION FOR DOMESTIC WATER SERVICE

CONNECT TO EXISTING WATER LINE, CONFIRM DEPTH, MAINTAIN 4 FEET MIN CROSS COUNTRY

150 L.F. 6" PVC SEWER SERVICE INV OUT:91.0' S=0.058 FT/FT

INSTALL CLEANOUTS AT 2 BENDS

PRIMARY SEWER SERVICE, CONFIRM SIZE, DEPTH AND CONDITION OF SERVICE TO BUILDING 4 WHERE CONNECTION IS PROPOSED

FER TO ARCHITECTURAL AND MEP PLANS FOR ON BUILDING AND SECURITY LIGHTING

POTENTIAL UNDERGROUND ELECTRIC/TEL/CABLE SERVICE CONNECTION. COORDINATE WITH EVERSOURCE AND TELCOM

POTENTIAL SEWER AND WATER CONNECTIONS VERIFY DEPTHS, SIZES, AND CONDITION OF PIPES PRIOR TO CONNECTION. CONFIRM NO CONFLICT.

TEST PITS NEEDED TO CONFIRM

PATCH AND REPAVE ADDITIONAL PAVEMENT TO CONNECTION

REFER TO MEP PLANS FOR LIGHT POLE WIRING

MARTHA'S WAY

TAX MAP H LOT 41-P 202,661± S.F. 4.65± AC.

SMH 1437 RIM ELEV.=95.1' (A) 6" PVC DROP INLET=89.5'* TABLE ELEV.=83.2' (1429) 8" PVC INV.=82.2' (1439) 8" PVC INV.=82.1' *TOP OF DROP INLET

CB 1434 RIM ELEV.=94.5' (INLET) 18" RCP INV.=89.7' (1431) 18" RCP INV.=89.6' TO REFUSAL=86.1'

CB 1431 RIM ELEV.=94.3' (INLET) 12" RCP INV.=90.5' (1438) 18" RCP INV.=89.7' (1434) 18" RCP INV.=89.0' (1427) 24" RCP INV.=88.8' TO REFUSAL=85.9'

TBM 7524D CHISELED BOX IN CORNER OF CONC. PAD ELEV.=94.25'

TBM 7524C CHISELED BOX IN CORNER OF CONC. PAD ELEV.=92.70'

TO CB 1438

TO SMH 1439

TO CB 1427

TO SMH 1429

BUILDING

TH=96.8'

TH=94.4'

TH=95.5'

BUILDING 4

FF=104.7'

HP

SBB

TRAIL

MAILBOXES

PAVED SIDEWALK

12" RCP INV.=92.0'

18" RCP INV.=90.5'

365/2A

365/2C

365/2D

41-1

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20

DATUM: HORZ.: VERT.:

GRAPHIC SCALE 0 10 20

FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
UTILITIES PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CU-101

File: J:\DWG\P20220900\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: CU-101 UTILS Plotted: 2023-03-10 11:30 AM Saved: 2023-03-10 10:45 AM User: BPratt
MS VIEW: LAYER STATE: PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Description	[MANUFAC]
⊙	2	P4	Single	ENM4-PT-FT-LED-05L-30-CXX / 4RP I S10G 12 CXX GA GBC(DBC) 12' POLE	LSI INDUSTRIES, INC.

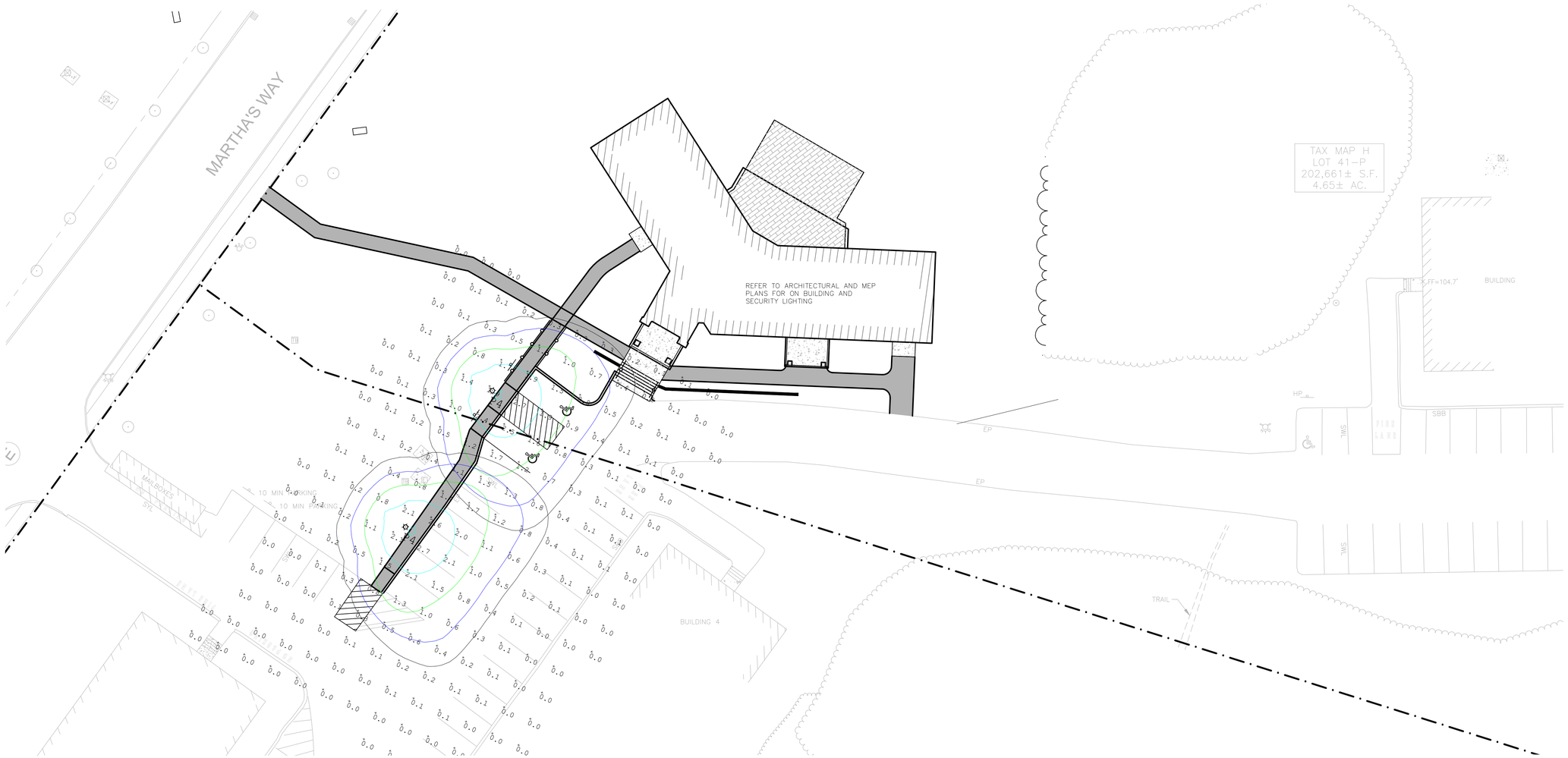
PARKING SPACES

Illuminance (Fc)
Average = 1.46
Maximum = 2.7
Minimum = 0.5
Avg/Min Ratio = 2.92
Max/Min Ratio = 5.40

NOTES:

LIGHTING PLAN, DETAILS, CALCULATIONS, AND SPECIFICATIONS PROVIDED BY:

EXPOSURE LIGHTING — CONTROLS — ELECTRICAL
ESS
New England's Premier Lighting, Controls and Electrical Rep Agency
KENNETH SWEENEY | APPLICATIONS ENGINEER
Cell: 603.759.1043
6 SCOTT RD | HAMPTON, NH 03842 | 603.601.8080
EXPOSURE2LIGHTING.COM & ESS-LLC.US



DESIGNER REVIEWER | DESCRIPTION | DATE | No.

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
GRAPHIC SCALE 20 10 0 20

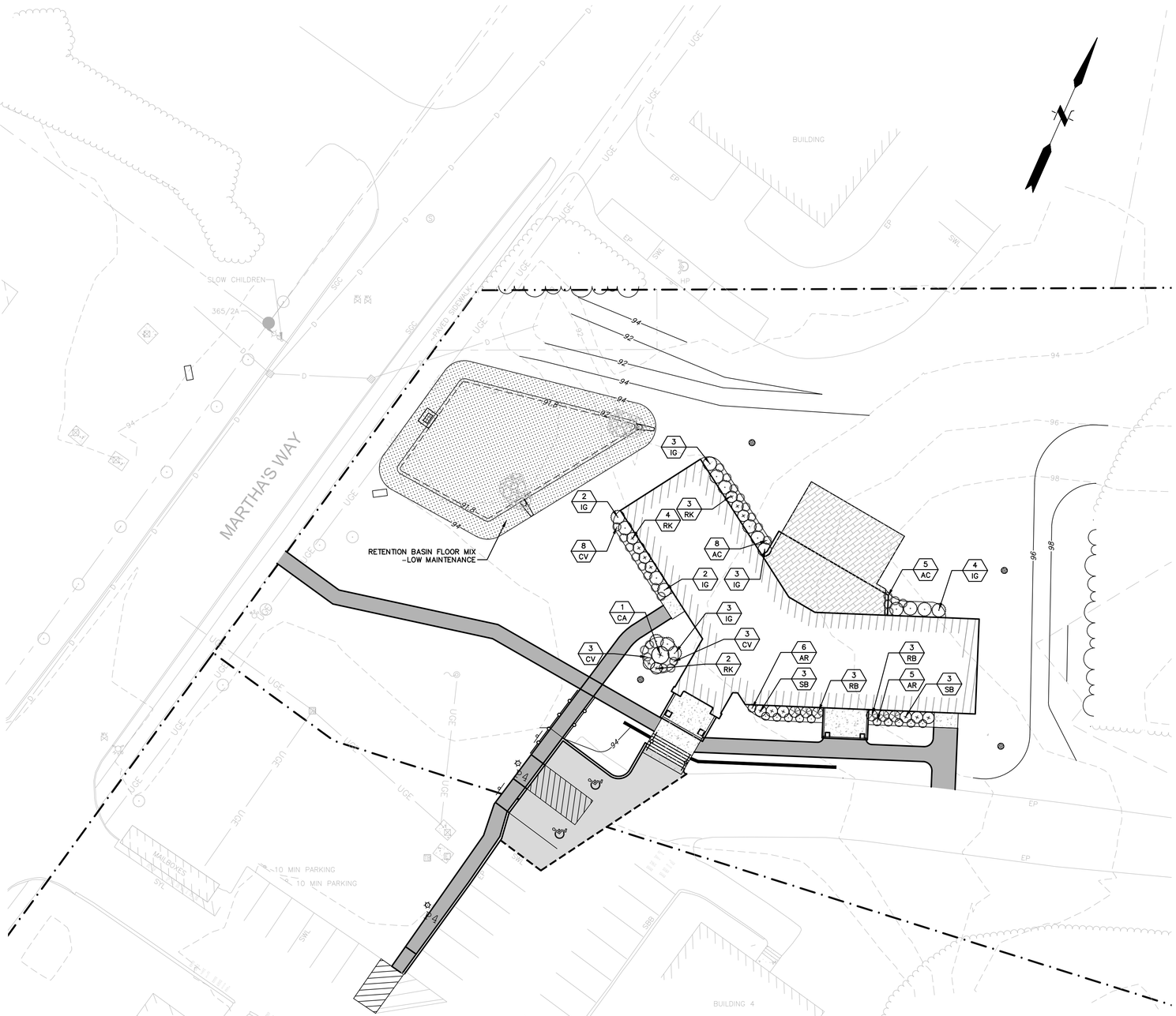
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
SITE LIGHTING PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

CU-102

File: J:\DWG\P20220900\A10\Civil\Plan\20220900.A10_NEW CONCEPT 2-8-2023.dwg Layout: CU-102 LIGHT Plotted: 2023-03-10 11:30 AM Saved: 2023-03-10 10:45 AM User: BPratt
MS VIEW: LAYER STATE: PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB



PLANTING NOTES:

1. ALL PLANTING MATERIAL TO BE NURSERY GROWN STOCK SUBJECT TO A.A.N. STANDARDS.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANTS IN QUANTITIES SUFFICIENT TO COMPLETE THE WORK SHOWN ON THE DRAWINGS AND LISTED IN THE PLANT LIST. IN THE EVENT OF A DISCREPANCY BETWEEN QUANTITIES SHOWN IN THE PLANT LIST AND THOSE REQUIRED BY THE DRAWINGS, THE LARGER NUMBER SHALL APPLY.
3. ALL PLANTS SHALL BE APPROVED PRIOR TO INSTALLATION AND SHALL BE LOCATED ON SITE BY THE CONTRACTOR FOR THE APPROVAL OF THE LANDSCAPE ARCHITECT. ANY INSTALLATIONS WHICH WERE NOT APPROVED BY THE LANDSCAPE ARCHITECT AND WHICH ARE SUBSEQUENTLY REQUESTED TO BE MOVED WILL BE DONE AT THE CONTRACTORS EXPENSE.
4. PRECISE LOCATION OF ITEMS NOT DIMENSIONED ON THE PLAN ARE TO BE FIELD STAKED BY THE CONTRACTOR AND SHALL BE SUBJECT TO THE REQUIREMENTS SPECIFIED IN THE PREVIOUS NOTE.
5. ALL SHRUB MASSINGS AND TREE PITS SHALL BE MULCHED TO A DEPTH OF 2" WITH SHREDDED PINE BARK MULCH.
6. TREES SHALL NOT BE STAKED UNLESS OTHERWISE NOTED.
7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGED VEGETATION AND SHALL REPLACE OR REPAIR ANY DAMAGED MATERIAL, AT HIS OWN EXPENSE. THE CONTRACTOR SHALL CONTACT "CALL DIG SAFE" AT 888-DIG-SAFE PRIOR TO CONSTRUCTION.
8. ALL SHRUB AND GROUNDCOVER PLANTING AREAS SHALL HAVE CONTINUOUS BEDS OF TOPSOIL 12" DEEP. ALL SOD AND HYDROSEED AREAS SHALL HAVE A MINIMUM TOPSOIL BED OF 6".
9. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES IN THE FIELD. WHERE PLANT MATERIAL MAY INTERFERE WITH UTILITIES, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT TO COORDINATE THEIR INSTALLATION.
10. FOR PLANTING SOIL MIX, SEE SPECIFICATIONS OR PLANTING DETAILS.
11. ALL EXISTING RILL, GULLY OR CHANNEL EROSION SHALL BE FILLED WITH APPROPRIATE BACKFILL MATERIAL, FINE RAKED, SCARIFIED AND STABILIZED WITH APPROPRIATE VEGETATIVE MATERIAL AND/OR APPROPRIATE SEDIMENTATION AND EROSION CONTROL MEASURES.
12. ADJUSTMENTS IN THE LOCATION OF THE PROPOSED PLANT MATERIAL AS A RESULT OF EXISTING VEGETATION TO REMAIN SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
13. CONTRACTOR TO RESEED ALL DISTURBED AREAS.

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE
	SHRUBS			
CA	CORNUS ALBA 'BAILHALO'	IVORY HALO DOGWOOD	1	2.5'-3'
IG	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	17	2.5'-3'
RB	RHODODENDRON 'BLAAUW'S PINK'	BLAAUW'S PINK AZALEA	6	2'-2.5'
RK	ROSA 'CORAL KNOCKOUT'	CORAL KNOCKOUT ROSE	9	#3 CONT.
SB	SPIREA X BUMALDA 'ANTHONY WATERER'	ANTHONY WATERER SPIREA	6	#3 CONT.
	PERENNIALS/GROUNDCOVER			
AR	AJUGA REPTANS 'BURGUNDY GLOW'	BURGUNDY GLOW CARPET BUGLE	11	1 GAL.
CV	COREOPSIS VERTICILLATA 'MOONBEAM'	MOONBEAM TICKSEED	14	1 GAL.
AC	ASTILBE CHINENSIS 'VISIONS'	VISIONS ASTILBE	13	1 GAL.

LEGEND

SHRUBS/ORNAMENTAL GRASSES

RETENTION BASIN FLOOR MIX - LOW MAINTENANCE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 20 VERT.: 20
DATUM: HORZ.: VERT.:
0 10 20 GRAPHIC SCALE

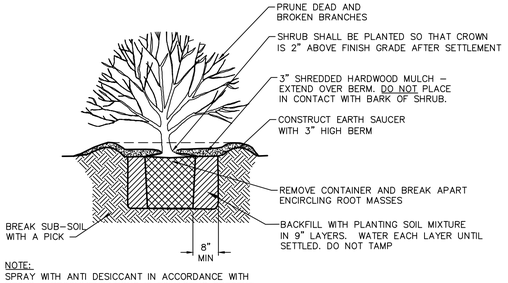
FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
SITE PLANTING PLAN
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 02/24/2023

LP-101

File: J:\DWG\P20220900\A10\Civil\Plan\20220900.A10_LND01.dwg Layout: LP-101 Plotted: 2023-03-09 11:58 AM Saved: 2023-03-09 11:58 AM User: MHuang
MS VIEW: | LAYER STATE: | PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB



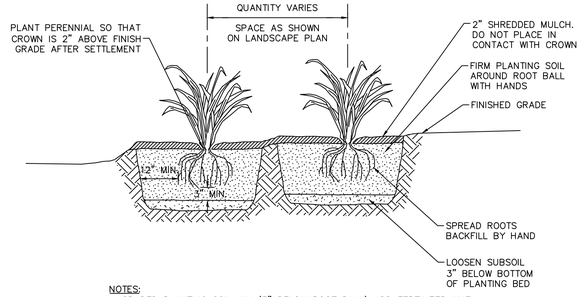
NOTE:
SPRAY WITH ANTI DESICCANT IN ACCORDANCE WITH MFG.'S RECOMMENDATIONS IF FOLIAGE IS PRESENT.

FOR CONTAINER GROWN SHRUBS, USE FINGERS OR SMALL HAND TOOLS TO PULL THE ROOTS OUT OF THE OUTER LAYER OF POTTING SOIL; THEN CUT OR PULL APART ANY ROOTS CIRCLING THE PERIMETER OF THE CONTAINER.

INCORPORATE COMMERCIALLY PREPARED MYCORRHIZA SPORES IN THE SOIL IMMEDIATELY AROUND THE ROOT BALL AT RATES SPECIFIED BY THE MANUFACTURER.

SHRUB PLANTING FOR CONTAINERIZED SHRUBS

Scale: N.T.S.



NOTES:
1. SPADED PLANTING SOIL MIX (3" BELOW ROOT BALL) ADD FERTILIZER WHEN MIXING. DO NOT COMPACT AFTER PLANTING.
2. WATER THOROUGHLY AFTER PLANTING.
3. PROVIDE WELL DRAINING SUBSOIL WHEN SOIL IS HEAVY OR COMPACTED.
4. FOR CONTAINER GROWN PLANTS, USE FINGERS OR SMALL HAND TOOLS TO PULL THE ROOTS OUT OF THE OUTER LAYER OF POTTING SOIL; THEN CUT OR PULL APART ANY ROOTS CIRCLING THE PERIMETER OF THE CONTAINER.

PERENNIAL PLANT BED

Scale: N.T.S.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE:
HORZ.: N/A
VERT.: N/A
DATUM:
HORZ.:
VERT.: NAVD88
0
GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fussoneill.com

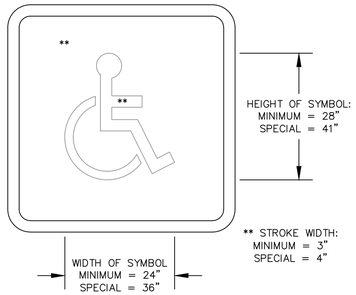
BRADY SULLIVAN PROPERTIES

LANDSCAPE DETAILS
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

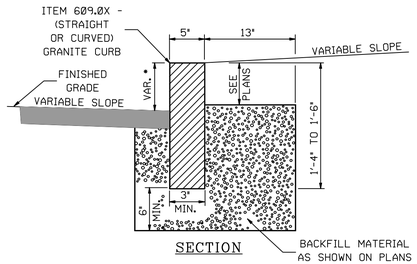
LD-101

File Path: J:\DWG\P20220900A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: LD-101 Plotted: Fri, March 10, 2023 - 11:38 AM User: bpratt
MS VIEW: LAYER STATE:
Plotter: DWG TO PDF.PC3 CTB File: FO.STB



Int'l Symbol of Accessibility Marking

N.T.S.



* NORMALLY 7" REVEAL, 0" AT PEDESTRIAN SIDEWALK RAMPS.

RADIUS	MAX. LENGTH
< 21'	USE CURVED CURB
21'	3'
22' - 28'	4'
29' - 35'	5'
36' - 42'	6'
43' - 49'	7'
50' - 56'	8'
57' - 60'	9'
OVER 60'	10'

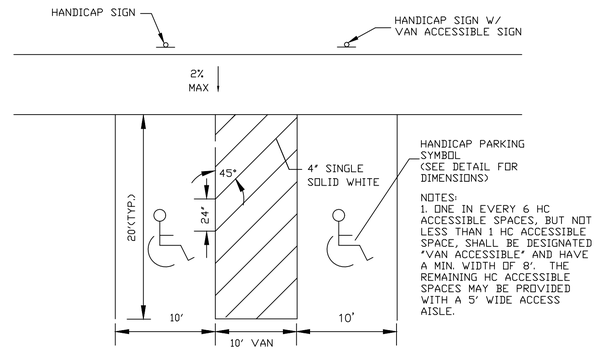
NOTE: ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.

MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES - SEE CHART

NOTES:
1. REFER TO NHDOT STANDARD PLAN CR-1 FOR ADDITIONAL INFORMATION.

NHDOT Granite Curb

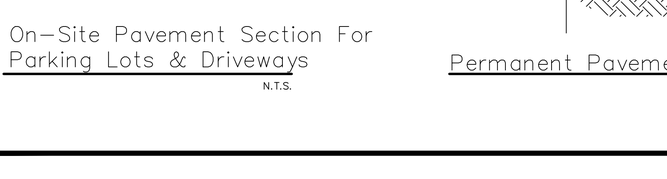
N.T.S.



NOTES:
1. ONE IN EVERY 6 HC ACCESSIBLE SPACES, BUT NOT LESS THAN 1 HC ACCESSIBLE SPACE, SHALL BE DESIGNATED 'VAN ACCESSIBLE' AND HAVE A MIN. WIDTH OF 8'. THE REMAINING HC ACCESSIBLE SPACES MAY BE PROVIDED WITH A 5' WIDE ACCESS AISLE.

Handicap Ramp & Striping Detail (Van Accessible)

N.T.S.



Typical Sidewalk Detail

N.T.S.

Reserved Parking
Handicap Sign

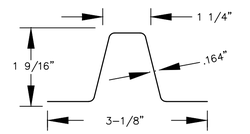
N.T.S.

NOTE: VAN ACCESSIBLE SIGN TO BE ATTACHED TO THE SIGN POST UNDER THE STANDARD HANDICAPPED PARKING SIGN WHERE NOTED ON DRAWINGS.

Reserved Parking – Handicap & Van Accessible Sign

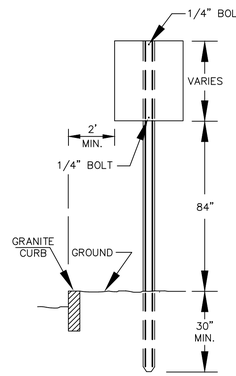
N.T.S.

LENGTH: P-12, 12'-0"; P-14, 14'-0"; P-16, 16'-0".
WEIGHT PER LINEAR FOOT: 2.50 LBS. (MIN.)
HOLES: 3/8" DIA. 1' C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070-1080).
FINISH: SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN, BAKED ON OR AIR DRIED. PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.



DIMENSIONS SHOWN ARE NOMINAL

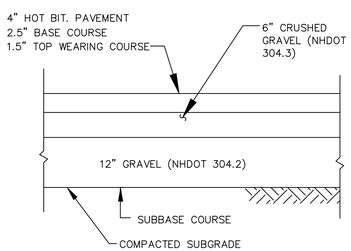
ALTERNATE SECTIONS MUST BE APPROVED PRIOR TO USE.



NOTES
1. POSTS SHALL BE PLUMB; ANY POST BENT OR OTHERWISE DAMAGED SHALL BE REMOVED AND PROPERLY REPLACED.
2. POSTS MAY BE SET OR DRIVEN. WHEN POSTS ARE SET, HOLES SHALL BE DUG TO THE PROPER DEPTH; AFTER INSERTING POSTS, THE HOLES SHALL BE BACK FILLED WITH SUITABLE MATERIAL IN LAYERS NOT TO EXCEED A 6" DEPTH, THOROUGHLY COMPACTED.
3. CARE SHALL BE TAKEN TO PRESERVE THE ALIGNMENT OF THE POST. WHEN POSTS ARE DRIVEN, A SUITABLE DRIVING CAP SHALL BE USED AND AFTER DRIVING THE TOP OF THE POST SHALL HAVE SUBSTANTIALLY THE SAME CROSS-SECTIONAL DIMENSION AS THE BODY OF THE POST; BATTERED HEADS WILL NOT BE ACCEPTED.
4. POSTS SHALL NOT BE DRIVEN WITH THE SIGN ATTACHED TO THE POST.
5. SIGNS SHALL BE ERECTED IN CONFORMANCE WITH THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
6. WHEN SIGN IS IN PLACE NO PART OF POST SHALL EXTEND ABOVE THE SIGN.

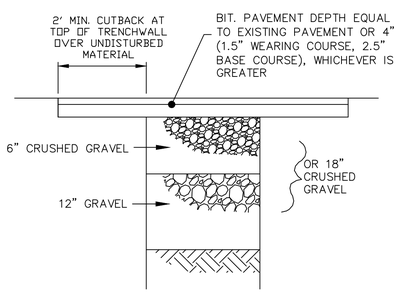
Sign Post

N.T.S.



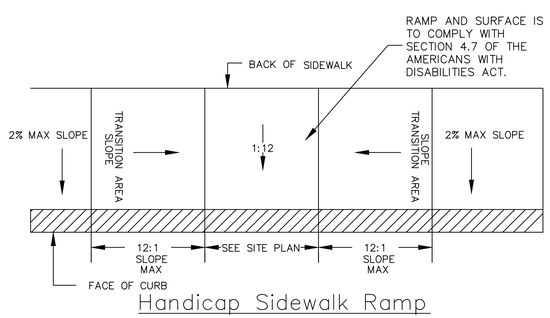
On-Site Pavement Section For Parking Lots & Driveways

N.T.S.



Permanent Pavement Repair

N.T.S.



Handicap Sidewalk Ramp

N.T.S.

No.	DESCRIPTION	DATE	DESIGNER REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: VERT.:
DATUM: HORZ.: NAD83
VERT.: NAVD88
0 GRAPHIC SCALE

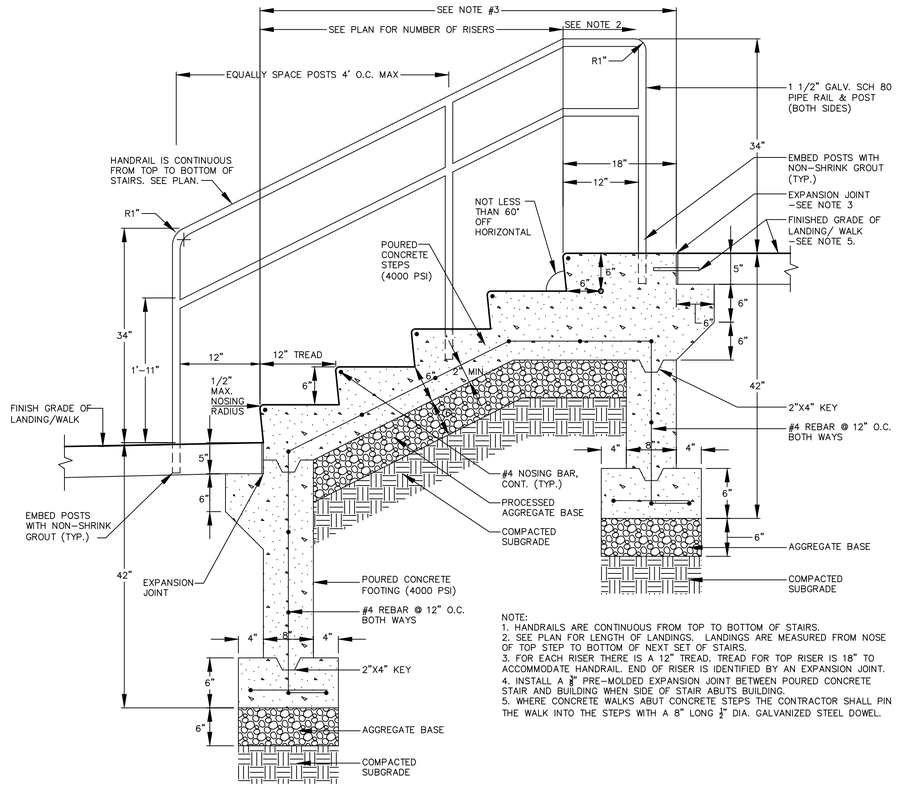
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS - PAVEMENT
SIDEWALK, SIGNAGE & CURBING
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-501

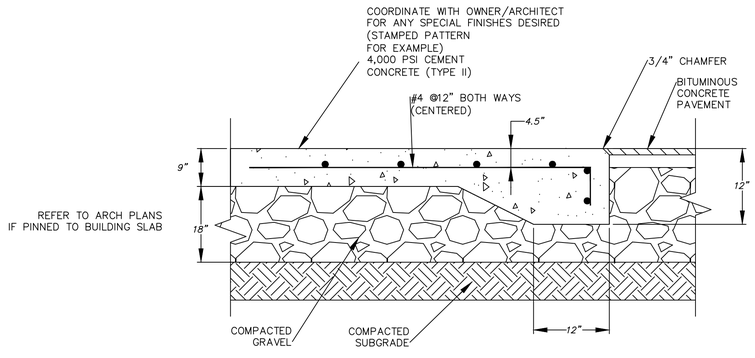
File Path: J:\DWG\P2022\09000\A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-501 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
MS VIEW: LAYER STATE: Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB



NOTE:
1. HANDRAILS ARE CONTINUOUS FROM TOP TO BOTTOM OF STAIRS.
2. SEE PLAN FOR LENGTH OF LANDINGS. LANDINGS ARE MEASURED FROM NOSE OF TOP STEP TO BOTTOM OF NEXT SET OF STAIRS.
3. FOR EACH RISER THERE IS A 12" TREAD. TREAD FOR TOP RISER IS 18" TO ACCOMMODATE HANDRAIL. END OF RISER IS IDENTIFIED BY AN EXPANSION JOINT.
4. INSTALL A ½" PRE-MOLDED EXPANSION JOINT BETWEEN POURED CONCRETE STAIR AND BUILDING WHEN SIDE OF STAIR ABUTS BUILDING.
5. WHERE CONCRETE WALKS ABUT CONCRETE STEPS THE CONTRACTOR SHALL PIN THE WALK INTO THE STEPS WITH A 8" LONG ½" DIA. GALVANIZED STEEL DOWEL.

(X) CONCRETE STEPS (12" TREAD) WITH HANDRAIL

SCALE: N.T.S.



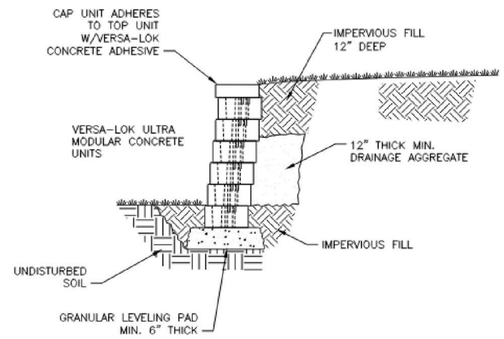
NOTES:
1. SIZE OF DUMPSTER OR DRIVE THROUGH PAD TO BE AS INDICATED ON PLANS. CONSTRUCTION JOINTS TO BE SET AT INTERVALS OF 1/3 OF LENGTH.

2. DETAIL PROVIDED FOR GENERAL INFORMATION ONLY. FINAL DESIGN TO BE BASED ON GEOTECHNICAL ENGINEERS RECOMMENDATIONS.

3) THE NEED FOR PLACEMENT OF A GEOTEXTILE OVER THE EXISTING FILL SUBGRADES SHOULD BE DETERMINED IN THE FIELD BY THE GEOTECHNICAL ENGINEER.

Concrete Pads at Doorways and Landings

N.T.S.



TYPICAL SECTION – UNREINFORCED RETAINING WALL

SCALE: 1/2"=1'

PRELIMINARY
THIS DRAWING IS PRELIMINARY AND SHOULD BE USED FOR ESTIMATING PURPOSES ONLY. A FINAL DESIGN SHOULD BE PERFORMED BY A QUALIFIED REGISTERED ENGINEER. DETERMINATION OF THE SUITABILITY OF ANY INFORMATION OR MATERIAL FOR THE USE CONTEMPLATED, AND ITS MANNER OF USE, IS THE SOLE RESPONSIBILITY OF THE USER.

VERSA-LOK® Retaining Wall Systems Solid Solutions.®
(800)770-4525 fax(651)770-4089
6348 Hwy36 Stel, Oakdale,MN 55128

VERSA-LOK ULTRA DETAILS
UNREINFORCED SECTION

SCALE: AS NOTED
DRAWN BY: PDL
CHECKED BY:
DATE: 8/2013
DWG. NO.: ULTRA UNREINFORCED Rev.

SHOP DRAWING TO BE PROVIDED PRIOR TO CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: VERT.:
DATUM: HORZ.: NAD88 VERT.: NAVD88
GRAPHIC SCALE 0

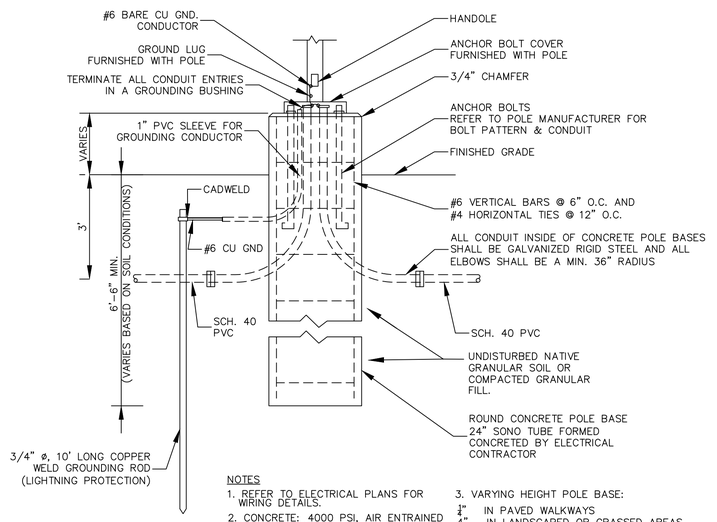
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fussoneill.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS - STAIRS, CONCRETE & RETAINING WALLS
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-502

File Path: J:\DWG\P20220900\A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-502 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:



NOTES

1. REFER TO ELECTRICAL PLANS FOR WIRING DETAILS.
2. CONCRETE: 4000 PSI, AIR ENTRAINED STEEL: 60 KSI
3. VARYING HEIGHT POLE BASE:
   - 4" IN PAVED WALKWAYS
   - 4" IN LANDSCAPED OR GRASSED AREAS (FURTHER THAN 2' FROM EDGE OF PAVE).
   - 30" IN PAVED AREAS (PAVED PARKING AREAS)

Light Pole Base Detail

(FOR 4 FULL SIZE FIXTURES)

N.T.S.

NOTES:

LIGHTING PLAN, DETAILS, AND SPECIFICATIONS PROVIDED BY:

EXPOSURE LIGHTING — CONTROLS — ELECTRICAL ESS
New England's Premier Lighting, Controls and Electrical Rep Agency
KENNETH SWEENEY | APPLICATIONS ENGINEER
Cell: 603.759.1043
6 SCOTT RD | HAMPTON, NH 03842 | 603.601.8080
EXPOSURE2LIGHTING.COM & ESS-LLC.US

Catalog # : Project : Type :
Prepared By : Date :

Steel Poles

Round Straight



QUICK LINKS

Ordering Guide | Configurations | Dimensions | EPA

FEATURES & SPECIFICATIONS

Pole Shaft
- Steel round poles are 4" or 5" in diameter.
- Pole shaft is electro-welded ASTM-A500 Grade C Steel Tubing with a minimum yield strength of 46,000 psi.
- On Tenon Mount steel poles, tenon is high-strength pipe. Tenon N option is 2-3/8" O.D. x 4-3/4" tall. Tenon 4N option is 4" O.D. x 4-7/8" tall.

Hand-Hole
- Standard hand-hole location is 12" above pole base.
- Poles 18' and above have a 3" x 6" reinforced hand-hole. Shorter poles have a 2" x 4" non-reinforced hand-hole.

Base
- Pole base is ASTM-A36 hot-rolled steel plate with a minimum yield strength of 36,000 psi.
- Two-piece square base cover is optional. Decorative base cover is also available.

Anchor Bolts
- Poles are furnished with anchor bolts featuring zinc-plated double nuts and washers. Galvanized anchor bolts are optional.
- Anchor Bolts conform to ASTM F 1554-07a Grade 55 with a minimum yield strength of 55,000 PSI.

Ground Lug
- Ground lug is standard.

Duplex Receptacle
- Weatherproof duplex receptacle is optional.

Ground Fault Circuit Interrupter
- Self-testing Ground fault circuit interrupter is optional.

Finishes
- Every pole is provided with the DuraGrip Protection System and a 5-year limited warranty:
- When the top-of-the line DuraGrip Plus Protection System is selected, in addition to the DuraGrip Protection System, a non-porous, automotive-grade corrosion coating is applied to the lower portion of the pole interior sealing and further protecting it from corrosion. This option extends the limited warranty to 7 years.

Determining The Luminaire/Pole Combination For Your Application:
- Select luminaire from luminaire ordering information.
- Select bracket configuration if required
- Determine EPA value from luminaire/ bracket EPA chart
- Select Pole Height
- Select MPH to match wind speed in the application area (See windspeed maps).
- Confirm pole EPA equal to or exceeding value of luminaire/bracket EPA
- Consult factory for special wind load requirements and banner brackets.

Pole Vibration Damper
- A pole vibration damper is recommended in open terrain areas of the country where low steady state winds are common.
- Non-tapered poles and lightly loaded poles are more susceptible to destructive vibration if a damper is not installed.

Listings
- UL Listed
- BAA/TAA Compliant

Catalog # : Project :
Prepared By : Date :

Enterprise (ENM4)

LED Decorative Post Top & Area Light



OVERVIEW	
Lumen Range	4,000 - 30,000
Wattage Range	39 - 228
Efficacy Range (LPW)	100 - 157
Weight lbs (kg)	64 (29)

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction
- Rugged die-cast aluminum housing.
- Cast aluminum wiring access door located in lower hub/fitter.
- Rigid die-cast aluminum arms for consistency and strength.
- Precision die cast aluminum heatsink and optical frame.
- Removable spun aluminum cap/driver enclosure is retained by captive stainless steel fasteners and safety cables. Housing and top cap interface is sealed with a one-piece extruded silicone gasket. Tool-less entry option is available.
- All exposed fasteners are black oxide coated stainless steel. Internal fasteners are stainless steel or zinc electroplated steel.
- IP65 rated luminaire protects integral components from harsh environments.
- 1.5G rated for ANSI C136.31 high vibration applications
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.

Optical System
- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated sealed optical chamber in 1 component.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in IES Types 2, 3, 5W and FT.
- Silicone optical material does not yellow or crack with age and provides a minimum light transmittance of 93%.
- Optical distributions are field rotatable (in 90° increments).
- Available in 5000K, 4000K, and 3000K (+/- 275K) color temperatures.
- Minimum CRI of 70. Consult Factory for Higher CRI requirements.
- Integral Louver (IL) option available for improved back-light control without sacrificing street side performance.

Electrical
- High-performance driver features over-voltage, under-voltage, short-circuit and over temperature protection.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 Vac) Input 50/60 Hz or optional High Voltage (347-480 Vac).
- L70 Calculated Life: >100k Hours (See Lumen Maintenance on Page 2)
- Total harmonic distortion: <20%
- Operating temperature: - -40°C to +50°C (-40°F to +122°F)
- Power factor: > 90
- Input power stays constant over life.
- Field replaceable surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Terminal block provided accepts up to 10ga wire, however the luminaire is supplied with a 32" 3 conductor wire harness.
- Components are fully encased in potting material for moisture resistance. Driver complies with FCC standards. Driver and key electronic components can easily be accessed.

Controls
- 7-pin ANSI C136.41-2013 photocontrol receptacle option available for twist lock photocontrols or wireless control modules.
- Optional integral passive infrared Bluetooth™ motion and photocell sensor. Fixtures operate independently and can be commissioned via iOS or Android configuration app (See page 5 for more detail).

Installation
- Post top version mounts to 4" O.D. pole or tenon and secures to pole with 6 stainless steel set screws (32' wire leads provided for ease of wiring).
- Side arm version Utilizes LSI's B3 drill pattern

Warranty
- LSI LED Fixtures carry a 5-year warranty.

Listings
- Listed to UL 1598 and UL 8750
- State of California Title 24
- Meets Buy American Act requirements
- Suitable For wet Locations
- IP65 rated Luminaire. IP66 rated optical chamber.
- 1.5G rated for ANSI C136.31 high vibration applications

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: VERT.:
DATUM: HORZ.: NAVD88 VERT.:
0 GRAPHIC SCALE

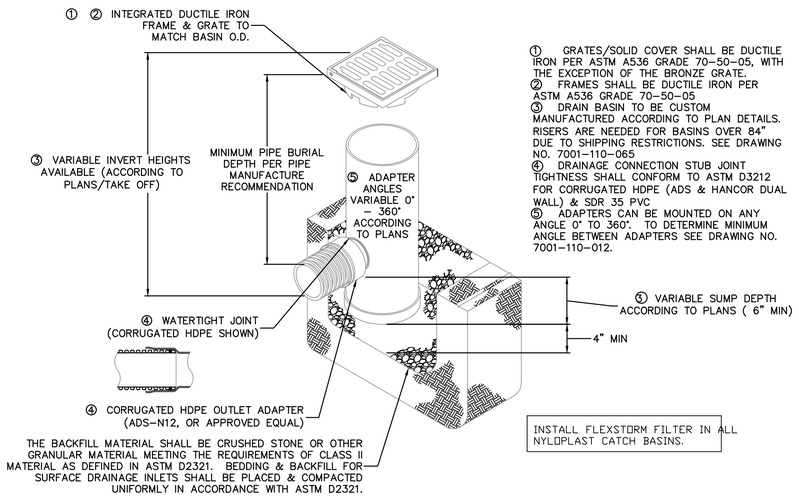
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS - SITE LIGHTING
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-503

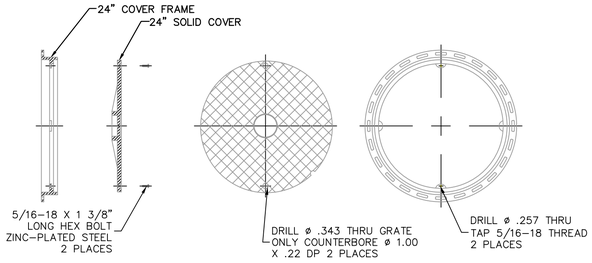
File Path: J:\DWG\P20220900A10\CivilPlan\20220900.A10_DTLS01.dwg Layout: CD-503 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
MS VIEW: LAYER STATE: Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: F.O.STB



① GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70–50–05, WITH THE EXCEPTION OF THE BRONZE GRATE.
② FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70–50–05
③ DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001–110–065
④ DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
⑤ ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001–110–012.

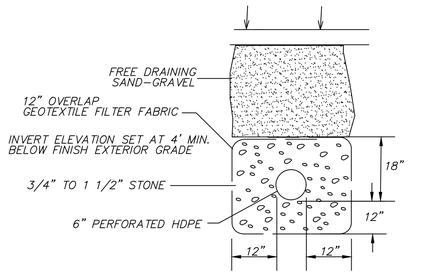
Nyloplast 12"–24" Drain Basin Installation Detail
(or Approved Equal)

N.T.S.



24" Nyloplast Solid Locking Cover

N.T.S.

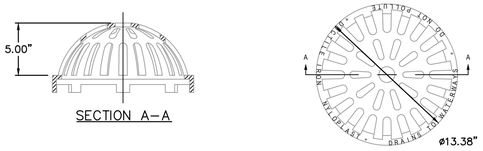


1 / 02620 Underdrain Detail

N.T.S.

1299CGD

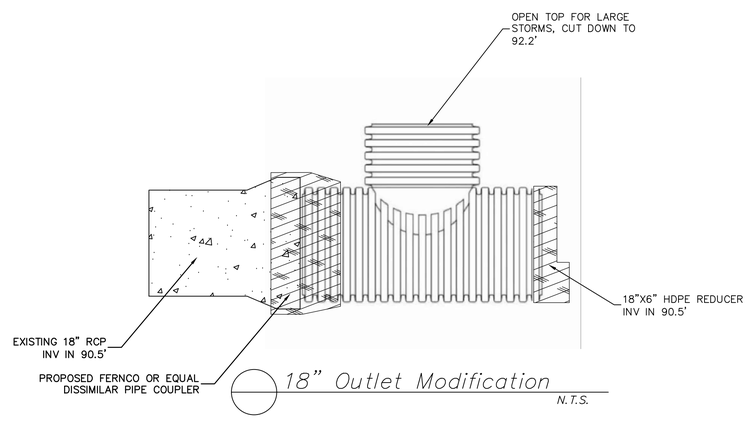
APPROX. DRAIN AREA = 82.87 SQ IN
APPROX. WEIGHT = 18.50 LBS



DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70–50–05
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST

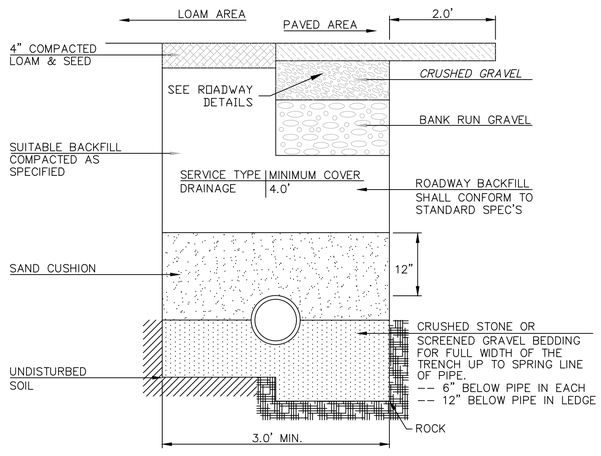
12" Nyloplast Dome Grate

N.T.S.



18" Outlet Modification

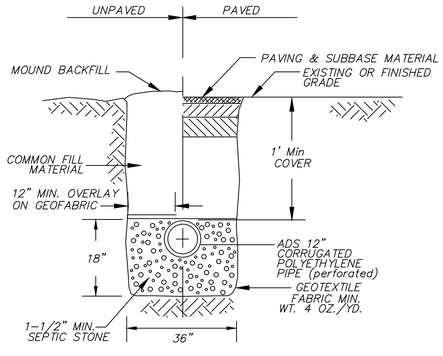
N.T.S.



NOTES:
1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS. DEPTH FOR BITUMINOUS PAVEMENT SHALL BE AS SPECIFIED IN PAVEMENT DETAIL.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPECIFICATIONS.
3. IN LIEU OF THE 12" GRAVEL COURSE AND 6" CRUSHED GRAVEL, 18" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.
6. USE CLASS V CONCRETE IN LOCATIONS WITH LESS THAN 3' OF COVER.
7. IF LEDGE IS DISCOVERED, REMOVE A MINIMUM OF 2' BELOW GRAVELS AND REPLACE WITH SAND.

6 / 02315 Typical Drainage Trench Detail

N.T.S.



3 / 02620 Perforated HDPE Exfiltration Trench Detail

N.T.S.

ADS® N-12® 1866AN Dual Wall Fabricated Tee, 18 in, Plain End, HDPE



ADS®
N-12® 18 x 6 in. Plain End Corrugated HDPE Reducer
Part #A1871AN | Item #689378 | Manufacturer Part #1871AN

No.	DATE	DESCRIPTION	DESIGNER REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: VERT.: | DATUM: HORZ.: VERT.: NAVD88 | 0 GRAPHIC SCALE

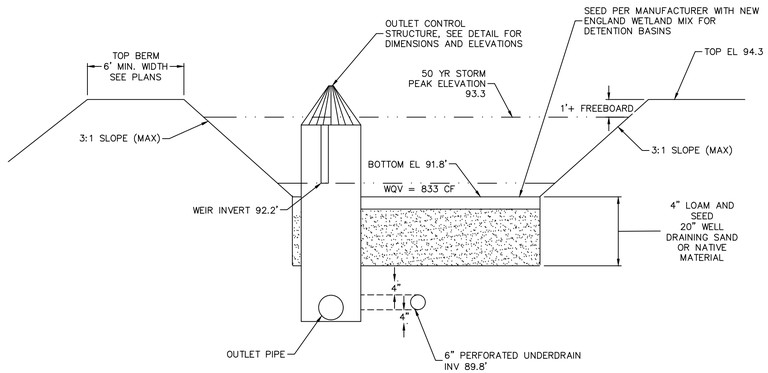
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS
STORMWATER
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

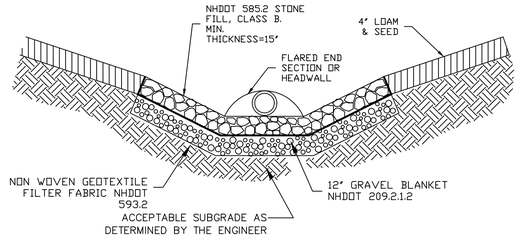
CD-504

File Path: J:\DWG\P2022\09000A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-504 Plotted: Thu, March 16, 2023 - 12:46 PM User: bpratt
MS VIEW: | LAYER STATE: | Plotter: DWG TO PDF.PC3 CTB File: FO.STB

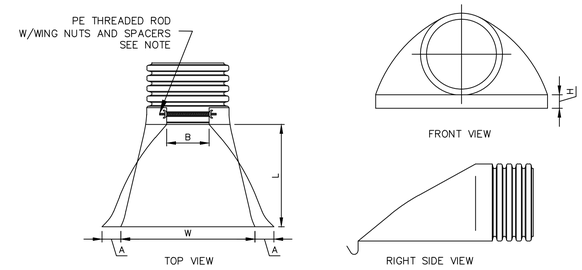


Infiltration Pond Detail

N.T.S.



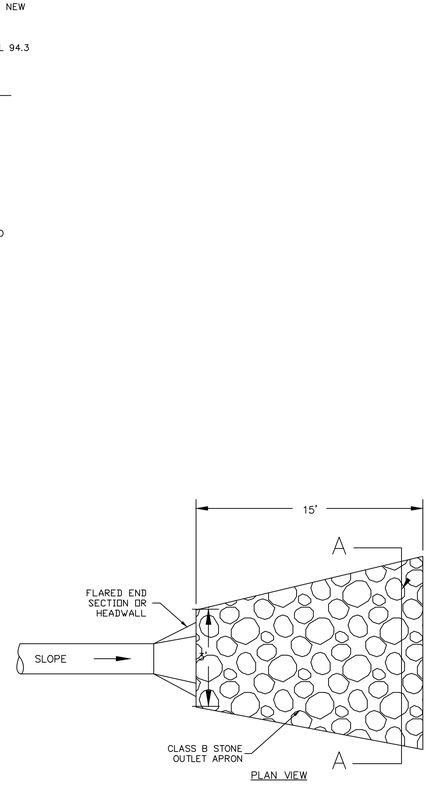
SECTION A–A



NOTE: PE THREADED ROD W/WING NUTS PROVIDED FOR END SECTIONS 12"-24", 30" & 36" END SECTIONS REQUIRE TWO (2) THREADED RODS FOR ASSEMBLE.

ADS Flared End Section

N.T.S.

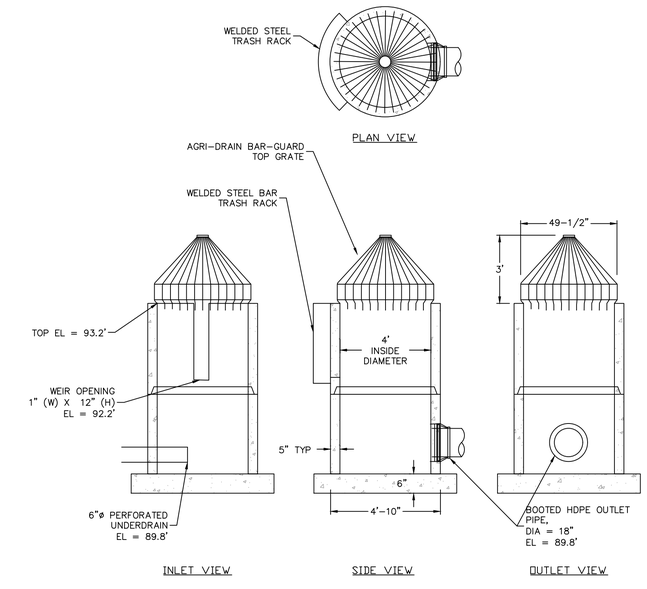


PLAN VIEW

THE HEIGHT OF THE STRUCTURAL LINING ALONG THE CHANNEL SIDES SHALL BEGIN AT THE ELEVATION EQUAL TO THE TOP OF THE CONDUIT AND TAPER DOWN TO THE CHANNEL BOTTOM THROUGH THE LENGTH OF THE APRON.

Stone Outlet Protection

N.T.S.



GENERAL NOTES:

1. STEEL REINFORCEMENT CONFORMING TO THE LATEST ASTM SPECIFICATION: ASTM A-615, GRADE 60 BLACK DEFORMED BARS, ASTM A-185 WELDED WIRE FABRIC, 0.12 SQ IN/LINEAL FT AND 0.12 SQ IN. (BOTH WAYS) BASE BOTTOM.
2. CONCRETE: fc=4,000 PSI @ 28 DAYS MINIMUM, TYPE III CEMENT.
3. BUTYL RUBBER JOINT SEALANT CONFORMING TO ASTM C-990 AND FEDERAL SPEC SS-S-210A.
4. HS-20 DESIGN LOADING TO CONFORM TO LATEST SPECIFICATIONS ASTM C478, AASHTO M199 PRECAST REINFORCED CONCRETE MANHOLE SECTIONS
5. ONE POUR MONOLITHIC BASE SECTION.

Infiltration Pond Outlet Structure Detail

N.T.S.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: VERT.:
DATUM: HORZ.: NAVD88 VERT.:
0 GRAPHIC SCALE

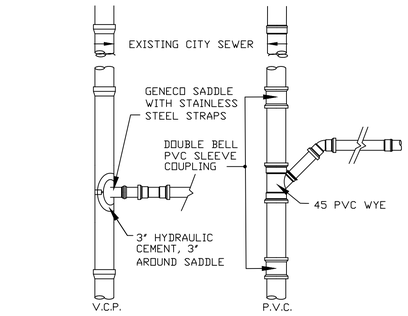
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS
STORMWATER POND
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

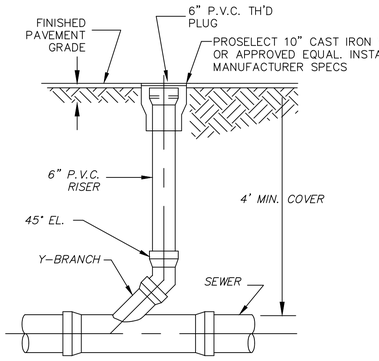
CD-505

File Path: J:\DWG\P2022\0900\A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-505 Plotted: Wed, March 15, 2023 - 4:57 PM User: bpratt
Plotter: DWG TO PDF.PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:



Typical Sewer Connection

N.T.S.



3 / 02530 Sewer Cleanout

N.T.S.

GRAVITY SEWER TESTING REQUIREMENTS

(A) ALL NEW GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.

(B) LOW-PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH THE FOLLOWING TESTING STANDARDS IN EFFECT AT THE TIME THE TEST IS CONDUCTED:

(1) ASTM F1417 "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW-PRESSURE AIR", AVAILABLE AS NOTED IN APPENDIX D; OR

(2) UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, "LOW-PRESSURE AIR TESTING OF INSTALLED SEWER PIPE", AVAILABLE AS NOTED IN APPENDIX D.

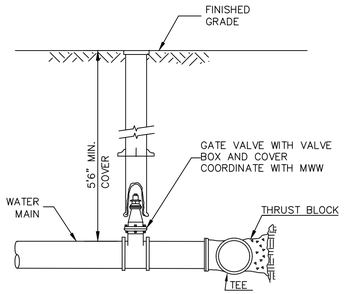
(C) ALL NEW GRAVITY SEWERS SHALL BE:

(1) CLEANED AND VISUALLY INSPECTED USING A LAMP TEST AND BY INTRODUCING WATER TO DETERMINE THAT THERE IS NO STANDING WATER IN THE SEWER; AND

(2) TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE. NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES 15 ENV-WQ 700

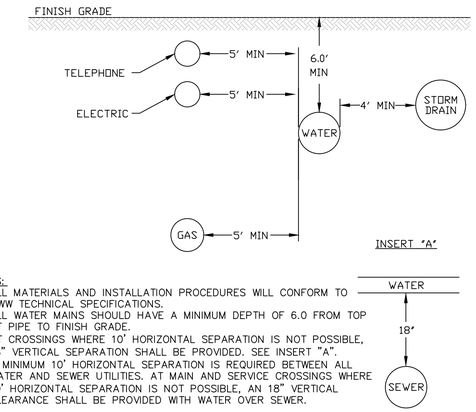
(D) ALL PLASTIC SEWER PIPE SHALL BE VISUALLY INSPECTED AND DEFLECTION TESTED NOT LESS THAN 30 DAYS NOR MORE THAN 90 DAYS FOLLOWING INSTALLATION.

(E) THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5% PERCENT OF AVERAGE INSIDE DIAMETER. A RIGID BALL OR MANDREL WITH A DIAMETER OF AT LEAST 95% OF THE AVERAGE INSIDE PIPE DIAMETER SHALL BE USED FOR TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.



Buried Gate Valve Detail

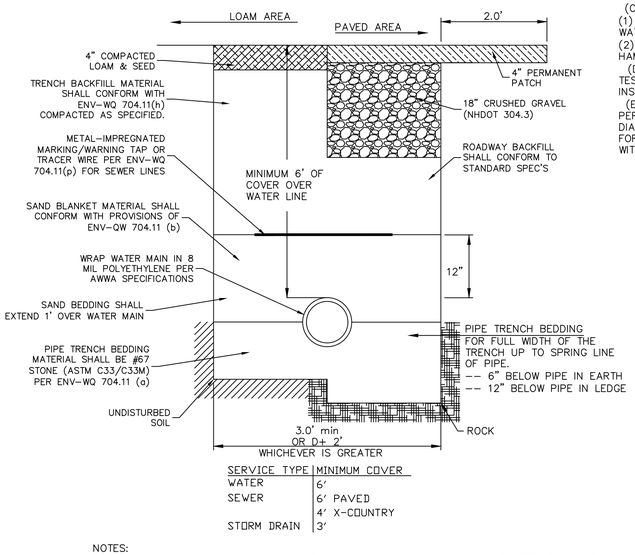
N.T.S.



NOTES:
1. ALL MATERIALS AND INSTALLATION PROCEDURES WILL CONFORM TO MWW TECHNICAL SPECIFICATIONS.
2. ALL WATER MAINS SHOULD HAVE A MINIMUM DEPTH OF 6.0 FROM TOP OF PIPE TO FINISH GRADE.
3. AT CROSSINGS WHERE 10' HORIZONTAL SEPARATION IS NOT POSSIBLE, 18" VERTICAL SEPARATION SHALL BE PROVIDED. SEE INSERT "A".
4. A MINIMUM 10' HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL WATER AND SEWER UTILITIES. AT MAIN AND SERVICE CROSSINGS WHERE 10' HORIZONTAL SEPARATION IS NOT POSSIBLE, AN 18" VERTICAL CLEARANCE SHALL BE PROVIDED WITH WATER OVER SEWER.

Water Main-Numerous Details Separation

N.T.S.

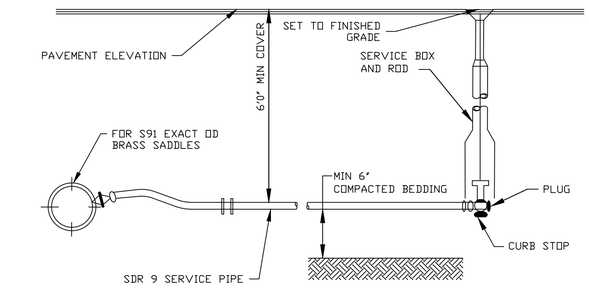


SERVICE TYPE	MINIMUM COVER
WATER	6'
SEWER	6' PAVED
	4' X-COUNTRY
STORM DRAIN	3'

NOTES:
1. PAVEMENT REPAIR IN EXISTING ROADWAYS SHALL CONFORM TO STREET OPENING REGULATIONS. DEPTH FOR BITUMINOUS PAVEMENT SHALL BE AS SPECIFIED IN PAVEMENT DETAIL.
2. NEW ROADWAY CONSTRUCTION SHALL CONFORM TO SUBDIVISION SPECIFICATIONS.
3. IN LIEU OF THE 12" GRAVEL COURSE AND 9" CRUSHED GRAVEL, 18" OF CRUSHED GRAVEL OR RECLAIMED STABILIZED BASE MAY BE USED AS A BASE FOR THE PAVEMENT REPAIR.
4. MATERIAL SHALL BE REPLACED IN KIND WHENEVER POSSIBLE.
5. A MINIMUM 2' CUTBACK IS REQUIRED AT THE TOP OF THE TRENCH WALL OVER UNDISTURBED MATERIAL.
6. ALL BACK FILL MATERIAL PLACED IN TRENCHES SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 6" IN COMPACTED THICKNESS AT NEAR OPTIMUM MOISTURE CONTENT USING PNEUMATIC TAMPERS, VIBRATORY COMPACTORS OR OTHER APPROVED MEANS. THE MATERIAL SHALL BE COMPACTED TO NO LESS THAN 95% OF AASHTO METHOD OF TEST T99, METHOD C. WATER SHALL BE UNIFORMLY APPLIED DURING COMPACTION IN THE AMOUNT NECESSARY FOR PROPER CONSOLIDATION, BUT PUDDLING WILL NOT BE ALLOWED.
7. NEW WATER CONSTRUCTION SHALL CONFORM TO DOVER VILLAGE WATER PRECINCT REGULATIONS, SPECIFICATIONS AND POLICIES.
8. TRENCHES FOR SEWER CONSTRUCTION SHALL MEET THE REQUIREMENTS OF ENV-WQ 704.11. PIPE TRENCH BEDDING MATERIAL SHALL BE #67 STONE (ASTM C33/C33M) PER ENV-WQ 704.11(A). SAND BLANKET MATERIAL SHALL CONFORM WITH PROVISIONS OF ENV-WQ 704.11(B). TRENCH BACKFILL MATERIAL SHALL CONFORM WITH ENV-WQ 704.11(H).
9. GRAVITY SEWER CONSTRUCTION MATERIALS SHALL MEET THE REQUIREMENTS OF ENV WQ. 704.05. PVC PIPE SHALL CONFORM WITH ASTM D3034 AND ASTM D2412 AND PVC JOINTS SEALS SHALL CONFORM WITH ASTM D3212.

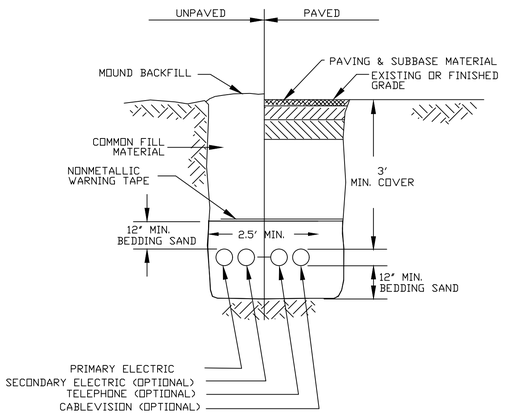
Typical Trench Detail

N.T.S.



Typical Water Service Connection

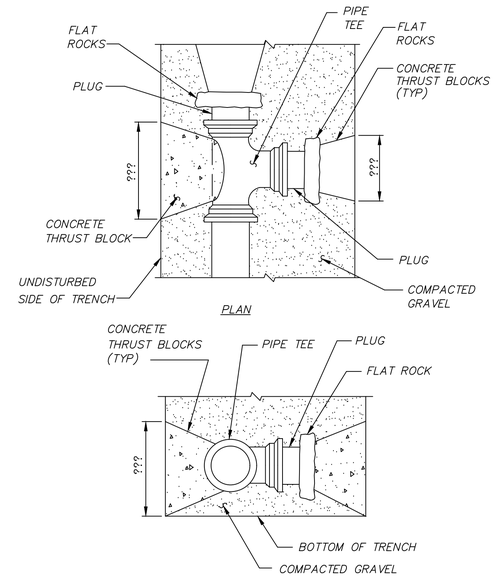
N.T.S.



Utility Trench

N.T.S.

UTILITY TRENCH MAY VARY. CONTRACTOR SHALL COORDINATE INSTALLATION WITH EACH UTILITY COMPANY AND INSTALL PER THEIR SPECIFICATIONS AND REQUIREMENTS.



7 / 02510 Typical Tees & Plugs Installation

N.T.S.

No.	DESCRIPTION	DATE	DESIGNER REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: VERT.: DATUM: HORZ.: VERT.: NAVD88 0 GRAPHIC SCALE

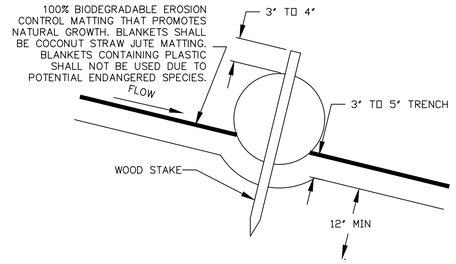
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS
UTILITIES
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

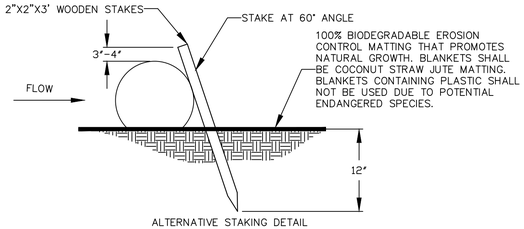
PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-506

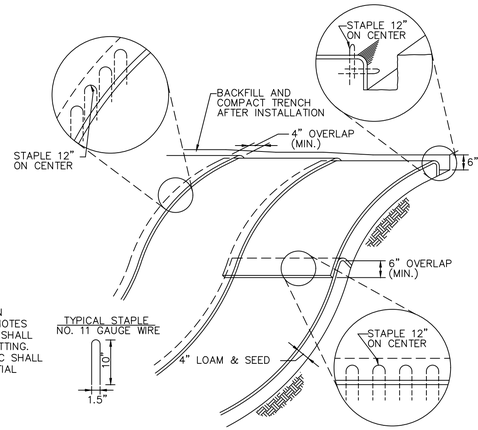
File Path: J:\DWG\P2022\09000A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-506 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:



ALTERNATIVE STAKING DETAIL



ALTERNATIVE STAKING DETAIL

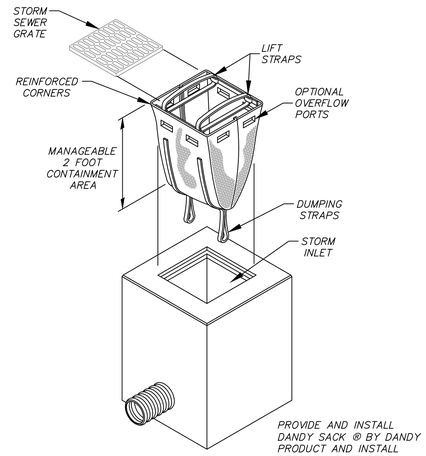


Erosion Control Blanket Slope Protection

N.T.S.

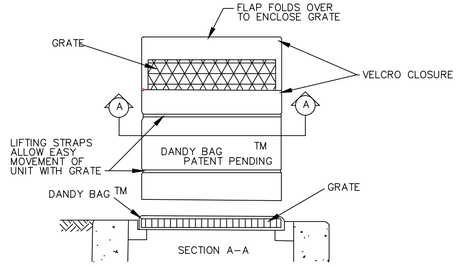
NOTES:

1. 100% BIODEGRADABLE EROSION CONTROL MATTING THAT PROMOTES NATURAL GROWTH. BLANKETS SHALL BE COCONUT STRAW JUTE MATTING. BLANKETS CONTAINING PLASTIC SHALL NOT BE USED DUE TO POTENTIAL ENDANGERED SPECIES.
2. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH. BACKFILL AND COMPACT TRENCH AFTER STAPLING.
3. ROLL THE BLANKET DOWN THE SWALE IN THE DIRECTION OF THE WATER FLOW.
4. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SWALE, PLACE BLANKET END OVER END WITH 6 INCH (MIN.) OVERLAP AND ANCHOR DOWN SLOPE BLANKET IN A 6 INCH DEEP TRENCH.
6. BLANKETS SHALL BE COCONUT STRAW JUTE MATTING. COORDINATION WITH FISH & GAME RESULT IN BLANKETS CONTAINING PLASTIC SHALL NOT BE USED DUE TO POTENTIAL ENDANGERED SPECIES.



Dandy Sack

N.T.S.



INSTALLATION:
STAND GRATE ON END. PLACE DANDY BAG OVER GRATE.
ROLL GRATE OVER SO THAT OPEN END IS UP.
PULL UP SACK.
TUCK FLAP IN PREE VELCRO STRIPS TOGETHER. BE SURE END OF GRATE IS COMPLETELY COVERED BY FLAP OR DANDY BAG WILL NOT WORK PROPERLY.
HOLDING HANDLES, CAREFULLY PLACE DANDY BAG WITH GRATE INSERTED INTO CATCH BASIN FRAME.

MAINTENANCE:
WITH A STIFF BRISTLE BROOM OR SQUARE POINT SHOVEL REMOVE SILT & OTHER DEBRIS OFF SURFACE AFTER EACH EVENT. REMOVE FINE MATERIAL FROM INSIDE ENVELOPE AS NEEDED.
(CONTACT DANDY PRODUCTS INC. 1–800–591–2284)

Dandy Bag

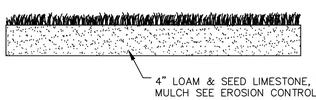
N.T.S.

COMPOST FILTER SOCK GENERAL NOTES:

1. NHF&G REQUIRES WHITE FILTREXX DEGRADABLE WOVEN SILT SOCK OR APPROVED EQUAL
2. FOR DITCH APPLICATIONS, MINIMUM INSTALLED HEIGHT OF SINGLE SOCK NOMINALLY. SOCKS ARE PLACED PERPENDICULAR TO FLOW OF WATER. FILTER SOCKS SHALL CONTINUE UP SIDE SLOPES TO TOP OF BANK OR MAXIMUM 3–FEET ABOVE INSTALLED HEIGHT. FILTER SOCKS SHALL REMAIN IN PLACE UNTIL ALL UPSTREAM AREAS ARE PERMANENTLY STABILIZED.
3. REMOVE SEDIMENT FROM BEHIND THE FILTER SOCK ONCE IT ACCUMULATES TO ONE–HALF OF THE ORIGINAL HEIGHT OF THE FILTER SOCK.
4. INSPECT FILTER SOCKS AFTER EACH RUNOFF EVENT. REMOVE AND REPLACE IF SIGNS OF UNDERCUTTING OR DOWNSTREAM RILLS ARE OBSERVED.
5. SOCKS SHOULD BE REMOVED FROM SLOPES AFTER STABILIZATION IS COMPLETE UNLESS DIRECTED OTHERWISE.
6. FILTER SOCKS APPLIED IN DITCHES SHALL BE COMPLETELY REMOVED ONCE VEGETATION IS ESTABLISHED.

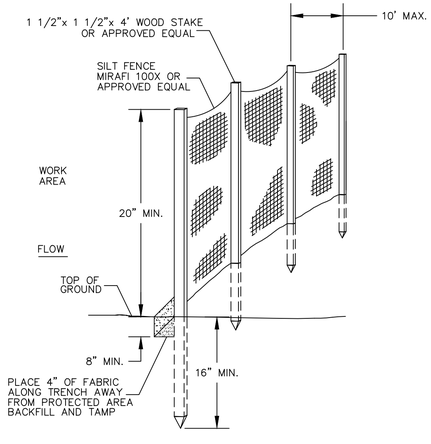
Compost Filter Sock Installation Detail

N.T.S.



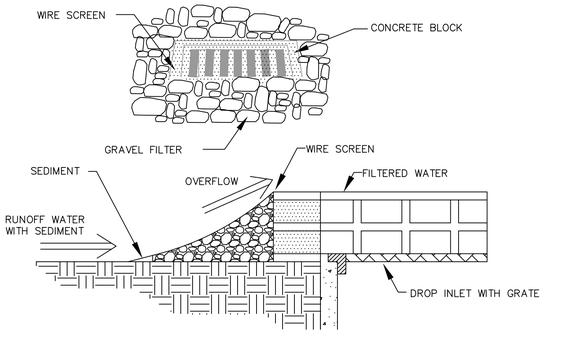
Loam & Seed Detail

N.T.S.



Silt Fence Barrier

N.T.S.



Block and Gravel Inlet Sediment Filter

N.T.S.

COLD WEATHER SITE STABILIZATION

PER ENV–WQ 1505.06 – COLD WEATHER SITE STABILIZATION.

A. TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE ADDITIONAL STABILIZATION TECHNIQUES SPECIFIED IN THIS SECTION SHALL BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15 THROUGH MAY 1.
B. SUBJECT TO (C), BELOW, THE AREA OF EXPOSED, UNSTABILIZED SOIL SHALL BE:
   1. LIMITED TO ONE ACRE; AND
   2. PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT.
C. THE ALLOWABLE AREA OF EXPOSED SOIL MAY BE INCREASED IF A WINTER CONSTRUCTION PLAN IS DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST AND SUBMITTED TO THE DEPARTMENT FOR APPROVAL AS A REQUEST TO WAIVE THE ONE–ACRE LIMIT.
D. SUBJECT TO (F) AND (G), BELOW, ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF LESS THAN 15% THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH 3 TO 4 TONS OF HAY OR STRAW MULCH PER ACRE SECURED WITH ANCHORED NETTING OR TACKIFIER OR WITH AT LEAST 2 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV–WQ 1506.05(B).
E. SUBJECT TO (F) AND (G), BELOW, ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF 15% OR GREATER THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH A PROPERLY INSTALLED AND ANCHORED EROSION CONTROL BLANKET OR WITH AT LEAST 4 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV–WQ 1506.05(B).
F. ANCHORED HAY MULCH OR EROSION CONTROL MIX THAT MEETS THE CRITERIA OF ENV–WQ 1506.05(B) SHALL NOT BE INSTALLED OVER SNOW GREATER THAN ONE INCH IN DEPTH.
G. EROSION CONTROL BLANKETS SHALL NOT BE INSTALLED OVER SNOW GREATER THAN ONE INCH IN DEPTH OR ON FROZEN GROUND.
H. ALL PROPOSED STABILIZATION IN ACCORDANCE WITH (D) OR (E), ABOVE, SHALL BE COMPLETED WITHIN A DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS.
I. ALL DITCHES OR SWALES THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, AS DETERMINED BY THE OWNER'S ENGINEERING CONSULTANT.
J. AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING AREAS WHERE ACTIVE CONSTRUCTION OF THE ROAD OR PARKING AREA HAS STOPPED FOR THE WINTER SEASON SHALL BE PROTECTED WITH A MINIMUM 3–INCH LAYER OF BASE COURSE GRAVELS MEETING THE GRADATION REQUIREMENTS OF NHDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2016, TABLE 304–1, ITEM NO. 304.1, 304.2, OR 304.3, AVAILABLE AS NOTED IN APPENDIX B.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: N/A VERT.: N/A
DATUM: HORZ.: VERT.: NAVD88
0 GRAPHIC SCALE

FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fussoneill.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS
EROSION CONTROL
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-507

File Path: J:\DWG\P2022\0900\A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-507 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
MS VIEW: LAYER STATE:
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB

INVASIVE SPECIES NOTE

1. THE CONTRACTOR SHALL TAKE STEPS TO PREVENT THE SPREAD OF INVASIVE PLANT, INSECT, AND FUNGAL SPECIES BY MEETING THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO INVASIVE SPECIES. http://gencourt.state.nh.us/rules/state_agencies/agr3800.html

DUST CONTROL NOTE

1. THE CONTRACTOR SHALL, IN ACCORDANCE WITH ENV–A 1000 "....TAKE PRECAUTIONS THROUGHOUT THE DURATION OF THE ACTIVITY IN ORDER TO PREVENT, ABATE, AND CONTROL THE EMISSION OF FUGITIVE DUST INCLUDING BUT NOT LIMITED TO WETTING, COVERING, SHIELDING, OR VACUUMING."

MAINTENANCE NOTES

SILT FENCE/ FILTER SOCK

1. SILT FENCE/ FILTER SOCK SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE OR THE FILTER SOCK SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE OR FILTER SOCK, THE FABRIC OR FILTER SOCK SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE–HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

BLOCK & GRAVEL INLET SEDIMENT FILTER

1. ALL STRUCTURES SHOULD BE INSPECTED AFTER EVERY RAIN STORM AND REPAIRS MADE AS NECESSARY. SEDIMENT SHOULD BE REMOVED FROM THE TRAPPING DEVICES AFTER THE SEDIMENT HAS REACHED A MAX. OF 1/2 THE DEPTH OF THE TRAP. THE SEDIMENT SHOULD BE DISPOSED OF IN A SUITABLE AREA AND PROTECTED FROM EROSION BY EITHER STRUCTURAL OR VEGETATIVE MEANS. THE TEMPORARY TRAPS SHOULD BE REMOVED AND THE AREA REPAIRED AS SOON AS THE CONTRIBUTING DRAINAGE AREA TO THE INLET HAS BEEN COMPLETELY STABILIZED.

TYPICAL EROSION CONTROL NOTES

DURING CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED:

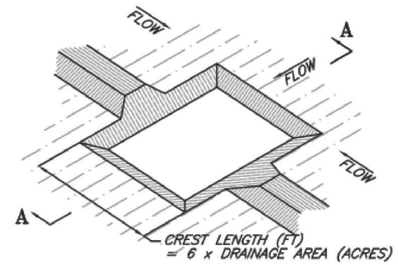
1. INSTALLATION OF PERIMETER CONTROLS (SILT FENCE OR FILTER SOCK) SHALL BE COMPLETED PRIOR TO THE START OF SITE WORK IN ANY GIVEN AREA. PREFABRICATED SILT FENCES SHALL BE INSTALLED ACCORDING TO THE MANUFACTURES' RECOMMENDATIONS.
2. PERIMETER CONTROLS SHALL BE KEPT CLEAN DURING CONSTRUCTION AND REMOVED WHEN ALL SLOPES HAVE A HEALTHY STAND OF VEGETATIVE COVER. EROSION CONTROL MEASURES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EVERY RAINFALL.
3. EXISTING VEGETATION IS TO REMAIN UNDISTURBED WHEREVER POSSIBLE.
4. NO MORE THAN FIVE ACRES OF LAND SHALL BE LEFT DISTURBED AT ANY ONE TIME. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 72 HOURS AFTER FINAL GRADING.
5. STABILIZATION SHALL INCLUDE THE FOLLOWING, AT A MINIMUM:
   A. INSTALLATION OF BASE COURSE GRAVELS (IN PAVED AREAS)
   B. MIN. 85% VEGETATED GROWTH
   C. INSTALLATION OF STONE OR RIP RAP MATERIAL (3" MIN. DEPTH)
   D. PROPERLY INSTALLED EROSION CONTROL BLANKETS
6. ALL DISTURBED AREAS SHALL HAVE A MINIMUM OF 4" OF LOAM INSTALLED WITH NOT LESS THAN 1.1 POUNDS OF SEED MIX PER 1,000 SQ. FT. SEED MIXTURE SHALL BE:

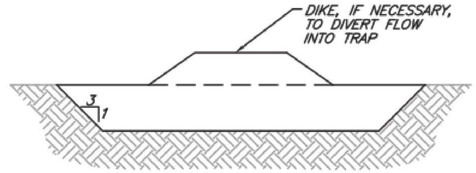
PERMANENT	
TALL FESCUE	0.45 LBS.
CREEPING RED FESCUE	0.45 LBS.
BIRDSFOOT TREFOIL	0.20 LBS.
TEMPORARY	
ANNUAL RYEGRASS	1.10 LBS.

7. LIME AND FERTILIZER SHALL BE INCORPORATED INTO THE SOIL PRIOR TO SEEDING. A MINIMUM OF 2 TONS PER ACRE OF AGRICULTURAL LIMESTONE AND 500 LBS. PER ACRE OF 10–20–20 FERTILIZER SHALL BE APPLIED. SEEDING PRACTICES SHALL COMPLY WITH LOCAL USDA SOIL CONSERVATION SERVICES RECOMMENDATIONS.
8. HAY MULCH OR JUTE MATTING SHALL BE USED WHERE INDICATED ON THE PLANS. A MINIMUM OF 1.5 TONS OF MULCH PER ACRE SHALL BE APPLIED. MULCH SHALL BE ANCHORED IN PLACE WHERE NECESSARY. JUTE MATTING SHALL BE LAID IN THE DIRECTION OF RUNOFF FLOW AND APPLIED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
9. PERMANENT OR TEMPORARY COVER MUST BE IN PLACE BEFORE THE GROWING SEASON ENDS. WHEN SEEDED AREAS ARE MULCHED, PLANTINGS BAY BE MADE FROM EARLY SPRING TO EARLY OCTOBER. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 15 TO SEPTEMBER 15. NO DISTURBED AREA SHALL BE LEFT EXPOSED DURING WINTER MONTHS, PLANT ANNUAL RYE GRASS PRIOR TO OCTOBER 15TH.
10. THE LAND AREA EXPOSED SHOULD BE KEPT TO THE SHORTEST PRACTICAL PERIOD OF TIME AND SHALL NOT REMAIN EXPOSED MORE THAN 45 DAYS FROM INITIAL DISTURBANCE.
11. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED
12. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
    - BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
    - A MINIMUM OF 85% OF VEGETATED GROWTH HAS BEEN ESTABLISHED
    - A MINIMUM OF 3" NON EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED
    - EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
13. ALL CONTRIBUTING WATERSHED AREAS MUST BE FULLY STABILIZED PRIOR TO DIRECTING STORMWATER TO THEM.
14. ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY 0.25" OR GREATER RAINFALL WITHIN A 24–HOUR PERIOD.
15. TEMPORARY WATER DIVERSION (SEDIMENT BASINS, SWALES, ETC.) MUST BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
16. CUT AND FILL SLOPES MUST BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
17. STORMWATER BASINS AND SWALES MUST BE INSTALLED BEFORE ROUGH GRADING THE SITE.
18. STORMWATER BASINS AND SWALES MUST BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.

TEMPORARY SEDIMENT TRAP NOTES

1. TEMPORARY SEDIMENT TRAPS SHOULD MEET THE FOLLOWING REQUIREMENTS:
   - SEDIMENT TRAPS SHOULD BE LOCATED SO THAT THEY CAN BE INSTALLED PRIOR TO DISTURBING THE AREA THEY ARE TO PROTECT.
   - THE TRAP SHOULD BE INSTALLED AS CLOSE TO THE DISTURBED AREA OR SOURCE OF SEDIMENT AS POSSIBLE.
   - THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE TRAP SHOULD BE LESS THAN 5 ACRES.
   - THE MINIMUM VOLUME OF THE TRAP SHOULD BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
   - THE SIDE SLOPES OF THE TRAP SHOULD BE 3:1 OR FLATTER, AND SHOULD BE STABILIZED IMMEDIATELY AFTER THEIR CONSTRUCTION.
2. EMBANKMENTS:
   - THE MAXIMUM HEIGHT OF THE SEDIMENT TRAP EMBANKMENT SHOULD BE 4 FEET WHEN MEASURED FROM THE LOWEST POINT OF NATURAL GROUND ON THE DOWNSTREAM SIDE OF THE EMBANKMENT.
   - THE MINIMUM TOP WIDTH OF THE EMBANKMENT SHOULD BE 6 FEET.
3. OUTLETS (GENERAL REQUIREMENTS):
   - THE OUTLET SHOULD BE DESIGNED, CONSTRUCTED AND MAINTAINED IN SUCH A MANNER THAT SEDIMENT DOES NOT LEAVE THE TRAP AND THAT EROSION AT OR BELOW THE OUTLET DOES NOT OCCUR.
   - OUTLETS SHOULD BE DESIGNED SO THAT THE TOP OF THE EMBANKMENT IS A MINIMUM OF 1 FOOT ABOVE THE CREST ELEVATION OF THE OUTLET.
   - THE OUTLET OF THE TRAP SHOULD BE A MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP
   - THE OUTLET SHOULD DISCHARGE TO A STABILIZED AREA. THE OUTLETS MUST EMPTY ONTO UNDISTURBED GROUND, INTO A WATERCOURSE, STABILIZED CHANNEL OR A STORM SEWER SYSTEM.
   - OUTLETS MAY BE CONSTRUCTED AS EARTH SPILLWAYS, STONE OUTLETS, OR PIPE OUTLETS.
4. EARTH OUTLETS:
   - AN EARTH OUTLET SEDIMENT TRAP HAS A DISCHARGE POINT THAT IS EITHER OVER NATURAL GROUND OR CUT INTO NATURAL GROUND.
   - THE OUTLET WIDTH SHOULD BE EQUAL TO 6 TIMES THE DRAINAGE AREA IN ACRES.
   - THE EMBANKMENT AND OUTLET SHOULD BE VEGETATED WITHIN 3 DAYS OF CONSTRUCTION.
5. STONE OUTLETS:
   - A STONE OUTLET SEDIMENT TRAP HAS AN OUTLET CONSISTING OF A CRUSHED STONE SECTION IN THE EMBANKMENT.
   - THE STONE SECTION SHOULD BE LOCATED AT THE LOW POINT OF THE NATURAL GROUND, AS DETERMINED AT THE DOWNSTREAM SIDE OF THE EMBANKMENT.
   - THE OUTLET SHOULD BE CONSTRUCTED OF MINIMUM SIZE 1 ½ CRUSHED STONE.
6. VEGETATION:
   - ALL EMBANKMENTS, EARTH SPILLWAYS, AND DISTURBED AREAS BELOW THE STRUCTURE SHOULD BE VEGETATED WITHIN 72 HOURS OF COMPLETION OF THE CONSTRUCTION OF THE STRUCTURE.
   - IF THE STRUCTURE IS NOT PLANNED FOR MORE THAN ONE VEGETATIVE GROWING SEASON, THE STRUCTURE MAY BE VEGETATED USING THE RECOMMENDATION OF THE TEMPORARY VEGETATION BEST MANAGEMENT PRACTICE DESCRIBED IN NHDES STORMWATER MANAGEMENT MANUAL, VOL. 2.
   - BASINS THAT WILL BE CARRIED OVER THE WINTER AND INTO THE NEXT VEGETATIVE GROWING SEASON SHOULD BE VEGETATED USING THE RECOMMENDATIONS FOR PERMANENT VEGETATION BEST MANAGEMENT PRACTICE.





Earth Outlet Temporary Sediment Trap

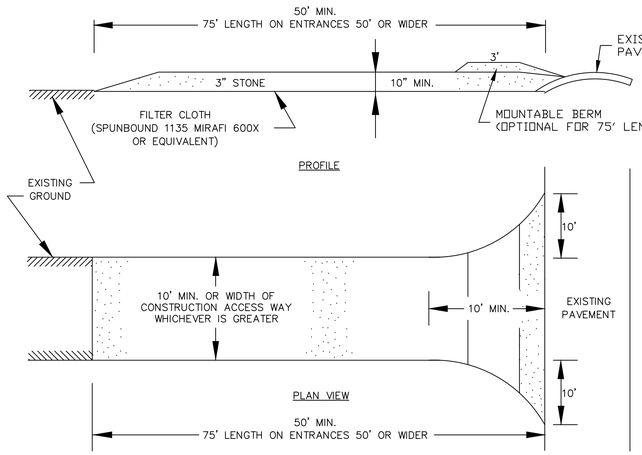
N.T.S.

TYPICAL CONSTRUCTION SEQUENCE

1. INSTALL HAY BALE BARRIERS AND SILT FENCES IN LOCATIONS SHOWN ON PLANS AS A MINIMUM. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATION. PREPARE TEMPORARY STABILIZED CONSTRUCTION ENTRANCE IN SUITABLE LOCATION.
2. INSPECT AND MAINTAIN EROSION CONTROL MEASURES ON A DAILY BASIS.
3. DAILY OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, CULVERTS, DITCHES, SILTATION FENCES, SEDIMENT TRAPS, ETC. MULCH AND SEED AS REQUIRED.
4. CUT AND CLEAR TREES, DISPOSE OF DEBRIS IN AN APPROVED OFF–SITE LOCATION.
5. THE WORK AREA SHALL BE GRADED, SHAPED AND OTHERWISE DRAINED IN SUCH A MANNER AS TO MINIMIZE SOIL EROSION, SILTATION OF DRAINAGE CHANNELS, DAMAGE TO EXISTING VEGETATION, AND DAMAGE TO PROPERTY OUTSIDE LIMITS OF THE WORK AREA. SILT FENCES, FILTER SOCK AND/OR DETENTION BASINS WILL BE NECESSARY TO ACCOMPLISH THIS.
6. TOPSOIL SHALL BE STRIPPED AND STOCKPILED DURING DRY CONDITIONS AND WITHOUT COMPACTION. TOPSOIL SHALL BE STABILIZED AGAINST EROSION.
7. REMOVE ONSITE UNDESIRABLE SOILS AND LEDGE.
8. GRUBBING AND STUMPING DISPOSAL IN AN APPROVED OFF–SITE LOCATION.
9. CONSTRUCT ALL DITCHES AND SWALES.
10. ALL DITCHES AND SWALES, SHALL BE STABILIZED PRIOR TO DIRECTING ANY STORM WATER INTO THEM.
11. CONSTRUCT SLOPED EMBANKMENTS.
12. ROUGH GRADE SITE OR PHASED WORK AREA. DISTURBED AREAS SHALL BE STABILIZED UPON COMPLETION OF ROUGH GRADING PER THE EROSION CONTROL NOTES.
13. INSTALL ALL UNDERGROUND UTILITIES.
14. INSTALL DRAINAGE STRUCTURES, CULVERTS, HEADWALLS, RIP RAP, AND OTHER DRAINAGE FACILITIES. PLACE CATCH BASIN RIMS IN DANDY BAGS UNTIL PARKING AREAS ARE PAVED. STORMWATER PONDS, INFILTRATION BASINS AND SWALES MUST BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
15. FINISH GRADING, LOAMING AND SEEDING. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 72 HOURS AFTER FINAL GRADING.
16. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
17. TEMPORARY EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL ALL DISTURBED AREAS ARE STABILIZED AND HAVE A HEALTHY VEGETATIVE COVER.
18. CLEAN ALL DRAINAGE STRUCTURE SUMPS OF SEDIMENT AND DEBRIS (INCLUDES ALL STRUCTURES WITHIN THE LIMITS OF WORK).
19. DUST SHALL BE CONTROLLED DURING CONSTRUCTION BY ADEQUATE USE OF WATER.

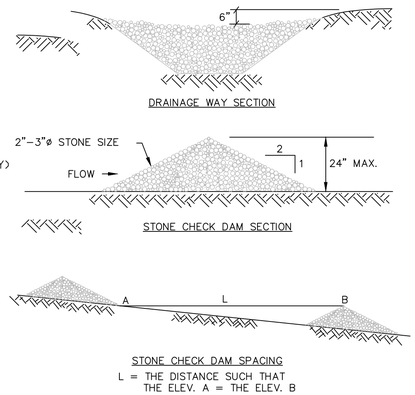
WINTER EROSION CONTROL NOTES

1. ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING 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 INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS;
2. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS; AND
3. AFTER OCTOBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.



1. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
2. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED
3. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
4. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO

USDA – SCS Stabilized Construction Entrance



MAINTENANCE:

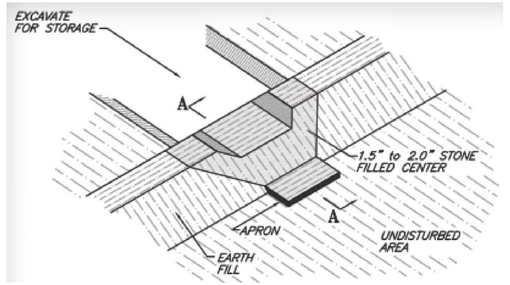
1. TEMPORARY GRADE STABILIZATION STRUCTURES SHOULD BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED STORMS. ANY NECESSARY REPAIRS SHOULD BE MADE IMMEDIATELY. PARTICULAR ATTENTION SHOULD BE GIVEN TO END RUN AND EROSION AT THE DOWNSTREAM TOE OF THE STRUCTURE. WHEN THE STRUCTURES ARE REMOVED, THE DISTURBED PORTION SHOULD BE BROUGHT TO THE EXISTING CHANNEL GRADE AND THE AREAS PREPARED, SEEDED AND MULCHED. WHILE THIS PRACTICE IS NOT INTENDED TO BE USED PRIMARILY FOR SEDIMENT TRAPPING, SOME SEDIMENT WILL ACCUMULATE BEHIND THE STRUCTURES. SEDIMENT SHALL BE REMOVED FROM BEHIND THE STRUCTURES WHEN IT HAS ACCUMULATED TO ONE HALF OF THE ORIGINAL HEIGHT OF THE STRUCTURE.

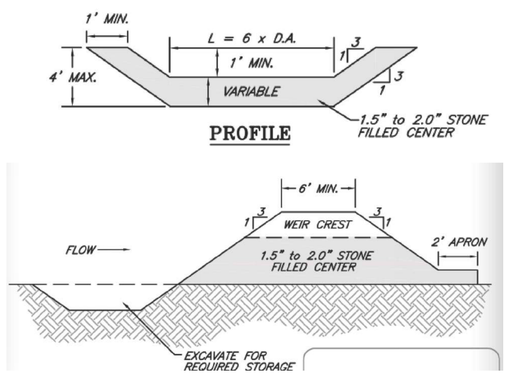
CONSTRUCTION SPECIFICATIONS:

1. DAMS SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLANS.
2. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER SO THAT EROSION AND AIR AND WATER POLLUTION WILL BE MINIMIZED.
3. STRUCTURES SHALL BE REMOVED FROM THE CHANNEL WHEN THEIR USEFUL LIFE HAS BE COMPLETED.
4. STONE SHALL BE FRACTURED FACE STONE. D50 SIZE SHALL BE 2 TO 3 INCHES. NO STONE SMALLER THAN 1–1/2 INCHES OR LARGER THAN 4 INCHES SHALL BE USED.

Typical Stone Check Dam Detail

N.T.S.





Temporary Sediment Trap

N.T.S.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE: HORZ.: N/A VERT.: N/A
DATUM: HORZ.: VERT.: NAVD88
0 GRAPHIC SCALE

FUSS&O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
CIVIL DETAILS
EROSION CONTROL
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-508

File Path: J:\DWGP20220900A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-508 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
LAYER STATE:
MS VIEW:





Property ID sign - (entrance to development, either side of road)
Qty. (2) single-sided
Granite posts; aluminum fence; carved panel for property ID;

FIRST SIGN INC.

Date: 02/06/2023 Scale:

107 Hollis Street | Manchester, NH 03101 | 603-627-0003

This drawing is the property of First Sign & Corporate Image, Inc. Any duplication or use without the prior written consent is punishable by law.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

PLANS UNDER DESIGN DEVELOPMENT. ISSUED FOR INTERIM REVIEW ONLY. NOT FOR CONSTRUCTION

SCALE:
HORZ.: N/A
VERT.: N/A
DATUM:
HORZ.:
VERT.: NAVD88
0
GRAPHIC SCALE

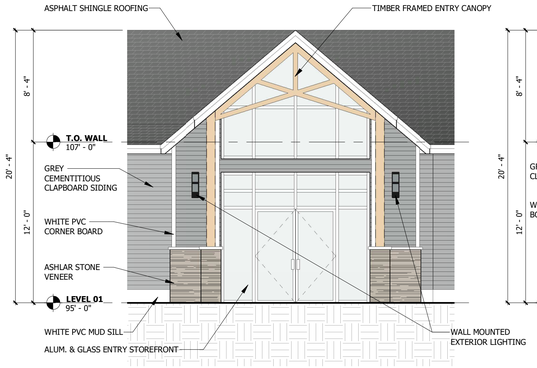
FUSS & O'NEILL
50 COMMERCIAL STREET
MANCHESTER, NEW HAMPSHIRE 03101
603.668.8223
www.fando.com

BRADY SULLIVAN PROPERTIES
SIGNAGE DETAILS
WHITE CLIFFS APARTMENTS
MARTHA'S WAY
TAX MAP H LOT 41-P
DOVER NEW HAMPSHIRE

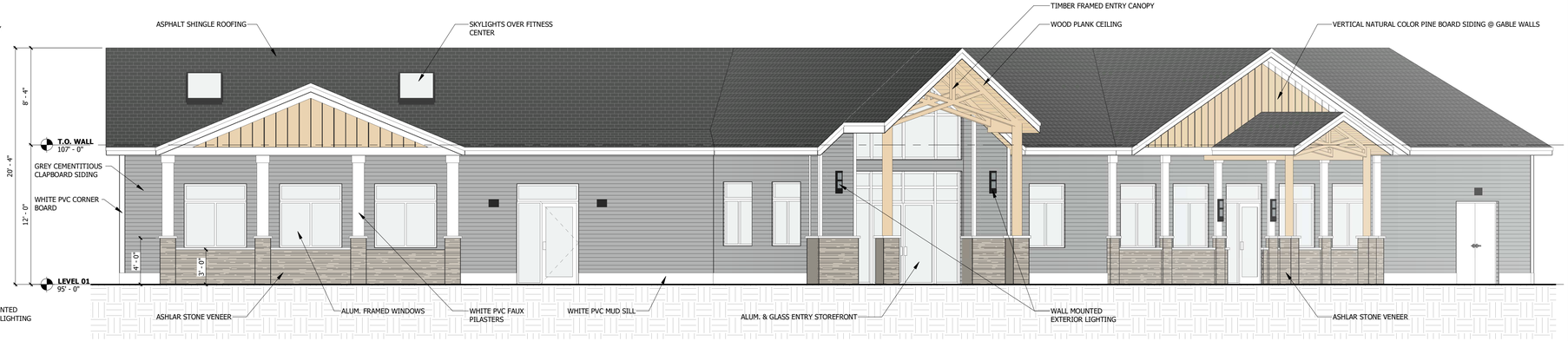
PROJ. No.: 20220900.A10
DATE: 2/24/2023

CD-509

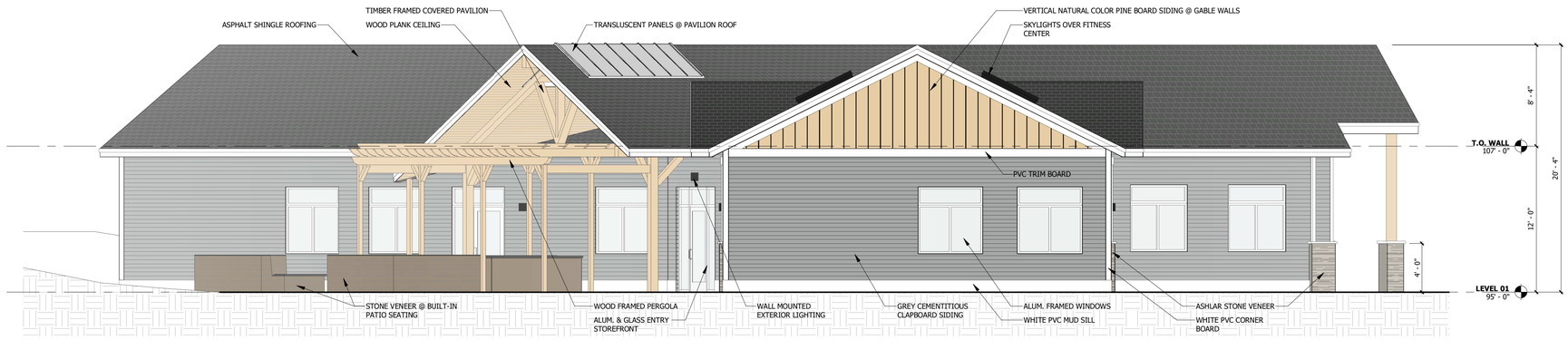
File Path: J:\DWG\P2022\09000A10\Civil\Plan\20220900.A10_DTLS01.dwg Layout: CD-509 Plotted: Fri, March 10, 2023 - 11:34 AM User: bpratt
Plotter: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 CTB File: FO.STB
MS VIEW: LAYER STATE:



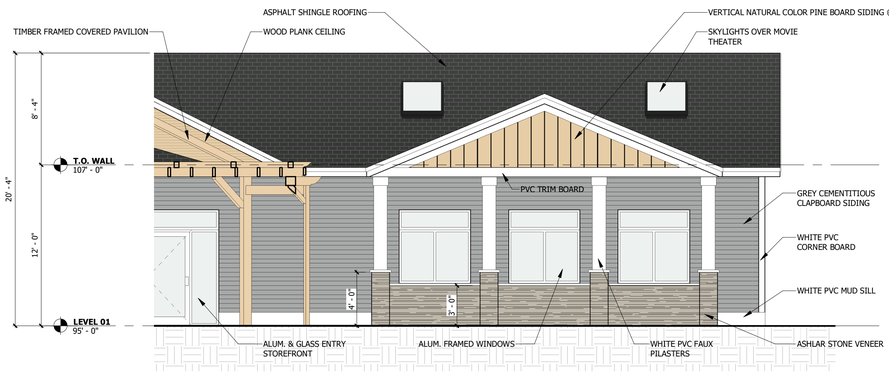
1 A0201 **PROPOSED EXTERIOR ELEVATION "A"**
3/16" = 1'-0"



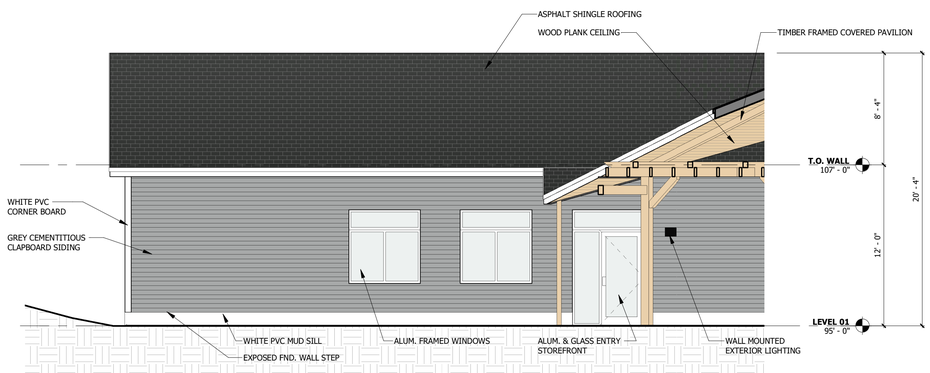
2 A0201 **PROPOSED EXTERIOR ELEVATION "B"**
3/16" = 1'-0"



3 A0201 **PROPOSED EXTERIOR ELEVATION "C"**
3/16" = 1'-0"



4 A0201 **PROPOSED EXTERIOR ELEVATION "D"**
3/16" = 1'-0"



5 A0201 **PROPOSED EXTERIOR ELEVATION "E"**
3/16" = 1'-0"



GREY CEMENTITIOUS HORIZONTAL CLAPBOARD SIDING @ EXTERIOR WALLS



WARM TONE ASHLAR STONE VENEER @ EXTERIOR WALLS



NATURAL COLOR VERTICAL PINE SHIPLAP BOARDS @ GABLE WALLS



RUSTIC COLOR ASHLAR STONE VENEER @ BUILT-IN PATIO SEATING

BRADY SULLIVAN PROPERTIES
670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
www.bradysullivan.com

White Cliffs at Dover Community Building
510 Marthas Way
Dover, NH 03820

No.	Description	Date

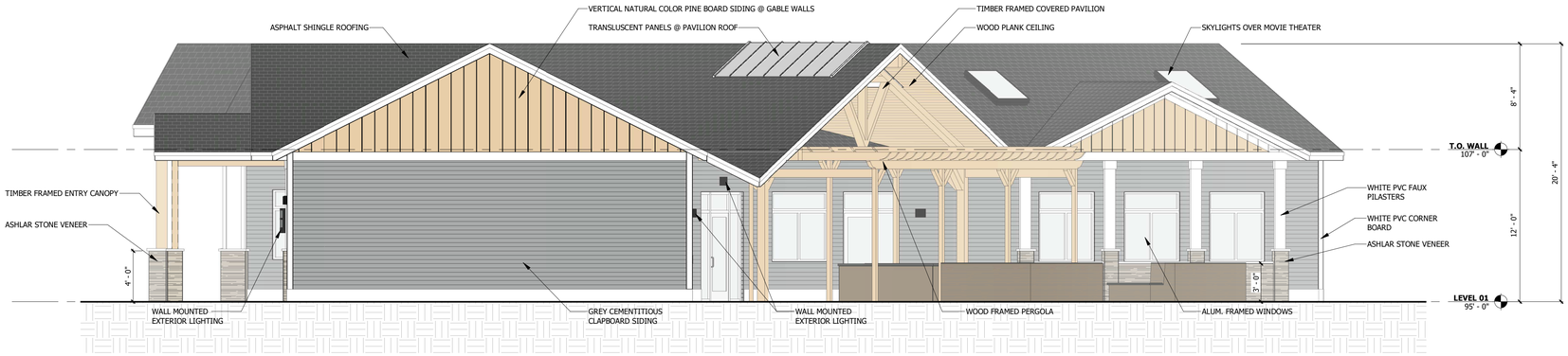
PROPOSED EXTERIOR ELEVATIONS

SHEET ISSUE	N.F.C.
DATE: PROJECT	XX.XXXX.XX
NO.: APPROVED	CL
BY: DRAWN	MN
BY:	

A0201

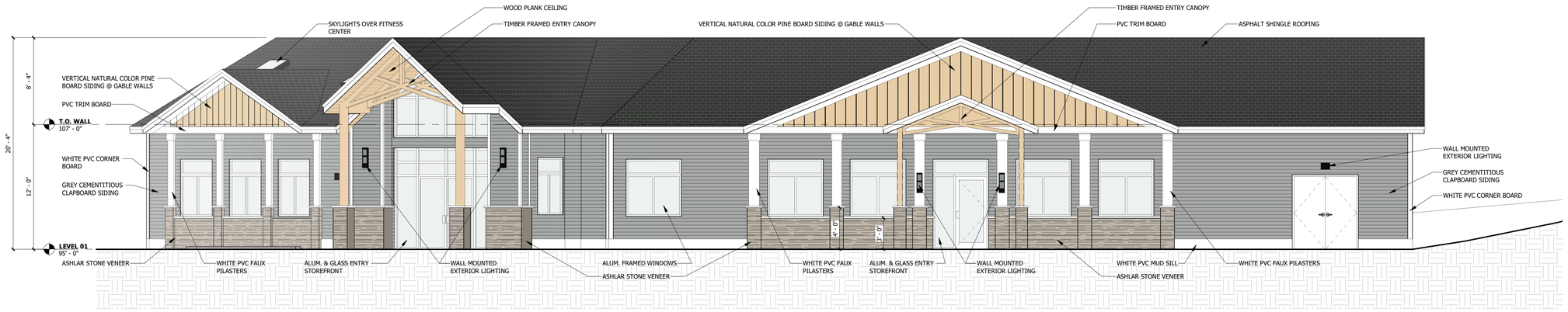
SCA LE: 3/16" = 1'-0"

Y:\ARCHITECTURE (REP)\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
7/23/2023 2:07:50 PM



1 A0202 **PROPOSED EXTERIOR ELEVATION "F"**

3/16" = 1'-0"



2 A0202 **PROPOSED EXTERIOR ELEVATION "G"**

3/16" = 1'-0"



GREY CEMENTITIOUS HORIZONTAL CLAPBOARD SIDING @ EXTERIOR WALLS



WARM TONE ASHLAR STONE VENEER @ EXTERIOR WALLS



NATURAL COLOR VERTICAL PINE SHIPLAP BOARDS @ GABLE WALLS



RUSTIC COLOR ASHLAR STONE VENEER @ BUILT-IN PATIO SEATING

BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
www.bradysullivan.com

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

No.	Description	Date

PROPOSED EXTERIOR ELEVATIONS

SHEET ISSUE N.F.C.
DATE: PROJECT XX.XXXX.XX
NO.: APPROVED CL
BY: DRAWN MN
BY:

A0202

SCALE: 3/16" = 1'-0"

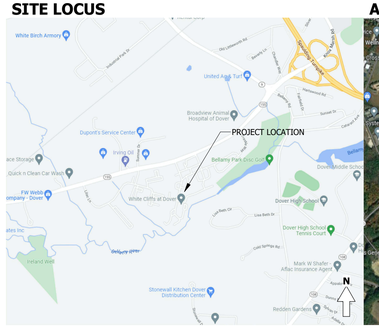
Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:07:53 PM

White Cliffs at Dover Community Building

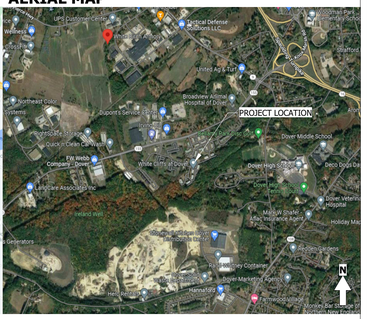
510 Marthas Way Dover, NH 03820



SITE LOCUS



AERIAL MAP



PROJECT CONTACT LIST

OWNER/DEVELOPER
BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101

603.622.6223

ARCHITECT
BRADY SULLIVAN PROPERTIES
-ARCHITECTURE DEPARTMENT

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101

603.622.6223

STRUCTURAL ENGINEER
T.B.D.

CONSTRUCTION MANAGER
T.B.D.

SHEET LIST

Sheet Number	Sheet Name	Sheet Issue Date
04 ARCHITECTURAL		
0000D	COVER SHEET (24x36)	N.F.C.
A0100A	BUILDING LOCATION PLAN	N.F.C.
A0100B	PROPOSED SITE PLAN	N.F.C.
A0101	PROPOSED FIRST FLOOR PLAN	N.F.C.
A0201	PROPOSED EXTERIOR ELEVATIONS	N.F.C.
A0202	PROPOSED EXTERIOR ELEVATIONS	N.F.C.
A0301	3-D EXTERIOR RENDERINGS	N.F.C.
A0302	3-D EXTERIOR RENDERINGS	N.F.C.
A0303	3-D EXTERIOR RENDERINGS	N.F.C.
A0304	3-D AERIAL VIEWS	N.F.C.

BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

No.	Description	Date

COVER SHEET (24x36)

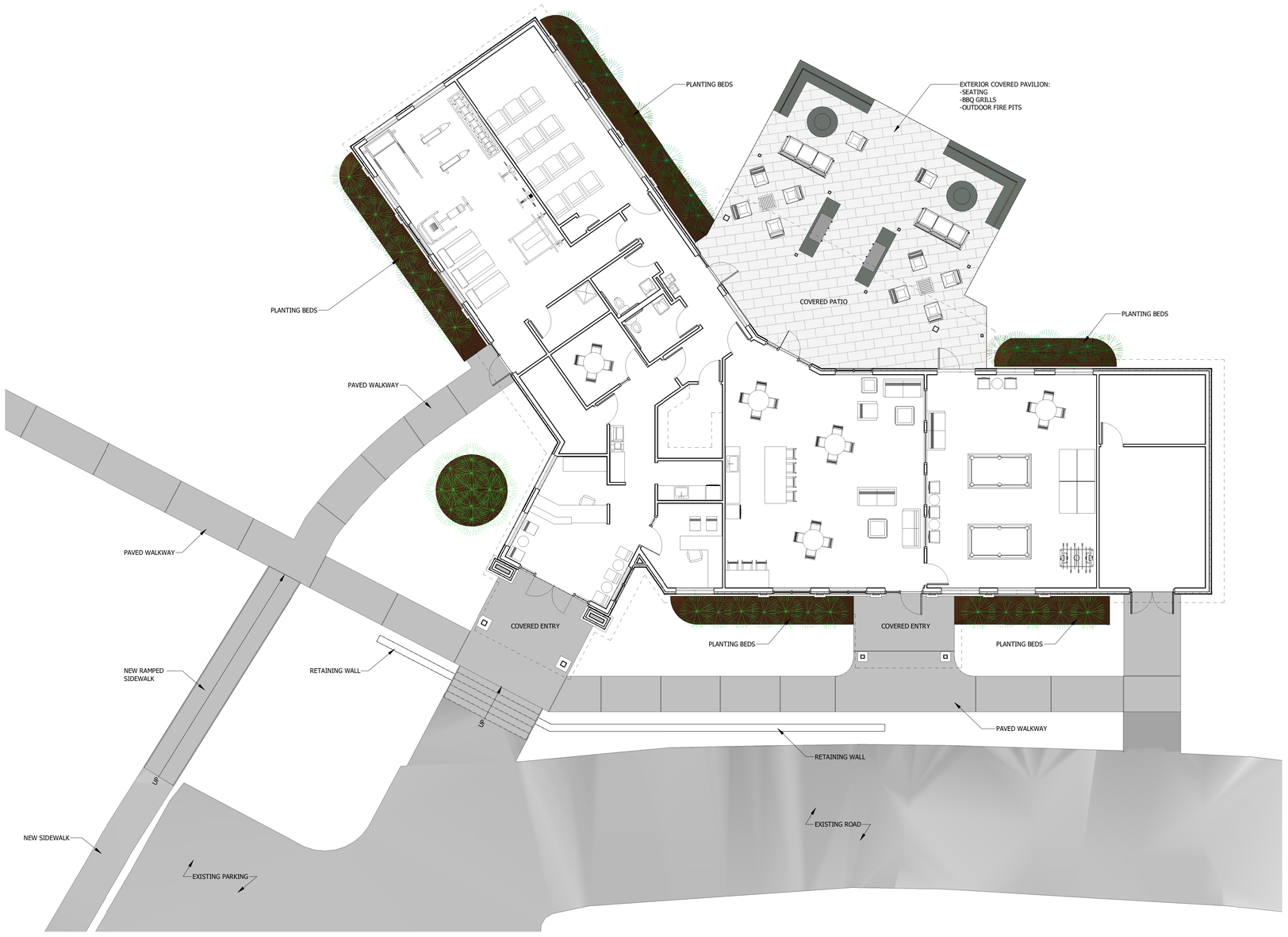
SHEET ISSUE: N.F.C.
DATE: PROJECT: XX.XXXX.XX
NO.: APPROVED: CL
BY: DRAWN: MN
BY:

0000D

SCALE: 12" = 1'-0"

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:07:34 PM


INGRESS/EGRESS EASEMENT
(B) (C)
H0041-E00000 CROSSHILL HOUSING ASSOCIATES LIMITED PARTNERSHIP
P.O. BOX 250
NEW IPSWISH, NH 03071
S.C.R.D. BOOK 1752 PAGE 514
H0041-N00000 CROSSHILL HOUSING ASSOCIATES LIMITED PARTNERSHIP
P.O. BOX 250
NEW IPSWISH, NH 03071
S.C.R.D. BOOK 1752 PAGE 514
H0041-000000 CROSSHILL HOUSING ASSOCIATES LIMITED PARTNERSHIP
P.O. BOX 250
NEW IPSWISH, NH 03071
S.C.R.D. BOOK 1752 PAGE 514
INGRESS/EGRESS EASEMENT
(16)
4" X 4" GRAN. BND. FND. (NO D.H.) UP 4"
N57°06'50"E 70.61' (TIE LINE)
MARTHAS WAY (C) (SEE NOTE 4)
N65°48'09"E 736.79'
1/2" REBAR FND. DOWN 6" NO CAP
TBM 7220A CHISELED BOX IN NW'LY CORNER OF CONC. PAD ELEV.=102.75'
5/8" REBAR FND. FLUSH W/ID CAP CLD LLS 849
TBM 7220B CHISELED BOX IN SW'LY CORNER OF CONC. PAD ELEV.=99.92'
EASEMENT FOR PARKING AREA AND DRIVES
(B) (D)
SEWER EASEMENT
(10)
S14°15'41"E 150.00'
S12°03'01"E 115.34'
BUILDING 1 (60'x100') (6,000 S.F.) BH=36'
BUILDING 2 (60'x100') (6,000 S.F.) BH=35'
BUILDING 3 (51'x121') (6,200 S.F.) BH=37'
BUILDING 4 (51'x121') (6,200 S.F.) BH=36'
BUILDING 5 (51'x121') (6,200 S.F.) BH=39'
BUILDING 6 (51'x121') (6,200 S.F.) BH=37'
BUILDING 7 (51'x121') (6,200 S.F.) BH=37'
BUILDING 8 (51'x121') (6,200 S.F.) BH=38'
MAINTENANCE SHED
SHEET #2 MATCHLINE SHEET #2
"DR FASE"
EASEMENT FOR PARKING AREA AND DRIVES
(B) (D)
NO ROW FOR FUTURE STREET CONNECTION
(9)
PHYSICAL ACCESS TO MARTHA'S WAY
SURVEY MONUMENT SET FLUSH TO ASPHALT SURFACE AT CURB TO CURB CORNER TO UNDERGROUND UTILITIES
SURVEY MONUMENT SET FLUSH TO ASPHALT SURFACE AT CURB TO CURB CORNER TO UNDERGROUND UTILITIES
5/8" REBAR SET UP 4" W/LS 849
5/8" REBAR SET UP 1" W/70 CAP LLS 849
5/8" REBAR SET UP 2" W/70 CAP LLS 849
H0041-000000 CROSSHILL HOUSING ASSOCIATES LIMITED PARTNERSHIP
P.O. BOX 250
NEW IPSWISH, NH 03071
S.C.R.D. BOOK 1752 PAGE 514
LOT 1 9,000 S.F. 0.21 AC. (SEE NOTE 2)
LOT 2 9,000 S.F. 0.21 AC. (SEE NOTE 2)
LOT 3 9,000 S.F. 0.21 AC. (SEE NOTE 2)
N12°43'44"E 100.00' (TIE LINE)
N12°43'44"E
N13°55'41"E
N13°55'41"E
N13°55'41



1 A0100B **PROPOSED SITE PLAN**
1/8" = 1'-0"

BRADY SULLIVAN PROPERTIES
670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

N
PLUS NORTH

No.	Description	Date

PROPOSED SITE PLAN

SHEET ISSUE	N.F.C.
DATE: PROJECT	XX.XXXX.XX
NO.: APPROVED	CL
BY: DRAWN	MN
BY:	

A0100B

SCALE: 1/8" = 1'-0"

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:07:38 PM



1 A0101 PROPOSED FIRST FLOOR PLAN

3/16" = 1'-0"

TOTAL NET AREA: 4,220 S.F.

BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

N

PLANS ABOVE

No.	Description	Date

PROPOSED FIRST FLOOR PLAN

SHEET ISSUE	N.F.C.
DATE: PROJECT	XX.XXXX.XX
NO.: APPROVED	CL
BY: DRAWN	MN
BY:	

A0101

SCALE: 3/16" = 1'-0"

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:07:47 PM





BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

No.	Description	Date

3-D EXTERIOR RENDERINGS

SHEET ISSUE N.F.C.
DATE: PROJECT XX.XXXX.XX
NO.: APPROVED CL
BY: DRAWN MN
BY:

A0301

SCALE: 12" = 1'-0"

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:07:55 PM





BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

No.	Description	Date

3-D EXTERIOR RENDERINGS

SHEET ISSUE N.F.C.
DATE: PROJECT XX.XXXX.XX
NO.: APPROVED CL
BY: DRAWN MN
BY:

A0302

SCALE: 12" = 1'-0"

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
7/23/2023 2:07:57 PM









BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

No.	Description	Date

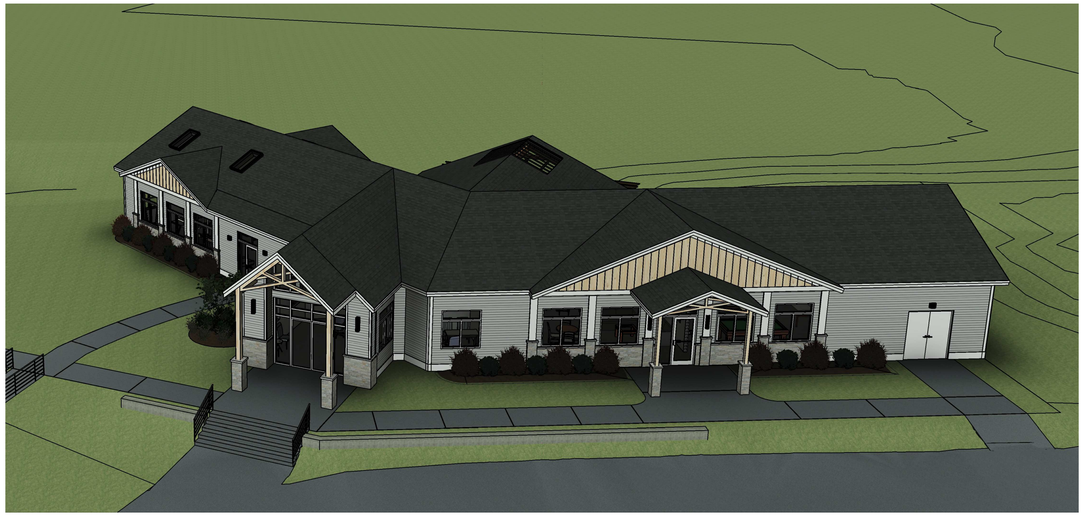
3-D EXTERIOR RENDERINGS

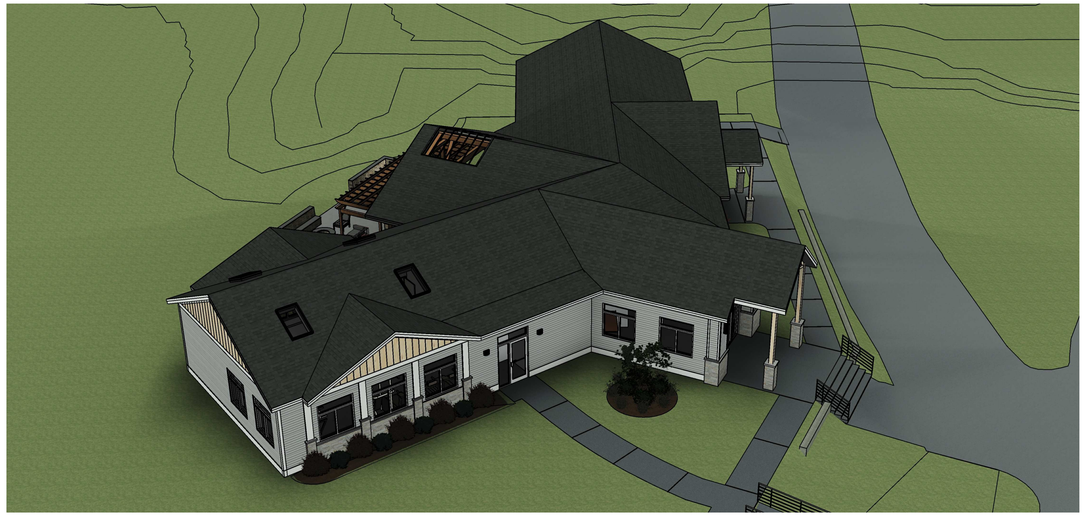
SHEET ISSUE N.F.C.
DATE: PROJECT XX.XXXX.XX
NO.: APPROVED CL
BY: DRAWN MN
BY:

A0303

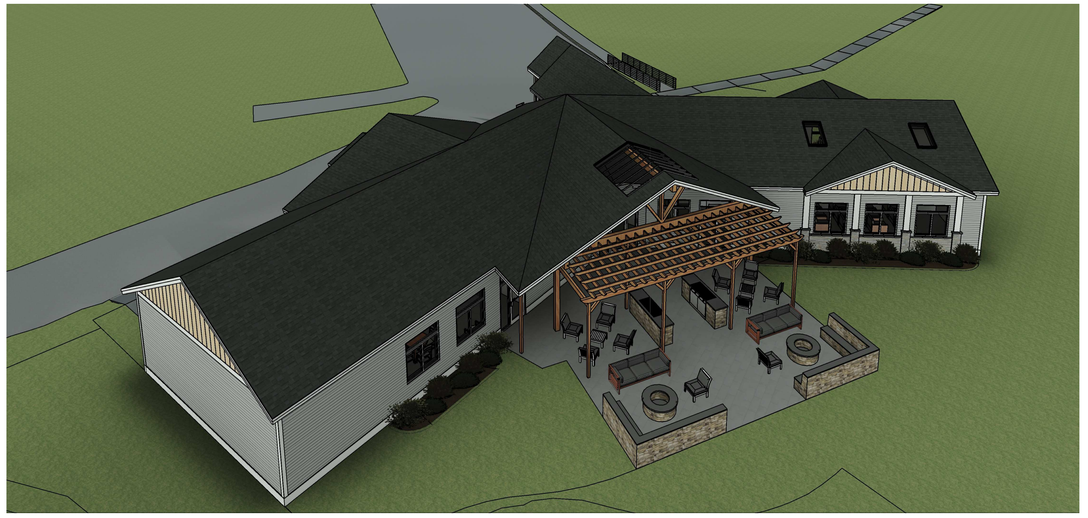
SCALE: 12" = 1'-0"

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:08:03 PM









BRADY SULLIVAN PROPERTIES

670 N. COMMERCIAL ST.
MANCHESTER, NH 03101
P: 603.622.6223
F: 603.622.7342
WWW.BRADYSULLIVAN.COM

White Cliffs at Dover Community Building

510 Marthas Way
Dover, NH 03820

No.	Description	Date

3-D AERIAL VIEWS

SHEET ISSUE N.F.C.
DATE: PROJECT XX.XXXX.XX
NO.: APPROVED CL
BY: DRAWN MN
BY:

A0304

SCALE:

Y:\ARCHITECTURE DEPT\NH - Dover - White Cliffs Apts Commons Bldg - 510 Martha's Way\REVIT\WHITE CLIFFS (FLIPPED).rvt
2/23/2023 2:08:05 PM