CITY OF DOVER

PLANNING TECHNICAL REVIEW COMMITTEE –AGENDA

Meeting Type: Regular Meeting
Meeting Location: Council Conference Room, City Hall, 288 Central Ave, Dover NH 03820
Meeting Date: **Thursday, February 15, 2024**
Meeting Time: **10:30 AM**

1. 10:30 AM - 11:30 AM: Site Review for Future Automation. LLC (Owners: DIBIDA), Assessor's Map D, Lot 11-8, zoned IT, located at Quality Way. (Proposal is to construct a light manufacturing facility consisting of two buildings 24,000 s.f and 10,000 s.f, each with office space, and associated infrastructure.) (SITE-2024-0002)

PLAN SNAPSHOT REPORT SITE-2024-0002
FOR CITY OF DOVER, N.H.

Plan Type:	Site Plan - Major	**Project:**		**App Date:**	01/24/2024
Work Class:	New Construction	**District:**	None	**Exp Date:**	03/29/2024
Status:	In Review	**Square Feet:**	0.00	**Completed:**	NOT COMPLETED
Valuation:	$0.00	**Assigned To:**	Blonigen, Rachel	**Approval Expire Date:**	
Description:	Site Plan, including Architect & Landscaping Plans				

Parcel: D0011-008000 Main	**Address:** Quality Wy Dover, NH Main	**Zone:** IT(Non-Residential - Innovative Technolo

Applicant
Alun Williams
Home: (000) 000-0000
Business: (000) 000-0000
Mobile: (000) 000-0000

Applicant
Civilworks New England
Steve Haight
181 Watson Road PO Box 1166
Dover, NH 03820
Business: (603) 749-0443
Mobile: (603) 817-6651

Plan Custom Fields

Total	0	Total2	0	Total3	0
Total4	0	Total5	0	Total6	0
Total7	0	Total8	0	Total9	0
Street Classification Type	Municipal	Net Change in # Parking Spaces (+/-)	45	Water Service	Municipal
Recording Number		Sewer Service	Municipal	Total Acres (GIS)	8.61
Deed Book	1559	Total SQFT	375052	Deed Page	394
Deed Date		Proposed Property Use	Light Manufacturing w/Office	Area of Parcel to be Developed (SQFT)	164238
Number of Parking Spaces Existing	0	Number of Parking Spaces Proposed	45	Number of Employees Total	45
Number of Employees in Max Shift	2	Distance to City Water	25	Distance to City Sewer	25
Type of Building to be Built	Steel Frame with Ribbed Metal Exterior	Estimated Construction Value	3500000.00	Refuse Removal	Private
Is there an existing Conservation Easement?	No	Existing Conservation Easement Details		TotalImpactFeeSDTOD	0.00
TotalImpactFeeTHTOD	0.00	TotalImpactFee23FTOD	0.00	TotalImpactFeeA4TOD	0.00
TotalImpactFeeMHTOD	0.00	TotalImpactFeeADUTOD	0.00	TotalImpactFeeAONRTOD	0.00
TotalImpactFeeAR55TOD	0.00	TotalImpactFeeAR62TOD	0.00	Sub Total Residential	0.00
TotalImpactFeeRIRCTOD	0.00	TotalImpactFeeOCSTOD	0.00	TotalImpactFeeITWCTOD	0.00
TotalImpactFeeNHALTOD	0.00	TotalImpactFeeOIUTOD	0.00	TotalImpactFeeAFAOTOD	0.00
Sub Total Non-Residential	0.00	Total of Impact Fees to be Assessed	0.00		

Attachment File Name	Added On	Added By	Attachment Group	Notes
Signature_Steve_Haight_1/24/2024.jpg	01/24/2024 15:36	Haight, Steve		Uploaded via CSS

Invoice No.	Fee	Fee Amount	Amount Paid
INV-00006548	Planning General Application Fee	$200.00	$0.00
	Total for Invoice INV-00006548	$200.00	$0.00

PLAN SNAPSHOT REPORT (SITE-2024-0002)

	Grand Total for Plan	**$200.00**	**$0.00**

Workflow Step / Action Name	Action Type	Start Date	End Date
Review v.1		01/25/2024 16:45	
Confirm application complete v.1	Generic Action		01/25/2024 16:46
Technical Review Committee Meeting Agenda v.1	Task	01/25/2024 16:45	
Land Use Plan Technical Review v.1	Receive Submittal		
Technical Review Committee Meeting v.1	Hold Meeting		
Planning Board v.1			
Planning Board Agenda v.1	Task		
Invoice for Notices v.1	Task		
Send Notices v.1	Task		
Planner Creates Staff Recommendations v.1	Plan Activity		
Distribute Planning Board Materials v.1	Task		
Planning Board Hearing v.1	Hold Hearing		
Planning Board Decision v.1	Plan Activity		
NOD Sent to Applicant v.1	Create Report		
Final Plan v.1			
Land Use Plan Stamped and Signed v.1	Generic Action		
Recording v.1	Task		
Document Archival v.1	Generic Action		
Internal Notification of Plan Completion v.1	Generic Action		
Building Official Notifies Address v.1	Generic Action		
Pre-Con Meeting v.1	Hold Meeting		
Create/Link to Records v.1			
Create / Link to Permit - Building Major v.1	Create Sub Permit		
Create / Link to Permit - Site Work, Construction v.1	Create Sub Permit		

CIVILWORKS NEW ENGLAND

181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443 FAX: 603.749.7348

January 25 , 2024

City of Dover
288 Central Ave
Dover, NH 03820

Attn: Donna Benton, Director of Planning & Community Development

Subject: Site Review & Conditional Use Permit Applications
Quality Way - Tax Map D, Lot 11-8
Civilworks New England Reference No. 22075

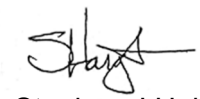
Dear Ms. Benton:

On behalf of our client, Future Automation, Inc., we are pleased to submit the following application(s) and associated materials for review by the Technical Review Committee (TRC). Attached are four (4) copies of associated material items 1-17 listed below, and two (2) copies of the Drainage Report. All materials will be provided electronically (PDF) to the Planning Department:

1) Cover Letter
2) Site Plan Review Application
3) Site Plan Review Checklist
4) Application Fee Schedule
5) Conditional Use Permit Application
6) Applicant's Authorizations
7) City of Dover Agreement (email)
8) Project Narrative
9) IT District Narrative
10) Conditional Use Permit Narrative
11) Stormwater Management Narrative
12) Letters to Serve (emails from City, Eversource, Until)
13) Pump Station Calculations
14) Traffic Assessment Memorandum
15) Landscape Operation & Maintenance Plan
16) Stormwater Inspection and Maintenance Plan
17) Site Plan Set, including Landscape Plan, Streetscapes & Architect Plans
18) Drainage Report w/Supporting Documents & Plans

We look forward to representing these applications at the TRC meeting on February 15, 2024. Please do not hesitate to contact our office should you have any questions.

Sincerely,



Stephen J Haight, PE
CIVILWORKS NEW ENGLAND

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: Future Automation, Inc. Telephone # N/A

Address of Applicant: 127 Venture Drive Dover, NH 03820

E-Mail Address: alun.williams@futureautomation.co.uk

Name of Property Owner (*if different from applicant*): Dover Business & Industrial Development Authority Telephone # N/A

Address of Property Owner: 288 Central Avenue Dover, NH 03820

PROPERTY INFORMATION

Address of Property: Quality Way

Assessor's Map # D Lot(s) # 11-8

Zoning District(s) IT - Innovation Technology Overlay District(s) N/A

Size of Parcel: 375,192 sq. ft. 8.61 ac. Property Deed: Book 1559 Page: 394

Existing Use of Property: vacant

SITE PLAN INFORMATION

Describe Proposed Use: Construct a light manufacturing facility consisting of two buildings, each with office space, and associated infrastructure.

Area of Parcel to be Developed: 164,238± sq. ft.

If Multi-family Residential: Number of Units N/A & Buildings Proposed N/A

If lodging: Number of Units N/A & number of Buildings N/A

Number of Parking Spaces: Existing N/A Proposed 45

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

Number of Employees Total: 45 In Maximum Shift: 2

Disposition of Parcel:

Building Footprint Building 1 - 25,000 Building 2 - 10,000 sq. ft.

Total Building Area 35,000 sq. ft.

Paved Area 60,610± sq. ft.

Building Setbacks:

Front Yard 50 ft.

Rear Yard 50 ft.

Side Yard: Right 50 ft. Left 50 ft.

City Water? X Yes ___ No How far is city water from the property? at Quality Way

City Sewer? X Yes ___ No How far is city sewer from the property? at Quality Way

TRANSFER OF DEVELOPMENT RIGHTS INFORMATION N/A

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: Steel Frame with Ribbed Metal Exterior

Height of Building: 35'± Finished Floor Elevation: 156.0'

Number of Seats (where applicable) N/A

Estimated value of construction: $3,500,000 Refuse removal: Public / (Private) (circle one)

WAIVER REQUESTS

Site Review Regulations section(s) to be waived: None Requested

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

SURVEYOR INFORMATION

Name of Surveyor and Company (Licensed in N.H.) Kevin McEneaney, LLS - McEneaney Survey Associates

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-742-0911

Professional License #: NH LLS #661 E-mail address: kevin@surveynh.com

ENGINEER INFORMATION

Name of Engineer and Company (Licensed in N.H.) Stephen J. Haight, PE - Civilworks New England

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

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

ARCHITECT INFORMATION

Name of Architect and Company (Licensed in N.H.) John M. Tuttle, AIA - TW Designs, LLC

Address 254 Drake Hill Road Strafford, NH 03884 Telephone #: 603-664-2181

Professional License #: NH AIA # 4015 E-mail address: john@tw-designs.com

LANDSCAPE ARCHITECT INFORMATION

Name of Landscape Architect and Company (Licensed in N.H.) Romy N. Maurer, PLA - Terrain Planning & Design, LLC

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

Professional License #: NH PLA # 086 E-mail address: romy@terrainplanning.com

SOIL SCIENTIST INFORMATION

Name of Soil Scientist and Company (Licensed in N.H.) Michael R. Cuomo, CWS, CSS

Address 6 York Pond Road York, ME 03909 Telephone #: 207-363-4532

Professional License #: NH CWS # 004 , NH CSS # 006 E-mail address: mcuomosoil@gmail.com

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~~ Applicant: _____ Date: 16 Jan 24

Signature of ~~Applicant~~ Owner (*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~~ Applicant: _____ Date: 16 Jan 24

Signature of ~~Applicant~~ Owner (*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~~ Applicant: _____ Date: 16 Jan 24

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

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
D	11-8	Dover Business & Industrial Dev. Authority	288 Central Avenue Dover, NH 03820

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS
Alun P. Williams, President	Future Automation, Inc.	127 Venture Drive Dover, NH 03820

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS
Stehpen J. Haight, PE	Civilworks New England	P.O. Box 1166 Dover, NH 03821
Kevin McEneaney, LLS	McEneaney Survey Associates	P.O. Box 1166 Dover, NH 03821

Conservation Easement Holder: N/A

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: Future Automation, Inc. File Number: _____

PROJECT TITLE: Future Automation

PROPERTY LOCATION: Quality Way Tax Map: D Lot: 11-8

	Where/How Provided	Reviewed
1. Completed and signed Application form	✓	
2. Plan Review Fees are provided	✓	
3. Electronic copy of the engineered/surveyed plan layout	✓	
4. Electronic copy of supplementary materials and application	✓	
5. Traffic Impact Assessment and Analysis (Standard or Advanced)	✓	
6. Waiver requests to the Site Plan Review Regulations, with written justification	none requested	
7. Conditional Use Permit applications	✓	
8. A colored rendering of the streetscape that will be created along the existing public right-of-way	✓	
9. A colored architectural plan showing all sides of buildings	✓	
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:	✓	
Location map at appropriate scale	✓	
Proposed Project name and title and Planning File #	✓	
Date, north arrow and scale	✓	
Names of all abutting property owners	✓	
Name and address of owners and/or applicants	✓	
Signature & stamp of NH licensed land surveyor and/or engineer	✓	
Zoning District boundaries, including any special or overlay districts	N/A	
Location of Conservation District areas	N/A	
Location, names and widths of existing and proposed streets, including pavement widths, grades, curbs and crosswalks	✓	
Location and widths of existing & proposed easements & right of ways	N/A	
Location and width of existing and proposed access/egress ways	✓	

Type text here

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

REVIEWED BY: _____ DATE_____ TRC DATE_____

PROJECT NARRATIVE

for

FUTURE AUTOMATION

Site Plan

Quality Way

Tax Map D, Lot 11-8

PROJECT OVERVIEW & SITE CHARACTERISTICS

The project parcel is shown on Tax Map D as Lot 11-8, is located within the IT District and consists of 8.61± acres, currently undeveloped.

The project, as proposed by Future Automation, will provide two buildings with a total floor area of about 35,000 square feet (sf) as follows:

- one 25,000± sf building having a floor area consisting of 22,000± sf of light manufacturing and 2,864 sf of office space, and
- one 10,000 sf build-to-suit building presumed to have a floor area consisting of 6,670 sf of light manufacturing and 3,330 sf of office space.

The two buildings will be accessed via a single shared access driveway but will be served by separate parking and loading areas. The parcel is currently owned by the Dover Business & Industrial Development Authority (DBIDA). The Applicant has met with DBIDA and received an endorsement to proceed.

The proposed site will include public water and sewer connections, underground electric service, natural gas service, and associated drainage improvements. The proposed access driveway will require a culverted wetland crossing resulting in 1,631± sf of wetland impacts. Additionally, a portion of the proposed grading, drainage, pavement, and buildings are proposed within the 50' wetland buffer. The resulting buffer impacts a total of 39,820± sf. Please see Conditional Use Permit application.

The project site consists of the following general improvements:

- Log and clear the site for construction.
- Construction of one new entrance on Quality Way.
- Construction of the two buildings with associated parking, passenger vehicle and truck access, and loading docks.
- Construction of on-site stormwater detention and treatment system, grading, and other drainage requirements.
- Site utility construction.
- Stabilize remaining areas with loam and seed.

DRIVEWAY AND PARKING LOT

Employee and visitor parking will be segregated from the truck delivery entrance. The entrance drive and truck access will be 30' wide and the parking area will have a 24' wide driveway entrance and drive aisle. Lighting for the proposed parking lot and driveway will be per the Lighting Plan and will be LED fixtures that are dark sky compliant.

PROJECT NARRATIVE
for
FUTURE AUTOMATION
Site Plan
Quality Way
Tax Map D, Lot 11-8

For the proposed development, the City of Dover parking maximums allow for the following:

Required/Proposed – Building 1:

- Office: 1 space per 300 sf (2,864 sf) = 10 surface spaces
- Manufacturing: 1 space per 800 sf (22,000 sf) = 28 surface spaces

    - Total Maximum = 38 Surface Spaces (includes 2 Accessible Spaces)
    - Total Proposed = 35 Surface Spaces (includes 2 Accessible Spaces)

Required/Proposed – Building 2:

- Office: 1 space per 300 sf (3,330 sf) = 12 surface spaces
- Manufacturing: 1 space per 800 sf (6,670 sf) = 9 surface spaces

    - Total Maximum = 21 Surface Spaces (includes 1 Accessible Spaces)
    - Total Proposed = 10 Surface Spaces (includes 2 Accessible Spaces)

WETLAND SETBACK IMPACT TYPE

The project work requires a Conditional Use Permit from the City of Dover. Approximately 1,631± sf of wetlands will be impacted along with 39,820± sf of wetland buffer.The project does not impact bogs, marshes, sand dunes, tidal wetlands, cedar swamps, undisturbed tidal buffer zone, or involve any work within 50 feet of a salt marsh. The project is not located within 100 feet of prime wetlands.

DRAINAGE

The parcel is located on the northwest side of the Quality Way cul-de-sac. The proposed development of the 8.61-acre lot will be surrounded by other commercial properties, open space, sending areas, and residential lots (to the south and southwest) within a previously established industrial park. The site is undeveloped, and the groundcover primarily consists of wooded vegetation with grassed areas along the edge of the Quality Way cul-de-sac. The 16.14± acre watershed of the parcel includes the project site as well as a portion of Quality Way. On site soils are a mix of Canton, Chatfield-Hollis Complex, Woodbridge, Scitico, Elmwood and Boxford soils. The Canton series soils are HSG B with Woodbridge, Scitico, Elmwood and Boxford series soils being classified as HSG C. The Chatfield-Hollis series soils are classified as HSG B & D.

PROJECT NARRATIVE
for
FUTURE AUTOMATION
Site Plan
Quality Way
Tax Map D, Lot 11-8

The project proposes 164,238± sf of disturbance including the construction of the two commercial buildings, corresponding site improvements including site grading, paved parking and loading areas, as well as stormwater quality and detention drainage improvements. The post development watershed is modeled utilizing the same points of analysis as the predevelopment watershed, allowing direct comparison of the peak runoff between the pre- and post- developed conditions (see drainage report).

TRAFFIC

A traffic assessment was completed for the project and is attached as a report to this submittal. Overall, and as expected, there is a minimal increase in traffic due to the proposed development.

UTILITIES

The proposed project will connect to City of Dover water and sewer as well as Unitil for natural gas, and Eversource for electricity. Water, sewer, electric lines, and natural gas lines are currently located within Quality Way. Building connections will be made per the City's Community Services Utility Division and Fire Department requirements and standards.

IT DISTRICT NARRATIVE

for

FUTURE AUTOMATION

Site Plan

Quality Way

Tax Map D, Lot 11-8

SITE DESIGN AND DEVELOPMENT CRITERIA NARRATIVE - §153-15

The project parcel is shown on Tax Map D as Lot 11-8, is located within the IT District and consists of 8.61± acres, currently undeveloped. The project is located at the cul-de-sac end of Quality Way which is in Dover's Enterprise Park. The project, as proposed by Future Automation, will provide two buildings with a total floor area of about 35,000 square feet (sf) as follows:

- one 25,000 sf building having a floor area consisting of 22,000± sf of light manufacturing and 2,864 sf of office space, and
- one 10,000 sf build-to-suit building presumed to have a floor area consisting of 6,670 sf of light manufacturing and 3,330 sf of office space.

The parcel is currently owned by the Dover Business & Industrial Development Authority (DBIDA). The Applicant has met with DBIDA and received an endorsement to proceed.

The following responses (**Responses in Bold**) provide narrative in support of meeting the requirements identified in §153-15 Design Standards for Innovative Technology (IT) District of the Dover Site Design and Development Criteria.

A. Purpose. These design standards are adopted to regulate development within the Innovative Technology (IT) District, which provides an area for large-scale high technology, research, professional office and clean manufacturing uses needing large sites and high aesthetic standards. The design standards are intended to:

(1) Establish and maintain high aesthetic standards in the IT District. **The project proposes two aesthetically pleasing buildings and will incorporate landscaping to maintain the aesthetics of the industrial neighborhood.**

(2) Preserve the district's natural resources and visual character by assuring that improvements are properly related to their sites and to neighboring developments. **The proposed buildings incorporate the site's natural grading to minimize building height as seen from the road. The site layout shields the shipping and receiving portion of the site behind the building, thus maintaining the visual character of the neighborhood. The project includes a landscape plan to further enhance the site as seen from Quality Way. The project requires a limited wetland disturbance to allow access to the site and has otherwise minimized disturbances within the wetland setback.**

(3) Encourage good design and innovation in site planning and development, including architecture, landscaping, and graphic design. **The project proposes aesthetically pleasing buildings and will incorporate landscaping to maintain the aesthetics of the industrial neighborhood.**

(4) Encourage the compatible and complementary development of each site in the district. **The project proposed is compatible and complimentary of the developed industrial/manufacturing parcels within the area.**

(5) Minimize conflicts between residential and nonresidential uses. **The project is in an industrial park (Enterprise Park).**

IT DISTRICT NARRATIVE
for
FUTURE AUTOMATION
Site Plan
Quality Way
Tax Map D, Lot 11-8

B. Building siting and design. The general character of the IT District is intended to be a campus or parklike setting, with emphasis on the natural characteristics of the site. The site design should create a sense of entry into the site and into the businesses within the site through landscaping, facade treatment, and signage. The architectural character of each building shall be of contemporary design and style. The design should integrate the building's form, textures and colors with the landscape and topographical character of each site. Specific requirements are as follows:

(1) All exterior building walls and structures shall be constructed with attractive, durable materials such as textured concrete, masonry, stone, brick, clapboard, finishing wood, stucco, or glass. **The building exteriors are consistent with other buildings in the Dover Industrial Park as accepted by DBIDA.**

(2) Buildings with exterior walls made of metal or corrugated steel shall not be permitted. **The building exteriors are consistent with other buildings in the Dover Industrial Park as accepted by DBIDA.**

(3) Building roofs shall be uncluttered, and when flat roofs are visible from public roads, pitched roofs or parapets are required. **The project does not propose flat roofs or rooftop equipment.**

(4) Rooftop and ground-mounted mechanical units and ventilating fans are to be either integrated into the design of the building or screened from view. **The project does not propose rooftop mounted mechanical units. Mechanical units visible from Quality Way include vegetative screening.**

(5) All exterior service, loading, storage, and utility areas shall be located at the side or rear of the building and screened or sheltered so as not to be visible from the public road or adjacent parcels. **The shipping and receiving areas are located at the back of the site and are not visible from Quality Way.**

C. Parking areas and pedestrian circulation.

(1) Parking areas shall be screened from public streets and existing residential uses to minimize the visibility of such areas. **The parking areas are screened with vegetation.**

(2) A majority of the parking spaces shall be located to the side or rear of the buildings. **The parking area locations have utilized as much of the sides of the building as possible based on site characteristics and wetland setbacks. The parking areas are screened with vegetation.**

(3) All sites shall be designed to promote safe pedestrian access, not only within the development but to adjacent properties and public streets. **The project proposes manufacturing facilities located at the end of a cul-de-sac in the Dover Industrial Park. A sidewalk along Quality Way is accessible from the site.**

D. Landscaping.

(1) A landscaping plan shall be submitted as part of the development application. The landscaping plan shall depict a scheme that creates a parklike setting. Maintenance of existing vegetation should be incorporated in the landscaping plan when appropriate. **The landscape plan is submitted as part of the application process and includes an inspection and maintenance manual.**

(2) Existing trees of significant size or special character should be preserved wherever possible. **Tree removal that is necessary for site development has been minimized to maintain as much existing woodland and buffer as possible.**

(3) All trees should be planted in a permeable area of no less than a three-foot-wide radius from the base of the tree. **Tree locations are situated to ensure the maximum likelihood of survival and at a minimum 3' from edge of pavement.**

(4) Planting islands should be used to define vehicular and pedestrian circulation patterns and to break up large expanses of pavement. A combination of end cap islands and linear islands running parallel to parking rows is preferred. Islands should be planted with either grass or evergreen shrubs and include trees. **The project does not propose planting islands as the parking areas are relatively small. The large expanse of pavement at the back of the proposed buildings is necessary to support shipping and receiving for the facilities while allowing truck access.**

(5) Landscaping should be maintained to present a healthy appearance, and dead materials should be replaced. **The landscape plan is submitted as part of the application process and includes an inspection and maintenance manual.**

E. Exterior lighting. Exterior lighting shall be low profile. High-intensity directional lighting shall be prohibited. Lighting shall be designed and oriented to avoid glare onto adjacent property or streets. **The lighting is proposed to be cut-off type fixtures that provide on-site lighting.**

CONDITIONAL USE NARRATIVE
§170-27.1
WETLAND PROTECTION DISTRICT
for
FUTURE AUTOMATION
Quality Way
Tax Map D, Lot 11-8

F. Conditional use approval.

(1) Conditional use approval may be granted by the PLANNING BOARD (RSA 674:21II) after proper public notice and public hearing, for construction within the Wetland Protection District or buffer. Said construction may include but is not limited to a road or other accessway, utility right-of-way, communication lines, power lines and pipelines, STRUCTUREs, and parking LOTs provided that the proposed construction complies with the following standards:

(a) Practicable Alternative: There is no practicable alternative that would have a less adverse impact on the area. **The proposed driveways, buildings, side slopes, and bio-retention basin location were chosen to avoid wetland impacts and to minimize wetland buffer impacts. The areas of impervious impact to the wetland buffer were minimized by utilizing the site characteristics including existing slope and ledge probe information to minimize additional side slope impacts.**

(b) Avoidance: The potential impacts have been avoided to the maximum extent practicable. The APPLICANT will demonstrate by plan and example that the proposed construction represents the least impacting alternative. **With the exception of the 1,631 sf of wetland impact for the access drive, wetland impacts have been avoided. There are 39,820 sf of wetland buffer impacts associated with the grading and drainage and the access drive and emergency vehicle maneuvering for the project. The design incorporated the unique site characteristics including existing slope, depth to ledge, and soil type to minimize wetland buffer impacts. The buildings have been situated to provide for the drive aisle and parking areas to further reduce wetland buffer impacts.**

(c) Minimization: Any unavoidable impacts have been minimized. No reasonable Alternative to the proposed construction exists which does not impact a wetland, or which has less detrimental impact on a wetland. Design, construction, and maintenance methods will be prepared by a registered engineer to minimize detrimental impacts to the wetlands and will include restoration of the site as nearly as possible to its original grade. **There are 1,631 sf of wetland impacts for the access drive and utilities and 39,820 sf of wetland buffer impacts. All impacts have been minimized to the greatest extent practicable. The design utilizes retaining walls, headwalls, and 2:1 side slope to further minimize grading in the wetland buffer. Increasing the slopes from 3:1 to 2:1 in the area of the bio-retention basin is not allowed per Env-Wq 1508.08(m) (5).**

(d) Mitigation: If the APPLICANT is required by State rules to prepare a compensatory mitigation plan, the APPLICANT shall provide the Conservation Commission and PLANNING BOARD with one copy each of said plan for their review. **Mitigation is not required.**

(e) Approval for the wetlands impact has been received from the NHDES Wetlands Bureau pursuant to Section G (3), below. **A NHDES wetland permit application will be filed.**

SITE DEVELOPMENT DESIGN CRITERIA NARRATIVE
§153-14
STORMWATER MANAGEMENT
for
FUTURE AUTOMATION
Quality Way
Tax Map D, Lot 11-8

A. Stormwater management, erosion control and flood hazards.

(1) Purpose and objective. These regulations establish standards to manage the discharge of runoff to the City of Dover's municipal storm sewer system and water bodies, in a manner compliant with the requirements of state and federal law, including provisions of the federal stormwater management legislation for municipal separate storm sewer systems (MS4), as amended. These provisions and standards are implemented for the purpose of:

(a) Managing stormwater runoff to protect water quality and quantity. **The proposed development has been designed in accordance with NH DES AoT permitting requirements to include the treatment and mitigation of stormwater runoff from the site.**

(b) Minimizing the contribution of a pollutant for which a water body is impaired to the maximum extent practicable (MEP). **The proposed development has been designed in accordance with NH DES AoT permitting requirements to include the treatment of stormwater runoff from all impervious areas of the site (and a small portion of the existing pavement within Quality Way) to minimize pollutant runoff.**

(c) Causing no discharge of runoff to an adjacent property in excess of runoff discharge in the existing developed or undeveloped condition. **The proposed development does not propose an increase in the peak rate of runoff from the project site.**

(d) Encouraging the use of low-impact development (LID) strategies. **The project proposes the use of a bioretention practice for stormwater treatment.**

(2) Applicability of the stormwater standards.

(a) All projects requiring site plan or major subdivision approval shall be subject to the following set of stormwater standards according to the amount and type of disturbance. Applicability is as follows: **The project does not qualify for the redevelopment standards and will disturb greater than 20,000 square feet, as such, the stormwater standards apply.**

[1] The minimum protections and management standards shall apply to all projects. **The design incorporates these standards.**

[2] The stormwater management for new development standards shall apply to any project that results in a contiguous land disturbance of more than 20,000 square feet or creates more than 4,000 square feet of new impervious area. **The design incorporates these standards.**

[3] The stormwater management for redevelopment standards shall apply to any project that results in a contiguous land disturbance of more than 20,000 square feet or creates more than 4,000 square feet of new impervious area where the existing land use has been previously developed as commercial, industrial, institutional, governmental, recreational, or multifamily. **The redevelopment standards are not applicable to this project.**

(b) All projects of such magnitude as to require a permit from the National Pollutant Discharge Elimination System (NPDES) Program or the New Hampshire Department of Environmental Services (NHDES) Alteration of Terrain (AoT) Program shall also comply with the standards of the Environmental Protection Agency (EPA) and/or NHDES permits and this section, whereas the stricter standards shall apply. **The project will require NH DES AoT permitting, a NH DES Wetland Permit, and a NPDES CGP through the EPA. The design of the project has incorporated the associated standards of these agencies.**

(3) Design standards.

(a) Minimum protections and management standards.

[1] Where applicable, all development must comply with the EPA Phase II Stormwater Rules and the City's MS4 permit, as amended. **The project complies with the City's design and stormwater requirements.**

[2] Existing surface waters, including ponds, rivers, perennial and intermittent streams (natural or channelized), and wetlands (including vernal pools), shall be protected by the minimum buffer setback as specified in Chapter 170, Zoning, § 170-27.1. Stormwater and erosion and sediment control best management practices (BMPs) shall be located outside the specified buffer zone unless otherwise approved by the Planning Board. **The project proposes a wetland crossing for access to the site and wetland buffer impacts as part of the construction. A Conditional Use Permit application has been submitted as part of the application process.**

[3] Low-impact development (LID) site planning and design strategies shall be used to the MEP in order to reduce the generation of the stormwater runoff Volume for both new and redevelopment projects. An owner/applicant must document why LID strategies are not appropriate if not used to manage stormwater. **LID strategies were implemented to the maximum extent practicable. The site was evaluated for infiltration practices but the site characteristics, including soil types, topography, depth to the SHWT and depth to ledge prevent the use of infiltration practices.**

[4] All proposed stormwater practices and measures shall be installed and maintained in accordance with manufacturers' specifications and performance specifications outlined in the New Hampshire Stormwater Management Manual Volume 2 (December 2008 or current revision) a copy of which can be found on The NHDES website. **The project incorporates stormwater BMP designed in accordance with NH DES AoT permitting requirements. Details provided for construction are aligned with the NH Stormwater Manual and the engineer of design will be required to review material submittals and witness the installation of the practices. NH DES AoT will require a letter from the design engineer indicating the site stormwater BMP's were installed as designed and permitted.**

[5] All storage facilities for fuel, chemicals, chemical or industrial wastes, and biodegradable raw materials shall meet the regulations of the NHDES, including but not limited to those involving underground storage tanks, aboveground storage tanks, hazardous waste, and best management practices for groundwater protection (Part Env Wq 401). **The project does not propose the storage of the referenced materials onsite.**

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

guidance fact sheet on road salt and snow disposal. **The project does not propose the storage of deicing materials onsite.**

[7] The use of sodium-chloride-based materials for winter maintenance shall be the minimum necessary for safety. The use of sodium-chloride-based materials is discouraged within the groundwater protection districts. **The project I&M manual directs the owner/operator to produce salt minimization plan as part of the winter maintenance of the site.**

[8] Impervious surfaces for parking areas and roads shall be minimized to the extent possible. **The project design incorporated the minimization of impervious areas to the maximum extent possible. All aspects of the design including road width, required number of parking spaces, drive aisle widths, and truck loading and turning areas were evaluated.**

[9] Stormwater runoff from new impervious surfaces shall be directed to a best management practice for flow mitigation, treatment and/or infiltration. **The proposed design includes the treatment of stormwater runoff from all impervious areas of the site (and a small portion of the existing pavement within Quality Way).**

(b) Stormwater management for new development.

[1] Runoff of impervious surfaces shall be treated to provide 80% removal of total suspended solids (TSS) and 50% removal of both total nitrogen and phosphorus. Removal rates shall be determined using approved manufacturer's pollutant removal efficiency analysis or the pollutant removal efficiencies outlined in the New Hampshire Stormwater Management Manual Volume 1, Appendix E (December 2008 or current revision), a copy of which is available from the NHDES website. **The project utilizes a bioretention basin for treatment of all impervious areas on site and the small portion of Quality way. This system provides 90% removal of TSS and 65% removal of both total nitrogen and phosphorous per the NH Stormwater Manual.**

[2] Rainfall amount shall be based on current extreme precipitation estimates obtained from the Northeast Regional Climate Center. **The design incorporates NRCC precipitation amounts and the associated storm distribution data. As the project will require a NH DES AoT permit, the precipitation amounts have been increased by 15% accordingly.**

[3] Measures shall be taken to control the post-development peak rate runoff so that it does not exceed predevelopment runoff for the two-, ten-, twenty-five- and fifty-year, twenty-four-hour storm events. **The proposed design mitigates post-development peak rate runoff to less than the pre-developed conditions.**

[4] Measures shall be taken to control the post-development surface water runoff volume so that it does not exceed predevelopment runoff for the two-, ten-, twenty-five- and fifty-year, twenty-four-hour storm events. For sites where infiltration/recharge is limited or not practicable, the owner/applicant must demonstrate that the project will not cause or contribute to flooding or functional impairments to streets, adjacent properties, and downstream properties. **The site was evaluated for the inclusion of infiltration practices but the site characteristics, including soil types, topography, depth to the SHWT and depth to ledge prevent the use of infiltration practices. The project proposes an increase in the volume of runoff from the site. Although the site increases runoff, the project design will still meet the Channel Protection requirements of Env-Wq 1507.05 as required by NH DES AoT regulation. The**

increased volume of runoff will be discharged directly to a large wetland complex associated with Reyner's Brook. The increase in volume will not cause flooding to adjacent or downstream properties.

[5] Infiltration rates for designing groundwater recharge practices shall be determined in accordance with Section Env-Wq 1504.14. **The site was not feasible for infiltration practices and as such infiltration rates were not calculated.**

[6] Stormwater conveyance practices shall be sized appropriately to convey the ten-year, twenty-four-hour storm event without overtopping or causing flooding on the property. **Stormwater conveyance practices are designed to ensure they pass the 50-yr, 24-hour storm events without overtopping.**

[7] For large projects adding greater than or equal to 10 acres of impervious cover, or projects located in known areas of flooding concern, or specifically within areas with a 1% chance of being inundated by water in any given year, the owner/applicant shall submit a supplementary report that describes how the project will not increase the future flooding potential and complies with the AoT requirements pertaining to floodplain impacts as described in Section Env-Wq 1503.09, regardless of whether an AoT permit is required. **The project is located outside of the 0.2 percent annual chance floodplain. The project does not propose permanent or temporary disturbance or alteration of terrain within the flood plain.**

[8] The design of the stormwater management systems shall take into account upstream and upgradient runoff that flows onto, over, or through the site to be developed or redeveloped and provide for this contribution of runoff. **The project has incorporated offsite and upgradient stormwater runoff in support of the design for the wetland crossing culvert and the area of Quality Way captured by the closed drainage system.**

[9] Seasonal high-water table elevations must be accounted for in all BMP design criteria. **Test pit information and design intent (underdrained system) were utilized in determining the SHWT associated with the bioretention basin design.**

[10] Access for maintenance of stormwater facilities must be included as part of the design, where necessary. Access easements may be required. **Stormwater facilities are included on site and the site will be solely owned by the applicant. Stormwater access easements are not required for this project.**

[11] Plantings in treatment areas shall be native grasses, shrubs and/or other native plants in sufficient numbers and density to prevent soil erosion and to achieve water-quality treatment. **A licensed Landscape Architect has produced a site-specific planting plan and O&M document in support of site revegetation including the stormwater BMP(s).**

(c) Stormwater management for redevelopment. In order to determine the stormwater requirements for redevelopment projects, the percentage of the site covered by existing impervious areas must be calculated. Stormwater requirements for redevelopment will vary based upon the amount of site surface area that is covered by existing impervious surfaces. **The project does not meet redevelopment requirements and this section is Not Applicable (N/A).**

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

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

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

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

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

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

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

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

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

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

(d) Erosion control standards during construction. The following standards shall be applied in project planning and shall be implemented prior to and during construction activity: **The plan set includes temporary and permanent sediment and erosion control practice notes and details in support of meeting the erosion control standards.**

[1] All proposed measures shall meet, at a minimum, the design standards for best management practices set forth in the New Hampshire Stormwater Management Manual Volume 3 (December 2008 or current revision), a copy of which is available from the NHDES website. **The sediment and erosion control details provided in the plan set are all designed in accordance with the NH Stormwater Manual.**

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

[3] Stripping of vegetation shall be done in a manner that minimizes soil erosion. Whenever practical, natural vegetation shall be retained, protected, or supplemented. **The Erosion Control Notes in the provided plan set indicate that the smallest practical area shall be disturbed during construction.**

[4] The area of land disturbance shall be kept to a minimum and be limited to an area only large enough to accommodate construction activities for a particular construction phase. **The Erosion Control Notes in the provided plan set indicate that the smallest practical area shall be disturbed during construction and that in no case shall greater than 5 acres be disturbed at any time.**

[5] Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas where feasible, or measures to convey stormwater through the project area without causing erosion of sediment must be included. The integrity of downstream drainage systems shall be maintained. **Direction to ensure that stormwater conveyance practices shall be stabilized prior to receiving stormwater runoff is included on the Erosion Control Notes sheet provided as part of this submittal.**

[6] Appropriate erosion and sediment control measures shall be installed prior to any soil land disturbance and must be reviewed and approved by the Community Services Department. **Construction scheduling and inspections will be discussed with Community Services at the required pre-construction meeting.**

[7] Perimeter site controls shall not be placed within wetland areas, stream channels or wetland buffers. **This project will require a NH DES wetland permit and a City of Dover Conditional Use Permit for work within the wetland and wetland buffers. Sediment and erosion control will be limited within the wetland and wetland buffer as identified and approved through these permits.**

[8] Disturbed soil areas shall be either temporarily or permanently stabilized. In areas where final grading has not occurred, temporary stabilization measures should be in place within seven calendar days for exposed soil areas that are within 100 feet of a surface water body or a wetland and no more than 14 calendar days for all other areas. Permanent stabilization should be in place within three calendar days following completion of final grading of exposed soil areas. **The definitions of, and direction for, stabilization of the site is provided on the Erosion Control Notes sheet provided as part of this submittal.**

[9] All temporary erosion and sediment control measures shall be maintained in functioning condition until final site stabilization is accomplished. A proposed BMP inspection schedule shall be included in the submittal. **The erosion control inspection scheduling requirements are identified on the Erosion Control Notes sheet provided as part of this submittal.**

[10] Additional temporary stabilization for the winter season consistent with NHDES guidelines shall be in place for disturbed areas that are not permanently stabilized by October 1, or at the discretion of the Community Services Department. **The NH DES AoT winter construction notes are identified on the Erosion Control Notes sheet provided as part of this submittal.**

[11] Special stabilization details shall be provided with the submission for any land disturbance on slopes equal to or steeper than 3:1. **Slopes greater than 3:1 require erosion control matting and a detail is provided in the plan set.**

[12] All temporary erosion and sediment control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30 calendar days unless conditions dictate otherwise. **Temporary practice details identify the need to remove sediment and/or stabilize the area once the practices have been removed.**

[13] For projects proposing to disturb and expose soils in areas of 10 acres or more at one time, a temporary (or permanent) sediment basin must be provided with storage for a calculated volume of runoff from a drainage area from a two-year, twenty-four-hour storm, or equivalent control measures, where attainable, until final stabilization of the site. Alternatively, the sediment of storage per acre of drainage area until final stabilization of the site. In determining appropriate locations and number of sediment basins needed, the operators may consider such factors as erodibility of site soils, slope lengths, available area on site, construction period and other unique site considerations. **The project does not propose the disturbance of greater than 10 acres of area. A temporary sediment trap detail, designed with a maximum contributing area of 5 acres, has been provided in accordance with NH DES AoT requirements.**

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

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

[1] The Community Services Department or its designated agent shall have access to the site to complete routine inspections. **Community Services access and inspection requirements will be discussed at the pre-construction meeting.**

[2] The Community Services Department shall be notified 24 hours prior to installation of a stormwater BMP in order to schedule an inspection. These inspections shall be completed during normal working hours. **The project notes provide direction for the contractor to notify the design engineer and the Community Services Department as required.**

[3] The Planning Board or Community Services Department may require the design engineer and/or an independent third party to provide inspection and oversight of the construction of the stormwater management facilities and erosion and sediment control measures at its discretion. Such oversight may be especially important for implementing techniques such as porous pavement or subsurface stormwater infiltration systems. The owner/applicant shall be responsible for all fees associated with third-party inspections. **NH DES AoT permitting requires the design engineer to provide a letter at the completion of work that indicates the stormwater practices were installed as designed.**

[4] All SWPPP inspections must be conducted by a qualified professional such as a professional engineer (PE), a certified professional in erosion and sediment control (CPESC), a certified erosion sediment and stormwater inspector (CESSWI), or a certified professional in stormwater quality (CPSWQ). Inspection reports shall be submitted to the Community Services Department. **The project notes provide direction for the inspector to be qualified and for all reports to be submitted to the Community Services Department.**

[5] The owner is ultimately responsible for the installation, construction, inspection, and disposition of all stormwater management and erosion control measures required by the provisions of these regulations. **The project notes identify the owner as having the responsibility for ensuring the stormwater management and erosion control measures are installed as approved.**

(f) Stormwater management plan (SWMP) submittal requirements. At the discretion of the Planning Board or Community Services Department, a technical review by an independent third party may be required of any SWMP prepared under these regulations. Such a review shall be performed by a qualified professional consultant and the expense of which shall be the full responsibility of the owner/applicant. **The SWMP is a comprehensive set of documents that include, at a minimum, a drainage report, plan set, and Stormwater I&M Manual. These documents each serve a role in presenting the necessary information to the appropriate audience. The information required in this section is provided within the SWMP documents.**

[1] For projects requiring minimum protection standards, a plan including the following information shall be submitted:

[a] Description of erosion and sediment control measures as well as sequence for final stabilization of the project site. **This information is provided within the Erosion Control Notes within the plan set.**

[b] Proposed changes in impervious cover areas and any changes in pre- and post-development drainage patterns. **This information is provided within the drainage report and the Pre/Post Development Watershed Plans.**

[c] Description of LID proposed measures. **This information is provided in the drainage report and throughout the plan set and details.**

[2] For projects requiring new development or redevelopment standards, a drainage report that contains the following items shall be submitted: **The SWMP documents include the proposed information when applicable.**

[a] Description of construction period and earth movement schedule, including anticipated project start and completion dates, sequence and duration of grading and construction activities, sequence, and timing of installation and/or application of soil erosion and sediment control measures as well as sequence for final stabilization of the project site. **The SWMP documents include the proposed information when applicable.**

[b] Description of the on-site and adjacent wetlands, streams and other water resources, including methods used to identify these resources, and a description of any buffer setbacks that may apply, steep slopes, critical habitat, existing vegetation, areas with a 1% chance of being inundated by water in any given year, and whether any downstream water bodies are listed as impaired according

to NHDES's most recent 303(d) list. **The SWMP documents include the proposed information when applicable.**

[c] Soils information for proposed disturbed areas shall be delineated by a certified soil scientist. For all other areas that contribute runoff to the project site, soil types may be identified in accordance with Natural Resources Conservation Service (NRCS) countywide soil survey. **The SWMP documents include the proposed information when applicable.**

[d] Description of existing drainage patterns, receiving water bodies or drainage infrastructure and soil types for recharge potential. **The SWMP documents include the proposed information when applicable.**

[e] Watershed area limits, including any off-site and upstream areas contributing flow to shared drainage channels and/or infrastructure. **The SWMP documents include the proposed information when applicable.**

[f] Description of proposed changes in impervious cover areas and any changes in pre- and post-development drainage patterns. **The SWMP documents include the proposed information when applicable.**

[g] Methods and assumptions used to calculate pre- and post-development runoff volume, peak discharge, and discharge velocity for the specified design storm events. **The SWMP documents include the proposed information when applicable.**

[h] Methods and assumptions used to calculate the pollutant load removal. **The SWMP documents include the proposed information when applicable.**

[i] Description of LID measures that are proposed to limit the development footprint, preserve existing vegetation and mimic existing hydrology to the extent feasible. **The SWMP documents include the proposed information when applicable.**

[j] If not used, provide rationale why LID measures are not practical for the site. **The SWMP documents include the proposed information when applicable.**

[k] Describe measures and calculations for proposed practices used to achieve no net increase in runoff volumes leaving the site. **The SWMP documents include the proposed information when applicable.**

[l] Provide calculations for the infiltration or exfiltration system. **The SWMP documents include the proposed information when applicable.**

[m] If an increase in post-development runoff volume is anticipated due to limited applicability for LID measures and site constraints, provide an assessment and supporting calculations to demonstrate no adverse impacts to downstream infrastructure, adjacent properties, or aquatic habitat. **The SWMP documents include the proposed information when applicable.**

[n] Descriptions, details, and design criteria and calculations for all structural, nonstructural, permanent, and temporary erosion and sedimentation control measures and BMPs. This information should include seeding mixtures and rates, types of sod, methods of seedbed preparation, expected seeding dates (or

limitations on seeding time frames), type and rate of lime and fertilizer application, and type and quantity of mulching for temporary and permanent control facilities. **The SWMP documents include the proposed information when applicable.**

[o] Where proposed changes are anticipated within mapped limits of the areas with a 1% chance of being inundated by water in any given year, provide hydrologic and hydraulic analysis to show no net increase in flood elevations. **The SWMP documents include the proposed information when applicable.**

[p] Proposed schedule for the inspection and maintenance of all erosion control measures on site prior to achieving final site stabilization. **The SWMP documents include the proposed information when applicable.**

[q] Describe procedures for removing temporary erosion control measures and removal of accumulated sediment captured by such measures. **The SWMP documents include the proposed information when applicable.**

[r] Any other specific study, calculation, or investigation as requested by the City. **Additional information is provided as requested and may include traffic studies, structural designs, septic/sewer designs, geotechnical reports, etc. These documents are provided on a case-by-case basis and as requested by the City.**

[s] Describe procedures to limit and/or optimize the use of deicing materials and minimize off-site increases in chloride levels in adjacent surface water and groundwater. **The Stormwater I&M Manual includes the implementation of a salt minimization plan.**

[t] Provide a maintenance and inspection plan for post-construction monitoring of stormwater BMPs to ensure long-term performance and functionality, including details of who will be responsible for inspections and maintenance, proposed schedule, documentation, submittal procedures and contingency plans if future maintenance is required. **A Stormwater I&M Manual is provided as part of the submission.**

[u] Provide copies of pertinent state and federal permits. **Copies of permits will be provided to the City.**

(g) Long-term operation and maintenance. The owner shall be responsible for continued inspection and maintenance requirements. **An I&M Manual that identifies the owner's responsibilities has been provided as a part of the submission.**

[1] An operation and maintenance manual shall be created with the following information:

[a] The names of the responsible qualified professionals who will implement the required reporting, inspections, and maintenance activities. **The Owner, Responsible Party, and the Management Company are identified in the I&M Manual.**

[b] An inspection checklist, identifying item or BMP, inspection frequency, and components to be inspected. The list shall clearly outline performance thresholds and triggers for maintenance. **Inspection requirements and maintenance thresholds are identified in the I&M Manual.**

[c] Snow and ice removal shall be performed by a contractor certified by the "Green SnoPro" Program, or approved equivalent, following best management practices for the application of deicing materials. **The I&M Manual requires the use of a Green SnowPro contractor.**

[d] Deicing log to track amount and type of deicing material applied. **The I&M Manual requires the implementation of a salt minimization plan that also requires the owner or operator to track salt usage onsite through a quantity usage log.**

[e] A site plan clearly identifying the locations of all stormwater practices to be inspected and maintained. **The approved Grading and Drainage Plan accompanies the I&M Manual.**

[f] Inspection and maintenance log to be submitted to the City of Dover Community Services Department on an annual basis. Documents shall be submitted no later than December 15 of each year. **The I&M Manual identifies this requirement.**

[2] The owner of record shall record at the Registry of Deeds documentation sufficient to provide notice to all persons that may acquire any property subject to the requirements and responsibilities described in the approved stormwater management plan. The notice shall comply with the applicable requirements for recording contained in RSA 477 and 478. The notice need not set forth the requirements at length, so long as it is sufficient to provide notice to prospective purchasers of the requirements for maintenance and reporting. **Not Applicable.**

CIVILWORKS NEW ENGLAND
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JOB 22075 - FUTURE AUTOMATION
SHEET NO. 1 OF 7
CALCULATED BY MEB DATE 10/26/23
~~CHECKED BY~~ REVISED DATE 1/10/24
~~SCALE~~ * NHPE #7101

PUMP STATION DESIGN – PS-1

25,000 SF BLDG. – 2,000 SF OFFICE
– 23,000 SF LIGHT MANUF.

- DESIGN FLOW:

OFFICE = 2,864 SF × 5 GPD/100 SF = 144 GPD

LIGHT MANUF. = 25 EMPL. × 10 GPD/EMPL. = 250 GPD
(NO CAFE, NO SHOWERS)

TOT. = 394 GPD

AVE. FLOW = $394 \frac{\text{GAL}}{\text{DAY}} \times \frac{1 \text{ DAY}}{8 \text{ HR}} \times \frac{1 \text{ HR}}{60 \text{ MIN}}$

= 0.82 GPM

PEAK FACTOR = 6.0 ⇒ PEAK DISCHARGE
= 4.93 GPM

- TOT. DYNAMIC HEAD (TDH)

$= H_s + H_L + V^2/2g$

H_s = STATIC HEAD

H_L = FRICTION LOSS IN PIPES ⇒ PIPE LENGTH + EQUIV. FITTING LENGTH

$V^2/2g$ = VELOCITY HEAD ($g = 32.2 \text{ FT/S}^2$)

- STATIC HEAD:

– SEWER MANHOLE INV. IN = 161.3

– PUMP CHAMBER INV. IN = 148.0
" " PUMP OFF = 146.9

STATIC HEAD = 161.3 – 146.9
= 14.4'

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- DYNAMIC HEAD:

FORCE MAIN L = 520'
LENGTH IN PC = 3' ±
TOT. PIPE L = 523'

1.25" IN PC PRESUME 1.5" TO BE CONSERV.

ASSUME 1.5" HDPE (or LLPDE) SDR-11

FITTING	PIPE (ϕ) DIA. (IN)	QUAN.	EQUIV. L (EA)	FITTING EQUIV. L (FT)
90° ELBOW (IN PC)	0.125"	1	30ϕ	3.75'
CHECK VALVE		1	135ϕ	16.88'
GATE VALVE		1	13ϕ	1.63'
UNION/ENLARGER		1	2ϕ	0.25'
45° ELBOW (IN SMH)		1	16ϕ	2.0'

(SEE TABLE 1)

TOT. = 24.51
= 25'

TOT. EFFECTIVE L = 523' + 25' = 548'
(PIPE) (FITTINGS)

(GPM) FLOW	H_f (FT/100)	H_L ($H_f \times 548/100$)	V (FPS)	$V^2/2g$	$H_L + V^2/2g$
8	0.54	2.96	1.35	0.03	2.99
10	0.82	4.49	1.69	0.04	4.53
12	1.15	6.30	2.03	0.06	6.36
15	1.74	9.54	2.54	0.10	9.64
18	2.43	13.32	3.05	0.14	13.46

(SEE TABLE 2)

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FLOW (GPM)	H_S (FT)	$H_L + V^2/2g$ (FT)	TDH (FT)
8	14.40	2.99	17.39
10	↓	4.53	18.93
12		6.36	20.76
15		9.64	24.04
18		13.46	27.86

- PUMP SELECTION:

TRY E-ONE DH152 PACKAGE SYSTEM WITH E-ONE SPD GRINDER PUMP (1 HP, 1725 RPM)

REFER TO SPD PUMP PERFORMANCE CURVE

OPERATING POINT = 22.0' TDH @ 12.7 GPM

→ WITHIN "TYP. OPERATING PRESSURE" ∴ OK

→ 12.7 GPM VS. PEAK INFLOW = 4.93 GPM ∴ OK

DH152 TANK CAPACITY = 150 GAL

TANK DIA. = 38" ± = 3.17'

$$\text{VOLUME/FT} = \frac{\pi(3.17)^2}{4} \times 1' = 7.9 \text{ FT}^3/\text{FT}$$

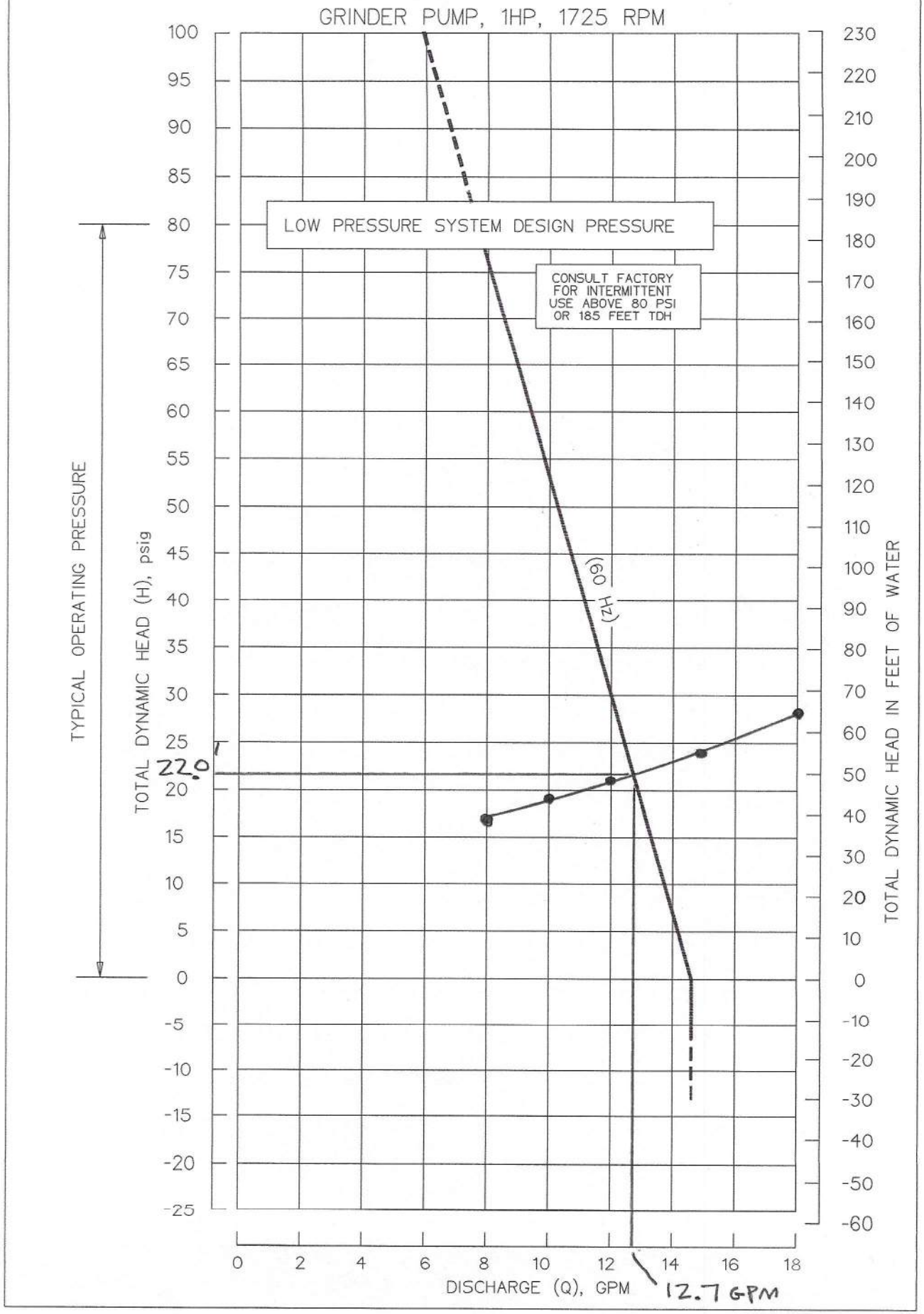
$$7.9 \text{ FT}^3/\text{FT} \times 7.48 \text{ GAL}/\text{FT}^3 = 59 \text{ GAL/FT}$$

DH152 DRAWDOWN = 4" = 0.33 FT

DRAWDOWN VOL. = 59(0.33) = 19.6 GAL

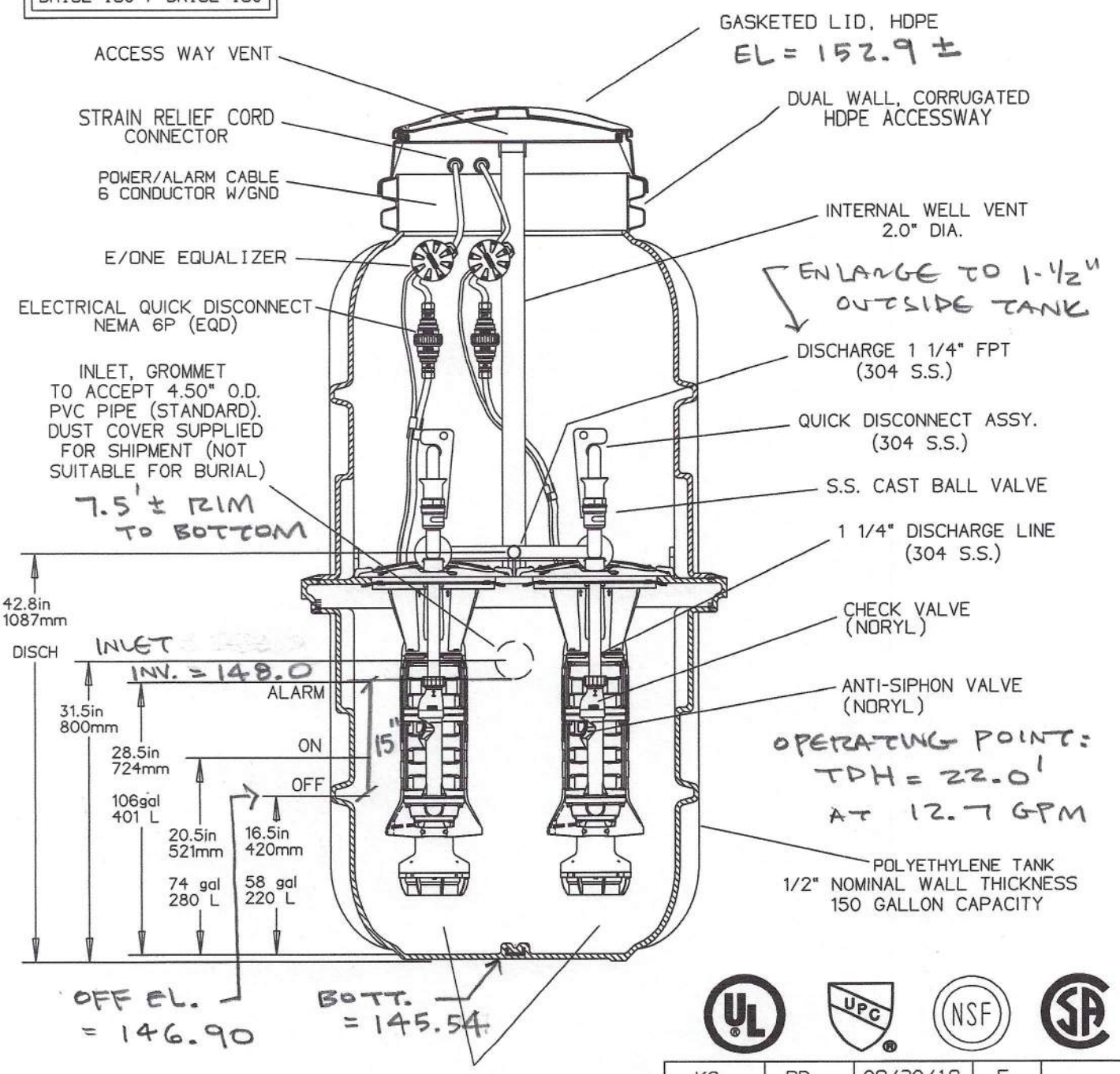
$$\text{DRAWDOWN TIME} = 19.6 \text{ GAL} / 12.7 \text{ GPM} = 1.54 \text{ MIN}$$ OK

E|ONE SPD PUMP PERFORMANCE CURVE



OPTIONS: ☒ DH152 (HARD WIRED LEVEL CONTROLS)
☐ DR152 (WIRELESS LEVEL CONTROLS)

FIELD JOINT REQUIRED FOR MODELS DH152-129 / DR152-129 & DH152-160 / DR152-160



SEMI-POSITIVE DISPLACEMENT TYPE PUMP EACH DIRECTLY DRIVEN BY A 1 HP MOTOR

JTC B-4 ~ EL = 151.5
REF. = 143.0
WATER = 144.5

CONCRETE BALLAST MAY BE REQUIRED SEE INSTALLATION INSTRUCTIONS FOR DETAILS
APPEARS NOT REQ'D ~ V.I.F.

NOTE: DIMENSIONS ARE FOR REF ONLY

KC	PD	09/30/19	F	
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

MODEL DH152 / DR152
DETAIL SHEET

NA0052P02

TABLE 1

A Staff Re

Valves, Pipe and Fittings

By JAMES A. EDWARDS, Field Editor, POLLUTION ENGINEERING

Valves and fittings that serve to direct and control the flow of fluids are the critical sections of a piping layout in a waste treatment process. Properly applied, they can provide either ON-OFF or proportional control, manual or automatic adjustment, good corrosion resistance, cleanouts in slurry lines, fluid blending, and backflow prevention. Good piping design depends on the proper application and use of valves and fittings through understanding of the equipment capability and how it was intended to be used.

Valves are available in a number of designs: **globe, ball, gate, plug, butterfly, diaphragm, and needle.** All of these types can be equipped with motor operators to automate the application. Despite the wide range of designs, all valves have only one purpose: to slow down or stop the flow of fluid. This is done by blocking the flow of the fluid with an obstruction that can be adjusted inside the pipe, with little leakage from the pipe to the outside.

Table 1. Representative Equivalent Length in Pipe Diameters (L/D) of Various Valves and Fittings

	Description of Product		Equivalent Length in Pipe Diameters (L/D)
Globe Valves	Stem Perpendicular to Run — With no obstruction in flat, bevel, or plug type seat	Fully open	340
	— With wing or pin guided disc	Fully open	450
	Y-Pattern (No obstruction in flat, bevel, or plug type seat) — With stem 60 degrees from run of pipe line	Fully open	175
	— With stem 45 degrees from run of pipe line	Fully open	145
Angle Valves	With no obstruction in flat, bevel, or plug type seat	Fully open	145
	With wing or pin guided disc	Fully open	200
Gate Valves	Wedge, Disc, Double Disc, or Plug Disc	Fully open	13
		Three-quarters open	35
		One-half open	160
		One-quarter open	900
	Pulp Stock	Fully open	17
		Three-quarters open	50
		One-half open	260
		One-quarter open	1200
Conduit Pipe Line Gate, Ball, and Plug Valves		Fully open	3**
Check Valves	Conventional Swing	0.5† ... Fully open	135
	Clearway Swing	0.5† ... Fully open	50
	Globe Lift or Stop; Angle Lift or Stop; In-Line Ball	2.0† ... Fully open	Same as Globe
	Stem Perpendicular to Run or Y-Pattern	2.0† ... Fully open	Same as Angle
	2.5 vertical and 0.25 horizontal	† ... Fully open	150
Foot Valves with Strainer	With poppet lift-type disc	0.3† ... Fully open	420
	With leather-hinged disc	0.4† ... Fully open	75
Butterfly Valves (8-inch and larger)		Fully open	40
Cocks	Straight-Through — Rectangular plug port area equal to 100% of pipe area	Fully open	18
	Three-Way — Rectangular plug port area equal to 80% of pipe area (fully open)	Flow straight through	44
		Flow through branch	140
Fittings	90 Degree Standard Elbow		30
	45 Degree Standard Elbow		16
	90 Degree Long Radius Elbow		20
	90 Degree Street Elbow		50
	45 Degree Street Elbow		26
	Square Corner Elbow		57
	Standard Tee — With flow through run		20
	With flow through branch		60
	Close Pattern Return Bend		50

Reprinted from Crane Technical Paper No. 410.

**Exact equivalent length is equal to the length between flange faces or welding ends.

†Minimum calculated pressure drop (psi) across valve to provide sufficient flow to lift disc fully.

TABLE 2

150 C	DR-11 200 PSI Poly Pipe IPS Size PE 4710													
Size:	1"		1-1/4"		1-1/2"		2"		2-1/2"		3"		4"	
GALS PER MIN	OD 1.315 Wall 0.120 ID 1.075		OD 1.660 Wall 0.151 ID 1.358		OD 1.900 Wall 0.173 ID 1.554		OD 2.375 Wall 0.216 ID 1.943		OD 2.875 Wall 0.261 ID 2.353		OD 3.500 Wall 0.318 ID 2.864		OD 4.500 Wall 0.409 ID 3.682	
	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss
2	0.71	0.25	0.44	0.08										
4	1.41	0.90	0.89	0.29	0.68	0.15								
6	2.12	1.91	1.33	0.61	1.02	0.32								
8	2.83	3.25	1.77	1.04	1.35	0.54	0.87	0.18						
10	3.54	4.92	2.22	1.58	1.69	0.82	1.08	0.28						
12	4.24	6.90	2.66	2.21	2.03	1.15	1.30	0.39	0.89	0.15				
15	5.30	10.42	3.32	3.34	2.54	1.74	1.62	0.59	1.11	0.23				
18	6.36	14.61	3.99	4.69	3.05	2.43	1.95	0.82	1.33	0.32	0.90	0.12		
20	7.07	17.76	4.43	5.70	3.38	2.96	2.16	1.00	1.48	0.39	1.00	0.15	0.60	0.04
25	8.84	26.8	5.54	8.61	4.23	4.47	2.71	1.51	1.84	0.59	1.25	0.23	0.75	0.07
30	10.61	37.6	6.65	12.07	5.08	6.26	3.25	2.11	2.21	0.83	1.49	0.32	0.90	0.09
35	12.38	50.1	7.75	16.1	5.92	8.33	3.79	2.81	2.58	1.11	1.74	0.43	1.05	0.13
40	14.14	64.1	8.86	20.6	6.77	10.67	4.33	3.60	2.95	1.42	1.99	0.54	1.21	0.16
45			9.97	25.6	7.61	13.27	4.87	4.48	3.32	1.76	2.24	0.68	1.36	0.20
50			11.08	31.1	8.46	16.1	5.41	5.44	3.69	2.14	2.49	0.82	1.51	0.24
55			12.2	37.1	9.31	19.2	5.95	6.49	4.06	2.56	2.74	0.98	1.66	0.29
60			13.3	43.6	10.15	22.6	6.49	7.63	4.43	3.00	2.99	1.15	1.81	0.34
65			14.4	50.5	11.00	26.2	7.04	8.84	4.80	3.48	3.24	1.34	1.96	0.39
70			15.5	58.0	11.8	30.1	7.58	10.15	5.17	4.00	3.49	1.54	2.11	0.45
75					12.7	34.2	8.12	11.53	5.53	4.54	3.74	1.75	2.26	0.51
80					13.5	38.5	8.66	12.99	5.90	5.12	3.99	1.97	2.41	0.58
85					14.4	43.1	9.20	14.5	6.27	5.73	4.23	2.20	2.56	0.65
90					15.2	47.9	9.74	16.2	6.64	6.37	4.48	2.45	2.71	0.72
95							10.28	17.9	7.01	7.04	4.73	2.70	2.86	0.80
100							10.82	19.6	7.38	7.74	4.98	2.97	3.01	0.88
110							11.9	23.4	8.12	9.23	5.48	3.55	3.32	1.04
120							13.0	27.5	8.86	10.85	5.98	4.17	3.62	1.23
130							14.1	31.9	9.59	12.58	6.48	4.83	3.92	1.42
140							15.2	36.6	10.33	14.4	6.97	5.55	4.22	1.63
150									11.07	16.4	7.47	6.30	4.52	1.86
160									11.8	18.5	7.97	7.10	4.82	2.09
170									12.5	20.7	8.47	7.95	5.12	2.34
180									13.3	23.0	8.97	8.83	5.43	2.60
190									14.0	25.4	9.46	9.76	5.73	2.88
200									14.8	27.9	9.96	10.74	6.03	3.16
220									16.2	33.3	10.96	12.81	6.63	3.77
240											12.0	15.0	7.23	4.43
260											13.0	17.5	7.84	5.14
280											13.9	20.0	8.44	5.90
300											14.9	22.7	9.0	6.70
320											15.9	25.6	9.6	7.55
340													10.2	8.4
360													10.9	9.4
380													11.5	10.4
400													12.1	11.4
450													13.6	14.2
500													15.1	17.3
550													16.6	20.6

Vel = Velocity (ft/s)

Loss = Friction Loss (ft/100' of pipe)

1/16/2017

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SHEET NO. 1 OF 7
CALCULATED BY MEB* DATE 10/26/23
~~CHECKED~~ BY REVISED DATE 1/9/24
~~SCALE~~ * NH PE # 7101

PUMP STATION DESIGN — PS-2

10,000 SF BLDG. — 3,330 SF OFFICE
— 6,770 SF LIGHT MANUF.

OFFICE = 3,330 SF × 5 GPD/100 SF = 167 GPD

LIGHT MANUF. = 20 EMPL. × 10 GPP/EMPL = 200 GPD
(NO CAFE, NO SHOWERS)

TOT. = 367 GPD

AVE. FLOW = $367 \frac{GAL}{DAY} \times \frac{1\ DAY}{8\ HR} \times \frac{1\ HR}{60\ MIN}$

= 0.76 GPM

PEAK FACTOR = 6.0 ⇒ PEAK DISCHARGE
= 4.56 GPM

- TOT. DYNAMIC HEAD (TDH):

$= H_S + H_L + V^2/2g$

H_S = STATIC HEAD

H_L = FRICTION LOSS IN PIPES ⇒ PIPE LENGTH + EQUIV. FITTING LENGTH

$V^2/2g$ = VELOCITY HEAD ($g = 32.2\ FT/S^2$)

- STATIC HEAD:

— SEWER MANHOLE INV. IN = 161.30

— PUMP CHAMBER INV. IN = 147.50
" " PUMP OFF = 146.40

STATIC HEAD = 161.30 — 146.40
= 14.9'

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~~CHECKED BY~~ REVISED DATE 1/9/24
~~SCALE~~ PS-2

- DYNAMIC HEAD:

FORCE MAIN L = 630'
LENGTH IN PC = 3' ±
TOT. PIPE L = 633'

ASSUME 1.5" HDPE (OR LLPDE) SDR-11

FITTING	PIPE (ϕ) DIA. (IN)	QUAN.	EQUIV. L (EA.)	FITTING EQUIV. L (FT)
90° ELBOW (IN PC)	0.125"	1	30ϕ	3.75'
CHECK VALVE		1	135ϕ	16.88'
GATE VALVE		1	13ϕ	1.63'
UNION/ENLARGER		1	2ϕ	0.25'
45° ELBOW (IN SMH)		1	16ϕ	2.0'
			TOT. =	24.51'

(PIPE) (FIT'S) = 25'

TOT. EFFECTIVE L = 633' + 25' = 658'

(GPM) FLOW	H_f (FT/100)	H_L (H_F x 658/100)	V (FPS)	$V^2/2g$	$H_L + V^2/2g$
8	0.54	3.55	1.35	0.03	3.58
10	0.82	5.40	1.69	0.04	5.44
12	1.15	7.57	2.03	0.06	7.63
15	1.74	11.45	2.54	0.10	11.55
18	2.43	15.99	3.05	0.14	16.13

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SHEET NO. 3 OF 7
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~~CHECKED BY~~ REVISED DATE 1/9/24
SCALE PS-2

FLOW (GPM)	Hs (FT)	$H_L + V^2/2g$ (FT)	TDH (FT)
8	14.9'	3.58	18.48
10	↓	5.44	20.34
12		7.63	22.53
15		11.55	26.45
18		16.13	31.03

- PUMP SELECTION:

TRY E-ONE DH152 PACKAGE SYSTEM W/ E-ONE SPD GRINDER PUMP (1 HP, 1725 GPM)

REFER TO SPD PUMP PERFORMANCE CURVE

OPERATING POINT = 23.5' TDH @ 12.6 GPM

→ WITHIN "TYP. OPERATING PRESSURE" ∴ OK

→ 12.6 GPM VS. PEAK INFLOW = 4.56 GPM ∴ OK

DH152 TANK = 38" ± = 3.17'

VOLUME/FT = $\pi\frac{(3.17)^2}{4} \times 1' = 7.9\ FT^3/FT$

$7.9\ FT^3/FT \times 7.48\ GAL/FT^3 = 59\ GAL/FT$

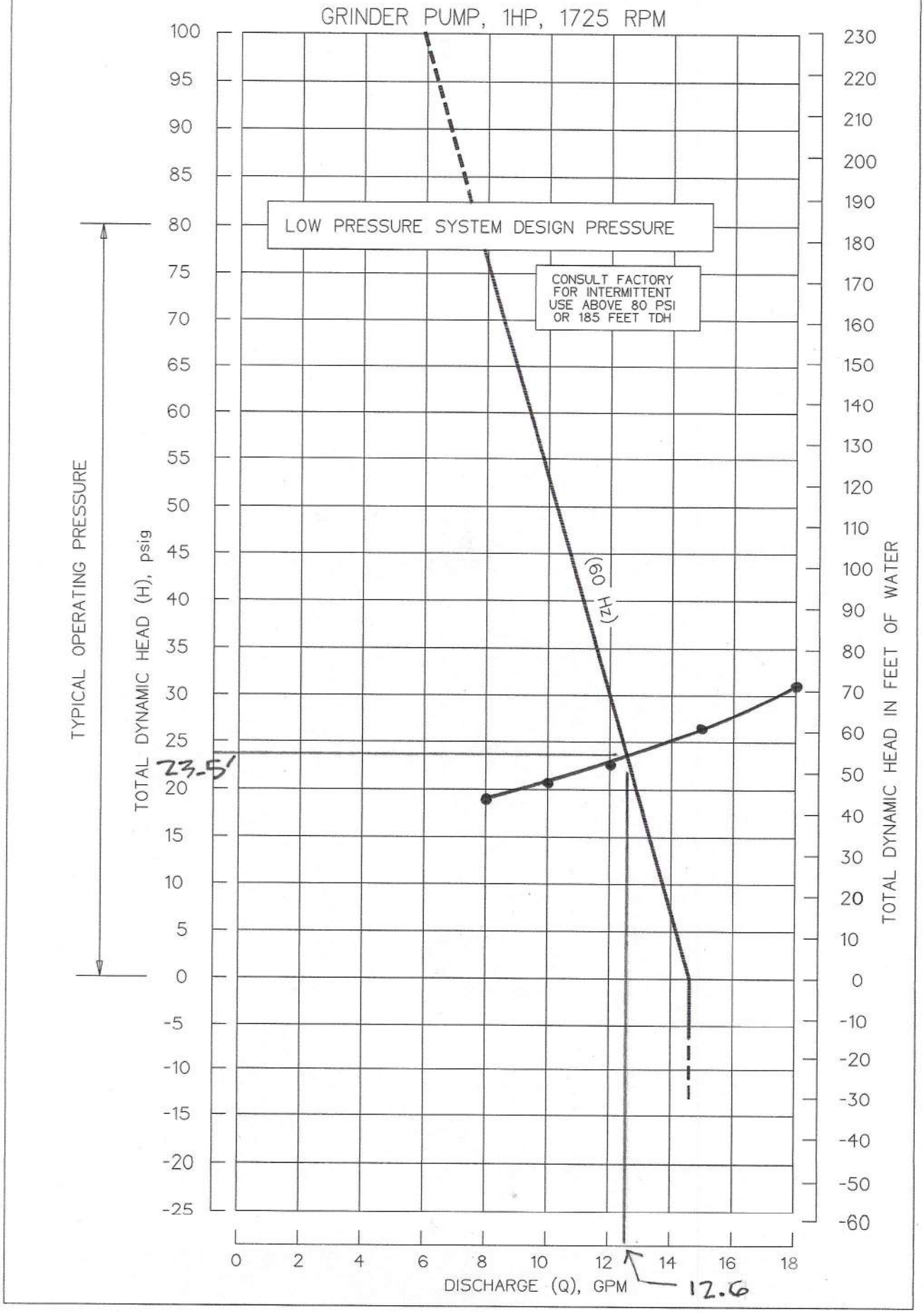
DH152 DRAWDOWN = 4" = 0.33'

DRAWDOWN VOL. = 59(0.33) = 19.6 GAL

DRAWDOWN TIME = 19.6 GAL / 12.6 GPM

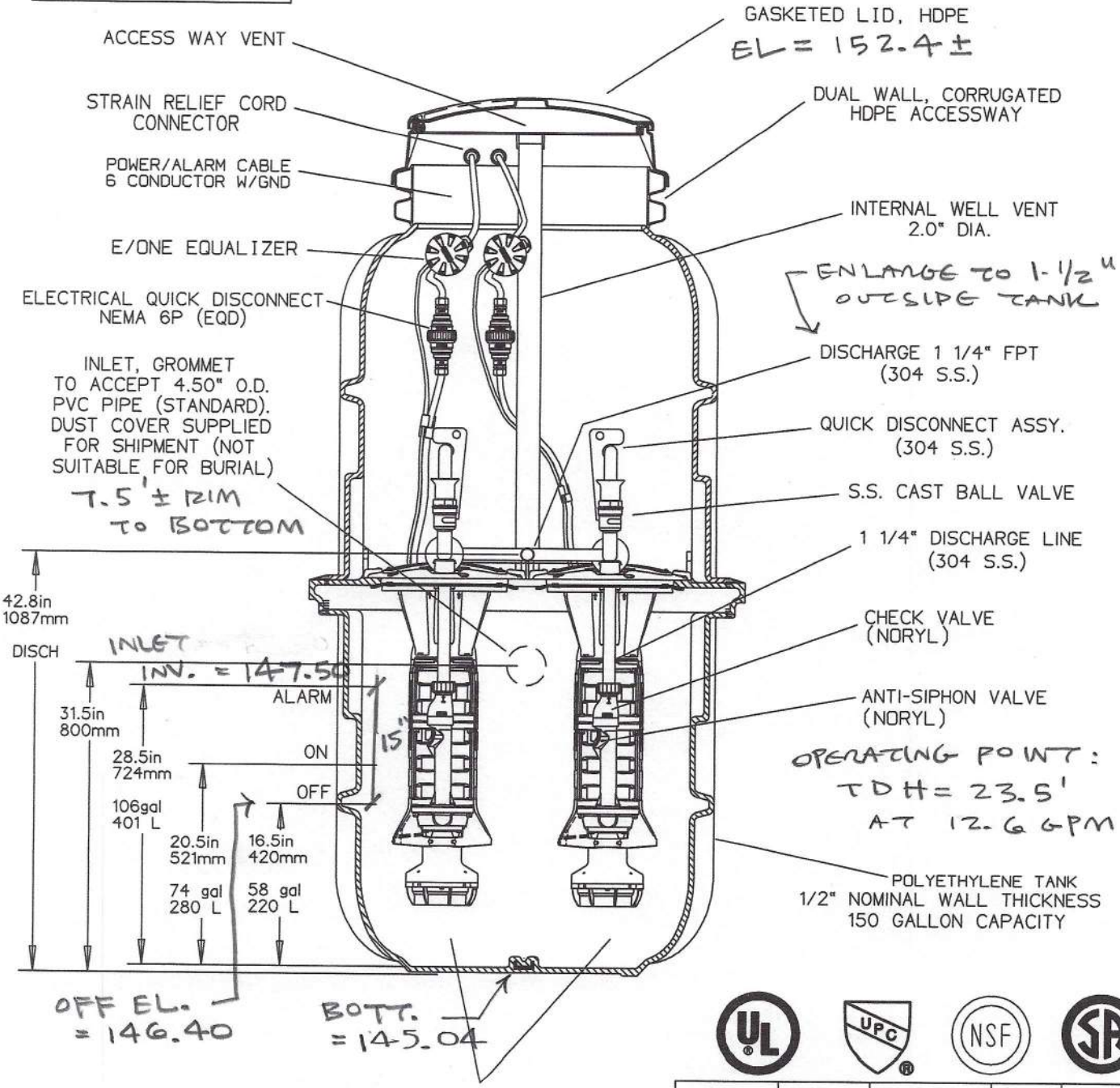
= 1.56 MIN. OK

E|ONE SPD PUMP PERFORMANCE CURVE



OPTIONS: [X] DH152 (HARD WIRED LEVEL CONTROLS)
[ ] DR152 (WIRELESS LEVEL CONTROLS)

FIELD JOINT REQUIRED FOR MODELS DH152-129 / DR152-129 & DH152-160 / DR152-160



SEMI-POSITIVE DISPLACEMENT TYPE PUMP
EACH DIRECTLY DRIVEN BY A 1 HP MOTOR

JTC B-3 – NO WATER ON REFUSAL TO 17' (AT PS-2)

NOT
CONCRETE BALLAST ~~MAY BE~~ REQUIRED
SEE INSTALLATION INSTRUCTIONS FOR DETAILS BUT, VIF

NOTE: DIMENSIONS ARE FOR REF ONLY

KC	PD	09/30/19	F	
DR BY	CHK'D	DATE	ISSUE	SCALE

e|one
SEWER SYSTEMS

MODEL DH152 / DR152
DETAIL SHEET

NA0052P02

TABLE 1

Valves, Pipe and Fittings

By JAMES A. EDWARDS, Field Editor, POLLUTION ENGINEERING

Valves and fittings that serve to direct and control the flow of fluids are the critical sections of a piping layout in a waste treatment process. Properly applied, they can provide either ON-OFF or proportional control, manual or automatic adjustment, good corrosion resistance, cleanouts in slurry lines, fluid blending, and backflow prevention. Good piping design depends on the proper application and use of valves and fittings through understanding of the equipment capability and how it was intended to be used.

Valves are available in a number of designs: **globe, ball, gate, plug, butterfly, diaphragm, and needle.** All of these types can be equipped with motor operators to automate the application. Despite the wide range of designs, all valves have only one purpose: to slow down or stop the flow of fluid. This is done by blocking the flow of the fluid with an obstruction that can be adjusted inside the pipe, with little leakage from the pipe to the outside.

Table 1. Representative Equivalent Length in Pipe Diameters (L/D) of Various Valves and Fittings

	Description of Product		Equivalent Length In Pipe Diameters (L/D)
Globe Valves	Stem Perpendicular to Run — With no obstruction in flat, bevel, or plug type seat	Fully open	340
	With wing or pin guided disc	Fully open	450
	Y-Pattern (No obstruction in flat, bevel, or plug type seat) — With stem 60 degrees from run of pipe line	Fully open	175
	— With stem 45 degrees from run of pipe line	Fully open	145
Angle Valves	With no obstruction in flat, bevel, or plug type seat	Fully open	145
	With wing or pin guided disc	Fully open	200
Gate Valves	Wedge Disc, Double Disc, or Plug Disc	Fully open	13
		Three-quarters open	35
		One-half open	160
		One-quarter open	900
	Pulp Stock	Fully open	17
		Three-quarters open	50
		One-half open	260
		One-quarter open	1200
Conduit Pipe Line Gate, Ball, and Plug Valves		Fully open	3**
Check Valves	Conventional Swing	0.5† ... Fully open	135
	Clearway Swing	0.5† ... Fully open	50
	Globe Lift or Stop; Angle Lift or Stop; In-Line Ball — Stem Perpendicular to Run or Y-Pattern	2.0† ... Fully open	Same as Globe
		2.0† ... Fully open	Same as Angle
		2.5 vertical and 0.25 horizontal † ... Fully open	150
Foot Valves with Strainer	With poppet lift-type disc	0.3† ... Fully open	420
	With leather-hinged disc	0.4† ... Fully open	75
Butterfly Valves (8 inch and larger)		Fully open	40
Cocks	Straight-Through — Rectangular plug port area equal to 100% of pipe area	Fully open	18
	Three Way — Rectangular plug port area equal to 80% of pipe area (fully open)	Flow straight through	44
		Flow through branch	140
Fittings	90 Degree Standard Elbow		30
	45 Degree Standard Elbow		16
	90 Degree Long Radius Elbow		20
	90 Degree Street Elbow		50
	45 Degree Street Elbow		26
	Square Corner Elbow		57
	Standard Tee — With flow through run		20
	With flow through branch		60
	Close Pattern Return Bend		50

Reprinted from Crane Technical Paper No. 410.

**Exact equivalent length is equal to the length between flange faces or welding ends.

†Minimum calculated pressure drop (psi) across valve to provide sufficient flow to lift disc fully.

TABLE 2

150 C	DR-11 200 PSI Poly Pipe IPS Size PE 4710															
Size:	1"		1-1/4"		1-1/2"		2"		2-1/2"		3"		4"			
GALS PER MIN	OD Wall ID	1.315 0.120 1.075	OD Wall ID	1.660 0.151 1.358	OD Wall ID	1.900 0.173 1.554	OD Wall ID	2.375 0.216 1.943	OD Wall ID	2.875 0.261 2.353	OD Wall ID	3.500 0.318 2.864	OD Wall ID	4.500 0.409 3.682		
	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss	Vel	Loss		
2	0.71	0.25	0.44	0.08												
4	1.41	0.90	0.89	0.29	0.68	0.15										
6	2.12	1.91	1.33	0.61	1.02	0.32										
8	2.83	3.25	1.77	1.04	1.35	0.54	0.87	0.18								
10	3.54	4.92	2.22	1.58	1.69	0.82	1.08	0.28								
12	4.24	6.90	2.66	2.21	2.03	1.15	1.30	0.39	0.89	0.15						
15	5.30	10.42	3.32	3.34	2.54	1.74	1.62	0.59	1.11	0.23						
18	6.36	14.61	3.99	4.69	3.05	2.43	1.95	0.82	1.33	0.32	0.90	0.12				
20	7.07	17.76	4.43	5.70	3.38	2.96	2.16	1.00	1.48	0.39	1.00	0.15	0.60	0.04		
25	8.84	26.8	5.54	8.61	4.23	4.47	2.71	1.51	1.84	0.59	1.25	0.23	0.75	0.07		
30	10.61	37.6	6.65	12.07	5.08	6.26	3.25	2.11	2.21	0.83	1.49	0.32	0.90	0.09		
35	12.38	50.1	7.75	16.1	5.92	8.33	3.79	2.81	2.58	1.11	1.74	0.43	1.05	0.13		
40	14.14	64.1	8.86	20.6	6.77	10.67	4.33	3.60	2.95	1.42	1.99	0.54	1.21	0.16		
45			9.97	25.6	7.61	13.27	4.87	4.48	3.32	1.76	2.24	0.68	1.36	0.20		
50			11.08	31.1	8.46	16.1	5.41	5.44	3.69	2.14	2.49	0.82	1.51	0.24		
55			12.2	37.1	9.31	19.2	5.95	6.49	4.06	2.56	2.74	0.98	1.66	0.29		
60			13.3	43.6	10.15	22.6	6.49	7.63	4.43	3.00	2.99	1.15	1.81	0.34		
65			14.4	50.5	11.00	26.2	7.04	8.84	4.80	3.48	3.24	1.34	1.96	0.39		
70			15.5	58.0	11.8	30.1	7.58	10.15	5.17	4.00	3.49	1.54	2.11	0.45		
75					12.7	34.2	8.12	11.53	5.53	4.54	3.74	1.75	2.26	0.51		
80					13.5	38.5	8.66	12.99	5.90	5.12	3.99	1.97	2.41	0.58		
85					14.4	43.1	9.20	14.5	6.27	5.73	4.23	2.20	2.56	0.65		
90					15.2	47.9	9.74	16.2	6.64	6.37	4.48	2.45	2.71	0.72		
95							10.28	17.9	7.01	7.04	4.73	2.70	2.86	0.80		
100							10.82	19.6	7.38	7.74	4.98	2.97	3.01	0.88		
110							11.9	23.4	8.12	9.23	5.48	3.55	3.32	1.04		
120							13.0	27.5	8.86	10.85	5.98	4.17	3.62	1.23		
130							14.1	31.9	9.59	12.58	6.48	4.83	3.92	1.42		
140							15.2	36.6	10.33	14.4	6.97	5.55	4.22	1.63		
150									11.07	16.4	7.47	6.30	4.52	1.86		
160									11.8	18.5	7.97	7.10	4.82	2.09		
170									12.5	20.7	8.47	7.95	5.12	2.34		
180									13.3	23.0	8.97	8.83	5.43	2.60		
190									14.0	25.4	9.46	9.76	5.73	2.88		
200									14.8	27.9	9.96	10.74	6.03	3.16		
220									16.2	33.3	10.96	12.81	6.63	3.77		
240											12.0	15.0	7.23	4.43		
260											13.0	17.5	7.84	5.14		
280											13.9	20.0	8.44	5.90		
300											14.9	22.7	9.0	6.70		
320											15.9	25.6	9.6	7.55		
340													10.2	8.4		
360													10.9	9.4		
380													11.5	10.4		
400													12.1	11.4		
450													13.6	14.2		
500													15.1	17.3		
550													16.6	20.6		

Vel = Velocity (ft/s)

Loss = Friction Loss (ft/100' of pipe)

1/18/2017

future automation
Enterprise Park
127 Venture Drive
Dover, NH 03820

December 27, 2023

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

Re: Future Automation Site Plan
Tax Map D, Lot 11-8
Quality Way - Dover, NH

LETTER OF AUTHORIZATION

Future Automation, Inc. as Applicant for the referenced project, hereby authorizes Civilworks New England to represent the firm to the State of New Hampshire, the City of Dover Planning Board and any other Dover Boards or Committees relative to the pursuit of permits for the development of the subject parcel.

Respectfully,

Alun P. Williams, President
Future Automation, Inc.

Cheryl Andreason

From: Parker, Christopher <C.Parker@dover.nh.gov>
Sent: Thursday, December 28, 2023 9:48 AM
To: Steve Haight
Cc: Cheryl Andreason
Subject: RE: Future Automation DIBDA authorization

Good morning Steve

This is confirmation that on August 9, 2022, DBIDA approved a purchase and sales agreement for Future Automation for an approximately for a 8.1 acre lot on Quality Way in Enterprise Park, and two accompanying TDR sending lots.

As part of the PnS DBIDA acknowledged the expectation that Future Automaton will seek site plan approval from the City of Dover Planning Board.

The applicant should sign the application as the applicant and the City Manager will sign as the owner.

Chris

Christopher G. Parker, AICP
Deputy City Manager: Development and Strategic Initiatives
City of Dover, NH
288 Central Avenue
Dover, NH 03820-4169
e: c.parker@dover.nh.gov
p: 603.516.6024 f: 603.516.6049

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www.dover.nh.gov

Join me for the Dover Download Podcast, a weekly look at what's happening in the City. The Dover Download podcast can be found on Apple Podcasts, Spotify, Amazon, or wherever you get your podcasts.

From: Steve Haight <shaight@civilworksne.com>
Sent: Wednesday, December 27, 2023 3:42 PM
To: Parker, Christopher <C.Parker@dover.nh.gov>
Cc: Cheryl Andreason <cheryl@surveynh.com>
Subject: Future Automation DIBDA authorization

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Good afternoon Chris

We are preparing the application for Future Automation …since the property is owned by DIBDA we will need an authorization memo or email from the City to represent Future Auto in front of the PB.

You had provided this for Weave

Thanks

Steve

Stephen J. Haight, P.E.
President
Civilworks New England/Haight Engineering, PLLC
181 Watson Road
P.O. Box 1166
Dover, New Hampshire 03821
O: 603.749-0443
C: 603.817.6651
F: 603.749.7348
shaight@civilworksne.com
www.civilworksne.com

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City of Dover, New Hampshire
CONDITIONAL USE PERMIT APPLICATION

[Revision Date: October 19, 2020]

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

APPLICANT AND OWNER INFORMATION

Name of Applicant: Future Automation, Inc. Telephone # N/A

Address of Applicant: 127 Venture Drive Dover, NH 03820

E-Mail Address: alun.williams@futureautomation.co.uk

Name of Property Owner (if different from applicant): Dover Business & Industrial Development Authority Telephone # N/A

Address of Property Owner: 288 Central Avenue Dover, NH 03820

PROPERTY INFORMATION

Assessor's Map # D Lot(s) # 11-8

Address of Property: Quality Way

Zoning District(s) IT - Innovation Technology Overlay District(s) N/A

Existing Use of Property: Vacant

CONDITIONAL USE PERMIT INFORMATION

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

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

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

The project proposes two (2) buildings with a total floor area of 35,000, accessed via a single shared drive with each having separate parking and loading areas. A box culvert is required at the entrance of the access drive resulting in a wetland impact of 1,631± sf.

In addition to the proposed buildings, access drive, parking and loading areas are associated utility and drainage improvements. Portions of the proposed grading, drainage, pavement, and buildings are within 50 feet of a wetland resulting in a wetland buffer impact of 39,820± sf.

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

1) NHDES Wetland Permit - not yet submitted
2) NHDES Alteration of Terrain Permit - not yet submitted

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

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-7429-0443

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

SIGNATURES

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

Signature of Property ~~Owner~~ Applicant: _____ Date: 16 Jan 24

Signature of ~~Applicant~~ Owner (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~~ Applicant: _____ Date: 16 Jan 24

CITY OF DOVER CONDITIONAL USE
LIST OF ABUTTERS

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

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS
D	11-8	Dover Business & Industrial Dev Authority	288 Central Avenue Dover, NH 03820

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS
	Future Automation, Inc.	127 Venture Drive Dover, NH 03820

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS
Stehpen J. Haight, PE	Civilworks New England	P.O. Box 1166 Dover, NH 03821
Kevin McEneaney, LLS	McEneaney Survey Associates	P.O. Box 1166 Dover, NH 03821

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

Mark Beaudry

From: Mavrogeorge, Kenneth <K.Mavrogeorge@dover.nh.gov>
Sent: Thursday, January 4, 2024 3:19 PM
To: Mark Beaudry
Cc: Steve Haight; Cheryl Andreason; Joseph Griffin; Nadeau, Mike; Fredrickson, David
Subject: RE: CNE 22075 – Future Automation, Quality Way

Mark,

At this time we have the ability to serve the site with water and sewer with the project demand in your email below.

Regards,

Ken

Ken Mavrogeorge, PE
City Engineer
City of Dover, NH
271 Mast Rd.
Dover, NH 03820-4169
e: k.mavrogeorge@dover.nh.gov
p: 603.516.6454 | c: 603.534.8865
f: 603.516.6463

Dover: First in New Hampshire, First with you!
http://www.dover.nh.gov

From: Mark Beaudry <mbeaudry@civilworksne.com>
Sent: Wednesday, January 3, 2024 10:36 AM
To: Mavrogeorge, Kenneth <K.Mavrogeorge@dover.nh.gov>
Cc: Steve Haight <shaight@civilworksne.com>; Cheryl Andreason <cheryl@surveynh.com>; Joseph Griffin <jgriffin@civilworksne.com>
Subject: FW: CNE 22075 – Future Automation, Quality Way

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Hello again Ken. Happy New Year. Just wanted to follow up on my email sent on Dec. 20th since we are getting ready to submit to start the TRC review process. Thx.

Mark

From: Mark Beaudry
Sent: Wednesday, December 20, 2023 12:16 PM
To: Mavrogeorge, Kenneth <K.Mavrogeorge@dover.nh.gov>
Cc: Steve Haight <shaight@civilworksne.com>; Joseph Griffin <jgriffin@civilworksne.com>
Subject: CNE 22075 – Future Automation, Quality Way

Hello Ken: Future Automation is proposing to build two buildings; one 25,000 SF and one 10,000 SF at the end of Quality Way on Tax Map D, Lot 11-8. The buildings will contain a mix of light manufacturing and office space as follows:

Building 1:

- Office = 2,000 SF x 5 GPD/100 SF = 100 GPD
- Light Manuf. (“Factory”) = 25 employees x 10 GPD/empl = 250 GPD
- Total = 350 GPD

Building 2:

- Office = 3,330 SF x 5 GPD/100 SF = 166.5 = 167 GPD
- Light Manuf. (Factory) = 20 employees x 10 GPD/empl = 200 GPD
- Total = 367 GPD

These design flow rates are based on NHDES Env-Wq 1008.03 Table 1008-1 *Unit Design Flow Figures* for “Unspecified Office Space” (5 GPD/100 SF) and “Factories (exclusive of Ind. Waste) without Cafeteria or Showers” (10 GPD/employee). This factory flow rate is the same for any “warehouse” space.

The client has specified that their manufacturing processes do not generate industrial wastewater.

Attached is our utility plan (coordination issuance) that depicts the location, site layout of the buildings and anticipated utility services.

Back in September of 2022 you provided an email to us stating that water and sewer was available for the Weave Filtration project proposed at Lot 11-7; which has not yet been constructed as you know. We request that you now advise on the availability of service to the Future Automation project.

If you have any questions or require more information, please do not hesitate to get back to us.

Thank you for your assistance on these projects.

Mark

_____

Mark Beaudry, PE
Senior Associate/Sr. Project Manager
Civilworks New England
C: (413) 325-3384
O: (603) 749-0443 x113

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Cheryl Andreason

From: Mark Beaudry
Sent: Wednesday, January 3, 2024 10:40 AM
To: Emmons, Trevor S; Busby, Michael J
Cc: Steve Haight; Joseph Griffin; Cheryl Andreason
Subject: RE: CNE 22075 – Future Automation, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8

Hello Trevor. Happy New Year. Just wanted to follow up on our will-serve email exchange on Dec. 21st since we are getting ready to submit to the City of Dover to start the review process. Thx.

Mark

Mark Beaudry, PE
Senior Associate/Sr. Project Manager
Civilworks New England
C: (413) 325-3384
O: (603) 749-0443 x113

From: Mark Beaudry
Sent: Thursday, December 21, 2023 10:45 AM
To: Emmons, Trevor S <trevor.emmons@eversource.com>; Busby, Michael J <michael.busby@eversource.com>
Cc: Steve Haight <shaight@civilworksne.com>; Joseph Griffin <jgriffin@civilworksne.com>
Subject: RE: CNE 22075 – Future Automation, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8

Hello again Trevor. Attached is the completed "letter to serve". If this could be approved, signed and returned to us before you take your break tomorrow, we would greatly appreciate it.

Thanks again for your attention to this.

Mark

From: Mark Beaudry
Sent: Thursday, December 21, 2023 10:09 AM
To: Emmons, Trevor S <trevor.emmons@eversource.com>; Busby, Michael J <michael.busby@eversource.com>
Cc: Steve Haight <shaight@civilworksne.com>; Joseph Griffin <jgriffin@civilworksne.com>
Subject: RE: CNE 22075 – Future Automation, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8

Thanks Trevor and good talking to you this morning. We will get this letter filled out, ~~to the extent we can at this point~~, and return it to you before you head off for vacation tomorrow.

Mark

From: Emmons, Trevor S <trevor.emmons@eversource.com>
Sent: Thursday, December 21, 2023 9:46 AM
To: Mark Beaudry <mbeaudry@civilworksne.com>; Busby, Michael J <michael.busby@eversource.com>
Cc: Steve Haight <shaight@civilworksne.com>; Joseph Griffin <jgriffin@civilworksne.com>
Subject: RE: CNE 22075 – Future Automation, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8

Mark,

Thank you for taking my call this morning. Please fill out the attached Letter to Serve Template and return for approval. Ideally the sooner the Engineers and Architects can finalize their designed and required service size the better. This job will require significant UG work which will involve a duct system that will be looped into Venture Drive as well as adding switchgear to minimize outages within the UG.

The more information that can be provided up front the better.

Thank you.

Trevor S. Emmons
Senior Engineer
Eastern Field Engineering
B: 603-332-7515 C: 207-651-8133
Email: trevor.emmons@eversource.com

For emergencies or outage reporting, please call 1-800-468-0034 - 24 hours a day, 7 days a week.

From: Mark Beaudry <mbeaudry@civilworksne.com>
Sent: Friday, December 15, 2023 2:32 PM
To: Busby, Michael J <michael.busby@eversource.com>; Emmons, Trevor S <trevor.emmons@eversource.com>
Cc: Steve Haight <shaight@civilworksne.com>; Joseph Griffin <jgriffin@civilworksne.com>
Subject: CNE 22075 – Future Automation, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8

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Hello Michael and Trevor: As part of the City of Dover site review permit process, we are required to provide a "will serve" letter stating that utilities are available for our proposed project. The project is located on Quality Way in Dover NH at Tax Map D, Lot 11-8 and is proposed to contain two buildings; one 25,000 SF and one 10,000 SF. Attached is our utility plan (coordination issuance) that depicts the location, site layout of the buildings and anticipated utility services.

The project proponent has estimated the power needed for the 25,000 SF building to be 600 ± amps and the 10,000 SF building to be 400 ± amps.

Back in June of 2022 you provided a letter to us stating that electric power was available for another building project proposed at Lot 11-7. That building has not yet been constructed. There is a building existing at 1 Quality Way that is currently being served by utilities.

The project proponent will be in contact with you at a later date to set up a work order and provide any additional information.

If you have any questions or require more information do not hesitate to get back to me directly.

Thank you again for your assistance on these projects.

Mark

_____

Mark Beaudry, PE

Senior Associate/Sr. Project Manager
Civilworks New England

MA Satellite Office:
71 7th Street, P.O. Box 161
Turners Falls, MA 01376
C: (413) 325-3384

Main Office:
181 Watson Road, P.O. Box 1166
Dover, NH 03821
O: (603) 749-0443 x113

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Unitil
Northern Utilities, Inc.

January 19th, 2024

Mark Beaudry, PE
Senior Associate/Sr. Project Manager
Civilworks New England

Natural Gas to Future Automation, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8

Hi Mark,

Unitil/Northern Utilities Natural Gas Division has reviewed the requested site for natural gas Service:

Unitil hereby confirms that natural gas is available for the proposed building at ***, Quality Way, Dover, NH 03820 Tax Map D, Lot 11-8.***

If you have any questions, please contact me at 603-534-2379.

Sincerely,

Dave MacLean
Senior Business Development Rep
Unitil

T 603.294.5261
M 603.534.2379
F 603.294.5264
Email macleand@unitil.com

CIVILWORKS NEW ENGLAND

181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443

TRAFFIC ASSESSMENT MEMORANDUM

INTRODUCTION

Civilworks New England has prepared this traffic-assessment memorandum (TAM) in regard to the Future Automation development project proposed on Map D, Lot 11-8 on Quality Way in the City of Dover, NH.

This TAM includes:

- existing site description
- proposed project description
- road description
- public transit
- sight distances at the proposed driveways
- trip generation
- trip distribution/assignment
- potential traffic impacts

This TAM concludes that:

- relevant sight distances at the Quality Way/proposed driveway intersection will be adequate.
- The proposed project is not anticipated to add significant new traffic to the area.

EXISTING SITE DESCRIPTION

The site:

- is along the northwesterly side of the cul-de-sac located on Quality Way
- has an area of about 8.61 acres.
- is presently wooded, vacant land.

PROPOSED PROJECT DESCRIPTION

The project will provide:

- two buildings with a total floor area of about 35,000 square feet (sf) as follows:
    - one 25,000 sf building having a floor area consisting of 22,136 sf of light industrial and 2,864 sf of office space.
    - one 10,000 sf build-to-suit building presumed to have a floor area consisting of 6,670 sf of light industrial and 3,330 sf of office space.
- one unsignalized driveway intersecting the west end of Quality Way that will provide access to both buildings.

CIVILWORKS NEW ENGLAND
181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443

ROAD DESCRIPTION

Quality Way:

- is under the jurisdiction of the City.
- is a local industrial cul-de-sac street.
- Quality Way is oriented about east-west.
- at the east end, intersects with Venture Drive, a local street serving Enterprise Park.
- includes a relatively straight horizontal alignment.
- has minor vertical grades.
- has bituminous concrete pavement in overall good condition.
- has one travel lane per direction, with a pavement width of 28 ft.
- has unmarked pavement.
- has no posted speed limit.
- includes existing utility services.

PUBLIC TRANSIT

Collaborative Alliance for Seacoast Transportation (COAST) Route 33 provides on-call bus service stopping anywhere along Venture Drive. Service is on non-holiday weekdays. Route 33 connects with:

- central Dover, to the southeast
- the Dover Transportation Center, to the southeast
- the NHDOT Park and Ride facility near Indian Brook Drive and Spaulding Turnpike interchange 9, to the east
- the Strafford County Complex, to the west

SIGHT DISTANCES

Quality Way currently services traffic from the SOS Parts LTD loading dock area at 1 Quality Way. The access to the loading area is approximately 240 feet east from the Future Automation project driveway at the westerly end of the cul-de-sac. The American Association of State Highway and Transportation Officials (AASHTO) has established authoritative policy for appropriate sight distances in terms of stopping sight distance (SSD) for vehicles on the main road reacting to existing traffic, and intersection sight distance (ISD) for left turn movements from a stop. Due to Quality Way not being a through road, the project location being at the very end of Quality Way (which is relatively short in length (720± feet)), the very low traffic volume, and vehicles slowing to access the 1 Quality Way driveway before reaching the project driveway, neither SSD or ISD appear to be an issue or even applicable in this case. That said, AASHTO has established the SSD for a 30 mile per hour roadway to be 200 feet and 250 feet for a 35 MPH roadway. The 240± foot distance to the 1 Quality Way driveway would appear to be suitable for a speed of approximately 34 MPH, which is not anticipated. Therefore, sight distance is adequate, if even applicable in this case.

CIVILWORKS NEW ENGLAND
181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443

CALCULATED TRIP GENERATION

The Institute of Transportation Engineers (ITE) compiles and publishes trip-generation information for a variety of land uses in *Trip Generation Manual*.[1] This authoritative guide for calculating site traffic includes vehicle trip information for Light Industrial (Land Use Code 110) based on floor area[2] and General Office Building (Land Use Code 710) based on floor area.[3] Table 1 shows calculated vehicle trip ends due to the light industrial portion of the proposed development project while Table 2 shows the calculations for the general office building portion of the proposed development. The total vehicle trips generated by the project are:

- Daily (weekday) = 208 total trips (104 into site and 104 out of site)
- AM peak hour (weekday) = 30 total trips (27 in and 3 out)
- PM peak hour (weekday) = 28 total trip (5 in and 23 out)

Table 1: Trip Generation - Light Industrial

			Vehicle Trips*		
Weekday Period	Avg. Trips / 1,000 sf	Proposed s.f. (1,000)	Total	In	Out
Daily	4.87	28.806	140	70	70
AM - Peak Hour of Adjacent Street Traffic	0.74	28.806	21	19	2
PM - Peak Hour of Adjacent Street Traffic	0.65	28.806	19	3	16

* ITE, *Trip Generation Manual,* General Light Industrial - Land Use Code 110

Table 2: Trip Generation - General Office Building

			Vehicle Trips*		
Weekday Period	Avg. Trips / 1,000 sf	Proposed s.f. (1,000)	Total	In	Out
Daily	10.84	6.194	68	34	34
AM - Peak Hour of Adjacent Street Traffic	1.52	6.194	9	8	1
PM - Peak Hour of Adjacent Street Traffic	1.44	6.194	9	2	7

* ITE, *Trip Generation Manual,* General Office Building - Land Use Code 710

[1] ITE, *Trip Generation Manual,* 11th edition (Washington DC, September 2021).

[2] ITE, *Trip Generation Manual,* Volume 3, General Urban/Suburban and Rural (Land Uses 000-399), pages 30 to 46.

[3] ITE, *Trip Generation Manual,* Volume 4, General Urban/Suburban and Rural (Land Uses 400-799), pages 707 to 726.

CIVILWORKS NEW ENGLAND
181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443

TRIP DISTRIBUTION/ASSIGNMENT

All project-related trips will access the site from Sixth Street via Venture Drive. The calculated vehicle trip generation for the development project is so low that area traffic operations are not sensitive to trip distribution/assignment of project vehicle trips. Vehicle trips to and from the east (and south) may predominate largely due to roadway connections of Sixth Street with central Dover and the Spaulding Turnpike.

POTENTIAL TRAFFIC IMPACTS

The calculations show less than 50 peak-hour primary vehicle trips, due to the proposed project. More specifically, tabulated *peak-hour* trip generation is:

- 28 to 30 vehicle trips.
- These totals are split between vehicles entering and vehicles exiting the site.

Therefore, the proposed project is not anticipated to add significant new traffic to Sixth Street or Venture Drive.

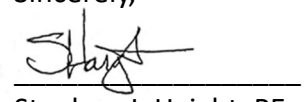
CONCLUSION

In conclusion:

- Sight distances at the Quality Way/proposed driveway intersection will be adequate.
- The proposed project is not anticipated to add significant new traffic to the area.

CIVILWORKS NEW ENGLAND

Sincerely,



Stephen J. Haight, PE

Cc: Future Automation. Inc.

Landscape Best Management Practices
Operations and Maintenance Plan

Commercial Site

Quality Way
Dover, New Hampshire 03820

Prepared for:
Joseph Griffin
Civilworks New England
181 Watson Road
PO Box 1166
Dover, NH 03821

Prepared by:
Terrain Planning & Design, LLC
311 Kast Hill Road
Hopkinton, NH 03229



Landscape Maintenance

Introduction:

The landscape enhancements proposed for the proposed commercial development will require modest maintenance at various times throughout the year. For the site plantings, maintenance is most important during the first 1-2 years following installation when plants are becoming established. Anyone involved in the upkeep of the facility should become familiar with the landscape and its features. Identified below are basic, at minimum, maintenance tasks:

Weekly Tasks:

1. Prune back any shrubs overhanging curbs or sidewalks.
2. Remove litter from plants bed.
3. Remove broken or fallen branches from trees.
4. Prune sucker growth from tree trunks.
5. Remove weeds larger than 2 inches high or wide from plant beds. Weeds 2 inches and larger must be removed, not just killed. **The application of herbicides such as Roundup is discouraged.**
6. Any invasive species seedlings observed should be removed and disposed of properly.
7. Replace bark mulch that may have been washed out of planting beds. Smooth mulch layer if it has been disturbed.
8. Check plants for signs of stress, pests, or disease and notify Owner for authorization to replace.
9. If a significant decline in plant health is attributed to an insect pest, **apply an organic product and/or process** to control the pest.
10. Water plants that are dry and stressed.
11. Notify Owner for authorization to replace dead plants at the appropriate time (see annual tasks, September).
12. Identify other tasks listed on the Annual and Monthly checklist of tasks.

Annual Tasks

Early Spring:

1. Prune winter damage such as broken tree branches that interfere with public safety.
2. Trim dead perennial foliage left in the fall for winter interest to within six inches of the ground.
3. Add new mulch to plant beds where the mulch depth has been reduced to less than 2 inches. Mulch depth shall not exceed two inches (top dressed). Mulch is not required where shrubs or groundcover completely hide the soil surface from view.
4. Gently prune shrubs at appropriate time of year based on species, for shape and form. **Do not shear.**
5. Energize the irrigation system, repair damaged components, test the system, adjust heads, and update programing.
6. Conduct a soil test to measure at a minimum, pH, phosphorus, potassium, calcium, and magnesium. Follow the recommendations provided with the soil test results.
7. Apply fertilizer only when required. A single application of fertilizer per year before Memorial Day is encouraged.

Monthly Tasks

June:

No additional items

July:

No additional items

August:

No additional items

September:

1. Inventory all plant materials, including an exact count of all shrubs and trees.
2. Replace any dead or missing plants.
3. Aerate lawn areas.
4. Apply pelletized lime at a rate of 80 lbs/1,000 square feet or as soil test dictates.

October:

1. Winterize irrigation system.

November:

1. Remove leaves from lawn areas and planting beds.
2. Remove perennial vegetation that has died back for the season.
3. Apply "WILT-PRUF" to broadleaf evergreens, according to label instructions, to protect shrubs from winter die back.

December:

1. Prune any tree branches that interfere with public safety.
2. Prune street and parking lot trees yearly to encourage strong growth the following growing season. Trees adjacent to pedestrian sidewalks shall have branches pruned to 6-foot height.

Management Task or Activity	Time or Frequency						
	Weekly	Monthly	Spring	Summer	Fall	Winter	After Major Rain Events
Replace dead or dying plants			X				
Remove weeds	X		X	X	X		
Cut down grasses			X				
Remove accumulated leaves, litter, and plant debris		X					X

Stormwater Detention Facilities

Introduction:

The stormwater facilities are used to attenuate flow and treat stormwater. The stormwater treatment areas consist of a large bioretention pond and linear swales seeded with a variety of native, adaptable, and rugged perennial grasses, and sometimes additional flowering plants. There are maintenance tasks associated with stormwater facilities.

Erosion:

The soil in the facility and in areas draining to the facility shall be inspected for erosion. Eroded areas shall be filled with soil or mulch and seeded with the approved seed mix for the location.

Sediment Accumulation & Clogging:

The accumulation of sediment within the facility may reduce its infiltration capacity and impair performance. The facility shall be inspected for accumulation of sediment and excessive sediment shall be removed with the area re-mulched and replanted as appropriate and necessary.

Outlet Structure Maintenance:

The facility outlet structure requires monitoring. Periodically, the orifice on the outlet pipe may clog with debris. Any found debris should be removed and appropriately disposed of off-site.

Debris & Litter:

Debris and litter should be removed monthly to maintain aesthetic appearance and public acceptance.

Plant Maintenance:

Healthy vegetation contributes to the optimal operation of the stormwater facility. Planting area maintenance tasks include the removal of accumulated leaves, litter, and plant debris as needed. During the first 1-2 years after planting, the facility should be monitored for invasive species and weeded as needed and appropriate. Well-established facility vegetation should be mowed annually in the fall.

Snow Storage:

Snow shall not be dumped directly onto the facility.

Chlorides:

The stormwater facility is not suitable for treating chlorides. Chloride use on source surface areas tributary to the facility should be avoided if possible. In these locations, it would be prudent to eliminate or reduce application of chloride-containing deicing compounds, use alternative deicers, or apply clean sand as needed. Aggressive sweeping in these areas, along with pretreatment sumps and filter strips, will minimize the negative impact of the sand on the facility.

Management Task or Activity	Time or Frequency						
	Weekly	Monthly	Spring	Summer	Fall	Winter	After Major Rain Events
Inspect for erosion. Rake and redistribute/replenish any soil, rap, or mulch that has eroded		X					X
Inspect for standing water							X
Remove accumulated leaves, litter, and plant debris		X					X
Weed plant material		X					
Mow plant material					X		

Stormwater Management System Inspection & Maintenance Plan

Prepared for:

FUTURE AUTOMATION
Map D, Lot 11-8

Quality Way
Dover, New Hampshire
Strafford County

JANUARY 2024

Owner of Record:

FUTURE AUTOMATION, INC.
127 Venture Drive
Dover, New Hampshire 03820

Prepared By:

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

Introduction

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

The inspection and maintenance requirements outlined in this document are required to be performed in perpetuity. In the event the property is sold, future owners will be responsible for implementing the responsibilities outlined in this document.

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

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

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

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

Owner:

Future Automation, Inc.
127 Venture Drive
Dover, NH 03820

In the event of a change in ownership, this Inspection and Maintenance Plan shall be transferred to the new party; transfer shall be documented to NH DES in writing.

Contact / Responsible Party:

Future Automation, Inc.
127 Venture Drive
Dover, NH 03820

Alun Williams
Phone: (603) 742-9181
Email: Alun.Williams@futureautomation.co.uk

The contact information for the Contact / Responsible Party shall be kept current; transfer shall be documented to NHDES in writing.

Management Company:

Future Automation, Inc.
127 Venture Drive
Dover, NH 03820

The contact information for the Management Party shall be kept current.

Inspection Schedule / Record Retention

Inspection frequency should, at a minimum, be in accordance with New Hampshire Stormwater Manual, Volume 2, latest edition, as updated by NHDES. See the Inspection and Maintenance Plan for frequency requirements. A copy of the completed Stormwater Management System's Inspection & Maintenance Log and Deicing Salt Quantity Use Log shall be maintained, kept on-site, and be made available to local, state, or federal regulators as applicable by law. All Inspection and Maintenance records must be provided to NHDES upon request and to the City of Dover Community Services Department annually before Dec 15th.

Stormwater Management System Components

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

- Pipes/Culverts
- Outlet Structures
- Energy Dissipation Structures (Rip Rap)/ Plunge Pool
- Sediment Forebay
- Catch Basins
- Bioretention Basin
- Grassed Lined Conveyance Swale
- Deep Sump Catch Basins
- Pavement
- Litter / Trash Removal

Design elements are identified in the design plans, a copy of which shall be maintained with this Inspection and Maintenance Plan.

Control of Invasive Species

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

Inspection and Maintenance Plan

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

PIPES/CULVERTS:

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

OUTLET STRUCTURE(S):

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

ENERGY DISSIPATION STRUCTURES (RIP RAP)/ PLUNGE POOL:

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

SEDIMENT FOREBAY:

- Vegetated areas shall be mowed to maintain a 4" start of vegetative growth.
- Inspect at least once per year.
- Inspect for sediment accumulation.
- Remove all debris immediately.

CATCH BASIN(S):

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

BIORETENTION BASIN:

- Inspection, by a **qualified professional**, of the Bioretention Basin at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection. If the Bioretention Basin systems do not drain within 72-hours following a rainfall event, a qualified professional should assess the condition and determine measures required to restore filtration practice (as applicable).
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Inlet and outlet pipes, inlet and outlet structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed, and the vegetation maintained in healthy condition, as appropriate to the function of the facility and type of vegetation.
- Vegetated embankments that serve as “berms” or “dams” that impound water should be mowed at least once annually to prevent the establishment of woody vegetation.
- Trash and debris should be removed from the pond and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

GRASS LINED CONVEYANCE SWALE:

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

DEEP SUMP CATCH BASINS:

- Inspect twice per year (recommended in the spring and fall).
- Inspect for floatables, sediment accumulation, and hydrocarbons (oils and grease).
- Remove all floatables immediately.
- Sediment should be removed when it approaches half the sump depth.
- Hydrocarbons shall be removed immediately by skimming, absorbent materials, or other methods and should be disposed of in accordance with applicable State and Federal regulations.

PAVEMENT:

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

LITTER / TRASH REMOVAL:

- Routinely patrol site for litter pick up.

DE-ICING AGENTS:

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

ANTI-ICING AND SALT MINIMIZATION:

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

Inspection & Maintenance Table

System Component / BMP	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
Pipes/Culverts	Annually	• Check for clogging • Check for sediment accumulation	Remove when noticed Clean when necessary
Outlet Structure(s)	Annually	• Inspect once per year. • Inspect for clogging and sediment accumulation. • Remove all debris immediately and sediment accumulations ≥ 2 inches.	≥ 2 in. sediment Remove immediately
Energy Dissipation (ED) Structures (Rip Rap)/ Plunge Pool	Annually	• Check for erosion • Check for displaced stones • Check for woody vegetation • Check for sediment accumulation	≥ 3 in. sediment Remove annually Replace/ reset Dislodged stones immediately
Sediment Forebay	Annually	• Check for sediment accumulation • Check for woody vegetation growth • Check for debris • Vegetated areas shall be mowed to maintain a 4” start of vegetative growth.	Remove/Dispose of accordingly Mow twice per year Remove/Dispose of accordingly
Catch Basins	Annually	• Check for sediment accumulation • Check for floatable contaminants • Check for hydrocarbons (oils and grease)	≥ 1 ft. sediment depth Remove all floatables Remove immediately
Bioretention Basin • Outlet Structure • Inlet/Outlet Piping • Embankments • Pond Sediment • Trash/Debris • Vegetation (Veg.)	Bi-Annually “ “ “ “ Periodically “ “ “ “	• See Outlet Structure (OS) Req. • Check for erosion, settlement, seepage, etc. • Check for sediment accumulation in pond • Check for trash (in pond and structures) • Maintain 95% veg. (pond & slopes) • Maintain healthy stand of veg.	See OS Req. Repair immediately ≥ 2 in. sediment Remove all trash/debris Restore veg. in-kind Mow when ≥ 6 in
Grass Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Ensure swale is stabilized • Maintain healthy stand of veg., 4” minimum • Inspect for invasive species	≥ 1 in. sediment Repair immediately Restore vegetation in-kind Mow twice per year Remove/Dispose of accordingly
Deep Sump Catch Basins	Bi-Annually	• Check for sediment accumulation • Check for floatable contaminants • Check for Hydrocarbons	Half the sump depth Remove all floatables Remove immediately
Pavement: • Sanding • Salt Applications • Sweep/Vacuum • Trash/Debris	Limit use As required 1 - 2 x’s Year Periodically	• Minimize use to prevent tracking issues • RECORD APPLICATION RATES • Sweep or vacuum to prevent tracking issues • Check for trash/debris	Sweep to prevent issues Minimize (as required) Sweep/Vac as needed Remove when noticed
Litter / Trash Removal	Periodically	• Check for litter and trash	Remove when noticed

Inspection & Maintenance Checklist/Log

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

Stormwater Management System's Inspection & Maintenance Log

Date of Inspection/Maintenance_____ Inspector:_____

System Component / BMP	Cleaning / Repair Needed (List Items / Comments)	Date of Cleaning/Repair	Performed By

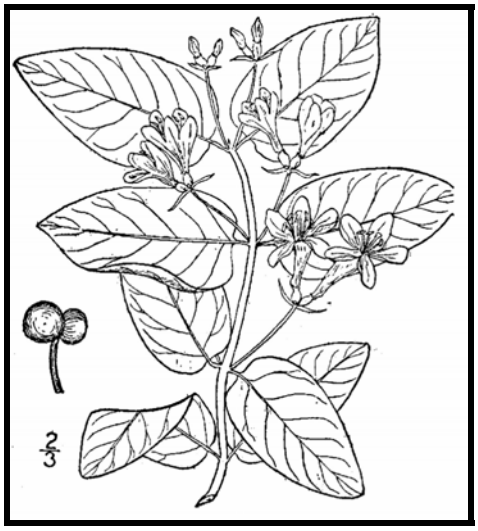
Deicing Salt Quantity Use Log

Date	Amount of Material Applied	Comments

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

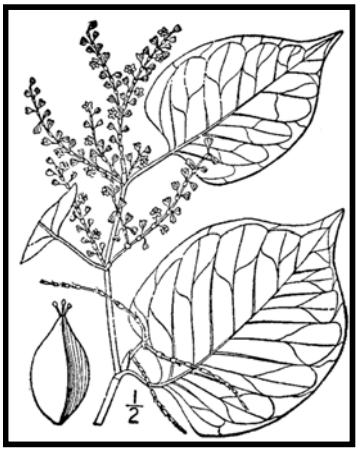
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

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 rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">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>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

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DRAINAGE ANALYSIS

FUTURE AUTOMATION
Map D, Lot 11-8

Quality Way
Dover, New Hampshire
Strafford County

January 2024

Prepared For:

FUTURE AUTOMATION, INC.
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1.0 INTRODUCTION

This is a hydrologic analysis of the subject parcel located on Quality Way in Dover, NH. The 8.61± acre lot is identified as Tax Map D, Lot 11-8. The site is undeveloped, and the groundcover primarily consists of wooded vegetation with grassed areas along the edge of the Quality Way cul-de-sac. The parcel is bifurcated by a wetland system that drains into the wetland bordering on Reyners Brook to the northwest. This bifurcation by the wetlands requires a wetland crossing and wetland permit for site access. The parcel slopes mildly to the wetland system and the northwest apart from the steeper slope to the east that is associated with a knoll on the easterly portion of the parcel. The site drains overland with discharge occurring to the north, west, and east. The site is bound by Quality Way to the southeast and commercial/industrial lots to the north/northeast (along with the Reyners Brook system), east and south/southwest. The property abuts residential property to the west/southwest. Drainage improvements account for the stormwater from offsite areas that drain directly to the subject parcel and, the overall watershed area is 16.14± acres. The site drains to the large wetland complex to the northwest associated with Reyners Brook.

The project proposes 164,238± sf of disturbance and will require an NHDES Alteration of Terrian Permit. Development of the site includes the construction of the two (2) commercial/ light industrial buildings (25,000± sf and 10,000± sf), a shared access drive, parking and loading areas, as well as drainage, utility, and landscape improvements.

To effectively analyze the pre-development conditions, the 16.14± acre watershed has been subdivided into three (3) watersheds. These points of discharge are identified as Watersheds A, B & C. Watershed A includes the off site areas that drain through the site and is further subdivided into 6 sub-catchments to properly analyze discharge point A. Watersheds B &C include portions of the subject parcel that do not include proposed development and therefore do not change between the pre and post conditions.

The post development model analyzes the 16.14± acres watershed at the same three (3) points of discharge as the pre-development conditions, watersheds A, B & C. Watershed A has been further divided into sixteen (16) sub-catchments to better model the proposed drainage improvements on site. Drainage improvements include a closed drainage system, roof drains, a cross box culvert, storm water conveyance swale, and stormwater quality structures. Stormwater quality and attenuation will be achieved through a bio-retention basin. The bio-retention basin treats all the proposed impervious areas on site as well as approximately 1,900± sf of the existing Quality Way. Site limitations prevent the ability to provide groundwater recharge, see section 2.5.2 Groundwater Recharge for further discussion. Watersheds B&C have not changed in the post development condition. The analysis shows that with the mitigation measures proposed the development of this site will have negligible impact on the watersheds.

2.0 DRAINAGE ANALYSIS

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

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

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

“Civil Engineering Reference Manual, Fifth Edition”

“Open-Channel Hydraulics” Chow.

“Stormwater Modeling System” HydroCAD Ver. 10.10

2.1 DRAINAGE DESIGN PARAMETERS

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

2.1.1 Watersheds

The watersheds and sub-catchment areas were delineated using topography surveyed by McEneaney Survey Associates of New England (MSA) and supplemented with wetland data provided by Damon E. Burt, Wetland Scientist (NHCWS #163) on June 6, 2022, and field located by MSA.

2.1.2 Soils

Soil types were determined utilizing the NRCS Web Soil Survey (WSS) mapping tool at http://websoilsurvey.nrcs.usda.gov which references the Strafford County, New Hampshire Soil Survey Area, Version 22, August 31, 2021, and a site specific soils map prepared by Michael Cuomo (NHCSS #006) in November 2022. The soil drainage classifications used for this analysis are Class A, B, C, and D with Class A soils being located only in the off-site contributing areas.

<u>Hydrologic Drainage Class A:</u>

Offsite:

111 - Gloucester, Very Stony, 0 - 25 Percent Slopes

GsC - Gloucester, Very Stony Fine Sandy Loam, 8 - 15 Percent Slopes

GlB - Gloucester, Fine Sandy Loam, 3 - 8 Percent Slopes

Hydrologic Drainage Class B:

Onsite:

40 - Chatfield-Hollis Complex, Loose Till, 8 - 15 Percent Slopes

42 - Canton, Loose Till, 0 - 25 Percent Slopes

Hydrologic Drainage Class C:

Onsite:

29 - Woodbridge, Basal Till, 0 - 25 Percent Slopes

33 - Scitico, Glacio Marine, 0 - 8 Percent Slopes

33 - Elmwood, Mixed Origin, 8 - 15 Percent Slopes

953 - Boxford, Glacio Marine, 0 - 25 Percent Slopes

Offsite:

32 - Buxton, 3 - 8 Percent Slopes

338 - Elmwood, Very Stony, 3 - 15 Percent Slopes

500 - Udorthents, Loamy, 3 - 8 Percent Slopes

Hydrologic Drainage Class D:

Onsite:

40 - Chatfield-Hollis Complex, Loose Till, 0 - 15 Percent

2.1.3 Rainfall Data

Extreme precipitation estimate values from the Northeast Regional Climate Center were utilized in this analysis. The analysis has been performed for the 2-year, 10-year, 25-year, and 50-year storm events with 3.60", 5.42", 6.85", and 8.18" rainfall depths respectively. The rain fall data has been peaked by 15% in accordance with NHDES Alteration of Terrain requirements as the site is located within the Coastal Region.

2.1.4 Runoff Curve Numbers

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

2.2 EXISTING CONDTIONS

For purposes of this analysis the subject parcel was analyzed with three points of discharge.

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

Watershed	**Pre-Development Volume (af)**	**Pre Development Peak Flows (cfs)**			
Point of Analysis	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.847	4.1	12.3	19.3	26.2
B	0.032	0.3	0.5	0.7	0.9
C	0.023	0.1	0.4	0.6	0.8

2.3 DEVELOPED CONDITIONS

The post development watershed was analyzed utilizing the same summing points as the pre development analysis.

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

Watershed	**Post-Development Volume (af)**	**Post Development Peak Flows (cfs)**			
Point of Analysis	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	1.321	4.0	10.9	18.7	26.1
B	0.032	0.3	0.5	0.7	0.9
C	0.023	0.1	0.4	0.6	0.8

2.4 HYDROLOGIC COMPARISON

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

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

Watershed	Pre / **Post-Development Volume (af)**	Pre / **Post Development Peak Flows (cfs)**			
Point of Analysis	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.847 / **1.321***	4.1 / **4.0**	12.3 / **10.9**	19.3 / **18.7**	26.2 / **26.1**
B	0.032 / **0.032**	0.3 / **0.3**	0.5 / **0.5**	0.7 / **0.7**	0.9 / **0.9**
C	0.023 / **0.023**	0.1 / **0.1**	0.4 / **0.4**	0.6 / **0.6**	0.8 / **0.8**

* See section "2.5.2 Groundwater Recharge" for discussion.

2.5 STORMWATER DESIGN

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

2.5.1 Stormwater Best Management Practices

The project incorporates a bio-retention basin to mitigate flow and water quality from the proposed development. Pre-treatment for the bio-retention basin includes deep-sump catch basins and sediment forebays. The bioretention basin was designed in accordance with NHDES AoT permit requirements (See Appendix B-1).

2.5.2 Groundwater Recharge

The site was evaluated for infiltration practices in support of groundwater recharge. The site characteristics were not conducive for infiltration as indicated by SHWT's ranging from the surface to 20" inches over much of the site where development will occur. There were isolated areas, primarily at the top of the onsite knolls, where a SHWT was not observed down to 6± feet. In these instances, bedrock was identified as the restrictive layer at the 6± feet depth. Site topography will require the knolls to be removed to allow for grading of the overall site. The test pit locations and logs are in the project plan set as supporting documentation. The site limitations prevent infiltration and therefore will influence the project's ability to meet City and State requirements to attenuate volume and meet channel protection requirements respectively.

The design team met with NHDES AoT, Mike Schlosser, PE, for a pre-application meeting to discuss the project, specifically as it relates to groundwater recharge and channel protection requirements. The pre-application meeting minutes are included in Appendix B-2.

The team discussed the site limitations and indicated that the project would be requesting a waiver from AoT's Groundwater Recharge requirement. The State indicated they would support the request based on the site limitations.

The team also discussed the difficulty of providing a Pre-Post analysis as it relates to channel protection from the subject parcel. The State indicated that in this instance, with the modeling including significant offsite areas and areas that wouldn't be developed, that it would be appropriate to utilize only the area(s) of disturbance, i.e. the sub-catchments of the overall watershed A, when evaluating the channel protection requirements. As such, pre-sub-catchments A1, A2, & A3 were evaluated against the post development sub-catchments (3 – 11, & 13) that drain to the proposed bio-retention basin. Evaluating these areas provides the following comparison. Pre-development 2-yr flow and volume are 1.0 cfs and 0.184 af respectively while post-development flow and volume from the bio-retention basin are 1.1 cfs and 0.677 af. Supporting data is provided in Appendix B-2. The proposed development will meet the NHDES AoT channel protection requirements identified in Env-Wq 1507.05.

Site characteristics including soil type, topography, depth to SHWT, and depth to ledge prevent the infiltration of stormwater. However, the project's stormwater infrastructure is designed to attenuate flow from the development of the parcel, while meeting channel protection criteria. The discharge from the site is directed to a large wetland complex associated with Reyners Brook and the proposed project will not contribute to flooding or functional impairments to streets, adjacent properties, or down stream properties.

2.5.3 Pollutant Removal

The site stormwater design captures 100% of the proposed onsite impervious area (2.3± ac.) as well as 1,900± sf of stormwater runoff from Quality Way and directs it to best management practices that provide pollutant removal. The project incorporates the following practices and associated pollutant removal efficacies as identified in the New Hampshire Stormwater Management Manual Volume 1, Appendix E:

	TSS	TN	TP
Bio-Retention System:	90%	65%	65%
Sediment Forebay:	NA	NA	NA
Off-Line Deep Sump Catch Basin:	15%	5%	5%

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

2.5.4 Outlet Protection

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

APPENDIX A

HYDROLOGIC CALCULATIONS

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	70.913 degrees West
Latitude	43.223 degrees North
Elevation	0 feet
Date/Time	Fri, 13 May 2022 11:51:56 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day		+15%
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.54	1.99	~~2.59~~	2.86	**1yr**	2.29	2.75	3.15	3.88	4.44	**1yr**	2.98
2yr	0.32	0.49	0.61	0.80	1.01	1.28	**2yr**	0.87	1.17	1.50	1.91	2.44	~~3.13~~	3.49	**2yr**	2.77	3.36	3.85	4.59	5.22	**2yr**	3.60
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.38	3.06	3.95	4.47	**5yr**	3.50	4.30	4.92	5.78	6.54	**5yr**	
10yr	0.40	0.63	0.80	1.09	1.42	1.85	**10yr**	1.22	1.69	2.18	2.82	3.64	~~4.71~~	5.39	**10yr**	4.17	5.18	5.93	6.90	7.75	**10yr**	5.42
25yr	0.46	0.74	0.94	1.30	1.72	2.27	**25yr**	1.49	2.09	2.69	3.52	4.58	~~5.96~~	6.91	**25yr**	5.27	6.64	7.58	8.71	9.72	**25yr**	6.85
50yr	0.52	0.83	1.06	1.48	2.00	2.66	**50yr**	1.73	2.45	3.18	4.17	5.46	~~7.11~~	8.34	**50yr**	6.29	8.02	9.14	10.40	11.54	**50yr**	8.18
100yr	0.58	0.94	1.21	1.71	2.32	3.12	**100yr**	2.01	2.88	3.74	4.94	6.49	~~8.49~~	10.07	**100yr**	7.52	9.68	11.02	12.42	13.71	**100yr**	9.76
200yr	0.64	1.05	1.36	1.96	2.71	3.67	**200yr**	2.33	3.39	4.42	5.87	7.74	10.15	12.16	**200yr**	8.98	11.70	13.29	14.83	16.29	**200yr**	
500yr	0.76	1.25	1.63	2.36	3.31	4.54	**500yr**	2.86	4.21	5.50	7.35	9.74	12.85	15.62	**500yr**	11.37	15.02	17.03	18.78	20.48	**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	0.92	1.25	1.54	2.05	2.46	**1yr**	1.82	2.36	2.94	3.42	4.10	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.15	1.36	1.82	2.35	3.05	3.39	**2yr**	2.70	3.26	3.74	4.46	5.08	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.14	2.77	3.69	4.11	**5yr**	3.26	3.95	4.59	5.39	6.09	**5yr**
10yr	0.38	0.59	0.73	1.02	1.31	1.60	**10yr**	1.13	1.56	1.81	2.44	3.12	4.24	4.77	**10yr**	3.75	4.58	5.30	6.21	6.97	**10yr**
25yr	0.44	0.66	0.83	1.18	1.55	1.91	**25yr**	1.34	1.87	2.11	2.84	3.64	5.08	5.76	**25yr**	4.50	5.54	6.47	7.50	8.35	**25yr**
50yr	0.48	0.73	0.91	1.31	1.77	2.19	**50yr**	1.52	2.14	2.36	3.20	4.08	5.83	6.64	**50yr**	5.16	6.39	7.51	8.63	9.55	**50yr**
100yr	0.54	0.81	1.02	1.47	2.02	2.51	**100yr**	1.74	2.45	2.65	3.58	4.55	6.69	7.65	**100yr**	5.92	7.35	8.72	9.94	10.90	**100yr**
200yr	0.60	0.90	1.14	1.65	2.30	2.87	**200yr**	1.98	2.81	2.96	4.02	5.07	7.66	8.80	**200yr**	6.78	8.46	10.12	11.45	12.46	**200yr**
500yr	0.70	1.04	1.33	1.94	2.75	3.46	**500yr**	2.38	3.39	3.44	4.67	5.87	9.13	10.59	**500yr**	8.08	10.18	12.32	13.81	14.81	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	**1yr**	0.75	1.05	1.23	1.73	2.20	2.82	3.07	**1yr**	2.49	2.95	3.37	4.17	4.74	**1yr**
2yr	0.33	0.51	0.62	0.84	1.04	1.24	**2yr**	0.90	1.22	1.47	1.95	2.51	3.24	3.61	**2yr**	2.86	3.47	3.98	4.73	5.39	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.58	**5yr**	1.13	1.54	1.85	2.49	3.19	4.21	4.83	**5yr**	3.73	4.64	5.27	6.20	6.96	**5yr**
10yr	0.46	0.70	0.87	1.21	1.57	1.91	**10yr**	1.35	1.87	2.22	3.03	3.84	5.18	6.02	**10yr**	4.58	5.79	6.63	7.60	8.47	**10yr**
25yr	0.55	0.84	1.05	1.50	1.97	2.46	**25yr**	1.70	2.41	2.87	3.94	4.94	6.81	8.08	**25yr**	6.03	7.77	8.86	10.01	11.03	**25yr**
50yr	0.64	0.97	1.21	1.75	2.35	2.97	**50yr**	2.03	2.90	3.48	4.80	5.99	8.37	10.12	**50yr**	7.41	9.73	11.07	12.30	13.48	**50yr**
100yr	0.75	1.13	1.41	2.04	2.80	3.58	**100yr**	2.42	3.50	4.22	5.87	7.28	10.30	12.68	**100yr**	9.12	12.19	13.81	15.14	16.48	**100yr**
200yr	0.87	1.30	1.65	2.39	3.33	4.34	**200yr**	2.88	4.24	5.13	7.18	8.84	12.71	15.90	**200yr**	11.25	15.29	17.25	18.63	20.18	**200yr**
500yr	1.06	1.58	2.03	2.95	4.19	5.56	**500yr**	3.62	5.44	6.62	9.38	11.45	16.80	21.45	**500yr**	14.87	20.62	23.17	24.55	26.40	**500yr**

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Extreme Precipitation in New York & New England

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Select Product

- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps

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

Hybrid | Map | Satellite | Terrain

Locate by Address → | Locate by Lat/Lon 43.22° N -70.91° W → | Locate by State/County



Select Options

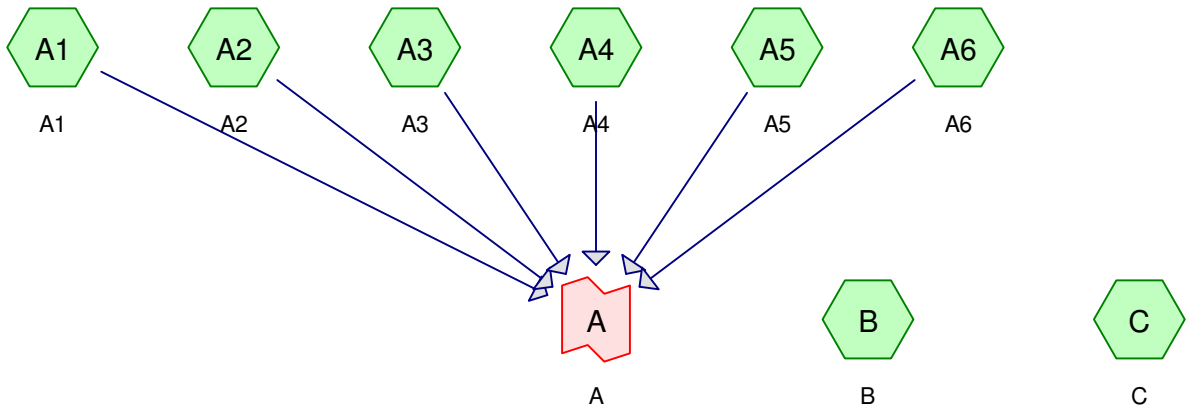
Smoothing: Yes | Delivery: Popup

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This project is a joint collaboration between:
Northeast Regional Climate Center (NRCC) Natural Resources Conservation Service (NRCS)
Cornell University
Contact: precip@cornell.edu

A-1

EXISTING WATERSHEDS



Subcat Reach Pond Link

Routing Diagram for 22075 - Pre
Prepared by Civilworks NE
HydroCAD® 10.10-5a s/n 03240 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.520	39	>75% Grass cover, Good, HSG A (A4)
0.058	61	>75% Grass cover, Good, HSG B (A4)
0.039	74	>75% Grass cover, Good, HSG C (A4)
0.716	98	Paved parking, HSG A (A4)
0.707	98	Roofs, HSG A (A4)
3.212	30	Woods, Good, HSG A (A4)
2.281	55	Woods, Good, HSG B (A1, A2, A3, A4, B, C)
7.518	70	Woods, Good, HSG C (A1, A2, A3, A4, A5, A6, B, C)
1.087	77	Woods, Good, HSG D (A4, A5, A6, B)
16.138	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.155	HSG A	A4
2.339	HSG B	A1, A2, A3, A4, B, C
7.557	HSG C	A1, A2, A3, A4, A5, A6, B, C
1.087	HSG D	A4, A5, A6, B
0.000	Other	
16.138		**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
0.520	0.058	0.039	0.000	0.000	0.617	>75% Grass cover, Good	A4
0.716	0.000	0.000	0.000	0.000	0.716	Paved parking	A4
0.707	0.000	0.000	0.000	0.000	0.707	Roofs	A4
3.212	2.281	7.518	1.087	0.000	14.098	Woods, Good	A1, A2, A3, A4, A5, A6, B, C
5.155	**2.339**	**7.557**	**1.087**	**0.000**	**16.138**	**TOTAL AREA**	

A – 1

NODE LISTING – 2-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 A1: A1 Runoff Area=12,999 sf 0.00% Impervious Runoff Depth=0.76"
Flow Length=108' Slope=0.0930 '/' Tc=11.6 min CN=64 Runoff=0.1 cfs 0.019 af

Subcatchment A2: A2 Runoff Area=35,072 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=220' Tc=10.9 min CN=63 Runoff=0.3 cfs 0.048 af

Subcatchment A3: A3 Runoff Area=76,153 sf 0.00% Impervious Runoff Depth=0.81"
Flow Length=340' Tc=22.9 min CN=65 Runoff=0.6 cfs 0.117 af

Subcatchment A4: A4 Runoff Area=499,168 sf 12.42% Impervious Runoff Depth=0.58"
Flow Length=1,332' Tc=20.3 min CN=60 Runoff=2.5 cfs 0.549 af

Subcatchment A5: A5 Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=233' Tc=12.6 min CN=72 Runoff=0.4 cfs 0.047 af

Subcatchment A6: A6 Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=296' Tc=13.7 min CN=72 Runoff=0.5 cfs 0.067 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=1.37"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.3 cfs 0.032 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.1 cfs 0.023 af

Link A: A Inflow=4.1 cfs 0.847 af
Primary=4.1 cfs 0.847 af

Total Runoff Area = 16.138 ac Runoff Volume = 0.902 af Average Runoff Depth = 0.67"
91.18% Pervious = 14.715 ac 8.82% Impervious = 1.423 ac

A – 1

NODE LISTING – 10-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 A1: A1 Runoff Area=12,999 sf 0.00% Impervious Runoff Depth=1.86"
Flow Length=108' Slope=0.0930 '/' Tc=11.6 min CN=64 Runoff=0.4 cfs 0.046 af

Subcatchment A2: A2 Runoff Area=35,072 sf 0.00% Impervious Runoff Depth=1.78"
Flow Length=220' Tc=10.9 min CN=63 Runoff=0.9 cfs 0.120 af

Subcatchment A3: A3 Runoff Area=76,153 sf 0.00% Impervious Runoff Depth=1.94"
Flow Length=340' Tc=22.9 min CN=65 Runoff=1.6 cfs 0.282 af

Subcatchment A4: A4 Runoff Area=499,168 sf 12.42% Impervious Runoff Depth=1.55"
Flow Length=1,332' Tc=20.3 min CN=60 Runoff=8.4 cfs 1.483 af

Subcatchment A5: A5 Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=2.53"
Flow Length=233' Tc=12.6 min CN=72 Runoff=0.8 cfs 0.101 af

Subcatchment A6: A6 Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=2.53"
Flow Length=296' Tc=13.7 min CN=72 Runoff=1.1 cfs 0.142 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.5 cfs 0.065 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=1.78"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.4 cfs 0.058 af

Link A: A Inflow=12.3 cfs 2.175 af
Primary=12.3 cfs 2.175 af

Total Runoff Area = 16.138 ac Runoff Volume = 2.298 af Average Runoff Depth = 1.71"
91.18% Pervious = 14.715 ac 8.82% Impervious = 1.423 ac

A – 1

10-YR STORM SUMMARY

Summary for Subcatchment A1: A1

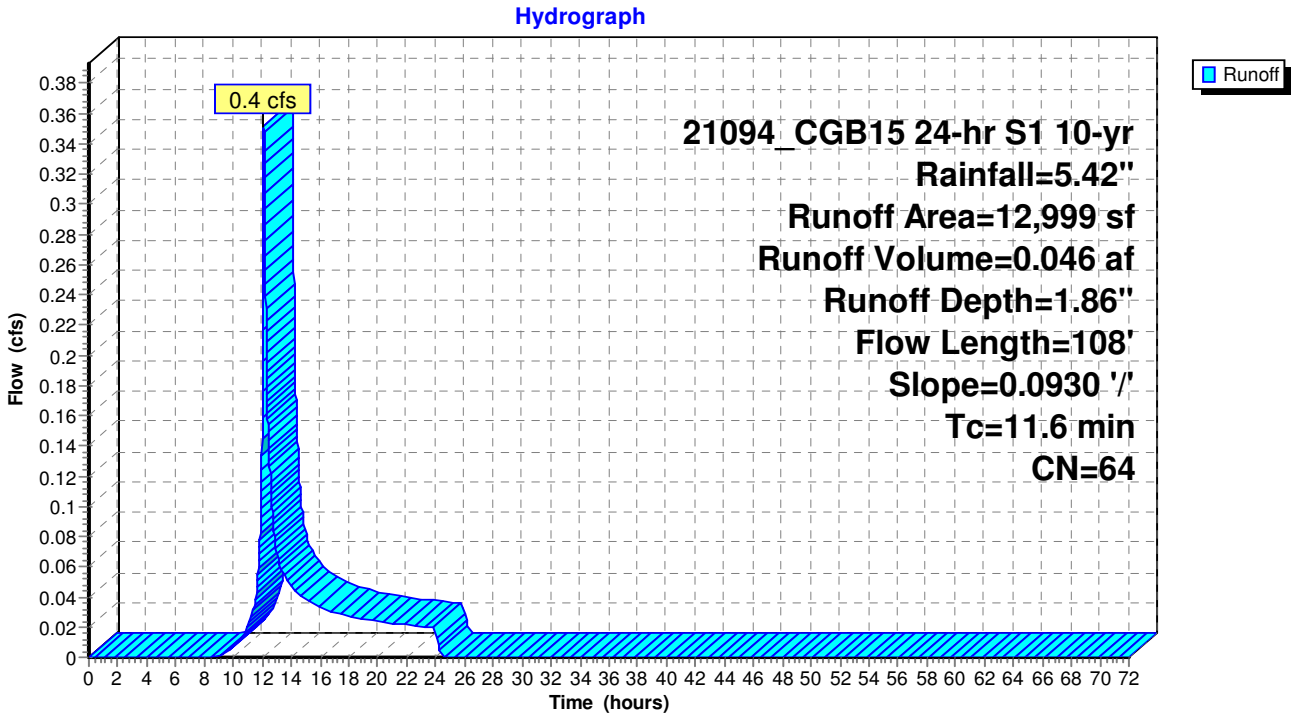
Runoff = 0.4 cfs @ 12.11 hrs, Volume= 0.046 af, Depth= 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
5,476	55	Woods, Good, HSG B
7,523	70	Woods, Good, HSG C
12,999	64	Weighted Average
12,999		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	108	0.0930	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"

Subcatchment A1: A1



Summary for Subcatchment A2: A2

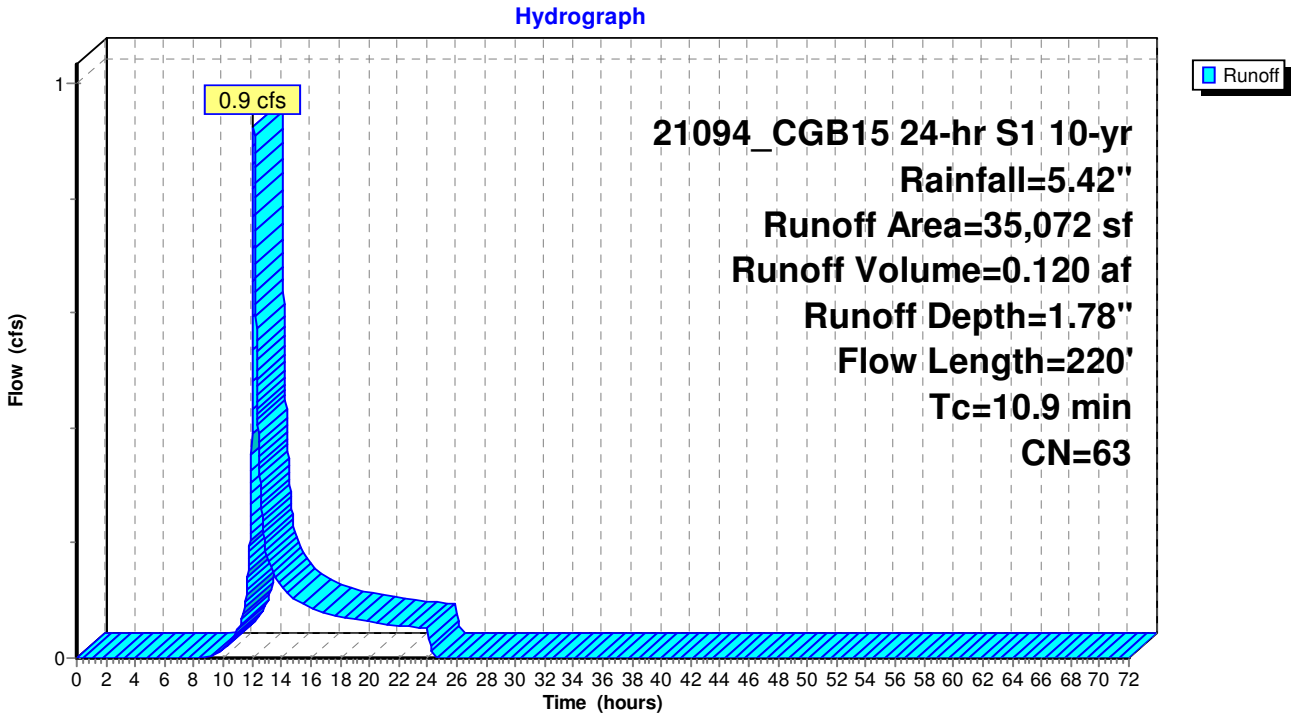
Runoff = 0.9 cfs @ 12.10 hrs, Volume= 0.120 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
17,259	55	Woods, Good, HSG B
17,813	70	Woods, Good, HSG C
35,072	63	Weighted Average
35,072		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.1250	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
1.2	120	0.1170	1.71		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	220	Total			

Subcatchment A2: A2



Summary for Subcatchment A3: A3

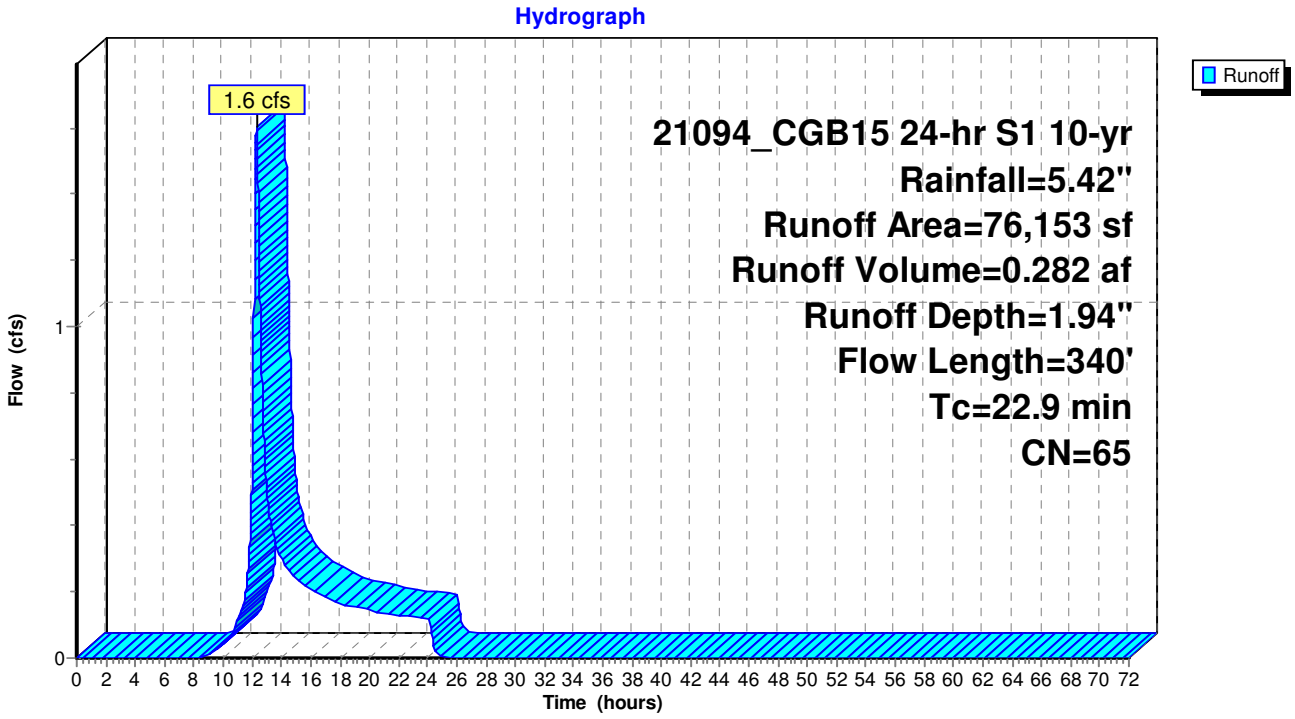
Runoff = 1.6 cfs @ 12.28 hrs, Volume= 0.282 af, Depth= 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
24,941	55	Woods, Good, HSG B
51,212	70	Woods, Good, HSG C
76,153	65	Weighted Average
76,153		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.2	100	0.0200	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
2.7	240	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
22.9	340	Total			

Subcatchment A3: A3



Summary for Subcatchment A4: A4

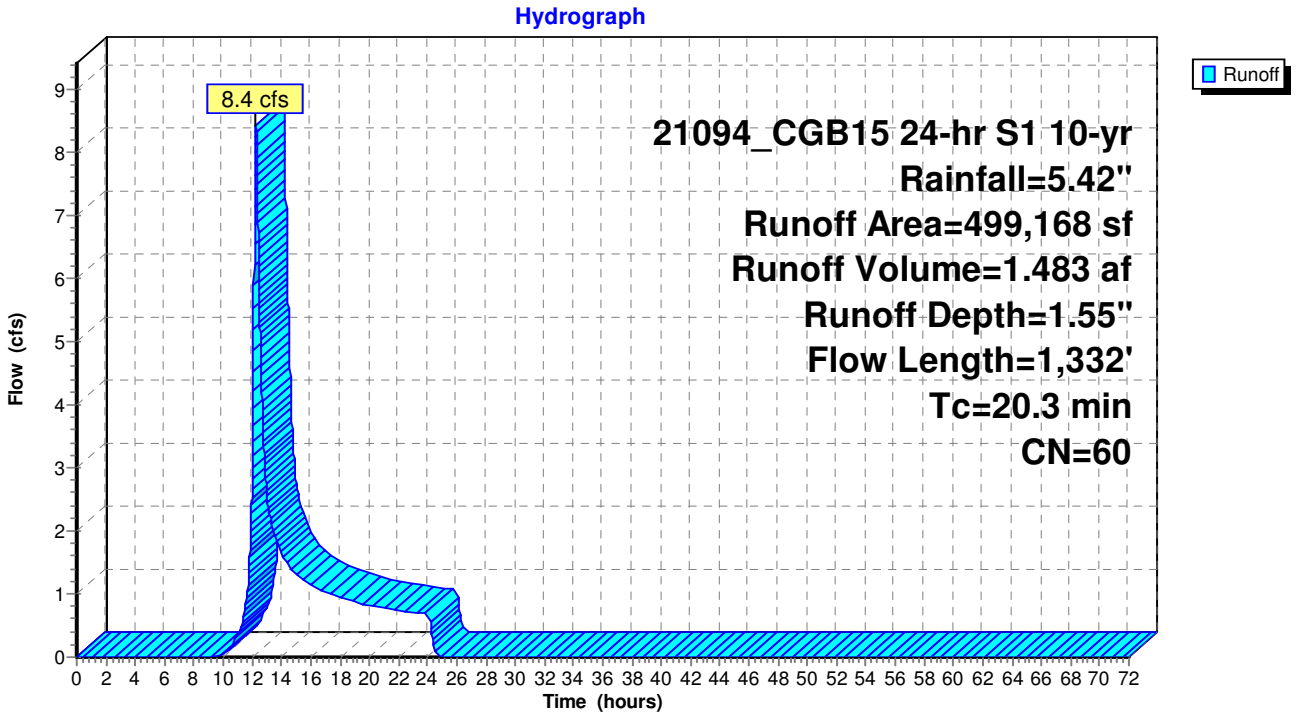
Runoff = 8.4 cfs @ 12.25 hrs, Volume= 1.483 af, Depth= 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
139,901	30	Woods, Good, HSG A
22,657	39	>75% Grass cover, Good, HSG A
31,189	98	Paved parking, HSG A
30,807	98	Roofs, HSG A
42,833	55	Woods, Good, HSG B
2,531	61	>75% Grass cover, Good, HSG B
205,967	70	Woods, Good, HSG C
1,683	74	>75% Grass cover, Good, HSG C
21,600	77	Woods, Good, HSG D
499,168	60	Weighted Average
437,172		87.58% Pervious Area
61,996		12.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0950	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
3.4	275	0.0730	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.0	957	0.0350	2.64	35.20	**Parabolic Channel,** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.080 Earth, long dense weeds
20.3	1,332	Total			

Subcatchment A4: A4



Summary for Subcatchment A5: A5

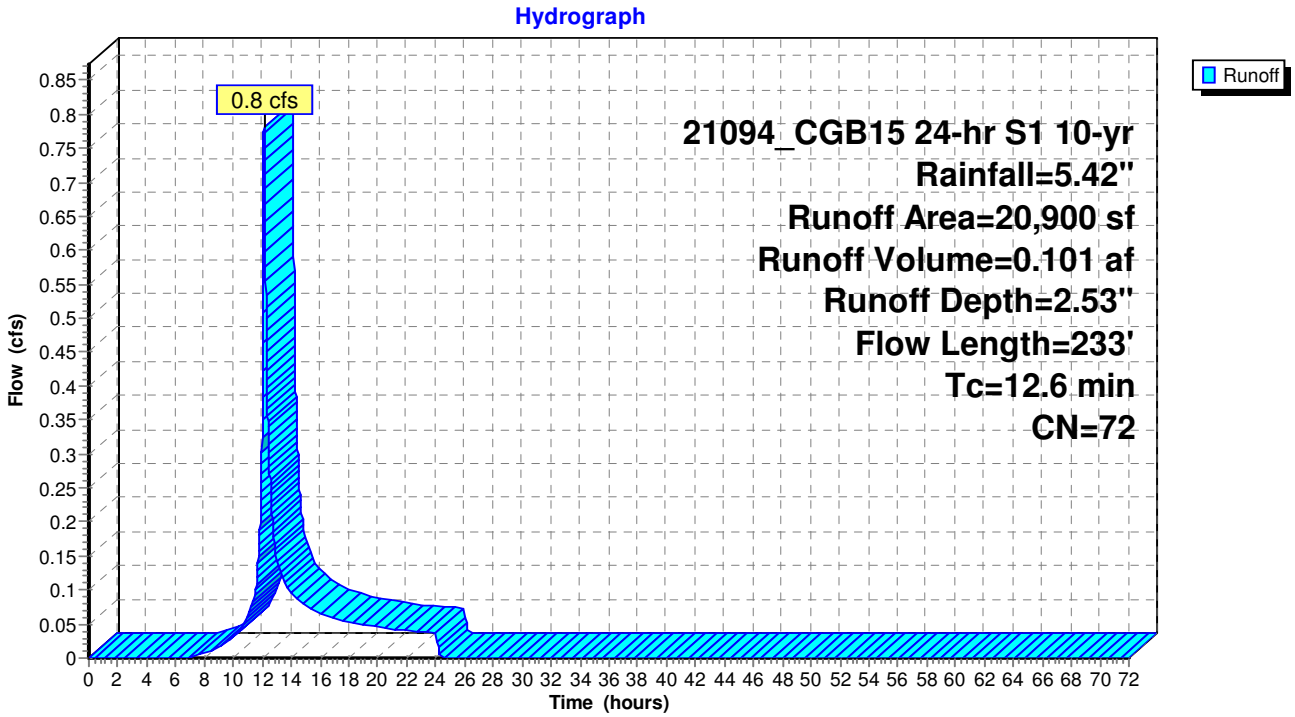
Runoff = 0.8 cfs @ 12.13 hrs, Volume= 0.101 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
13,720	70	Woods, Good, HSG C
7,180	77	Woods, Good, HSG D
20,900	72	Weighted Average
20,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0830	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	133	0.1690	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.6	233	Total			

Subcatchment A5: A5



Summary for Subcatchment A6: A6

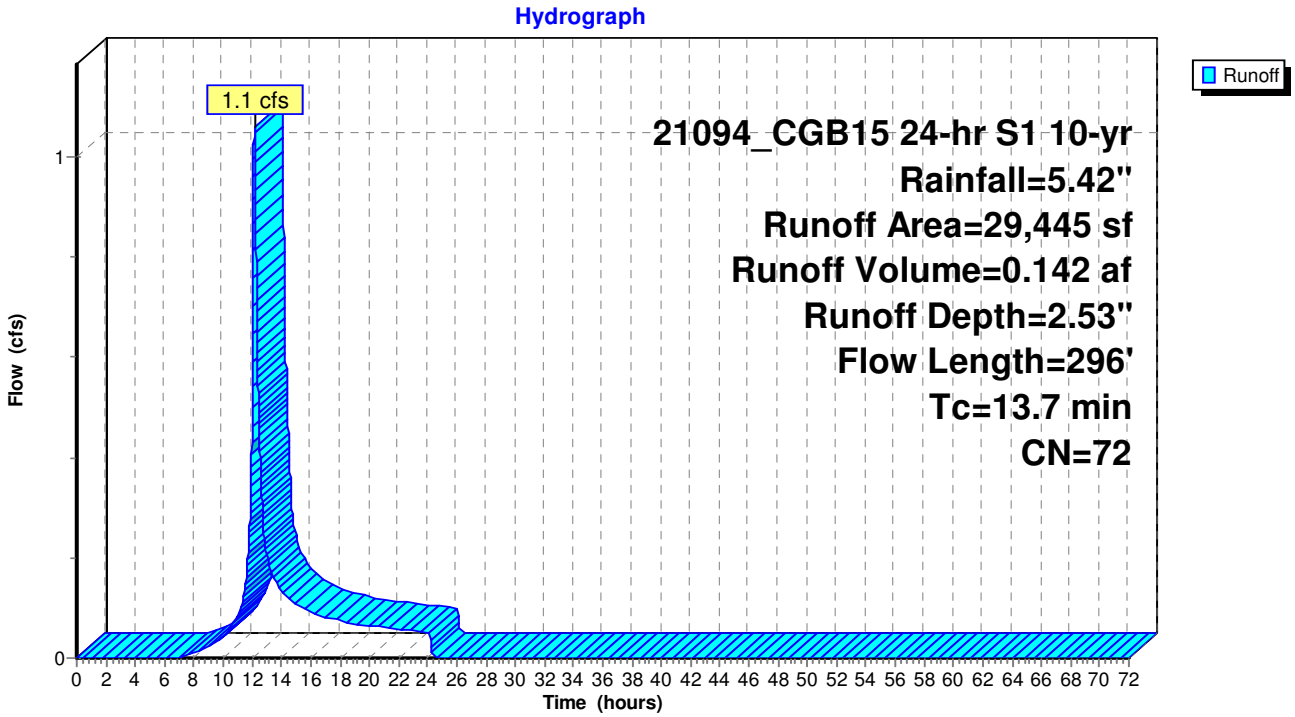
Runoff = 1.1 cfs @ 12.14 hrs, Volume= 0.142 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
21,502	70	Woods, Good, HSG C
7,943	77	Woods, Good, HSG D
29,445	72	Weighted Average
29,445		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0750	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
1.8	196	0.1330	1.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	296	Total			

Subcatchment A6: A6



Summary for Subcatchment B: B

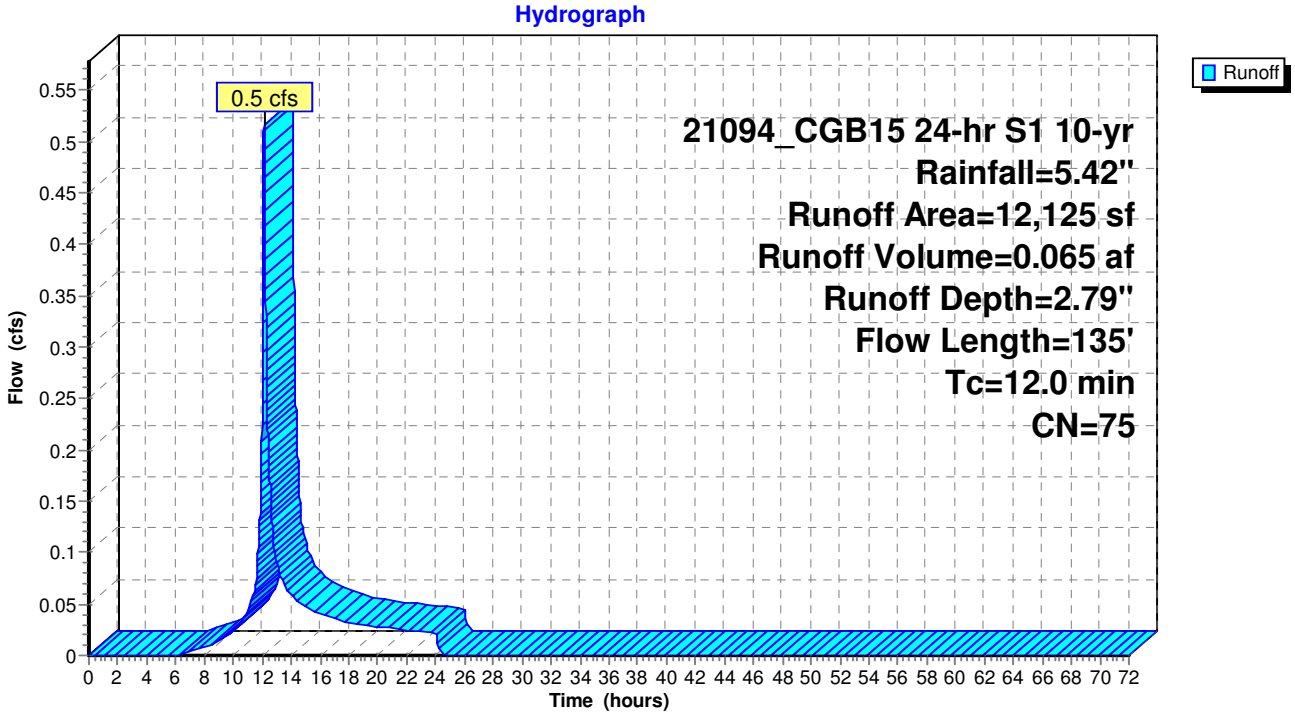
Runoff = 0.5 cfs @ 12.12 hrs, Volume= 0.065 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
1,146	55	Woods, Good, HSG B
331	70	Woods, Good, HSG C
10,648	77	Woods, Good, HSG D
12,125	75	Weighted Average
12,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0800	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.4	35	0.0860	1.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.0	135	Total			

Subcatchment B: B



Summary for Subcatchment C: C

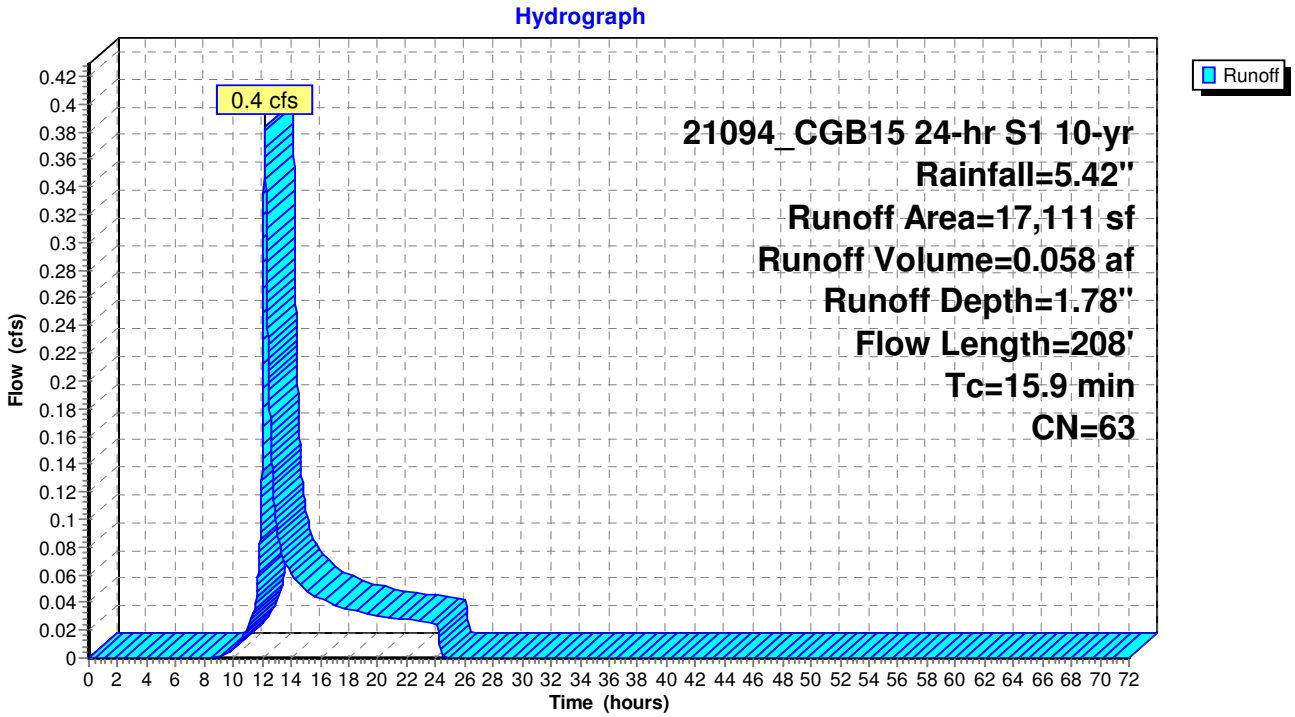
Runoff = 0.4 cfs @ 12.18 hrs, Volume= 0.058 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
7,692	55	Woods, Good, HSG B
9,419	70	Woods, Good, HSG C
17,111	63	Weighted Average
17,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0550	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	108	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	208	Total			

Subcatchment C: C

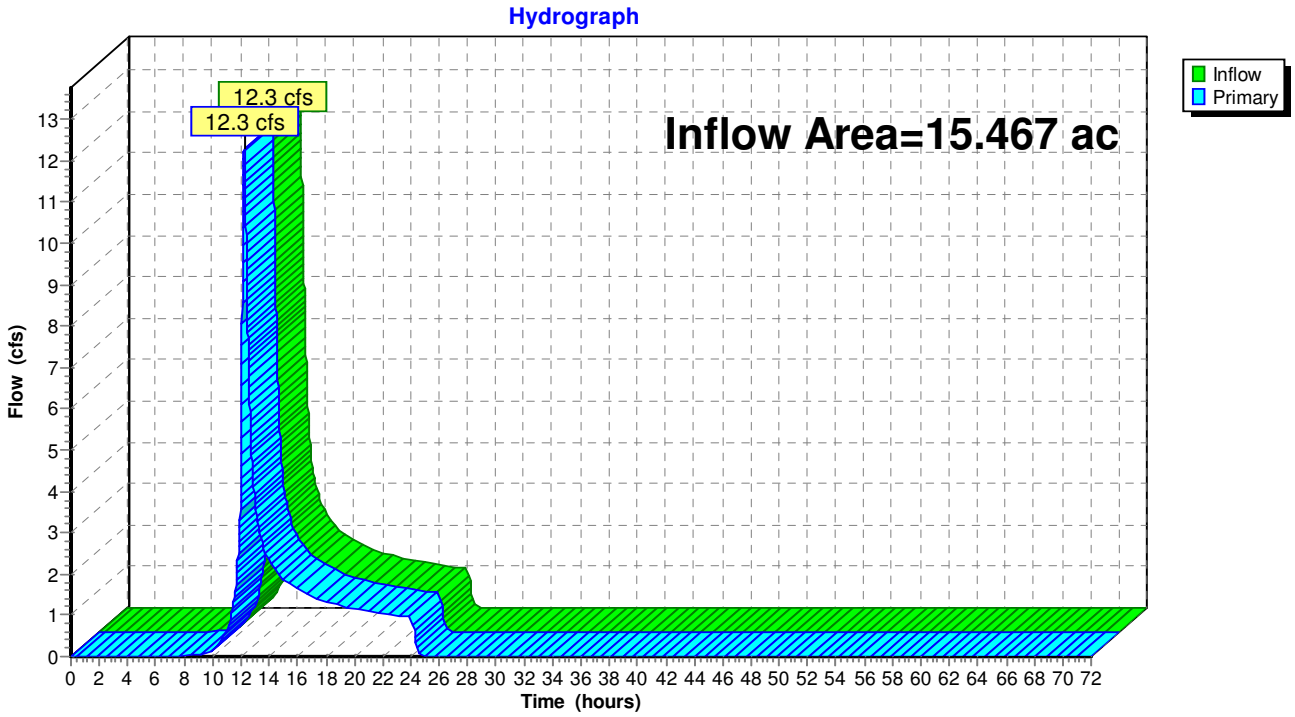


Summary for Link A: A

Inflow Area = 15.467 ac, 9.20% Impervious, Inflow Depth = 1.69" for 10-yr event
Inflow = 12.3 cfs @ 12.22 hrs, Volume= 2.175 af
Primary = 12.3 cfs @ 12.22 hrs, Volume= 2.175 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A



A – 1

NODE LISTING – 25-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 A1: A1 Runoff Area=12,999 sf 0.00% Impervious Runoff Depth=2.89"
Flow Length=108' Slope=0.0930 '/' Tc=11.6 min CN=64 Runoff=0.5 cfs 0.072 af

Subcatchment A2: A2 Runoff Area=35,072 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=220' Tc=10.9 min CN=63 Runoff=1.4 cfs 0.187 af

Subcatchment A3: A3 Runoff Area=76,153 sf 0.00% Impervious Runoff Depth=2.99"
Flow Length=340' Tc=22.9 min CN=65 Runoff=2.4 cfs 0.435 af

Subcatchment A4: A4 Runoff Area=499,168 sf 12.42% Impervious Runoff Depth=2.50"
Flow Length=1,332' Tc=20.3 min CN=60 Runoff=13.5 cfs 2.385 af

Subcatchment A5: A5 Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=3.70"
Flow Length=233' Tc=12.6 min CN=72 Runoff=1.1 cfs 0.148 af

Subcatchment A6: A6 Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=3.70"
Flow Length=296' Tc=13.7 min CN=72 Runoff=1.5 cfs 0.209 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=4.02"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.7 cfs 0.093 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.6 cfs 0.091 af

Link A: A Inflow=19.3 cfs 3.436 af
Primary=19.3 cfs 3.436 af

Total Runoff Area = 16.138 ac Runoff Volume = 3.621 af Average Runoff Depth = 2.69"
91.18% Pervious = 14.715 ac 8.82% Impervious = 1.423 ac

A – 1

NODE LISTING – 50-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 A1: A1 Runoff Area=12,999 sf 0.00% Impervious Runoff Depth=3.93"
Flow Length=108' Slope=0.0930 '/' Tc=11.6 min CN=64 Runoff=0.7 cfs 0.098 af

Subcatchment A2: A2 Runoff Area=35,072 sf 0.00% Impervious Runoff Depth=3.81"
Flow Length=220' Tc=10.9 min CN=63 Runoff=1.9 cfs 0.256 af

Subcatchment A3: A3 Runoff Area=76,153 sf 0.00% Impervious Runoff Depth=4.04"
Flow Length=340' Tc=22.9 min CN=65 Runoff=3.2 cfs 0.589 af

Subcatchment A4: A4 Runoff Area=499,168 sf 12.42% Impervious Runoff Depth=3.47"
Flow Length=1,332' Tc=20.3 min CN=60 Runoff=18.6 cfs 3.313 af

Subcatchment A5: A5 Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=4.85"
Flow Length=233' Tc=12.6 min CN=72 Runoff=1.4 cfs 0.194 af

Subcatchment A6: A6 Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=4.85"
Flow Length=296' Tc=13.7 min CN=72 Runoff=1.9 cfs 0.273 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=5.20"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.9 cfs 0.121 af

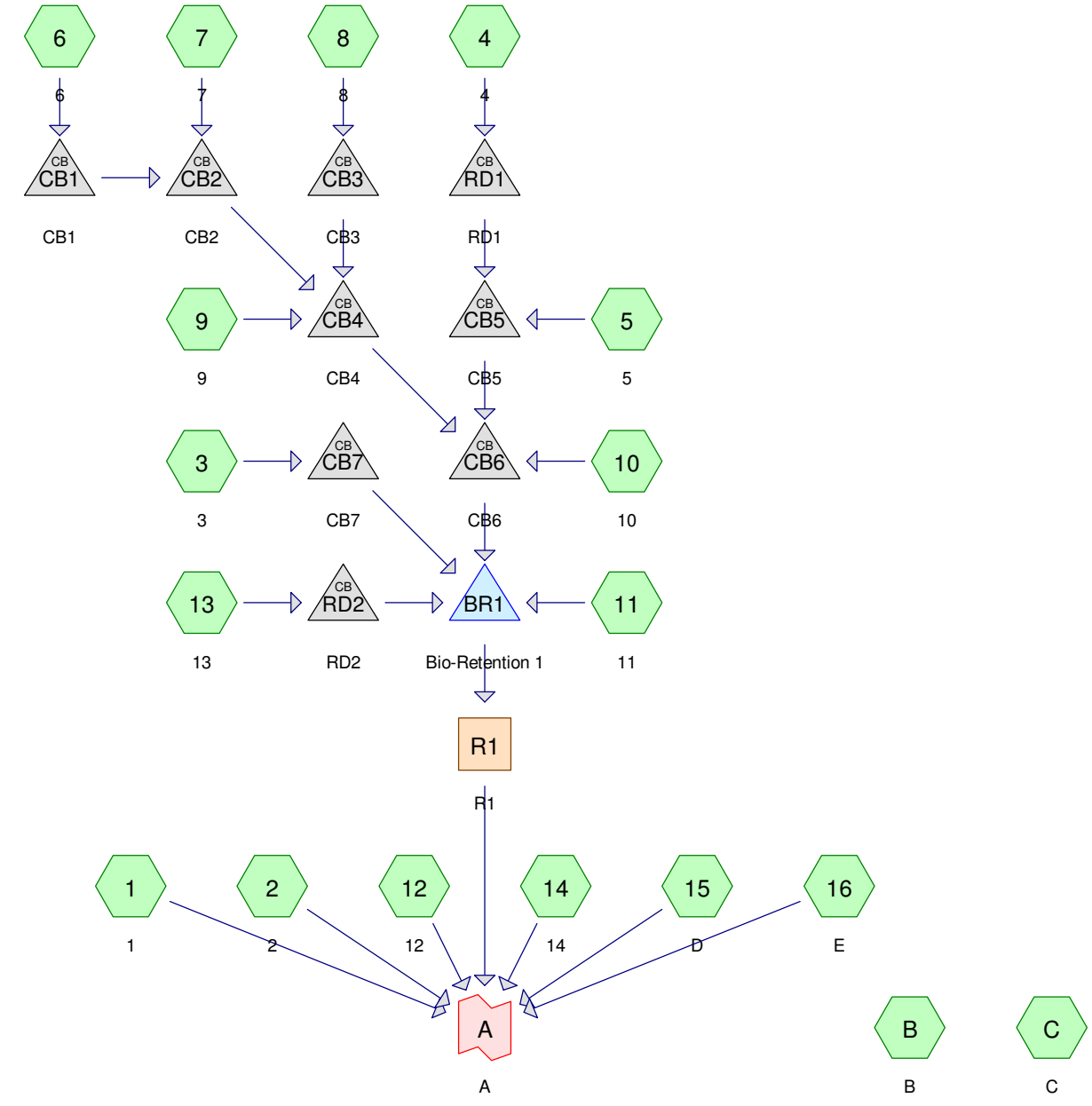
Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=3.81"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.8 cfs 0.125 af

Link A: A Inflow=26.2 cfs 4.722 af
Primary=26.2 cfs 4.722 af

Total Runoff Area = 16.138 ac Runoff Volume = 4.967 af Average Runoff Depth = 3.69"
91.18% Pervious = 14.715 ac 8.82% Impervious = 1.423 ac

A-2

DEVELOPED WATERSHEDS



Subcat Reach Pond Link

Routing Diagram for 22075 - Post
Prepared by Civilworks NE
HydroCAD® 10.10-5a s/n 03240 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.508	39	>75% Grass cover, Good, HSG A (6, 7, 14)
0.532	61	>75% Grass cover, Good, HSG B (1, 2, 3, 5, 6, 7, 8, 11, 12, 14)
1.152	74	>75% Grass cover, Good, HSG C (1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 14)
0.728	98	Paved parking, HSG A (6, 7, 14)
0.531	98	Paved parking, HSG B (3, 5, 6, 7, 8, 11)
0.902	98	Paved parking, HSG C (3, 5, 6, 7, 8, 9, 10, 11)
0.707	98	Roofs, HSG A (14)
0.561	98	Roofs, HSG B (4, 13)
0.242	98	Roofs, HSG C (4, 13)
0.001	98	Unconnected Impervious, HSG B (2)
0.018	98	Unconnected Impervious, HSG C (12, 14)
3.212	30	Woods, Good, HSG A (14)
0.714	55	Woods, Good, HSG B (1, 2, 12, 14, B, C)
5.243	70	Woods, Good, HSG C (1, 2, 5, 10, 11, 12, 14, 15, 16, B, C)
1.087	77	Woods, Good, HSG D (14, 15, 16, B)
16.138	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.155	HSG A	6, 7, 14
2.339	HSG B	1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14, B, C
7.557	HSG C	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, B, C
1.087	HSG D	14, 15, 16, B
0.000	Other	
16.138		**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
0.508	0.532	1.152	0.000	0.000	2.192	>75% Grass cover, Good	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14
0.728	0.531	0.902	0.000	0.000	2.161	Paved parking	3, 5, 6, 7, 8, 9, 10, 11, 14
0.707	0.561	0.242	0.000	0.000	1.511	Roofs	4, 13, 14
0.000	0.001	0.018	0.000	0.000	0.019	Unconnected Impervious	2, 12, 14
3.212	0.714	5.243	1.087	0.000	10.256	Woods, Good	1, 2, 5, 10, 11, 12, 14, 15, 16, B, C
5.155	**2.339**	**7.557**	**1.087**	**0.000**	**16.138**	**TOTAL AREA**	

A – 2

NODE LISTING – 2-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 1: 1 Runoff Area=10,503 sf 0.00% Impervious Runoff Depth=1.01"
Flow Length=90' Slope=0.0770 '/' Tc=10.9 min CN=69 Runoff=0.2 cfs 0.020 af

Subcatchment 2: 2 Runoff Area=17,817 sf 0.34% Impervious Runoff Depth=1.01"
Flow Length=136' Tc=10.4 min CN=69 Runoff=0.3 cfs 0.035 af

Subcatchment 3: 3 Runoff Area=11,703 sf 94.27% Impervious Runoff Depth=3.14"
Flow Length=101' Tc=4.8 min CN=96 Runoff=0.8 cfs 0.070 af

Subcatchment 4: 4 Runoff Area=10,000 sf 100.00% Impervious Runoff Depth=3.37"
Flow Length=80' Tc=1.2 min CN=98 Runoff=0.8 cfs 0.064 af

Subcatchment 5: 5 Runoff Area=5,946 sf 69.71% Impervious Runoff Depth=2.45"
Flow Length=56' Tc=1.4 min CN=89 Runoff=0.4 cfs 0.028 af

Subcatchment 6: 6 Runoff Area=6,167 sf 85.47% Impervious Runoff Depth=2.83"
Flow Length=301' Tc=2.4 min CN=93 Runoff=0.4 cfs 0.033 af

Subcatchment 7: 7 Runoff Area=6,350 sf 85.15% Impervious Runoff Depth=2.83"
Flow Length=305' Tc=2.4 min CN=93 Runoff=0.5 cfs 0.034 af

Subcatchment 8: 8 Runoff Area=13,970 sf 80.74% Impervious Runoff Depth=2.83"
Flow Length=135' Tc=1.7 min CN=93 Runoff=1.0 cfs 0.076 af

Subcatchment 9: 9 Runoff Area=2,654 sf 62.96% Impervious Runoff Depth=2.45"
Flow Length=33' Tc=2.7 min CN=89 Runoff=0.2 cfs 0.012 af

Subcatchment 10: 10 Runoff Area=11,702 sf 23.75% Impervious Runoff Depth=1.57"
Flow Length=121' Tc=11.3 min CN=78 Runoff=0.3 cfs 0.035 af

Subcatchment 11: 11 Runoff Area=46,099 sf 50.43% Impervious Runoff Depth=1.94"
Flow Length=135' Tc=6.4 min CN=83 Runoff=2.0 cfs 0.171 af

Subcatchment 12: 12 Runoff Area=7,853 sf 4.55% Impervious Runoff Depth=1.19"
Flow Length=38' Slope=0.0250 '/' Tc=5.7 min CN=72 Runoff=0.2 cfs 0.018 af

Subcatchment 13: 13 Runoff Area=25,000 sf 100.00% Impervious Runoff Depth=3.37"
Flow Length=125' Tc=1.2 min CN=98 Runoff=2.0 cfs 0.161 af

Subcatchment 14: 14 Runoff Area=447,629 sf 13.52% Impervious Runoff Depth=0.53"
Flow Length=1,332' Tc=20.1 min CN=59 Runoff=1.9 cfs 0.457 af

Subcatchment 15: D Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=233' Tc=12.6 min CN=72 Runoff=0.4 cfs 0.047 af

Subcatchment 16: E Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=296' Tc=13.7 min CN=72 Runoff=0.5 cfs 0.067 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=1.37"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.3 cfs 0.032 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.1 cfs 0.023 af

Reach R1: R1 Avg. Flow Depth=0.11' Max Vel=1.63 fps Inflow=1.1 cfs 0.677 af
n=0.035 L=20.0' S=0.0500 '/' Capacity=30.4 cfs Outflow=1.1 cfs 0.677 af

Pond BR1: Bio-Retention 1 Peak Elev=143.48' Storage=7,543 cf Inflow=7.8 cfs 0.686 af
Outflow=1.1 cfs 0.677 af

Pond CB1: CB1 Peak Elev=154.12' Inflow=0.4 cfs 0.033 af
15.0" Round Culvert n=0.012 L=24.0' S=0.0104 '/' Outflow=0.4 cfs 0.033 af

Pond CB2: CB2 Peak Elev=153.91' Inflow=0.9 cfs 0.068 af
15.0" Round Culvert n=0.012 L=168.0' S=0.0488 '/' Outflow=0.9 cfs 0.068 af

Pond CB3: CB3 Peak Elev=148.84' Inflow=1.0 cfs 0.076 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0583 '/' Outflow=1.0 cfs 0.076 af

Pond CB4: CB4 Peak Elev=145.92' Inflow=2.1 cfs 0.156 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0187 '/' Outflow=2.1 cfs 0.156 af

Pond CB5: CB5 Peak Elev=147.74' Inflow=1.2 cfs 0.092 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0431 '/' Outflow=1.2 cfs 0.092 af

Pond CB6: CB6 Peak Elev=145.23' Inflow=3.4 cfs 0.283 af
15.0" Round Culvert n=0.012 L=54.0' S=0.0102 '/' Outflow=3.4 cfs 0.283 af

Pond CB7: CB7 Peak Elev=145.43' Inflow=0.8 cfs 0.070 af
15.0" Round Culvert n=0.012 L=42.0' S=0.0417 '/' Outflow=0.8 cfs 0.070 af

Pond RD1: RD1 Peak Elev=151.02' Inflow=0.8 cfs 0.064 af
12.0" Round Culvert n=0.012 L=265.0' S=0.0113 '/' Outflow=0.8 cfs 0.064 af

Pond RD2: RD2 Peak Elev=151.44' Inflow=2.0 cfs 0.161 af
12.0" Round Culvert n=0.012 L=360.0' S=0.0187 '/' Outflow=2.0 cfs 0.161 af

Link A: A Inflow=4.0 cfs 1.321 af
Primary=4.0 cfs 1.321 af

Total Runoff Area = 16.138 ac Runoff Volume = 1.385 af Average Runoff Depth = 1.03"
77.13% Pervious = 12.447 ac 22.87% Impervious = 3.691 ac

A – 2

NODE LISTING – 10-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 1: 1 Runoff Area=10,503 sf 0.00% Impervious Runoff Depth=2.27"
Flow Length=90' Slope=0.0770 '/' Tc=10.9 min CN=69 Runoff=0.4 cfs 0.046 af

Subcatchment 2: 2 Runoff Area=17,817 sf 0.34% Impervious Runoff Depth=2.27"
Flow Length=136' Tc=10.4 min CN=69 Runoff=0.6 cfs 0.077 af

Subcatchment 3: 3 Runoff Area=11,703 sf 94.27% Impervious Runoff Depth=4.95"
Flow Length=101' Tc=4.8 min CN=96 Runoff=1.1 cfs 0.111 af

Subcatchment 4: 4 Runoff Area=10,000 sf 100.00% Impervious Runoff Depth=5.18"
Flow Length=80' Tc=1.2 min CN=98 Runoff=1.0 cfs 0.099 af

Subcatchment 5: 5 Runoff Area=5,946 sf 69.71% Impervious Runoff Depth=4.18"
Flow Length=56' Tc=1.4 min CN=89 Runoff=0.6 cfs 0.047 af

Subcatchment 6: 6 Runoff Area=6,167 sf 85.47% Impervious Runoff Depth=4.61"
Flow Length=301' Tc=2.4 min CN=93 Runoff=0.6 cfs 0.054 af

Subcatchment 7: 7 Runoff Area=6,350 sf 85.15% Impervious Runoff Depth=4.61"
Flow Length=305' Tc=2.4 min CN=93 Runoff=0.6 cfs 0.056 af

Subcatchment 8: 8 Runoff Area=13,970 sf 80.74% Impervious Runoff Depth=4.61"
Flow Length=135' Tc=1.7 min CN=93 Runoff=1.4 cfs 0.123 af

Subcatchment 9: 9 Runoff Area=2,654 sf 62.96% Impervious Runoff Depth=4.18"
Flow Length=33' Tc=2.7 min CN=89 Runoff=0.2 cfs 0.021 af

Subcatchment 10: 10 Runoff Area=11,702 sf 23.75% Impervious Runoff Depth=3.07"
Flow Length=121' Tc=11.3 min CN=78 Runoff=0.6 cfs 0.069 af

Subcatchment 11: 11 Runoff Area=46,099 sf 50.43% Impervious Runoff Depth=3.56"
Flow Length=135' Tc=6.4 min CN=83 Runoff=3.2 cfs 0.314 af

Subcatchment 12: 12 Runoff Area=7,853 sf 4.55% Impervious Runoff Depth=2.53"
Flow Length=38' Slope=0.0250 '/' Tc=5.7 min CN=72 Runoff=0.4 cfs 0.038 af

Subcatchment 13: 13 Runoff Area=25,000 sf 100.00% Impervious Runoff Depth=5.18"
Flow Length=125' Tc=1.2 min CN=98 Runoff=2.6 cfs 0.248 af

Subcatchment 14: 14 Runoff Area=447,629 sf 13.52% Impervious Runoff Depth=1.48"
Flow Length=1,332' Tc=20.1 min CN=59 Runoff=7.1 cfs 1.267 af

Subcatchment 15: D Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=2.53"
Flow Length=233' Tc=12.6 min CN=72 Runoff=0.8 cfs 0.101 af

Subcatchment 16: E Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=2.53"
Flow Length=296' Tc=13.7 min CN=72 Runoff=1.1 cfs 0.142 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.5 cfs 0.065 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=1.78"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.4 cfs 0.058 af

Reach R1: R1 Avg. Flow Depth=0.14' Max Vel=1.98 fps Inflow=2.0 cfs 1.134 af
n=0.035 L=20.0' S=0.0500 '/' Capacity=30.4 cfs Outflow=2.0 cfs 1.134 af

Pond BR1: Bio-Retention 1 Peak Elev=144.35' Storage=12,457 cf Inflow=11.0 cfs 1.143 af
Outflow=2.0 cfs 1.134 af

Pond CB1: CB1 Peak Elev=154.20' Inflow=0.6 cfs 0.054 af
15.0" Round Culvert n=0.012 L=24.0' S=0.0104 '/' Outflow=0.6 cfs 0.054 af

Pond CB2: CB2 Peak Elev=154.00' Inflow=1.2 cfs 0.110 af
15.0" Round Culvert n=0.012 L=168.0' S=0.0488 '/' Outflow=1.2 cfs 0.110 af

Pond CB3: CB3 Peak Elev=148.95' Inflow=1.4 cfs 0.123 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0583 '/' Outflow=1.4 cfs 0.123 af

Pond CB4: CB4 Peak Elev=146.11' Inflow=2.9 cfs 0.255 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0187 '/' Outflow=2.9 cfs 0.255 af

Pond CB5: CB5 Peak Elev=147.85' Inflow=1.6 cfs 0.147 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0431 '/' Outflow=1.6 cfs 0.147 af

Pond CB6: CB6 Peak Elev=145.52' Inflow=4.7 cfs 0.470 af
15.0" Round Culvert n=0.012 L=54.0' S=0.0102 '/' Outflow=4.7 cfs 0.470 af

Pond CB7: CB7 Peak Elev=145.50' Inflow=1.1 cfs 0.111 af
15.0" Round Culvert n=0.012 L=42.0' S=0.0417 '/' Outflow=1.1 cfs 0.111 af

Pond RD1: RD1 Peak Elev=151.10' Inflow=1.0 cfs 0.099 af
12.0" Round Culvert n=0.012 L=265.0' S=0.0113 '/' Outflow=1.0 cfs 0.099 af

Pond RD2: RD2 Peak Elev=151.75' Inflow=2.6 cfs 0.248 af
12.0" Round Culvert n=0.012 L=360.0' S=0.0187 '/' Outflow=2.6 cfs 0.248 af

Link A: A Inflow=10.9 cfs 2.804 af
Primary=10.9 cfs 2.804 af

Total Runoff Area = 16.138 ac Runoff Volume = 2.937 af Average Runoff Depth = 2.18"
77.13% Pervious = 12.447 ac 22.87% Impervious = 3.691 ac

A – 2

10-YR STORM SUMMARY

Summary for Subcatchment 1: 1

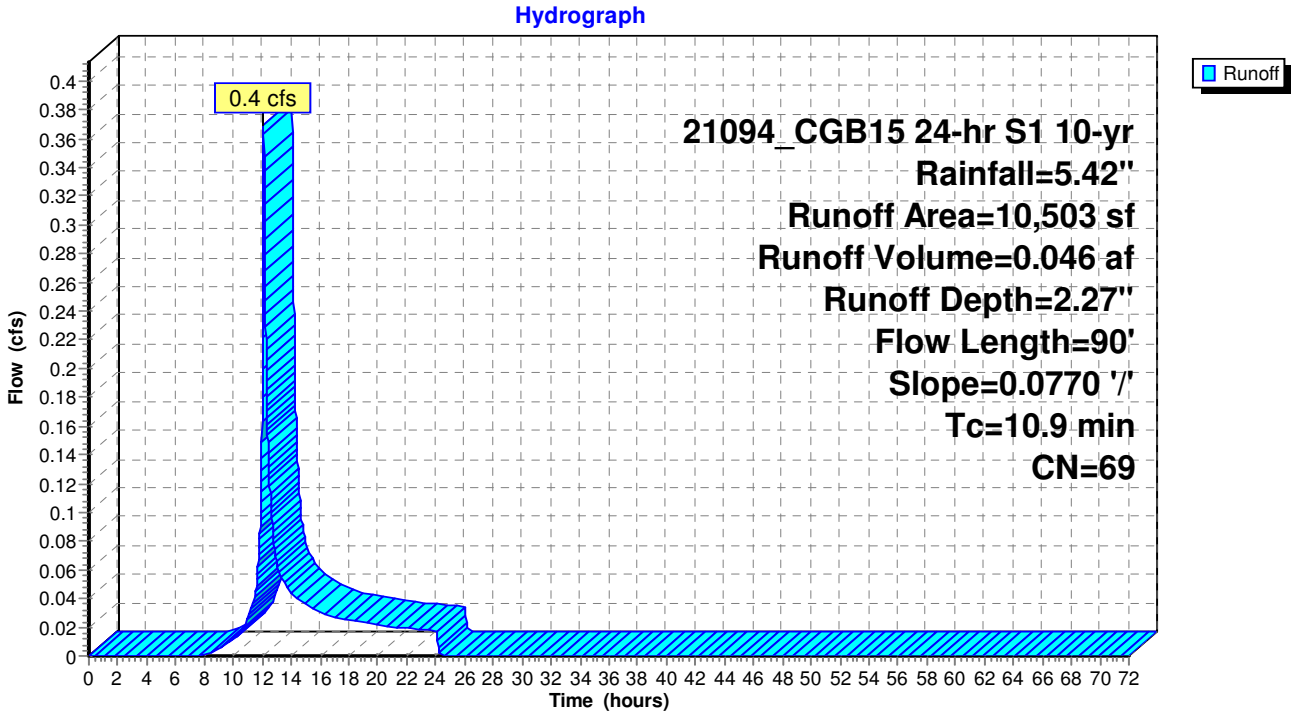
Runoff = 0.4 cfs @ 12.10 hrs, Volume= 0.046 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
35	55	Woods, Good, HSG B
2,067	61	>75% Grass cover, Good, HSG B
5,238	70	Woods, Good, HSG C
3,163	74	>75% Grass cover, Good, HSG C
10,503	69	Weighted Average
10,503		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	90	0.0770	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"

Subcatchment 1: 1



Summary for Subcatchment 2: 2

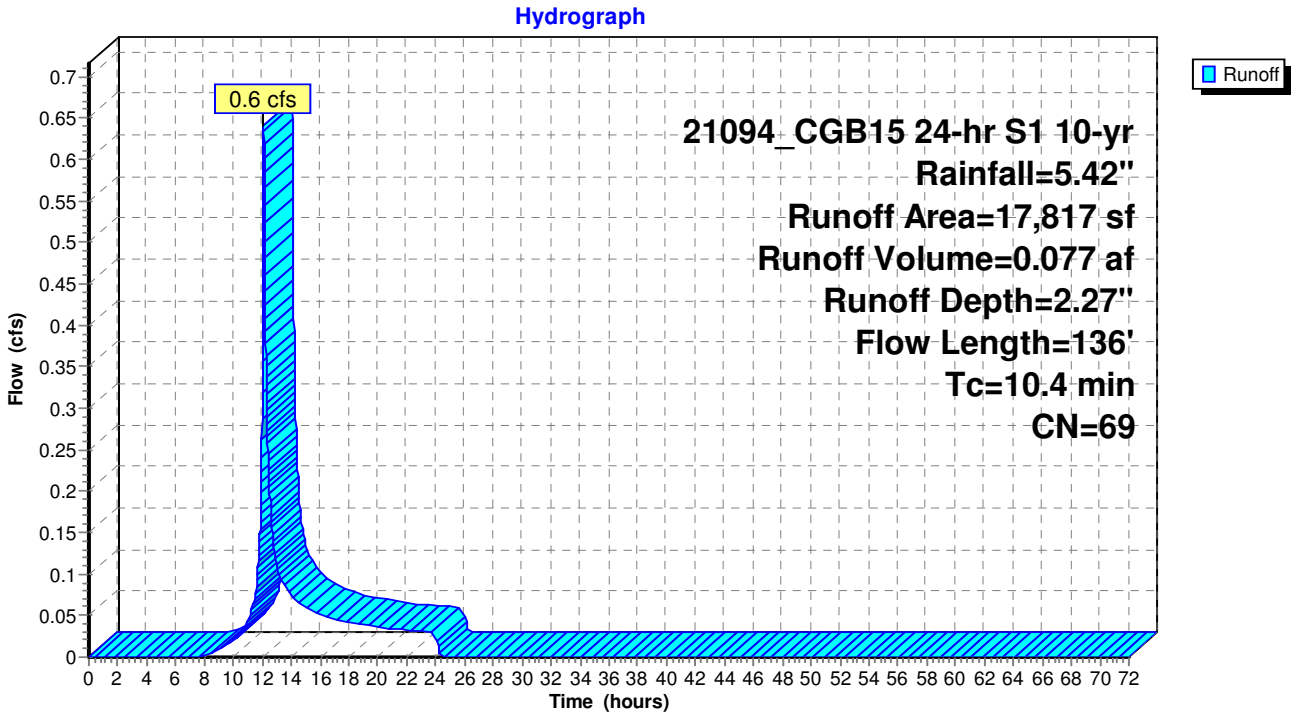
Runoff = 0.6 cfs @ 12.10 hrs, Volume= 0.077 af, Depth= 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

	Area (sf)	CN	Description
	808	55	Woods, Good, HSG B
	2,880	61	>75% Grass cover, Good, HSG B
*	60	98	Unconnected Impervious, HSG B
	8,519	70	Woods, Good, HSG C
	5,550	74	>75% Grass cover, Good, HSG C
	17,817	69	Weighted Average
	17,757		99.66% Pervious Area
	60		0.34% Impervious Area
	60		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	30	0.1830	0.24		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
7.9	70	0.1030	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.4	36	0.1030	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	136	Total			

Subcatchment 2: 2



Summary for Subcatchment 3: 3

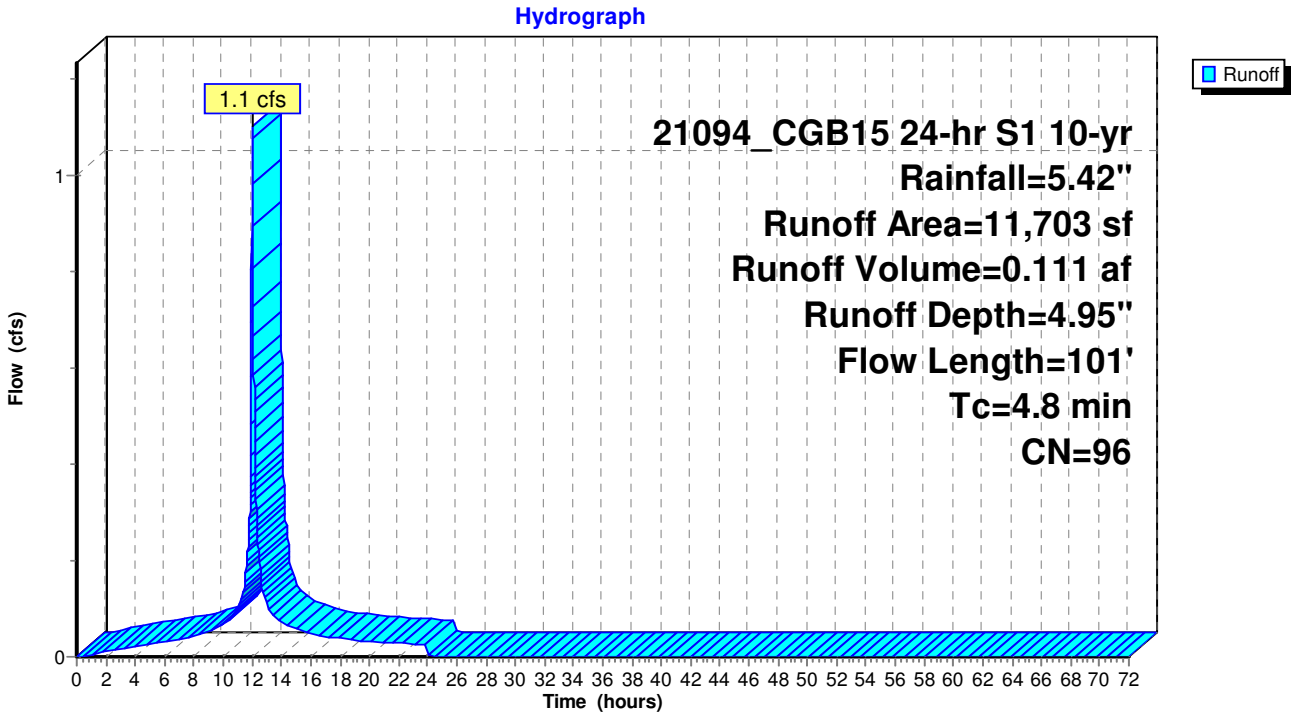
Runoff = 1.1 cfs @ 12.02 hrs, Volume= 0.111 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
671	61	>75% Grass cover, Good, HSG B
7,185	98	Paved parking, HSG B
3,847	98	Paved parking, HSG C
11,703	96	Weighted Average
671		5.73% Pervious Area
11,032		94.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	25	0.0200	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
0.4	76	0.0270	3.34		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.8	101	Total			

Subcatchment 3: 3



Summary for Subcatchment 4: 4

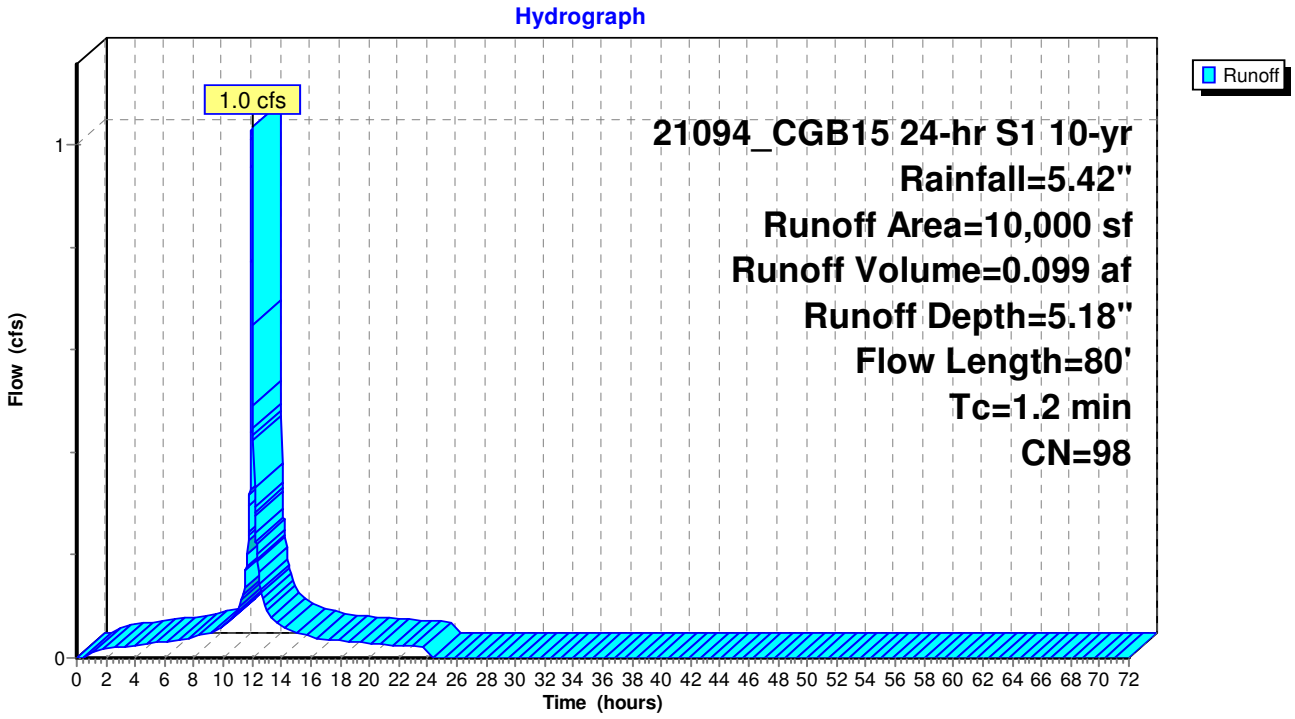
Runoff = 1.0 cfs @ 11.99 hrs, Volume= 0.099 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
9,985	98	Roofs, HSG B
15	98	Roofs, HSG C
10,000	98	Weighted Average
10,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	80		1.11		**Direct Entry, Roof Runoff**

Subcatchment 4: 4



Summary for Subcatchment 5: 5

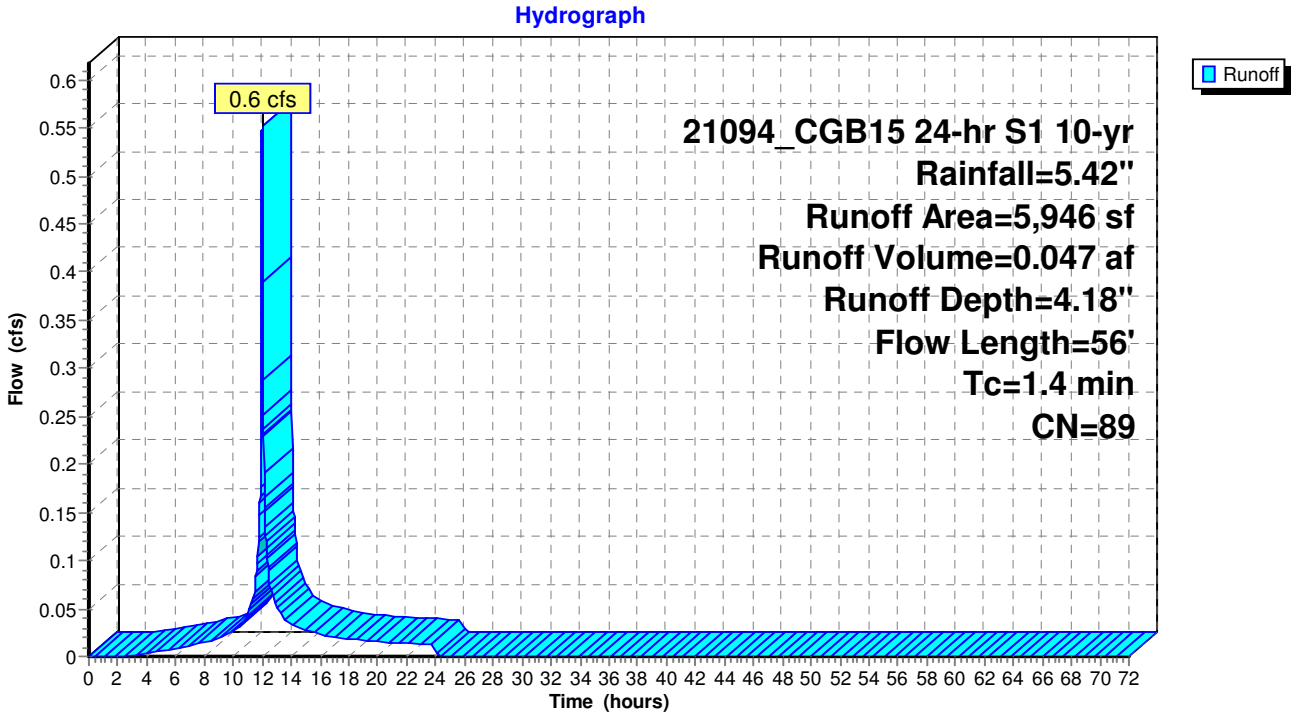
Runoff = 0.6 cfs @ 12.00 hrs, Volume= 0.047 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
718	61	>75% Grass cover, Good, HSG B
2,721	98	Paved parking, HSG B
94	70	Woods, Good, HSG C
989	74	>75% Grass cover, Good, HSG C
1,424	98	Paved parking, HSG C
5,946	89	Weighted Average
1,801		30.29% Pervious Area
4,145		69.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	21	0.3330	0.28		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
0.1	35	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.4	56	Total			

Subcatchment 5: 5



Summary for Subcatchment 6: 6

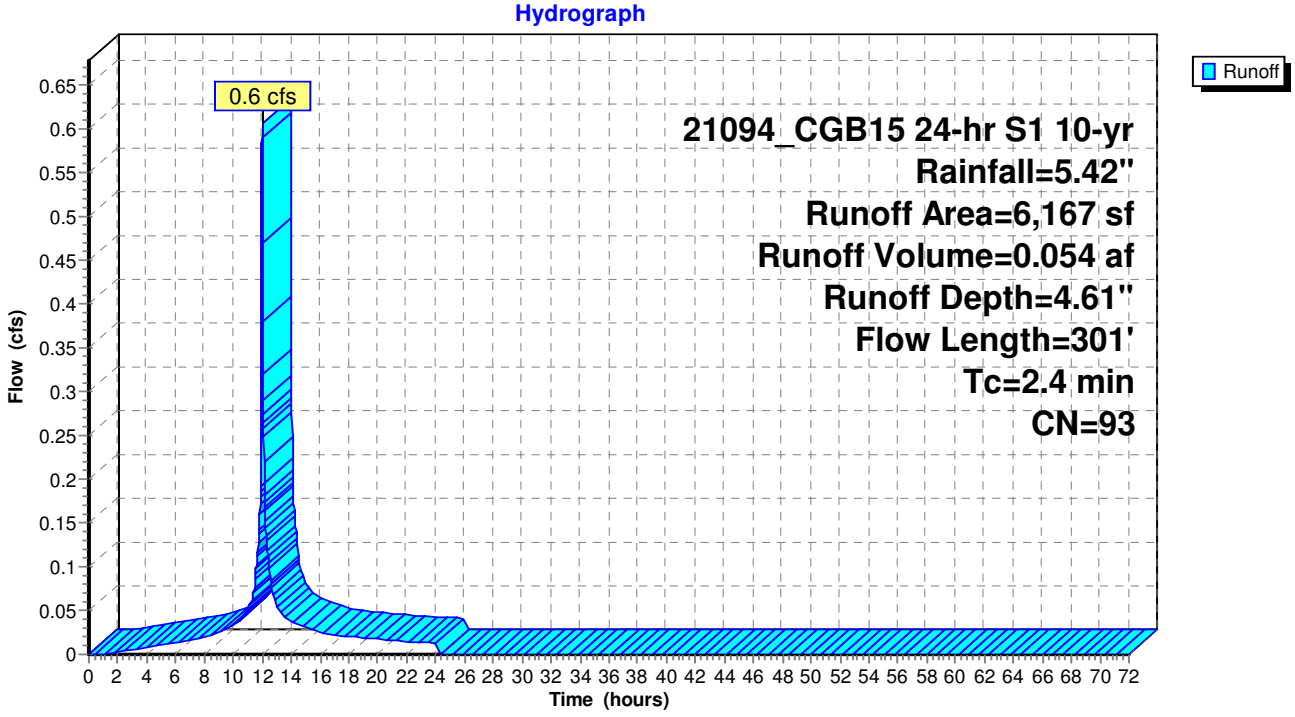
Runoff = 0.6 cfs @ 12.00 hrs, Volume= 0.054 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
67	39	>75% Grass cover, Good, HSG A
1,200	98	Paved parking, HSG A
555	61	>75% Grass cover, Good, HSG B
2,757	98	Paved parking, HSG B
274	74	>75% Grass cover, Good, HSG C
1,314	98	Paved parking, HSG C
6,167	93	Weighted Average
896		14.53% Pervious Area
5,271		85.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	5	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
1.2	296	0.0390	4.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	301	Total			

Subcatchment 6: 6



Summary for Subcatchment 7: 7

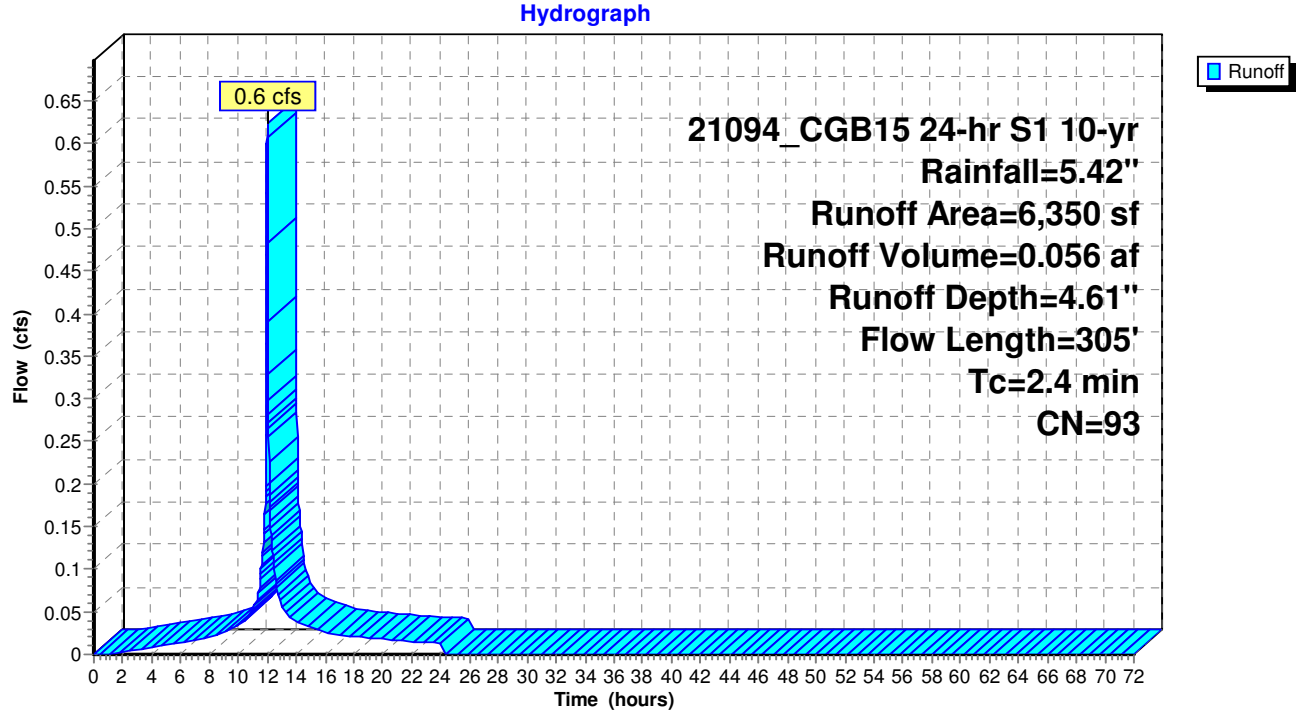
Runoff = 0.6 cfs @ 12.00 hrs, Volume= 0.056 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
64	39	>75% Grass cover, Good, HSG A
1,223	98	Paved parking, HSG A
555	61	>75% Grass cover, Good, HSG B
2,765	98	Paved parking, HSG B
324	74	>75% Grass cover, Good, HSG C
1,419	98	Paved parking, HSG C
6,350	93	Weighted Average
943		14.85% Pervious Area
5,407		85.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	5	0.0200	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
1.2	300	0.0390	4.01		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.4	305	Total			

Subcatchment 7: 7



Summary for Subcatchment 8: 8

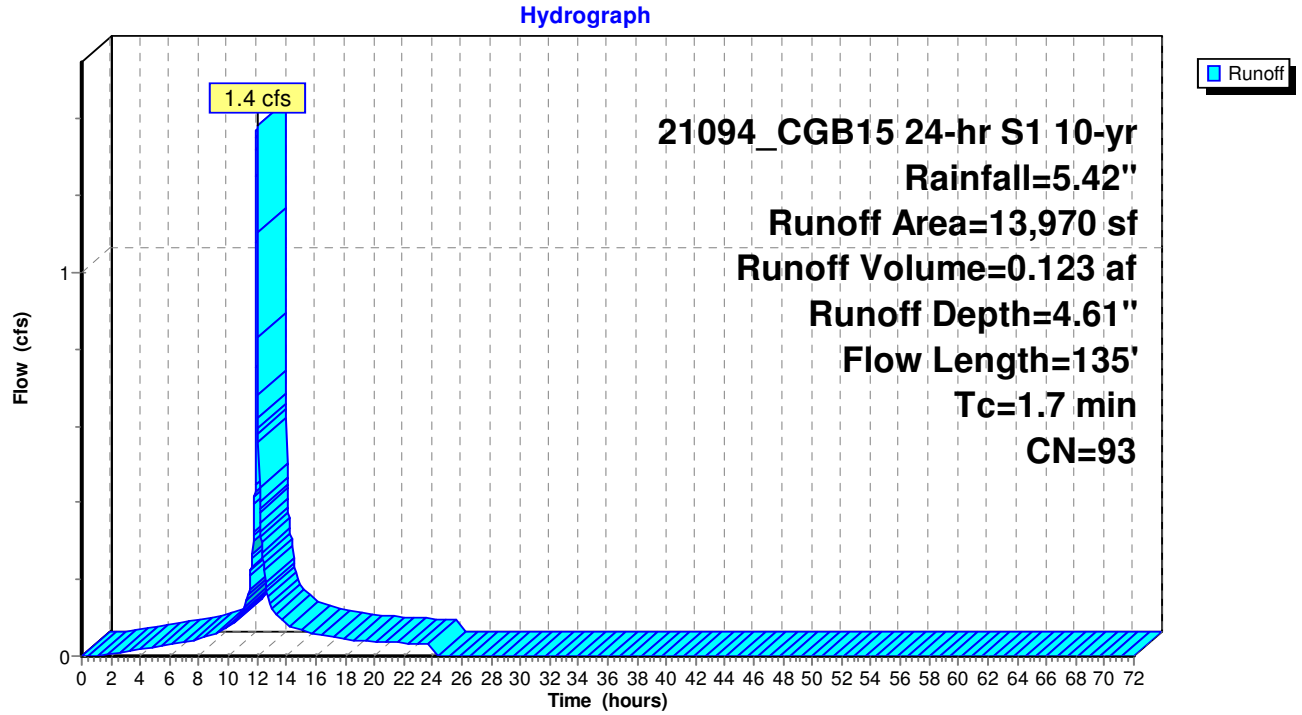
Runoff = 1.4 cfs @ 12.00 hrs, Volume= 0.123 af, Depth= 4.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
415	61	>75% Grass cover, Good, HSG B
2,656	98	Paved parking, HSG B
2,275	74	>75% Grass cover, Good, HSG C
8,624	98	Paved parking, HSG C
13,970	93	Weighted Average
2,690		19.26% Pervious Area
11,280		80.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	10	0.1500	0.17		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
0.7	125	0.0230	3.08		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	135	Total			

Subcatchment 8: 8



Summary for Subcatchment 9: 9

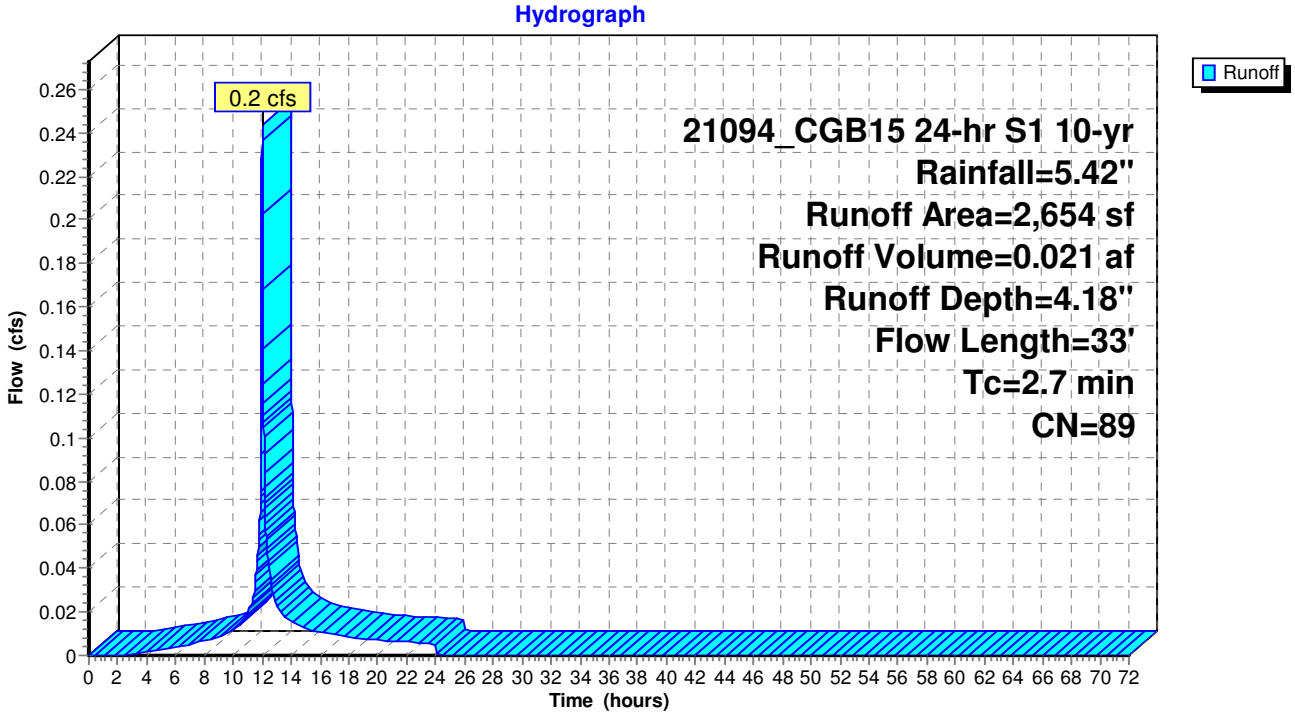
Runoff = 0.2 cfs @ 12.01 hrs, Volume= 0.021 af, Depth= 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
983	74	>75% Grass cover, Good, HSG C
1,671	98	Paved parking, HSG C
2,654	89	Weighted Average
983		37.04% Pervious Area
1,671		62.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	26	0.0730	0.16		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
0.0	7	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
2.7	33	Total			

Subcatchment 9: 9



Summary for Subcatchment 10: 10

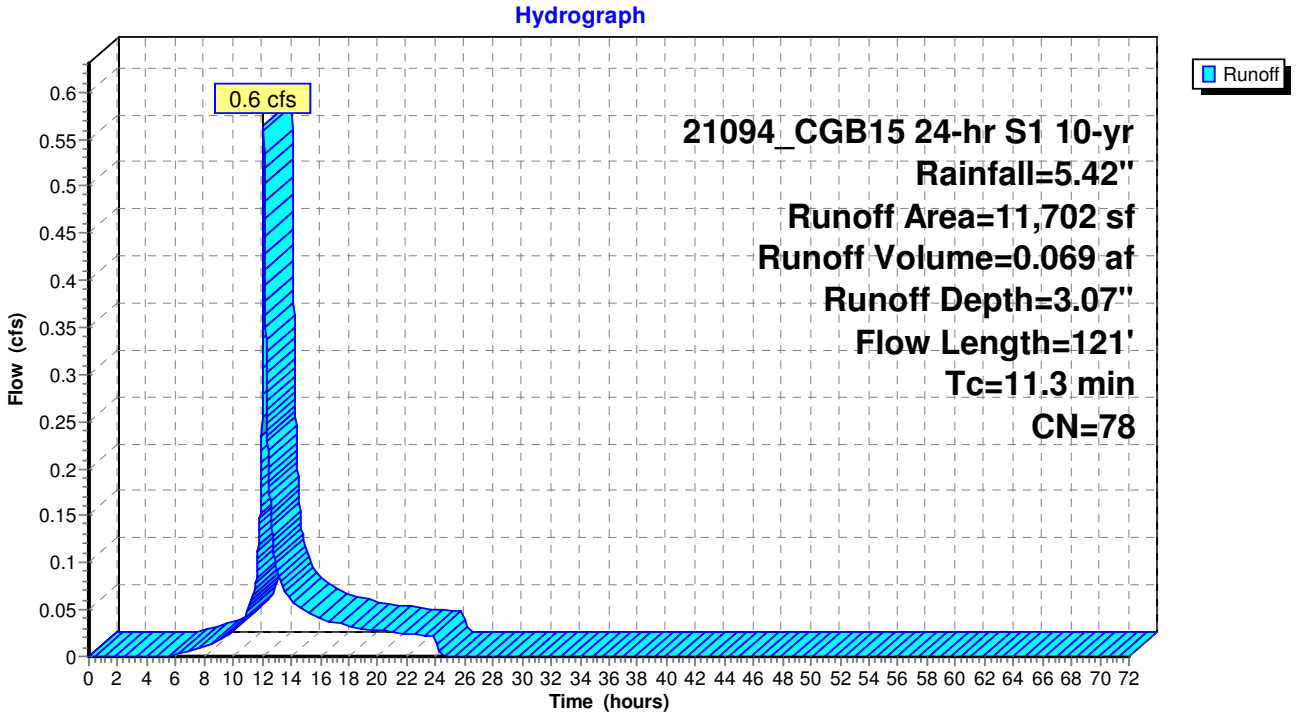
Runoff = 0.6 cfs @ 12.11 hrs, Volume= 0.069 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
5,557	70	Woods, Good, HSG C
3,366	74	>75% Grass cover, Good, HSG C
2,779	98	Paved parking, HSG C
11,702	78	Weighted Average
8,923		76.25% Pervious Area
2,779		23.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	60	0.0330	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.1	18	0.2220	3.30		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.2	43	0.0400	4.06		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
11.3	121	Total			

Subcatchment 10: 10



Summary for Subcatchment 11: 11

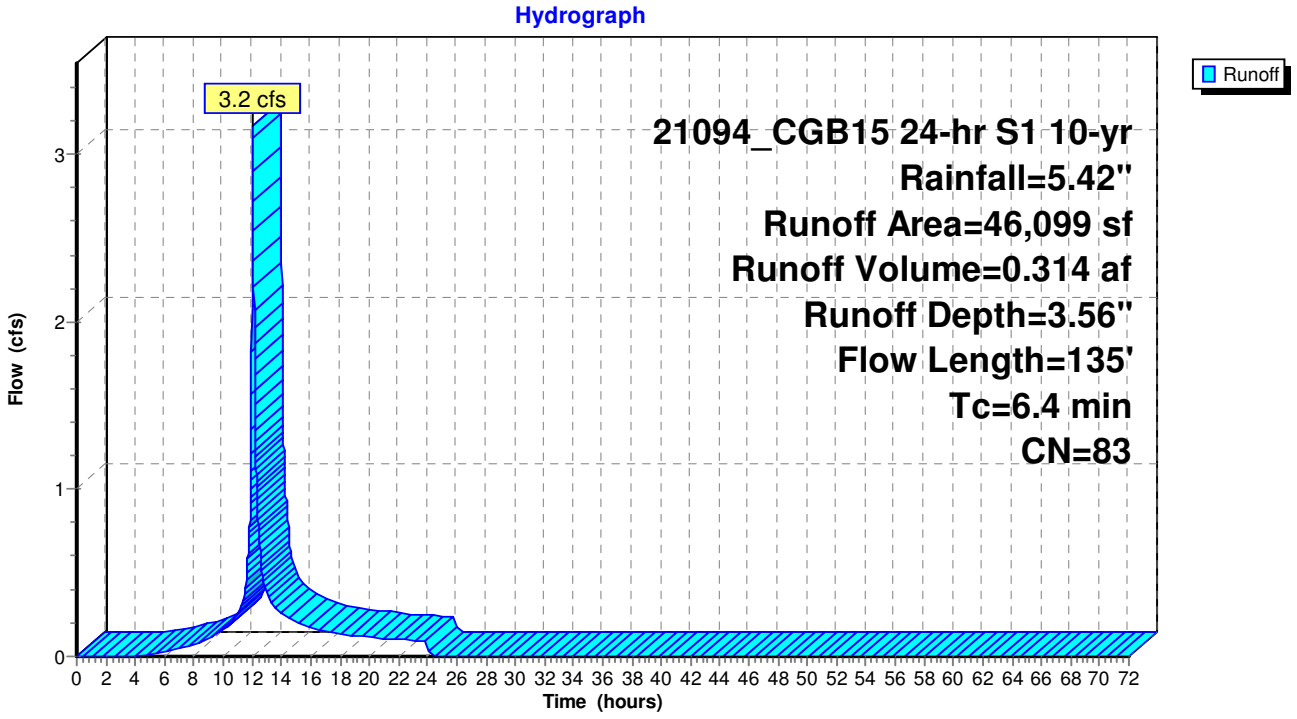
Runoff = 3.2 cfs @ 12.04 hrs, Volume= 0.314 af, Depth= 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
9,683	61	>75% Grass cover, Good, HSG B
5,044	98	Paved parking, HSG B
12	70	Woods, Good, HSG C
13,158	74	>75% Grass cover, Good, HSG C
18,202	98	Paved parking, HSG C
46,099	83	Weighted Average
22,853		49.57% Pervious Area
23,246		50.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	72	0.0760	0.20		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
0.3	63	0.0320	3.63		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
6.4	135	Total			

Subcatchment 11: 11



Summary for Subcatchment 12: 12

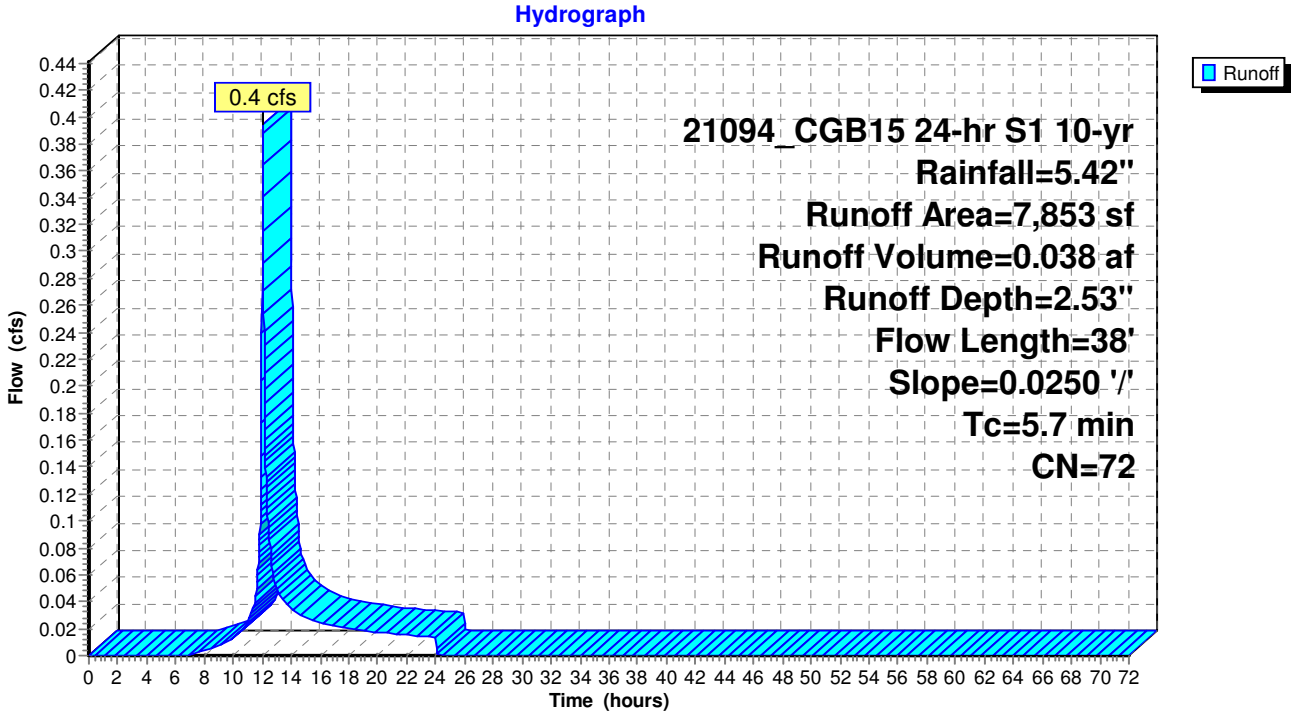
Runoff = 0.4 cfs @ 12.04 hrs, Volume= 0.038 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

	Area (sf)	CN	Description
	121	55	Woods, Good, HSG B
	1,159	61	>75% Grass cover, Good, HSG B
	1,276	70	Woods, Good, HSG C
	4,940	74	>75% Grass cover, Good, HSG C
*	357	98	Unconnected Impervious, HSG C
	7,853	72	Weighted Average
	7,496		95.45% Pervious Area
	357		4.55% Impervious Area
	357		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	38	0.0250	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"

Subcatchment 12: 12



Summary for Subcatchment 13: 13

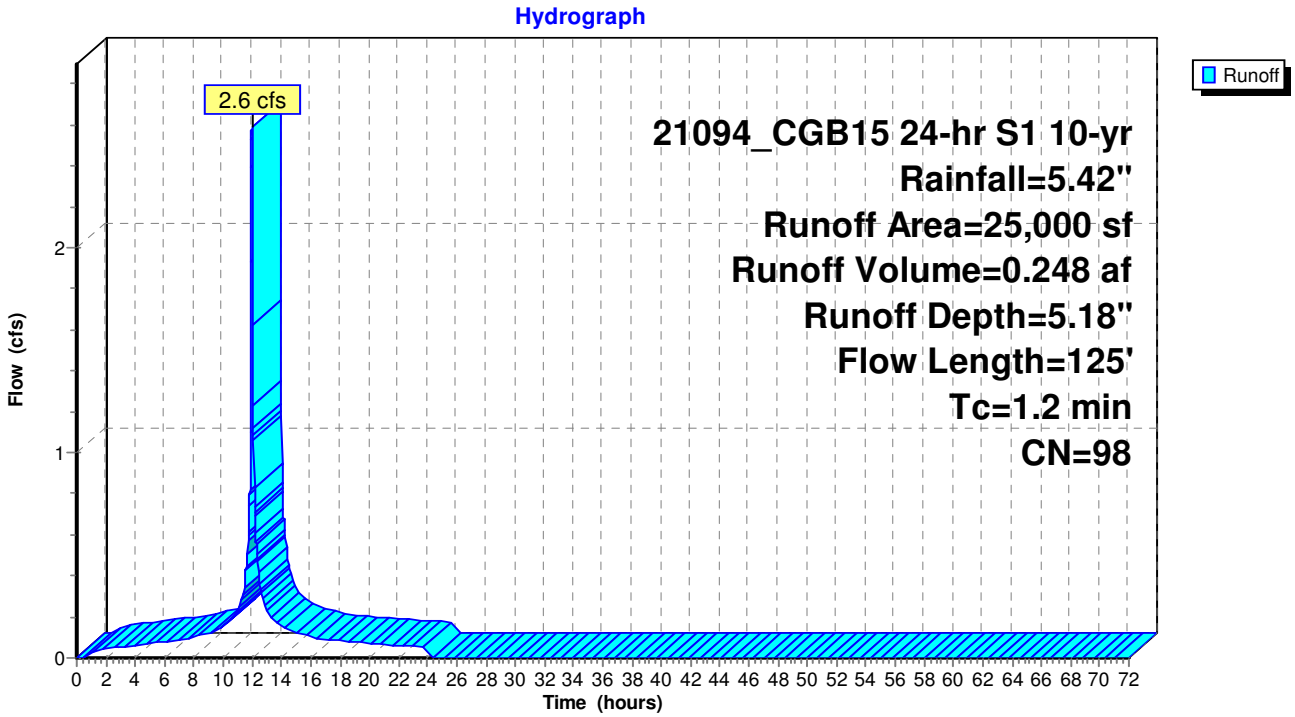
Runoff = 2.6 cfs @ 11.99 hrs, Volume= 0.248 af, Depth= 5.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
14,461	98	Roofs, HSG B
10,539	98	Roofs, HSG C
25,000	98	Weighted Average
25,000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	125		1.74		**Direct Entry, Roof Runoff**

Subcatchment 13: 13



Summary for Subcatchment 14: 14

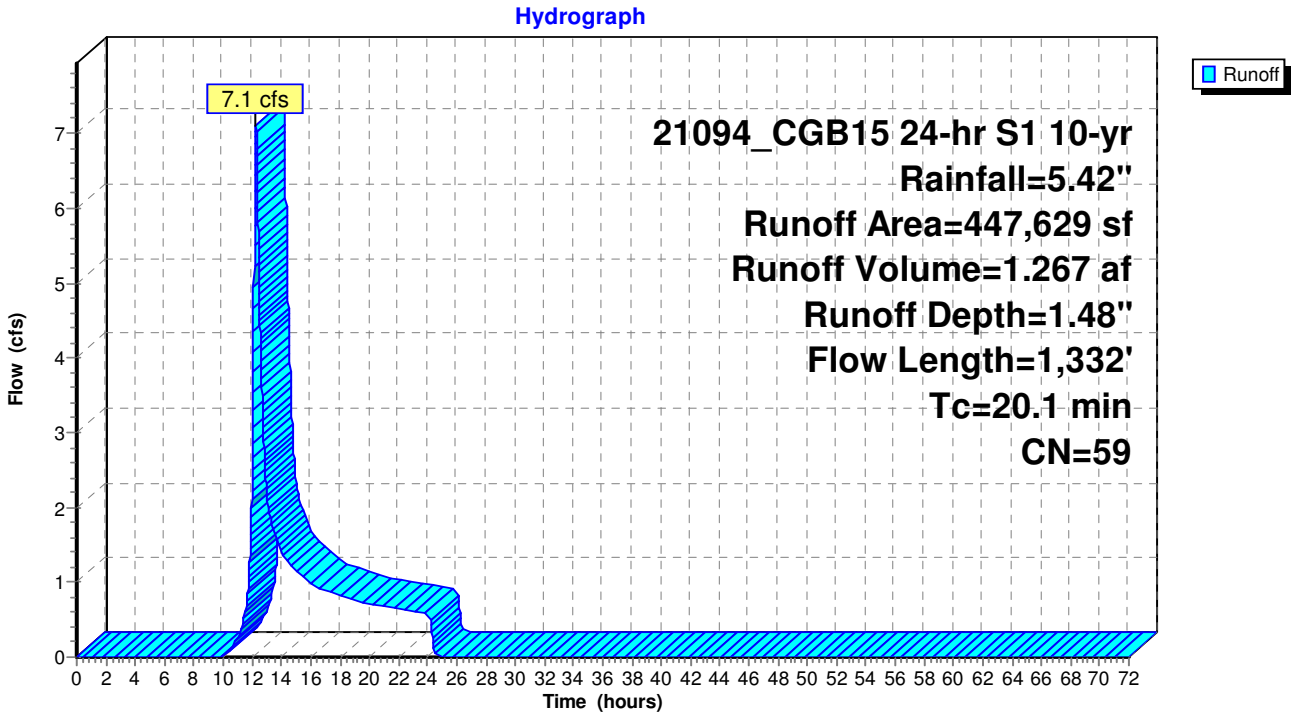
Runoff = 7.1 cfs @ 12.25 hrs, Volume= 1.267 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

	Area (sf)	CN	Description
	139,901	30	Woods, Good, HSG A
	22,006	39	>75% Grass cover, Good, HSG A
	29,286	98	Paved parking, HSG A
	30,807	98	Roofs, HSG A
	21,279	55	Woods, Good, HSG B
	4,461	61	>75% Grass cover, Good, HSG B
	162,713	70	Woods, Good, HSG C
	15,148	74	>75% Grass cover, Good, HSG C
*	428	98	Unconnected Impervious, HSG C
	21,600	77	Woods, Good, HSG D
	447,629	59	Weighted Average
	387,108		86.48% Pervious Area
	60,521		13.52% Impervious Area
	428		0.71% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	100	0.0950	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
3.4	275	0.0730	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	233	0.0350	2.64	35.20	**Parabolic Channel,** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.080 Earth, long dense weeds
0.0	40	0.0350	14.28	85.66	**Pipe Channel, BOX CULVERT** 48.0" x 18.0" Box Area= 6.0 sf Perim= 11.0' r= 0.55' n= 0.013 Concrete pipe, bends & connections
4.3	684	0.0350	2.64	35.20	**Parabolic Channel,** W=20.00' D=1.00' Area=13.3 sf Perim=20.1' n= 0.080 Earth, long dense weeds
20.1	1,332	Total			

Subcatchment 14: 14



Summary for Subcatchment 15: D

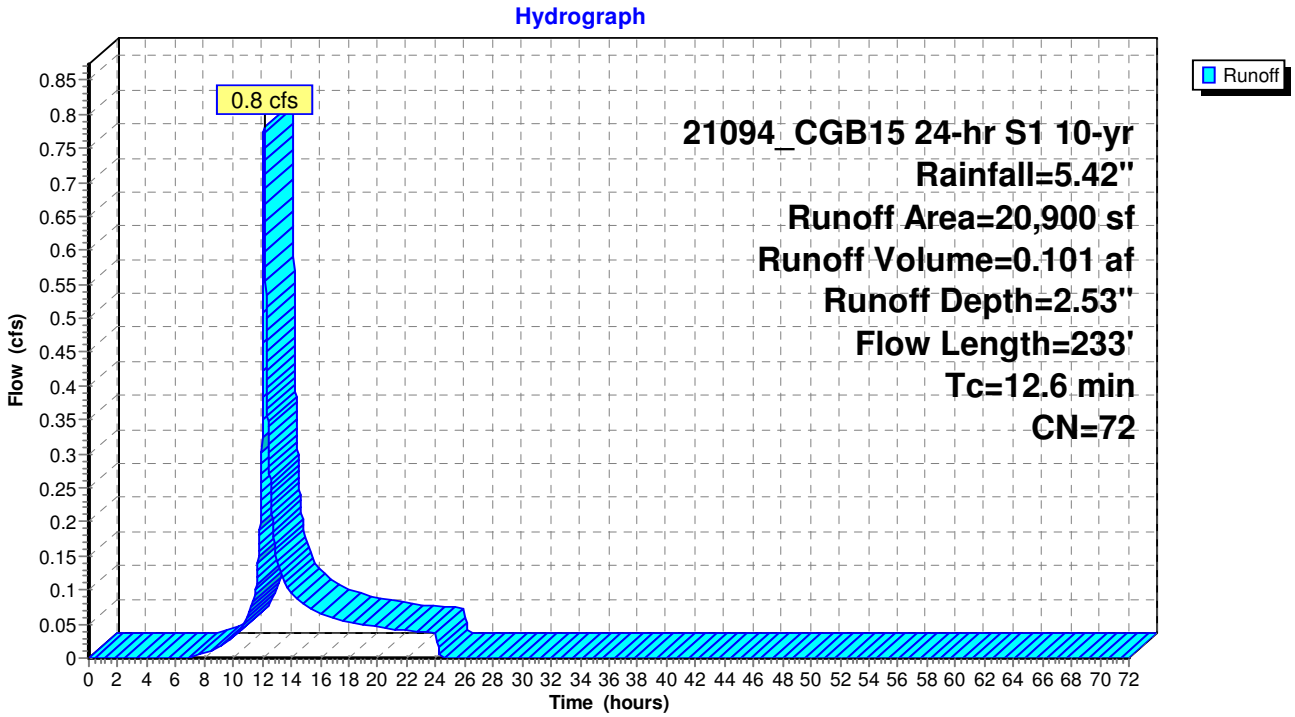
Runoff = 0.8 cfs @ 12.13 hrs, Volume= 0.101 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
13,720	70	Woods, Good, HSG C
7,180	77	Woods, Good, HSG D
20,900	72	Weighted Average
20,900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.5	100	0.0830	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
1.1	133	0.1690	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.6	233	Total			

Subcatchment 15: D



Summary for Subcatchment 16: E

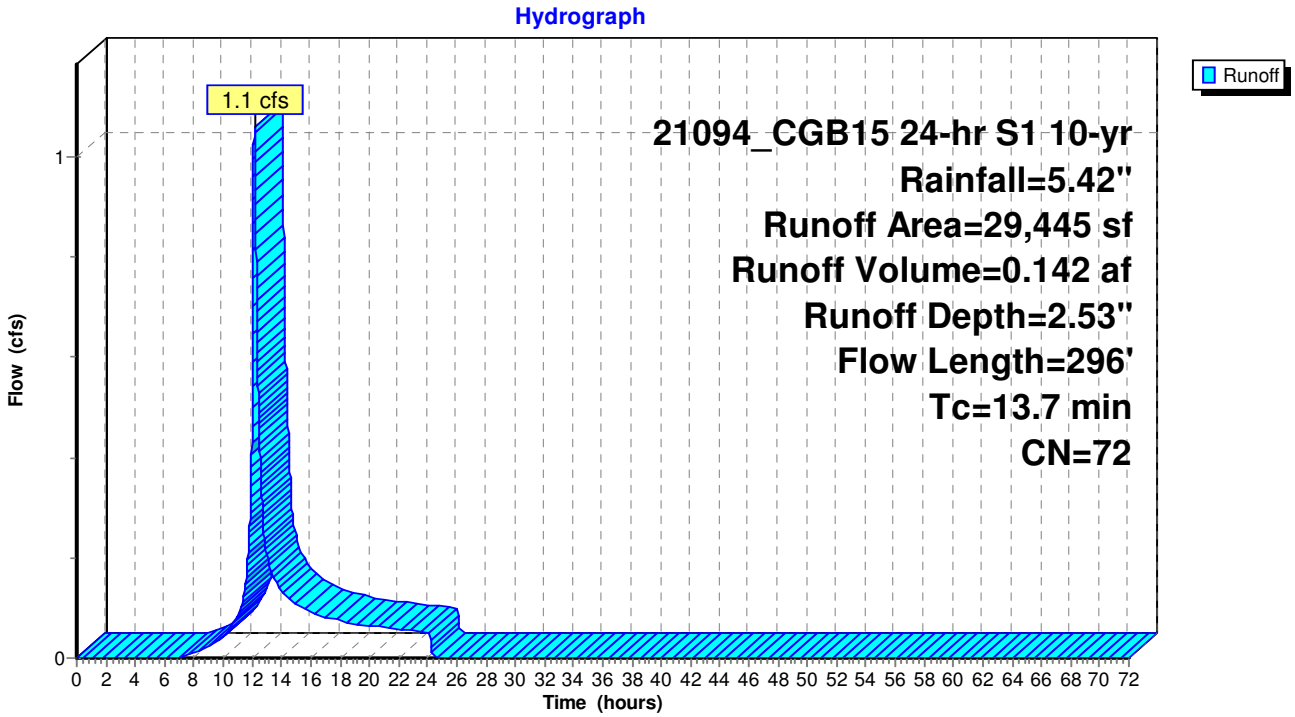
Runoff = 1.1 cfs @ 12.14 hrs, Volume= 0.142 af, Depth= 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
21,502	70	Woods, Good, HSG C
7,943	77	Woods, Good, HSG D
29,445	72	Weighted Average
29,445		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	100	0.0750	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
1.8	196	0.1330	1.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.7	296	Total			

Subcatchment 16: E



Summary for Subcatchment B: B

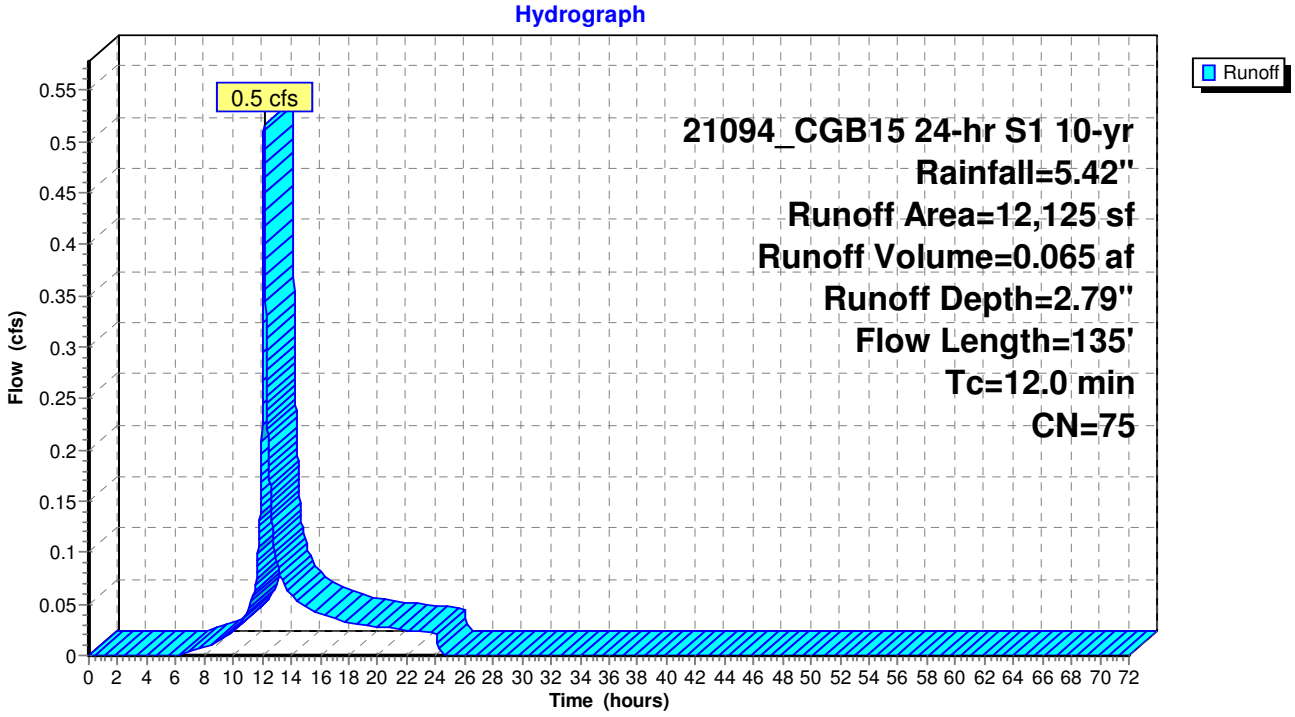
Runoff = 0.5 cfs @ 12.12 hrs, Volume= 0.065 af, Depth= 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
1,146	55	Woods, Good, HSG B
331	70	Woods, Good, HSG C
10,648	77	Woods, Good, HSG D
12,125	75	Weighted Average
12,125		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	100	0.0800	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
0.4	35	0.0860	1.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.0	135	Total			

Subcatchment B: B



Summary for Subcatchment C: C

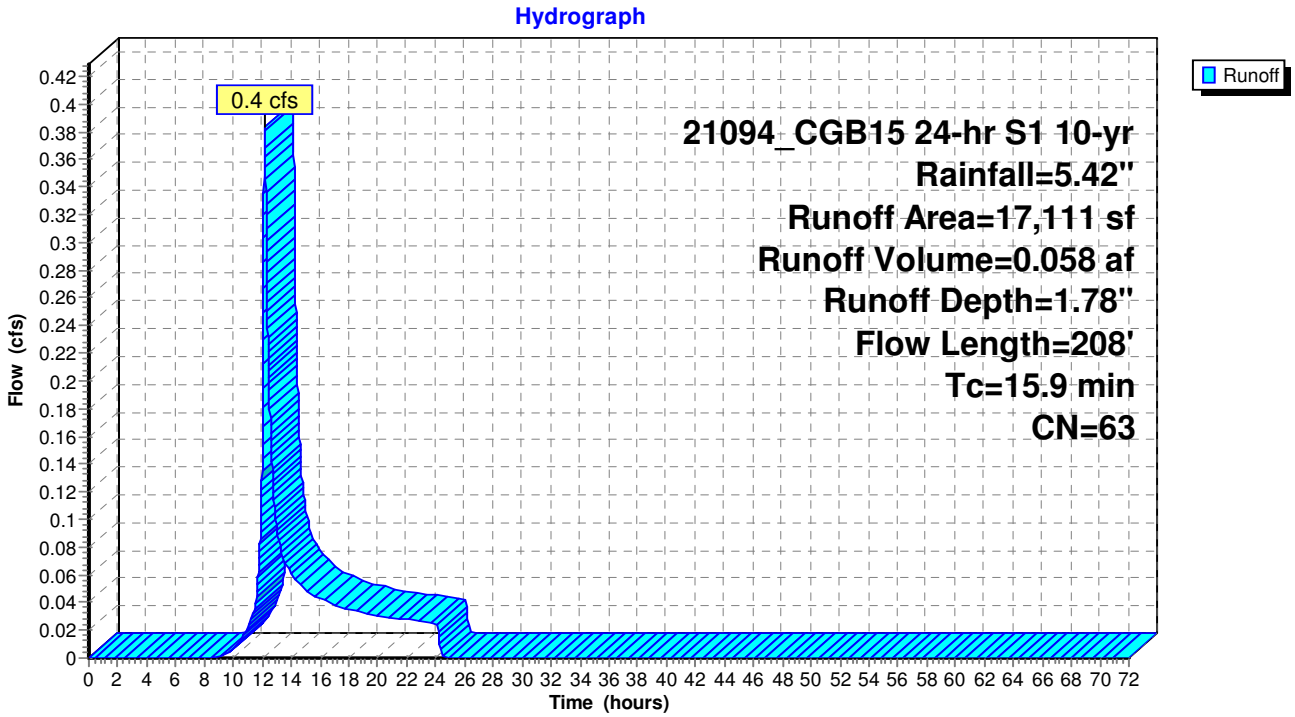
Runoff = 0.4 cfs @ 12.18 hrs, Volume= 0.058 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
21094_CGB15 24-hr S1 10-yr Rainfall=5.42"

Area (sf)	CN	Description
7,692	55	Woods, Good, HSG B
9,419	70	Woods, Good, HSG C
17,111	63	Weighted Average
17,111		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0550	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.60"
2.4	108	0.0230	0.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	208	Total			

Subcatchment C: C



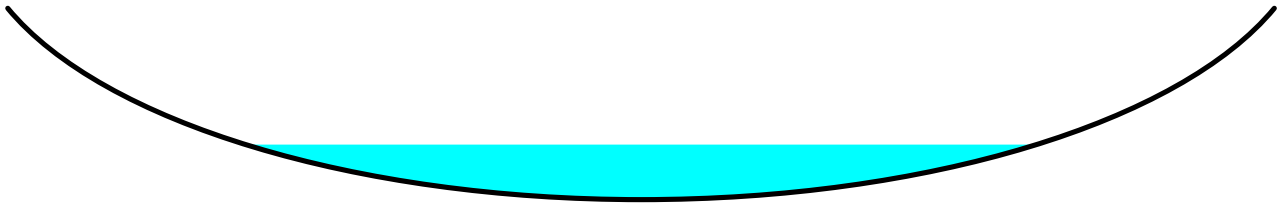
Summary for Reach R1: R1

Inflow Area = 3.205 ac, 71.52% Impervious, Inflow Depth = 4.24" for 10-yr event
Inflow = 2.0 cfs @ 12.53 hrs, Volume= 1.134 af
Outflow = 2.0 cfs @ 12.53 hrs, Volume= 1.134 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.98 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 0.57 fps, Avg. Travel Time= 0.6 min

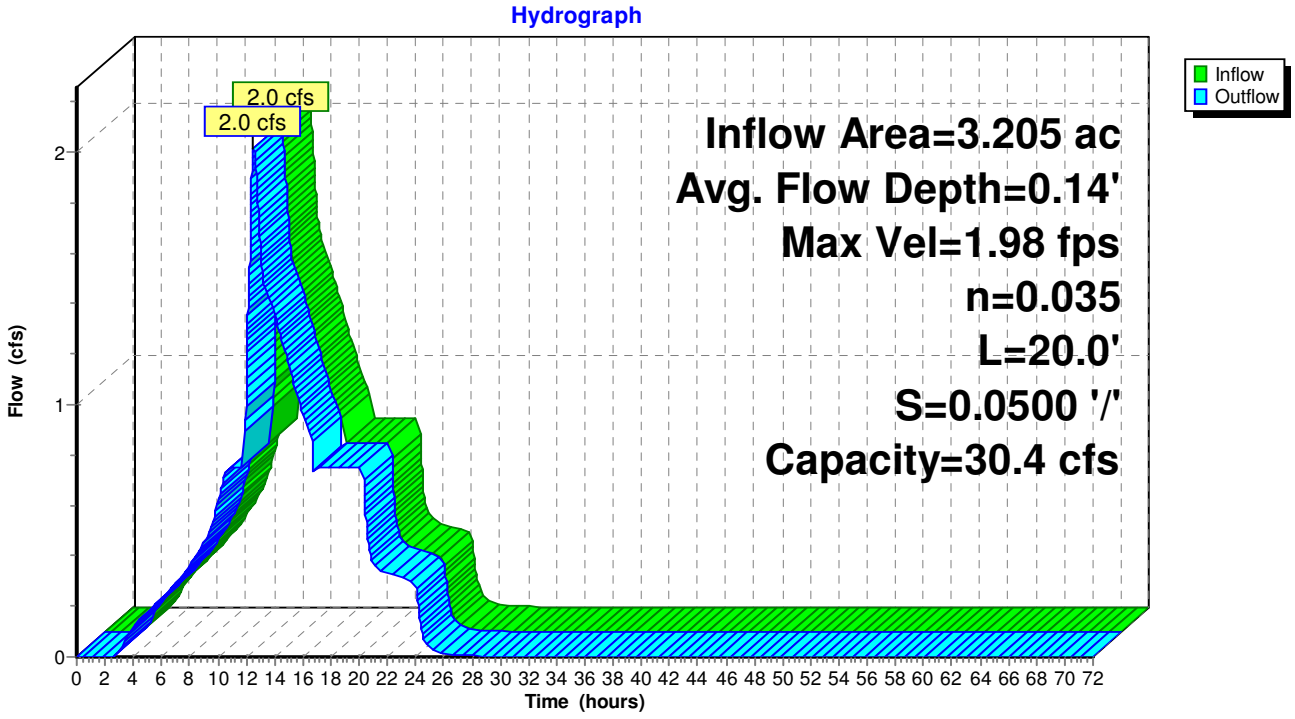
Peak Storage= 20 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 10.69'
Bank-Full Depth= 0.50' Flow Area= 6.7 sf, Capacity= 30.4 cfs

20.00' x 0.50' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 20.0' Slope= 0.0500 '/'
Inlet Invert= 135.00', Outlet Invert= 134.00'



‡

Reach R1: R1



Summary for Pond BR1: Bio-Retention 1

Inflow Area = 3.205 ac, 71.52% Impervious, Inflow Depth = 4.28" for 10-yr event
Inflow = 11.0 cfs @ 12.00 hrs, Volume= 1.143 af
Outflow = 2.0 cfs @ 12.53 hrs, Volume= 1.134 af, Atten= 82%, Lag= 31.4 min
Primary = 2.0 cfs @ 12.53 hrs, Volume= 1.134 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 144.35' @ 12.53 hrs Surf.Area= 6,722 sf Storage= 12,457 cf
Flood Elev= 145.60' Surf.Area= 12,445 sf Storage= 22,922 cf

Plug-Flow detention time= 88.1 min calculated for 1.133 af (99% of inflow)
Center-of-Mass det. time= 83.3 min (875.7 - 792.4)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	3,058 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	136.92'	19,864 cf	**Rain Garden (Irregular)** Listed below (Recalc)
		22,922 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
143.00	446	301.9	0	0	446
144.00	1,524	356.6	931	931	3,331
145.00	2,793	413.5	2,127	3,058	6,839

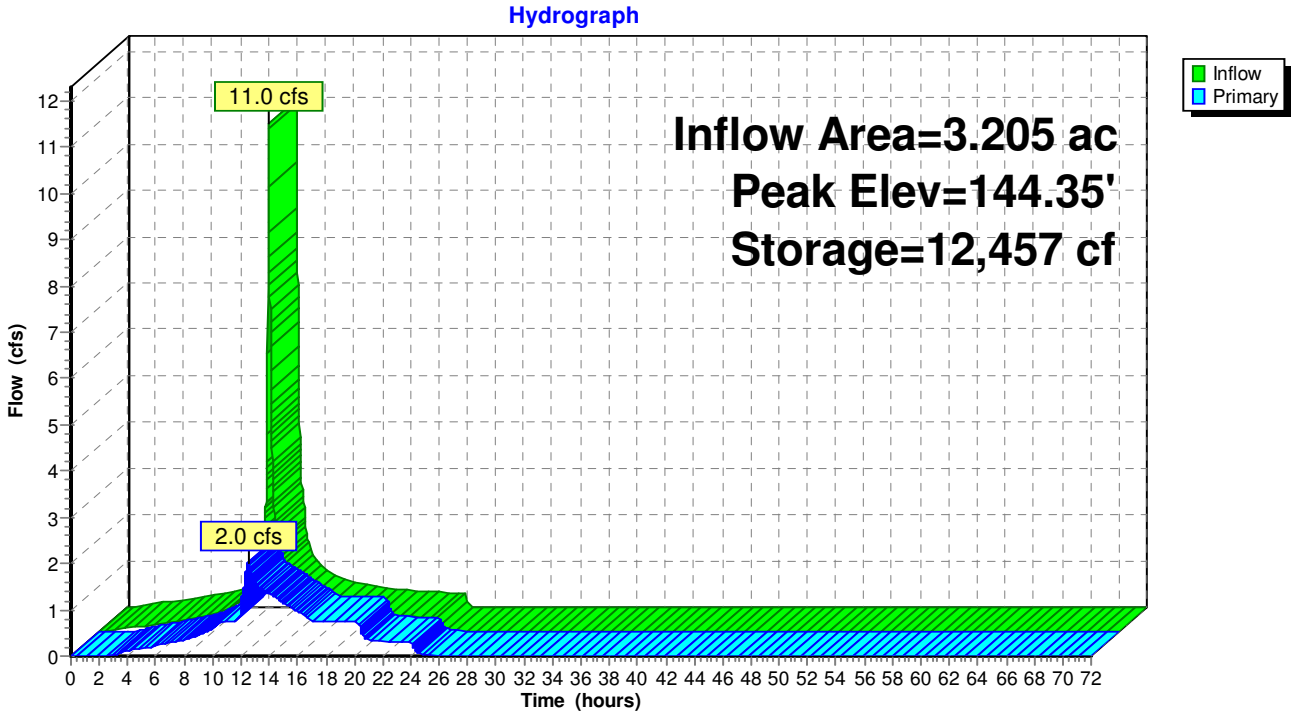
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
136.92	3,230	340.4	0.0	0	0	3,230
141.25	3,230	340.4	35.0	4,895	4,895	4,704
141.50	3,230	340.4	20.0	162	5,057	4,789
143.00	3,230	340.4	10.0	485	5,541	5,300
144.00	4,380	387.4	100.0	3,790	9,331	8,046
144.17	4,579	390.6	100.0	761	10,093	8,255
145.00	5,654	425.1	100.0	4,239	14,332	10,520
145.01	8,862	532.2	100.0	72	14,404	18,678
145.60	9,652	542.7	100.0	5,460	19,864	19,631

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.00' S= 0.0667 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	137.25'	**12.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.25' / 137.25' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	136.92'	**10.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	144.20'	**30.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	144.45'	**11.0" W x 6.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	145.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=2.0 cfs @ 12.53 hrs HW=144.35' TW=135.14' (Dynamic Tailwater)
- **1=Culvert** (Passes 2.0 cfs of 16.4 cfs potential flow)
  - **2=Culvert** (Passes 1.6 cfs of 6.4 cfs potential flow)
    - **3=Exfiltration** (Exfiltration Controls 1.6 cfs)
  - **4=Orifice/Grate** (Orifice Controls 0.5 cfs @ 1.23 fps)
  - **5=Orifice/Grate** (Controls 0.0 cfs)
  - **6=Orifice/Grate** (Controls 0.0 cfs)

Pond BR1: Bio-Retention 1



Summary for Pond CB1: CB1

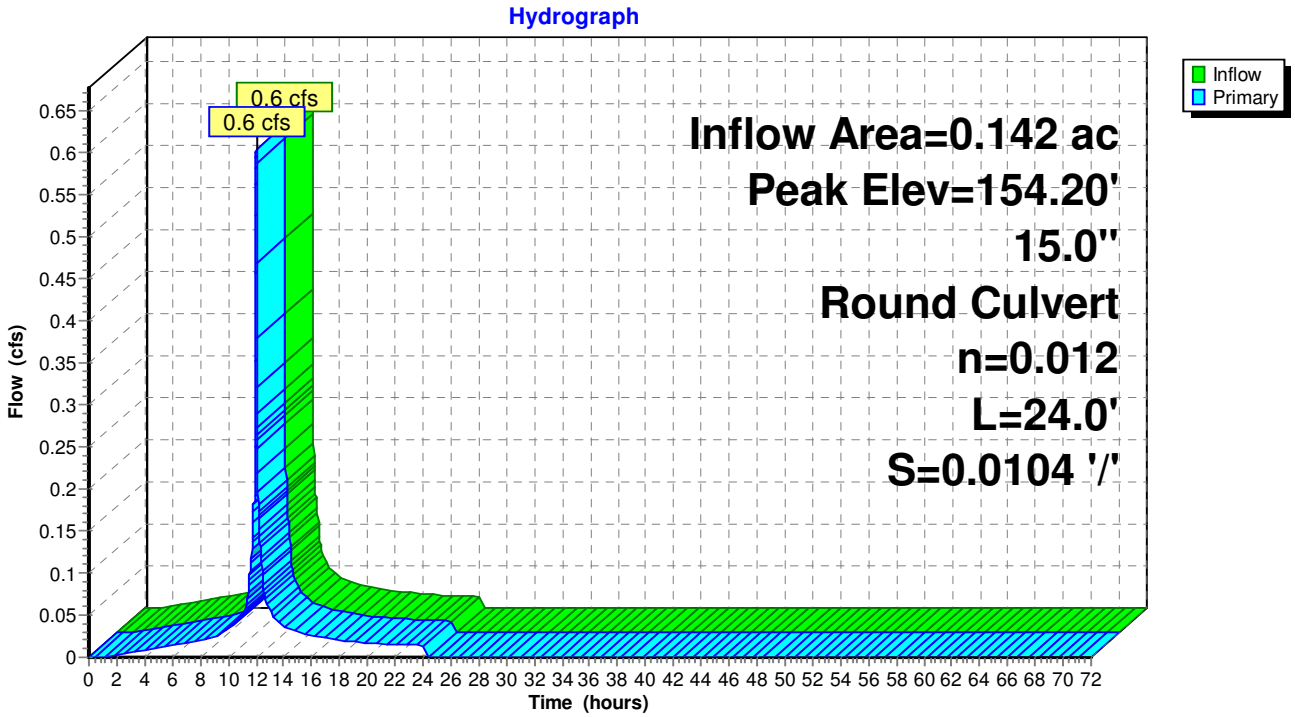
Inflow Area = 0.142 ac, 85.47% Impervious, Inflow Depth = 4.61" for 10-yr event
Inflow = 0.6 cfs @ 12.00 hrs, Volume= 0.054 af
Outflow = 0.6 cfs @ 12.00 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.6 cfs @ 12.00 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 154.20' @ 12.01 hrs
Flood Elev= 158.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	153.75'	**15.0" Round Culvert** L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 153.75' / 153.50' S= 0.0104 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=0.6 cfs @ 12.00 hrs HW=154.20' TW=154.00' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.6 cfs @ 2.27 fps)

Pond CB1: CB1



Summary for Pond CB2: CB2

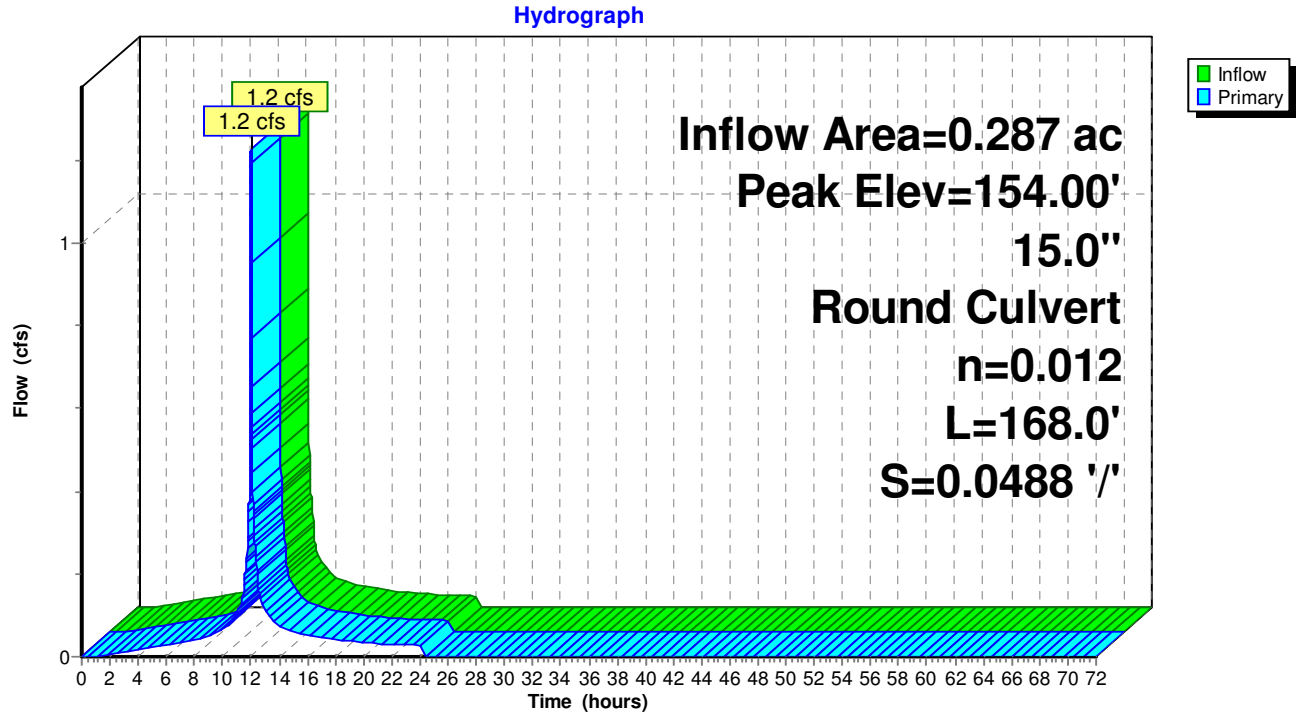
Inflow Area = 0.287 ac, 85.31% Impervious, Inflow Depth = 4.61" for 10-yr event
Inflow = 1.2 cfs @ 12.00 hrs, Volume= 0.110 af
Outflow = 1.2 cfs @ 12.00 hrs, Volume= 0.110 af, Atten= 0%, Lag= 0.0 min
Primary = 1.2 cfs @ 12.00 hrs, Volume= 0.110 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 154.00' @ 12.00 hrs
Flood Elev= 158.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	153.40'	**15.0" Round Culvert** L= 168.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 153.40' / 145.20' S= 0.0488 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.2 cfs @ 12.00 hrs HW=154.00' TW=146.10' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.2 cfs @ 2.09 fps)

Pond CB2: CB2



Summary for Pond CB3: CB3

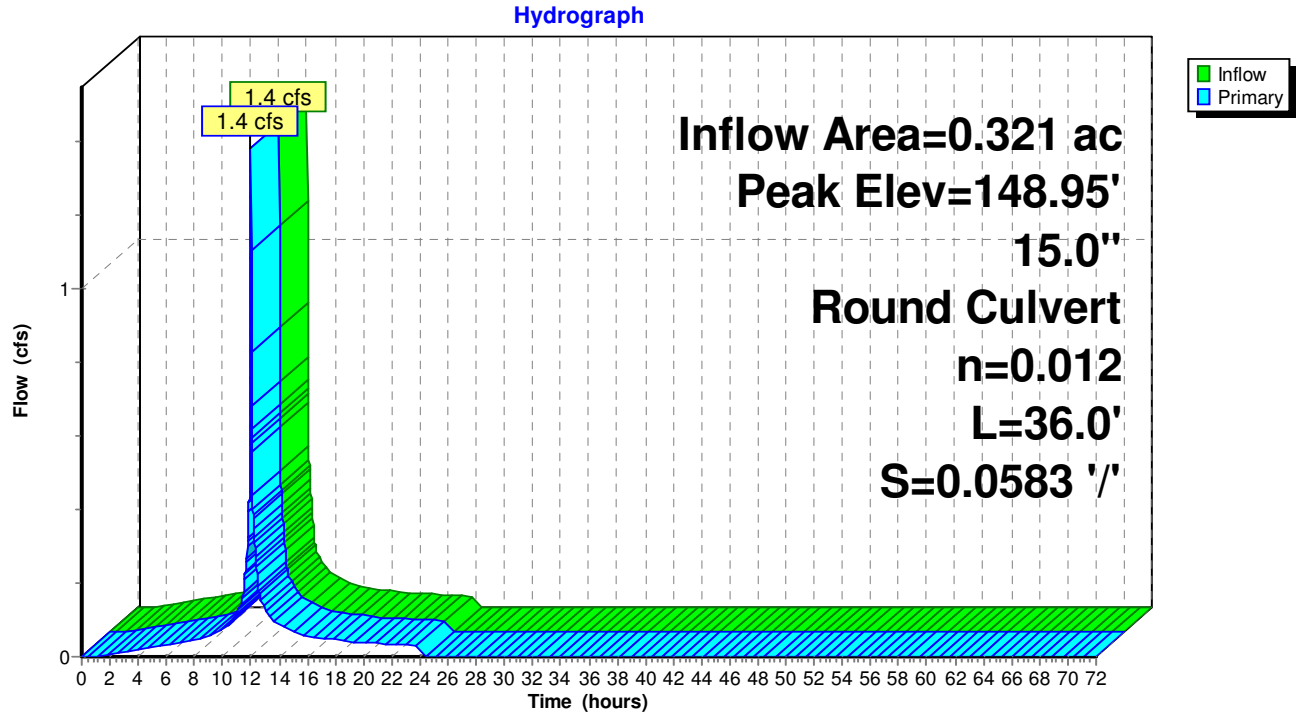
Inflow Area = 0.321 ac, 80.74% Impervious, Inflow Depth = 4.61" for 10-yr event
Inflow = 1.4 cfs @ 12.00 hrs, Volume= 0.123 af
Outflow = 1.4 cfs @ 12.00 hrs, Volume= 0.123 af, Atten= 0%, Lag= 0.0 min
Primary = 1.4 cfs @ 12.00 hrs, Volume= 0.123 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 148.95' @ 12.00 hrs
Flood Elev= 151.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	148.30'	**15.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 148.30' / 146.20' S= 0.0583 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.4 cfs @ 12.00 hrs HW=148.95' TW=146.10' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.4 cfs @ 2.16 fps)

Pond CB3: CB3



Summary for Pond CB4: CB4

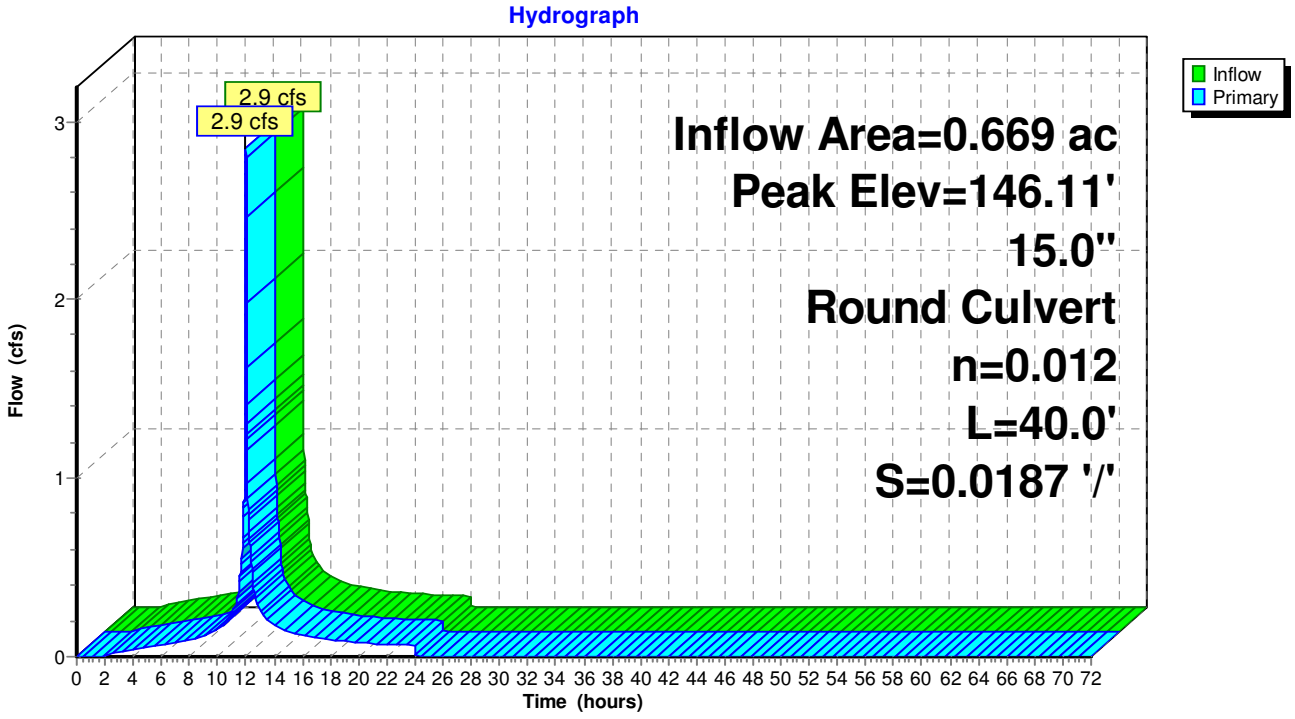
Inflow Area = 0.669 ac, 81.09% Impervious, Inflow Depth = 4.57" for 10-yr event
Inflow = 2.9 cfs @ 12.00 hrs, Volume= 0.255 af
Outflow = 2.9 cfs @ 12.00 hrs, Volume= 0.255 af, Atten= 0%, Lag= 0.0 min
Primary = 2.9 cfs @ 12.00 hrs, Volume= 0.255 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 146.11' @ 12.00 hrs
Flood Elev= 149.45'

Device	Routing	Invert	Outlet Devices
#1	Primary	145.10'	**15.0" Round Culvert** L= 40.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 145.10' / 144.35' S= 0.0187 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=2.8 cfs @ 12.00 hrs HW=146.10' TW=145.52' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.8 cfs @ 2.69 fps)

Pond CB4: CB4



Summary for Pond CB5: CB5

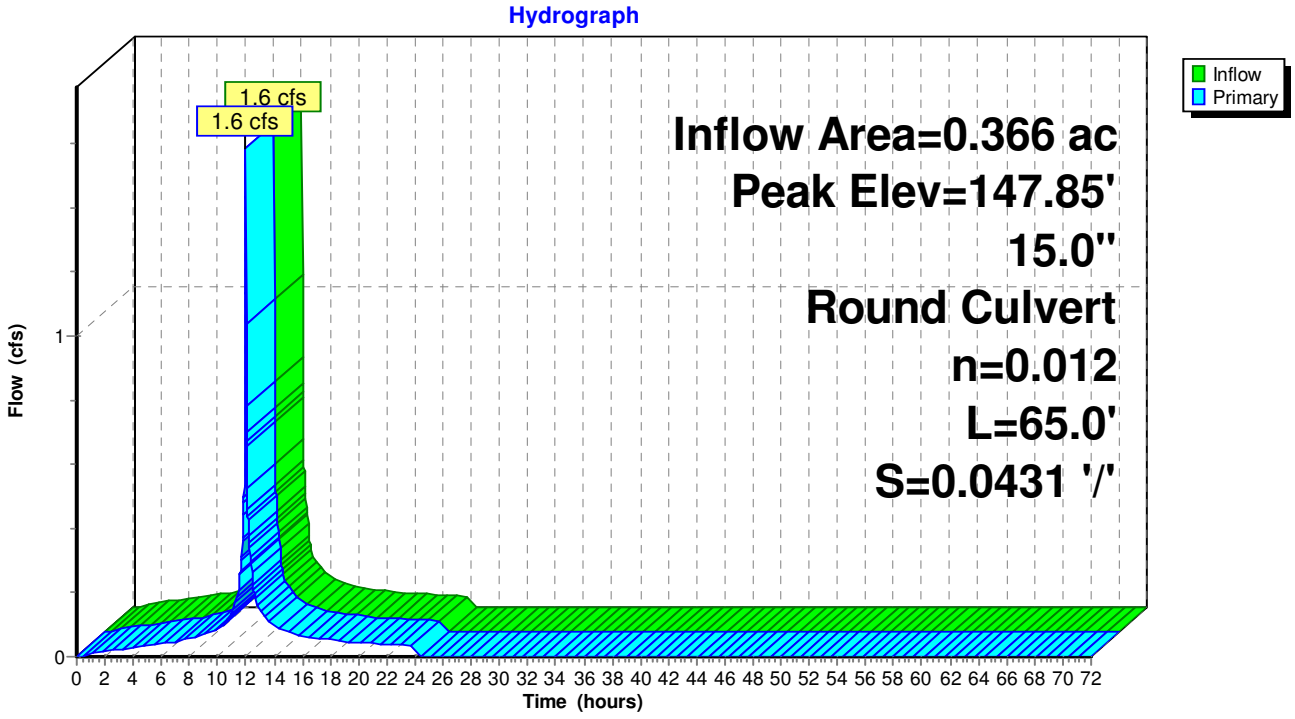
Inflow Area = 0.366 ac, 88.71% Impervious, Inflow Depth = 4.81" for 10-yr event
Inflow = 1.6 cfs @ 12.00 hrs, Volume= 0.147 af
Outflow = 1.6 cfs @ 12.00 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min
Primary = 1.6 cfs @ 12.00 hrs, Volume= 0.147 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 147.85' @ 12.00 hrs
Flood Elev= 151.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	147.15'	**15.0" Round Culvert** L= 65.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 147.15' / 144.35' S= 0.0431 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.6 cfs @ 12.00 hrs HW=147.85' TW=145.52' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.6 cfs @ 2.25 fps)

Pond CB5: CB5



Summary for Pond CB6: CB6

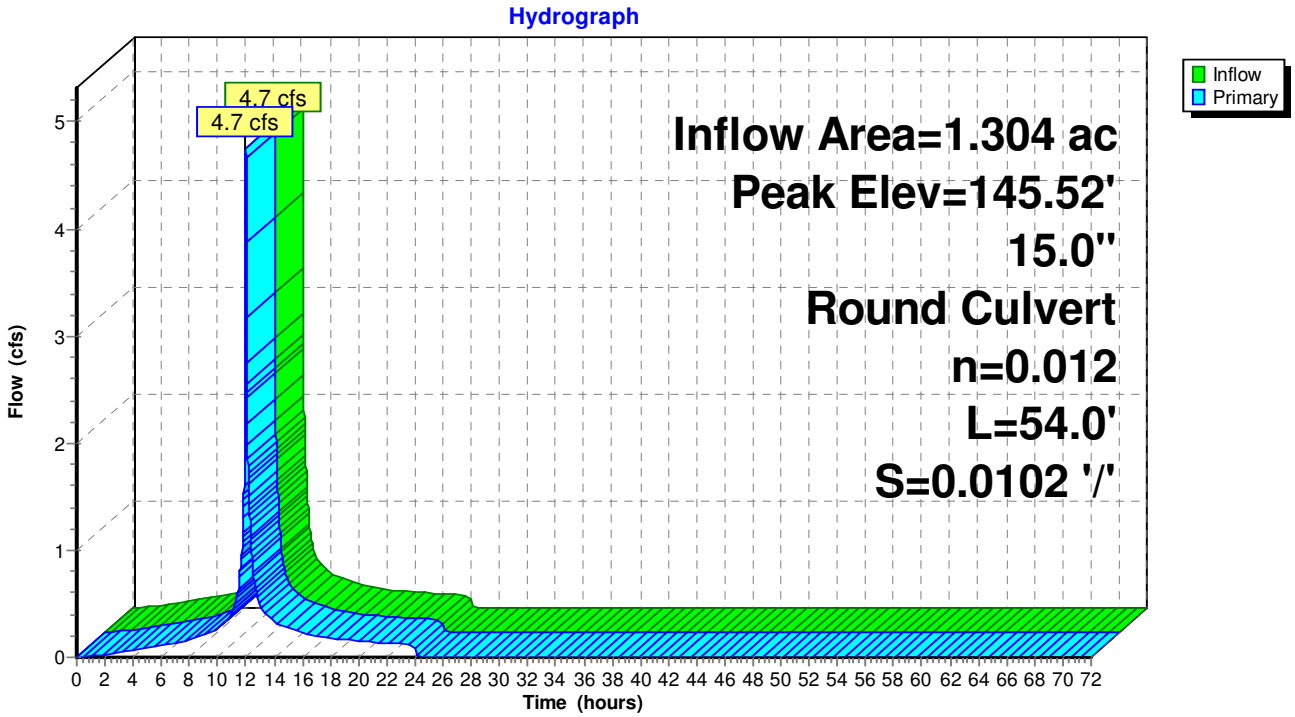
Inflow Area = 1.304 ac, 71.41% Impervious, Inflow Depth = 4.33" for 10-yr event
Inflow = 4.7 cfs @ 12.00 hrs, Volume= 0.470 af
Outflow = 4.7 cfs @ 12.00 hrs, Volume= 0.470 af, Atten= 0%, Lag= 0.0 min
Primary = 4.7 cfs @ 12.00 hrs, Volume= 0.470 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 145.52' @ 12.00 hrs
Flood Elev= 148.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	144.25'	**15.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 144.25' / 143.70' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=4.7 cfs @ 12.00 hrs HW=145.52' TW=143.46' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 4.7 cfs @ 3.85 fps)

Pond CB6: CB6



Summary for Pond CB7: CB7

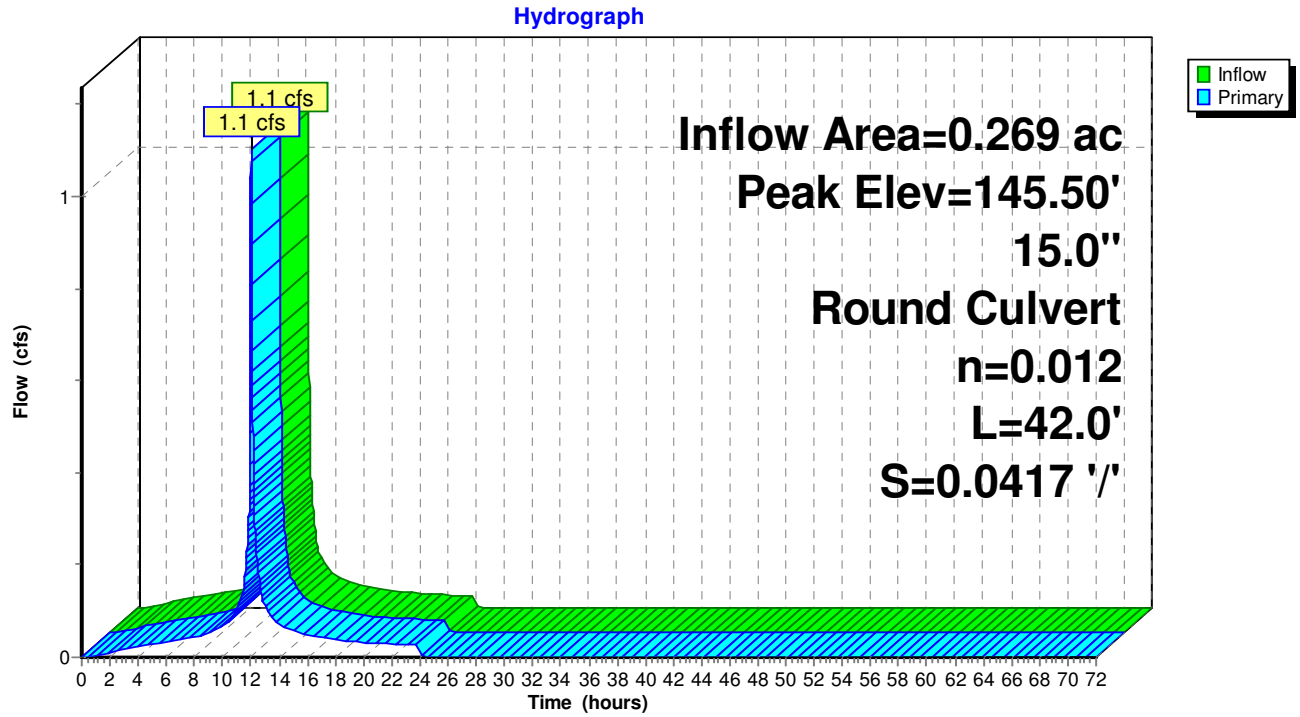
Inflow Area = 0.269 ac, 94.27% Impervious, Inflow Depth = 4.95" for 10-yr event
Inflow = 1.1 cfs @ 12.02 hrs, Volume= 0.111 af
Outflow = 1.1 cfs @ 12.02 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min
Primary = 1.1 cfs @ 12.02 hrs, Volume= 0.111 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 145.50' @ 12.02 hrs
Flood Elev= 149.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	145.00'	**15.0" Round Culvert** L= 42.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 145.00' / 143.25' S= 0.0417 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.1 cfs @ 12.02 hrs HW=145.50' TW=143.64' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.1 cfs @ 2.40 fps)

Pond CB7: CB7



Summary for Pond RD1: RD1

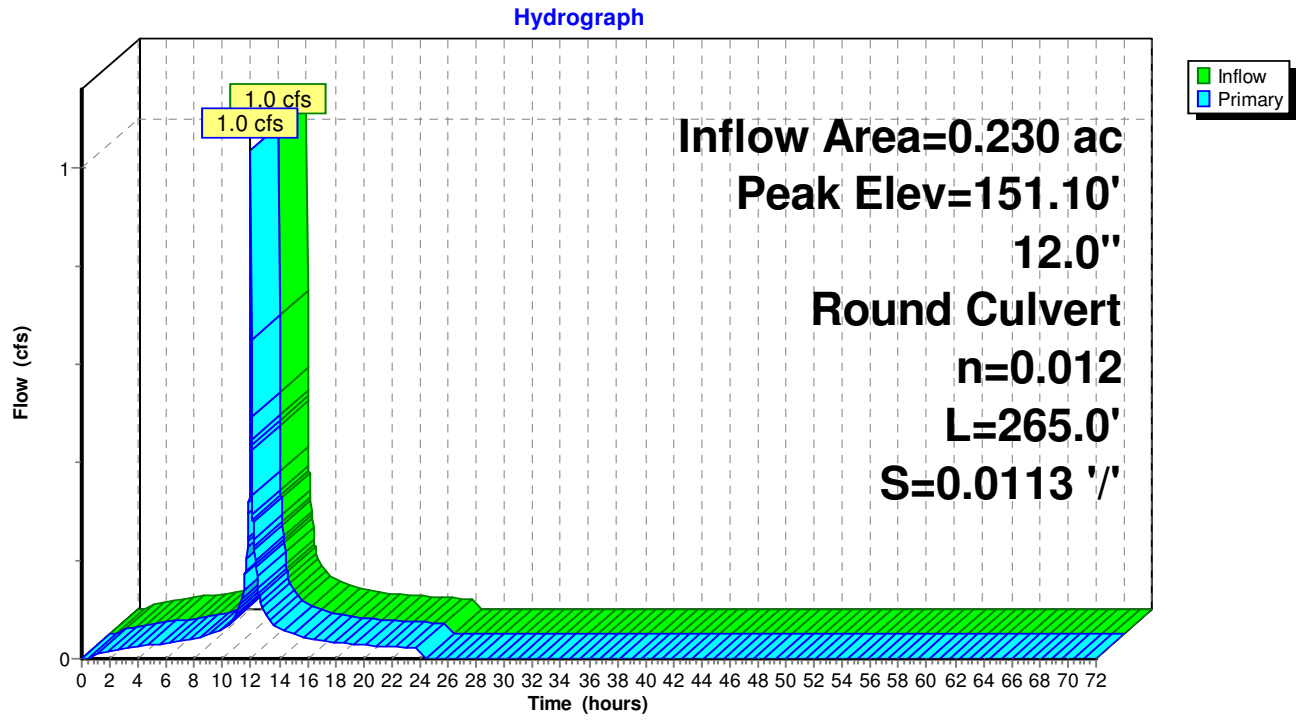
Inflow Area = 0.230 ac,100.00% Impervious, Inflow Depth = 5.18" for 10-yr event
Inflow = 1.0 cfs @ 11.99 hrs, Volume= 0.099 af
Outflow = 1.0 cfs @ 11.99 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min
Primary = 1.0 cfs @ 11.99 hrs, Volume= 0.099 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 151.10' @ 11.99 hrs
Flood Elev= 155.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	150.50'	**12.0" Round Culvert** L= 265.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 150.50' / 147.50' S= 0.0113 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.0 cfs @ 11.99 hrs HW=151.10' TW=147.85' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.0 cfs @ 2.09 fps)

Pond RD1: RD1



Summary for Pond RD2: RD2

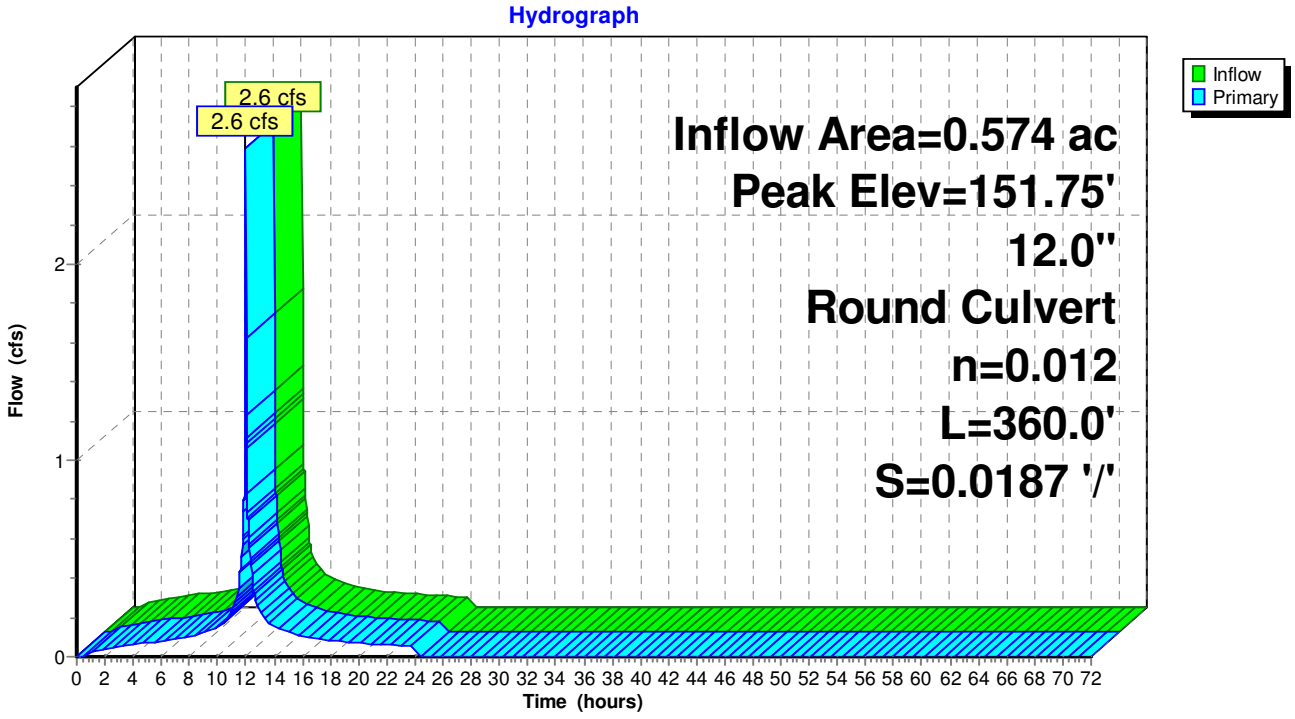
Inflow Area = 0.574 ac,100.00% Impervious, Inflow Depth = 5.18" for 10-yr event
Inflow = 2.6 cfs @ 11.99 hrs, Volume= 0.248 af
Outflow = 2.6 cfs @ 11.99 hrs, Volume= 0.248 af, Atten= 0%, Lag= 0.0 min
Primary = 2.6 cfs @ 11.99 hrs, Volume= 0.248 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 151.75' @ 11.99 hrs
Flood Elev= 155.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	150.50'	**12.0" Round Culvert** L= 360.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 150.50' / 143.75' S= 0.0187 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=2.6 cfs @ 11.99 hrs HW=151.75' TW=143.41' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.6 cfs @ 3.29 fps)

Pond RD2: RD2

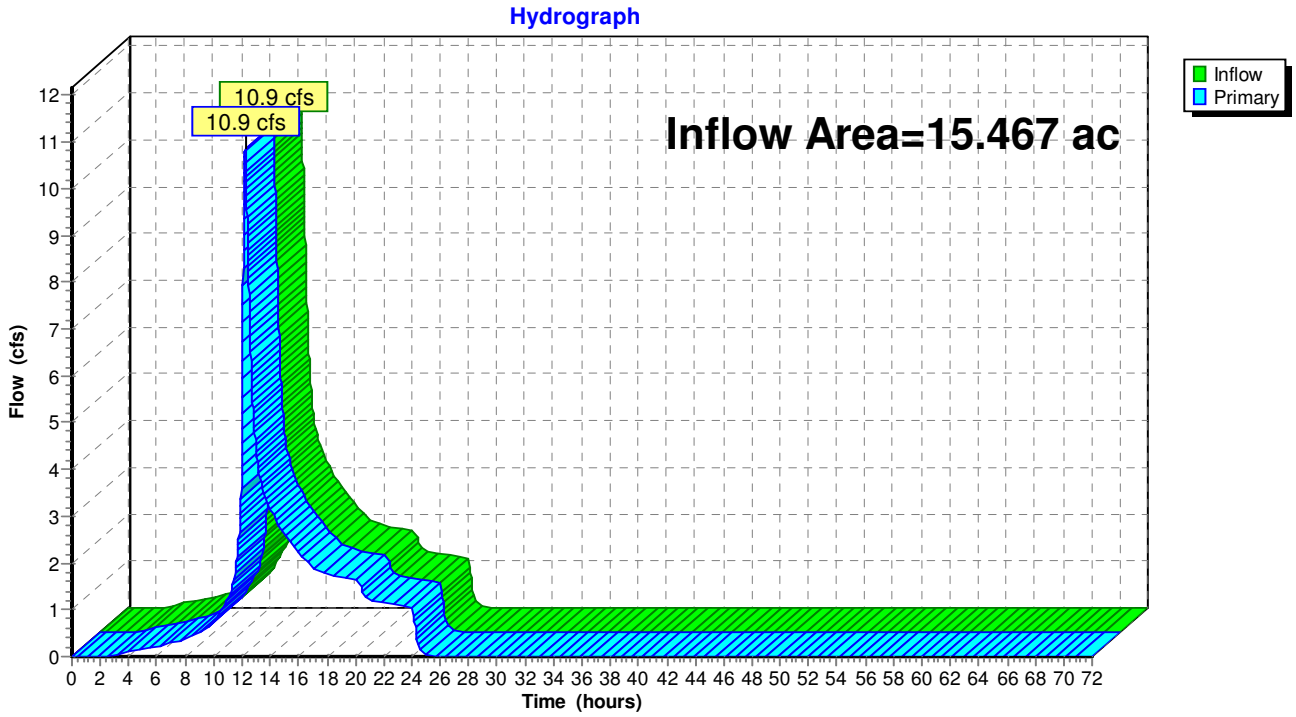


Summary for Link A: A

Inflow Area = 15.467 ac, 23.86% Impervious, Inflow Depth = 2.18" for 10-yr event
Inflow = 10.9 cfs @ 12.21 hrs, Volume= 2.804 af
Primary = 10.9 cfs @ 12.21 hrs, Volume= 2.804 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link A: A



A – 2

NODE LISTING – 25-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 1: 1 Runoff Area=10,503 sf 0.00% Impervious Runoff Depth=3.39"
Flow Length=90' Slope=0.0770 '/' Tc=10.9 min CN=69 Runoff=0.5 cfs 0.068 af

Subcatchment 2: 2 Runoff Area=17,817 sf 0.34% Impervious Runoff Depth=3.39"
Flow Length=136' Tc=10.4 min CN=69 Runoff=0.9 cfs 0.116 af

Subcatchment 3: 3 Runoff Area=11,703 sf 94.27% Impervious Runoff Depth=6.37"
Flow Length=101' Tc=4.8 min CN=96 Runoff=1.3 cfs 0.143 af

Subcatchment 4: 4 Runoff Area=10,000 sf 100.00% Impervious Runoff Depth=6.61"
Flow Length=80' Tc=1.2 min CN=98 Runoff=1.2 cfs 0.126 af

Subcatchment 5: 5 Runoff Area=5,946 sf 69.71% Impervious Runoff Depth=5.56"
Flow Length=56' Tc=1.4 min CN=89 Runoff=0.7 cfs 0.063 af

Subcatchment 6: 6 Runoff Area=6,167 sf 85.47% Impervious Runoff Depth=6.02"
Flow Length=301' Tc=2.4 min CN=93 Runoff=0.7 cfs 0.071 af

Subcatchment 7: 7 Runoff Area=6,350 sf 85.15% Impervious Runoff Depth=6.02"
Flow Length=305' Tc=2.4 min CN=93 Runoff=0.7 cfs 0.073 af

Subcatchment 8: 8 Runoff Area=13,970 sf 80.74% Impervious Runoff Depth=6.02"
Flow Length=135' Tc=1.7 min CN=93 Runoff=1.6 cfs 0.161 af

Subcatchment 9: 9 Runoff Area=2,654 sf 62.96% Impervious Runoff Depth=5.56"
Flow Length=33' Tc=2.7 min CN=89 Runoff=0.3 cfs 0.028 af

Subcatchment 10: 10 Runoff Area=11,702 sf 23.75% Impervious Runoff Depth=4.34"
Flow Length=121' Tc=11.3 min CN=78 Runoff=0.7 cfs 0.097 af

Subcatchment 11: 11 Runoff Area=46,099 sf 50.43% Impervious Runoff Depth=4.89"
Flow Length=135' Tc=6.4 min CN=83 Runoff=4.0 cfs 0.431 af

Subcatchment 12: 12 Runoff Area=7,853 sf 4.55% Impervious Runoff Depth=3.70"
Flow Length=38' Slope=0.0250 '/' Tc=5.7 min CN=72 Runoff=0.5 cfs 0.056 af

Subcatchment 13: 13 Runoff Area=25,000 sf 100.00% Impervious Runoff Depth=6.61"
Flow Length=125' Tc=1.2 min CN=98 Runoff=3.0 cfs 0.316 af

Subcatchment 14: 14 Runoff Area=447,629 sf 13.52% Impervious Runoff Depth=2.40"
Flow Length=1,332' Tc=20.1 min CN=59 Runoff=11.6 cfs 2.057 af

Subcatchment 15: D Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=3.70"
Flow Length=233' Tc=12.6 min CN=72 Runoff=1.1 cfs 0.148 af

Subcatchment 16: E Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=3.70"
Flow Length=296' Tc=13.7 min CN=72 Runoff=1.5 cfs 0.209 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=4.02"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.7 cfs 0.093 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=2.79"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.6 cfs 0.091 af

Reach R1: R1 Avg. Flow Depth=0.19' Max Vel=2.42 fps Inflow=3.9 cfs 1.501 af
n=0.035 L=20.0' S=0.0500 '/' Capacity=30.4 cfs Outflow=3.9 cfs 1.501 af

Pond BR1: Bio-Retention 1 Peak Elev=144.68' Storage=14,829 cf Inflow=13.3 cfs 1.510 af
Outflow=3.9 cfs 1.501 af

Pond CB1: CB1 Peak Elev=154.26' Inflow=0.7 cfs 0.071 af
15.0" Round Culvert n=0.012 L=24.0' S=0.0104 '/' Outflow=0.7 cfs 0.071 af

Pond CB2: CB2 Peak Elev=154.07' Inflow=1.5 cfs 0.144 af
15.0" Round Culvert n=0.012 L=168.0' S=0.0488 '/' Outflow=1.5 cfs 0.144 af

Pond CB3: CB3 Peak Elev=149.01' Inflow=1.6 cfs 0.161 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0583 '/' Outflow=1.6 cfs 0.161 af

Pond CB4: CB4 Peak Elev=146.33' Inflow=3.4 cfs 0.333 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0187 '/' Outflow=3.4 cfs 0.333 af

Pond CB5: CB5 Peak Elev=147.92' Inflow=1.9 cfs 0.190 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0431 '/' Outflow=1.9 cfs 0.190 af

Pond CB6: CB6 Peak Elev=145.81' Inflow=5.7 cfs 0.620 af
15.0" Round Culvert n=0.012 L=54.0' S=0.0102 '/' Outflow=5.7 cfs 0.620 af

Pond CB7: CB7 Peak Elev=145.55' Inflow=1.3 cfs 0.143 af
15.0" Round Culvert n=0.012 L=42.0' S=0.0417 '/' Outflow=1.3 cfs 0.143 af

Pond RD1: RD1 Peak Elev=151.17' Inflow=1.2 cfs 0.126 af
12.0" Round Culvert n=0.012 L=265.0' S=0.0113 '/' Outflow=1.2 cfs 0.126 af

Pond RD2: RD2 Peak Elev=152.04' Inflow=3.0 cfs 0.316 af
12.0" Round Culvert n=0.012 L=360.0' S=0.0187 '/' Outflow=3.0 cfs 0.316 af

Link A: A Inflow=18.7 cfs 4.154 af
Primary=18.7 cfs 4.154 af

Total Runoff Area = 16.138 ac Runoff Volume = 4.348 af Average Runoff Depth = 3.23"
77.13% Pervious = 12.447 ac 22.87% Impervious = 3.691 ac

A – 2

NODE LISTING – 50-YR

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 1: 1 Runoff Area=10,503 sf 0.00% Impervious Runoff Depth=4.50"
Flow Length=90' Slope=0.0770 '/' Tc=10.9 min CN=69 Runoff=0.7 cfs 0.090 af

Subcatchment 2: 2 Runoff Area=17,817 sf 0.34% Impervious Runoff Depth=4.50"
Flow Length=136' Tc=10.4 min CN=69 Runoff=1.2 cfs 0.153 af

Subcatchment 3: 3 Runoff Area=11,703 sf 94.27% Impervious Runoff Depth=7.70"
Flow Length=101' Tc=4.8 min CN=96 Runoff=1.5 cfs 0.172 af

Subcatchment 4: 4 Runoff Area=10,000 sf 100.00% Impervious Runoff Depth=7.94"
Flow Length=80' Tc=1.2 min CN=98 Runoff=1.4 cfs 0.152 af

Subcatchment 5: 5 Runoff Area=5,946 sf 69.71% Impervious Runoff Depth=6.86"
Flow Length=56' Tc=1.4 min CN=89 Runoff=0.8 cfs 0.078 af

Subcatchment 6: 6 Runoff Area=6,167 sf 85.47% Impervious Runoff Depth=7.34"
Flow Length=301' Tc=2.4 min CN=93 Runoff=0.8 cfs 0.087 af

Subcatchment 7: 7 Runoff Area=6,350 sf 85.15% Impervious Runoff Depth=7.34"
Flow Length=305' Tc=2.4 min CN=93 Runoff=0.9 cfs 0.089 af

Subcatchment 8: 8 Runoff Area=13,970 sf 80.74% Impervious Runoff Depth=7.34"
Flow Length=135' Tc=1.7 min CN=93 Runoff=1.9 cfs 0.196 af

Subcatchment 9: 9 Runoff Area=2,654 sf 62.96% Impervious Runoff Depth=6.86"
Flow Length=33' Tc=2.7 min CN=89 Runoff=0.3 cfs 0.035 af

Subcatchment 10: 10 Runoff Area=11,702 sf 23.75% Impervious Runoff Depth=5.56"
Flow Length=121' Tc=11.3 min CN=78 Runoff=0.9 cfs 0.124 af

Subcatchment 11: 11 Runoff Area=46,099 sf 50.43% Impervious Runoff Depth=6.15"
Flow Length=135' Tc=6.4 min CN=83 Runoff=4.8 cfs 0.542 af

Subcatchment 12: 12 Runoff Area=7,853 sf 4.55% Impervious Runoff Depth=4.85"
Flow Length=38' Slope=0.0250 '/' Tc=5.7 min CN=72 Runoff=0.7 cfs 0.073 af

Subcatchment 13: 13 Runoff Area=25,000 sf 100.00% Impervious Runoff Depth=7.94"
Flow Length=125' Tc=1.2 min CN=98 Runoff=3.5 cfs 0.380 af

Subcatchment 14: 14 Runoff Area=447,629 sf 13.52% Impervious Runoff Depth=3.36"
Flow Length=1,332' Tc=20.1 min CN=59 Runoff=16.2 cfs 2.874 af

Subcatchment 15: D Runoff Area=20,900 sf 0.00% Impervious Runoff Depth=4.85"
Flow Length=233' Tc=12.6 min CN=72 Runoff=1.4 cfs 0.194 af

Subcatchment 16: E Runoff Area=29,445 sf 0.00% Impervious Runoff Depth=4.85"
Flow Length=296' Tc=13.7 min CN=72 Runoff=1.9 cfs 0.273 af

Subcatchment B: B Runoff Area=12,125 sf 0.00% Impervious Runoff Depth=5.20"
Flow Length=135' Tc=12.0 min CN=75 Runoff=0.9 cfs 0.121 af

Subcatchment C: C Runoff Area=17,111 sf 0.00% Impervious Runoff Depth=3.81"
Flow Length=208' Tc=15.9 min CN=63 Runoff=0.8 cfs 0.125 af

Reach R1: R1 Avg. Flow Depth=0.23' Max Vel=2.74 fps Inflow=5.8 cfs 1.847 af
n=0.035 L=20.0' S=0.0500 '/' Capacity=30.4 cfs Outflow=5.8 cfs 1.847 af

Pond BR1: Bio-Retention 1 Peak Elev=145.00' Storage=17,404 cf Inflow=15.6 cfs 1.856 af
Outflow=5.8 cfs 1.847 af

Pond CB1: CB1 Peak Elev=154.31' Inflow=0.8 cfs 0.087 af
15.0" Round Culvert n=0.012 L=24.0' S=0.0104 '/' Outflow=0.8 cfs 0.087 af

Pond CB2: CB2 Peak Elev=154.13' Inflow=1.7 cfs 0.176 af
15.0" Round Culvert n=0.012 L=168.0' S=0.0488 '/' Outflow=1.7 cfs 0.176 af

Pond CB3: CB3 Peak Elev=149.08' Inflow=1.9 cfs 0.196 af
15.0" Round Culvert n=0.012 L=36.0' S=0.0583 '/' Outflow=1.9 cfs 0.196 af

Pond CB4: CB4 Peak Elev=146.84' Inflow=4.0 cfs 0.407 af
15.0" Round Culvert n=0.012 L=40.0' S=0.0187 '/' Outflow=4.0 cfs 0.407 af

Pond CB5: CB5 Peak Elev=147.99' Inflow=2.2 cfs 0.230 af
15.0" Round Culvert n=0.012 L=65.0' S=0.0431 '/' Outflow=2.2 cfs 0.230 af

Pond CB6: CB6 Peak Elev=146.15' Inflow=6.7 cfs 0.761 af
15.0" Round Culvert n=0.012 L=54.0' S=0.0102 '/' Outflow=6.7 cfs 0.761 af

Pond CB7: CB7 Peak Elev=145.59' Inflow=1.5 cfs 0.172 af
15.0" Round Culvert n=0.012 L=42.0' S=0.0417 '/' Outflow=1.5 cfs 0.172 af

Pond RD1: RD1 Peak Elev=151.23' Inflow=1.4 cfs 0.152 af
12.0" Round Culvert n=0.012 L=265.0' S=0.0113 '/' Outflow=1.4 cfs 0.152 af

Pond RD2: RD2 Peak Elev=152.37' Inflow=3.5 cfs 0.380 af
12.0" Round Culvert n=0.012 L=360.0' S=0.0187 '/' Outflow=3.5 cfs 0.380 af

Link A: A Inflow=26.1 cfs 5.505 af
Primary=26.1 cfs 5.505 af

Total Runoff Area = 16.138 ac Runoff Volume = 5.759 af Average Runoff Depth = 4.28"
77.13% Pervious = 12.447 ac 22.87% Impervious = 3.691 ac

APPENDIX B

DESIGN

B – 1

STORMWATER BEST MANAGEMENT PRACTICES

FILTRATION PRACTICE DESIGN CRITERIA
(Env-Wq 1508.07)

Type/Node Name: **BIO-RETENTION 1 (BR1)**

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

Yes		Check if you reviewed the restrictions on unlined systems outlined in Env-Wq 1508.07(a).	
3.21	ac	A = Area draining to the practice	
2.29	ac	A_I = Impervious area draining to the practice	
0.72	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.69	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
2.22	ac-in	WQV= 1" x Rv x A	
8,070	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
2,018	cf	25% x WQV (check calc for sediment forebay volume)	
6,053	cf	75% x WQV (check calc for surface sand filter volume)	
Forebay/Deep Sump		Method of Pretreatment? (not required for clean or roof runoff)	
3,058	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
Calculate time to drain if system IS NOT underdrained:			
	sf	A_{SA} = Surface area of the practice	
	iph	$Ksat_{DESIGN}$ = Design infiltration rate[1]	
		If Ksat (prior to factor of safety) is < 0.50 iph, has an underdrain been provided?	
	Yes/No	(Use the calculations below)	
-	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**≤ 72-hrs**
Calculate time to drain if system IS underdrained:			
144.17	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
1.50	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	
2.99	hours	T_{DRAIN} = Drain time = 2WQV/Q_{WQV}	**≤ 72-hrs**
141.50	feet	E_{FC} = Elevation of the bottom of the filter course material[2]	
137.25	feet	E_{UD} = Invert elevation of the underdrain (UD), if applicable	
137.25	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
136.92	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.25	feet	$D_{FC\ to\ UD}$ = Depth to UD from the bottom of the filter course	**≥ 1'**
4.58	feet	$D_{FC\ to\ ROCK}$ = Depth to bedrock from the bottom of the filter course	**≥ 1'**
4.25	feet	$D_{FC\ to\ SHWT}$ = Depth to SHWT from the bottom of the filter course	**≥ 1'**
145.00	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
145.60	ft	Elevation of the top of the practice	
YES		50 peak elevation ≤ Elevation of the top of the practice	**← yes**
If a surface sand filter or underground sand filter is proposed:			
YES	ac	Drainage Area check.	**< 10 ac**
	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ 75%WQV**
	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet		Note what sheet in the plan set contains the filter course specification.	
	Yes/No	Access grate provided?	**← yes**

If a bioretention area is proposed:			
YES	ac	Drainage Area no larger than 5 ac?	**← yes**
8,094	cf	V = Volume of storage[3] (attach a stage-storage table)	**≥ WQV**
18.0	inches	D_{FC} = Filter course thickness	**18", or 24" if within GPA**
Sheet	17	Note what sheet in the plan set contains the filter course specification	
3.0	:1	Pond side slopes	**≥ 3:1**
Sheet	L1.0	Note what sheet in the plan set contains the planting plans and surface cover	
If porous pavement is proposed:			
		Type of pavement proposed (Concrete? Asphalt? Pavers? Etc.)	
	acres	A_{SA} = Surface area of the pervious pavement	
	:1	Ratio of the contributing area to the pervious surface area	**≤ 5:1**
	inches	D_{FC} = Filter course thickness	**12", or 18" if within GPA mod. 304.1 (see spec)**
Sheet		Note what sheet in the plan set contains the filter course spec.	

1. Rate of the limiting layer (either the filter course or the underlying soil). $Ksat_{design}$ includes factor of safey. See Env-Wq 1504.14 for guidance on determining the infiltration rate.

2. See lines 34, 40 and 48 for required depths of filter media.

3. Volume without depending on infiltration. The volume includes the storage above the filter (but below the invert of the outlet stucture, if any), the filter media voids, and the pretreatment area. The storage above the filter media shall not include the volume above the outlet structure, if any.

Designer's Notes:

Summary for Pond BR1: Bio-Retention 1

Inflow Area = 3.205 ac, 71.52% Impervious, Inflow Depth = 6.95" for 50-yr event
Inflow = 15.6 cfs @ 12.00 hrs, Volume= 1.856 af
Outflow = 5.8 cfs @ 12.21 hrs, Volume= 1.847 af, Atten= 63%, Lag= 12.6 min
Primary = 5.8 cfs @ 12.21 hrs, Volume= 1.847 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 145.00' @ 12.21 hrs Surf.Area= 9,120 sf Storage= 17,404 cf
Flood Elev= 145.60' Surf.Area= 12,445 sf Storage= 22,922 cf

Plug-Flow detention time= 84.5 min calculated for 1.846 af (99% of inflow)
Center-of-Mass det. time= 81.6 min (861.2 - 779.7)

485 SF + 3,790 SF + 761 SF + 3,058 SF
= 8094 SF > 8070 SF

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	3,058 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	136.92'	19,864 cf	**Bio-Basin (Irregular)** Listed below (Recalc)
		22,922 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
143.00	446	301.9	0	0	446
144.00	1,524	356.6	931	931	3,331
145.00	2,793	413.5	2,127	3,058	6,839

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
136.92	3,230	340.4	0.0	0	0	3,230
141.25	3,230	340.4	35.0	4,895	4,895	4,704
141.50	3,230	340.4	20.0	162	5,057	4,789
143.00	3,230	340.4	10.0	485	5,541	5,300
144.00	4,380	387.4	100.0	3,790	9,331	8,046
144.17 =WQV	4,579	390.6	100.0	761	10,093	8,255
145.00	5,654	425.1	100.0	4,239	14,332	10,520
145.01	8,862	532.2	100.0	72	14,404	18,678
145.60	9,652	542.7	100.0	5,460	19,864	19,631

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.00' S= 0.0667 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	137.25'	**12.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.25' / 137.25' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	136.92'	**10.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	144.20'	**30.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	144.45'	**11.0" W x 6.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	145.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=5.8 cfs @ 12.21 hrs HW=145.00' TW=135.23' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.8 cfs of 17.1 cfs potential flow)
  ├─**2=Culvert** (Passes 2.1 cfs of 6.7 cfs potential flow)
  │ └─**3=Exfiltration** (Exfiltration Controls 2.1 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 2.5 cfs @ 3.96 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 1.2 cfs @ 2.42 fps)
  └─**6=Orifice/Grate** (Weir Controls 0.0 cfs @ 0.15 fps)

Stage-Discharge for Pond BR1: Bio-Retention 1 (continued)

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
143.40	1.0	143.94	1.3	144.48	2.8	145.02	6.6
143.41	1.0	143.95	1.3	144.49	2.9	145.03	6.8
143.42	1.0	143.96	1.3	144.50	2.9	145.04	7.0
143.43	1.0	143.97	1.3	144.51	3.0	145.05	7.2
143.44	1.1	143.98	1.4	144.52	3.0	145.06	7.4
143.45	1.1	143.99	1.4	144.53	3.1	145.07	7.7
143.46	1.1	144.00	1.4	144.54	3.1	145.08	7.9
143.47	1.1	144.01	1.4	144.55	3.2	145.09	8.2
143.48	1.1	144.02	1.4	144.56	3.2	145.10	8.5
143.49	1.1	144.03	1.4	144.57	3.3	145.11	8.8
143.50	1.1	144.04	1.4	144.58	3.3	145.12	9.1
143.51	1.1	144.05	1.4	144.59	3.4	145.13	9.4
143.52	1.1	144.06	1.4	144.60	3.4	145.14	9.7
143.53	1.1	144.07	1.4	144.61	3.5	145.15	10.0
143.54	1.1	144.08	1.4	144.62	3.5	145.16	10.4
143.55	1.1	144.09	1.4	144.63	3.6	145.17	10.8
143.56	1.1	144.10	1.4	144.64	3.6	145.18	11.1
143.57	1.1	144.11	1.4	144.65	3.7	145.19	11.5
143.58	1.1	144.12	1.4	144.66	3.8	145.20	11.9
143.59	1.1	144.13	1.4	144.67	3.8	145.21	12.3
143.60	1.1	144.14	1.4	144.68	3.9	145.22	12.7
143.61	1.1	144.15	1.4	144.69	3.9	145.23	13.1
143.62	1.1	144.16	1.5	144.70	4.0	145.24	13.5
143.63	1.2	144.17	1.5	144.71	4.0	145.25	13.9
143.64	1.2	144.18	1.5	144.72	4.1	145.26	14.4
143.65	1.2	144.19	1.5	144.73	4.1	145.27	14.8
143.66	1.2	144.20	1.5	144.74	4.2	145.28	15.2
143.67	1.2	144.21	1.5	144.75	4.2	145.29	15.7
143.68	1.2	144.22	1.5	144.76	4.3	145.30	16.2
143.69	1.2	144.23	1.5	144.77	4.3	145.31	16.6
143.70	1.2	144.24	1.6	144.78	4.4	145.32	17.1
143.71	1.2	144.25	1.6	144.79	4.5	145.33	17.4
143.72	1.2	144.26	1.6	144.80	4.5	145.34	17.4
143.73	1.2	144.27	1.7	144.81	4.6	145.35	17.5
143.74	1.2	144.28	1.7	144.82	4.6	145.36	17.5
143.75	1.2	144.29	1.7	144.83	4.7	145.37	17.5
143.76	1.2	144.30	1.8	144.84	4.7	145.38	17.5
143.77	1.2	144.31	1.8	144.85	4.8	145.39	17.5
143.78	1.2	144.32	1.9	144.86	4.8	145.40	17.5
143.79	1.2	144.33	1.9	144.87	4.9	145.41	17.5
143.80	1.2	144.34	2.0	144.88	4.9	145.42	17.5
143.81	1.3	144.35	2.0	144.89	5.0	145.43	17.5
143.82	1.3	144.36	2.1	144.90	5.1	145.44	17.5
143.83	1.3	144.37	2.1	144.91	5.1	145.45	17.6
143.84	1.3	144.38	2.2	144.92	5.2	145.46	17.6
143.85	1.3	144.39	2.2	144.93	5.2	145.47	17.6
143.86	1.3	144.40	2.3	144.94	5.3	145.48	17.6
143.87	1.3	144.41	2.4	144.95	5.3	145.49	17.6
143.88	1.3	144.42	2.4	144.96	5.4	145.50	17.6
143.89	1.3	144.43	2.5	144.97	5.5	145.51	17.6
143.90	1.3	144.44	2.6	144.98	5.5	145.52	17.6
143.91	1.3	144.45	2.6	144.99	5.6	145.53	17.6
143.92	1.3	144.46	2.7	145.00	5.6	145.54	17.6
143.93	1.3	144.47	2.7	145.01	6.5	145.55	17.7

B – 2

GROUNDWATER RECHARGE

Meeting Minutes

When: November 1, 2023
Where: NH Department of Environmental Services-29 Hazen Drive, Concord, NH
Topic: Pre-AOT Meeting
Future Automation
Quality Way, Dover
CNE Reference No. 22075
Prepared by: Joe Griffin, PE - Civilworks NE
Attendees: Mike Schlosser, PE – AOT Bureau, NH Dept. of Environmental Services
Jase Gregoire, EIT - Civilworks NE

The following matters were discussed:

1) Joe provided a general overview of the site, location, site characteristics, existing drainage and design intent.
    a. The site slopes, fairly steeply, in a north westerly direction from Quality Way to the Reyners Brook wetland.
    b. The wetland is a large complex that feeds into Reyners Brook and is on property owned by Dover.
    c. The parcel is owned by Dover and abuts additional Dover property to the north, east, and south. Private residences are abutted to the west.
    d. The AoT screening and impairment data was provided. The site is in the Great Bay Communities and Reyners brook is impaired for e-coli. An initial NHB inquiry (since expired) did not indicate any hits on the site. A new NHB request will be submitted.
    e. The proposed design incorporates a large sediment forebay, deep sump CB, and an underdrained bioretention area. The roof runoff is also directed to the sediment forebays. A discussion occurred regarding whether the roof runoff would be required to be routed through the sediment forebays. The consensus was that it normally wouldn't. Discussed incorporating additional storage under the bioretention area to attenuate flow. Mike suggested, based on the grading in the area, that we confirm the pond will not be considered a dam.
    f. The project will require a wetland permit and a sewage connection permit.
    g. Mike asked about the floodplain location. Joe indicated that the EC plan indicated that the subject parcel is outside the 0.2 percent annual chance floodplain. Joe also added that Dover, when subdividing the industrial park, created open space areas of large wetlands and along the flood plains. The flood plains run along the property line on the abutting property owned by Dover.
2) Joe indicated that the soils on site are predominantly C/D soils with tops of knolls being B soils. Development will require significant cut primarily in the locations of the B soils which

is also where the buildings/paved areas will be. We will likely be requesting a waiver from the GRV (Env-Wq 1507.04 Groundwater Recharge Requirements). Mike asked about the western portion of the site that won't be developed and whether there would be future development on that portion of the lot. Joe indicated that the applicant has shown interest in future development and that it would require an AoT permit if within 10 years of the project being completed. Joe indicated that future development would require another wetland crossing/permit. Joe indicated that in the event future development onsite occurs that the future project would evaluate whether the GRV from the entire buildout of the site could be achieved on the undeveloped portion of the site. Mike asked about additional information regarding the soil types, depth to estimated seasonal high water table etc. Mike asked that an official waiver request be provided with the application and NHDES would be in favor of the waiver. Joe will provide detailed information in the waiver request.

3) Joe discussed the pre and post drainage areas and longest flow paths. A discussion ensued regarding routing of the subcatchments. It was determined that the large Reyners brook wetland would be considered the point of analysis and routing from the property line to the edge of wetland wouldn't be necessary due to its close proximity.
4) Joe discussed the longest flow paths entering the large wetland from various subcatchments as they relate to channel protection requirements. Joe requested that each separate subcatchment be evaluated, where it leaves the site, against the channel protection requirements. Joe indicated that portions of the site and off site areas in the model that will be undeveloped contribute greater than 2 cfs in the 2-yr storm event. A lengthy discussion ensued regarding the intention of the channel protection requirements. Mike confirmed that, in this instance, it would be appropriate to cumulatively evaluate the peak runoff from the area(s) where the development occurs while excluding the undeveloped drainage areas, when comparing post development peak flows to the channel protection requirements.
5) No further questions or statements were discussed about this project.

Summary for Link A: A1, A2, & A3 SUM

Inflow Area = 2.852 ac, 0.00% Impervious, Inflow Depth = 0.77" for 2-yr event
Inflow = 1.0 cfs @ 12.24 hrs, Volume= 0.184 af
Primary = 1.0 cfs @ 12.24 hrs, Volume= 0.184 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Summary for Pond BR1: Bio-Retention 1

Inflow Area = 3.205 ac, 71.52% Impervious, Inflow Depth = 2.57" for 2-yr event
Inflow = 7.8 cfs @ 12.00 hrs, Volume= 0.686 af
Outflow = 1.1 cfs @ 12.61 hrs, Volume= 0.677 af, Atten= 86%, Lag= 36.3 min
Primary = 1.1 cfs @ 12.61 hrs, Volume= 0.677 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 143.48' @ 12.61 hrs Surf.Area= 4,649 sf Storage= 7,543 cf
Flood Elev= 145.60' Surf.Area= 12,445 sf Storage= 22,922 cf

Plug-Flow detention time= 83.7 min calculated for 0.677 af (99% of inflow)
Center-of-Mass det. time= 75.4 min (880.5 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	3,058 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	136.92'	19,864 cf	**Bio-Basin (Irregular)** Listed below (Recalc)
		22,922 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
143.00	446	301.9	0	0	446
144.00	1,524	356.6	931	931	3,331
145.00	2,793	413.5	2,127	3,058	6,839

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
136.92	3,230	340.4	0.0	0	0	3,230
141.25	3,230	340.4	35.0	4,895	4,895	4,704
141.50	3,230	340.4	20.0	162	5,057	4,789
143.00	3,230	340.4	10.0	485	5,541	5,300
144.00	4,380	387.4	100.0	3,790	9,331	8,046
144.17	4,579	390.6	100.0	761	10,093	8,255
145.00	5,654	425.1	100.0	4,239	14,332	10,520
145.01	8,862	532.2	100.0	72	14,404	18,678
145.60	9,652	542.7	100.0	5,460	19,864	19,631

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.00' S= 0.0667 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	137.25'	**12.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.25' / 137.25' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	136.92'	**10.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	144.20'	**30.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	144.45'	**11.0" W x 6.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	145.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=1.1 cfs @ 12.61 hrs HW=143.48' TW=135.11' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.1 cfs of 15.5 cfs potential flow)
  ├─**2=Culvert** (Passes 1.1 cfs of 5.9 cfs potential flow)
  │ └─**3=Exfiltration** (Exfiltration Controls 1.1 cfs)
  ├─**4=Orifice/Grate** (Controls 0.0 cfs)
  ├─**5=Orifice/Grate** (Controls 0.0 cfs)
  └─**6=Orifice/Grate** (Controls 0.0 cfs)

B – 3

OUTLET PROTECTION

OUTLET PROTECTION DESIGN CALCS

DEFINED CHANNEL

Job #: 22075
Date: 1/11/2024
Structure: Outlet from RD2

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of outlet pipe (ft)
D= Width of channel (ft)
z= Channel side slope (H:V ft/ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	143.75
Tailwater elev:	144.02
Tw:	0.27
Q:	3
D_0:	1.00
D:	3
z:	3

Apron Dimensions

w_1=	**9**	(ft)
w_2=	**3**	(ft)
La=	**13**	(ft)

Apron Length:

$Tw > .5D_0$	$Tw < .5D_0$
La: 16.000	La: 12.400

Apron Width:

w_2: 3

w_1: 9

w_1=	9.00
w_2=	3.00
La=	12.4

RipRap Sizing

d_{50}=	0.32	(ft)
d_{50}=	3.85	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.48	TO	0.64	100
0.42	TO	0.58	85
0.32	TO	0.48	50
0.10	TO	0.16	15

Minimum Depth of Rock= 0.96 (ft)

Summary for Pond RD2: RD2

Inflow Area = 0.574 ac,100.00% Impervious, Inflow Depth = 6.61" for 25-yr event
Inflow = 3.0 cfs @ 11.99 hrs, Volume= 0.316 af
Outflow = 3.0 cfs @ 11.99 hrs, Volume= 0.316 af, Atten= 0%, Lag= 0.0 min
Primary = 3.0 cfs @ 11.99 hrs, Volume= 0.316 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 152.04' @ 11.99 hrs
Flood Elev= 155.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	150.50'	**12.0" Round Culvert**
			L= 360.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 150.50' / 143.75' S= 0.0187 '/' Cc= 0.900
			n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.0 cfs @ 11.99 hrs HW=152.04' TW=144.02' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.0 cfs @ 3.87 fps)

OUTLET PROTECTION DESIGN CALCS

DEFINED CHANNEL

Job #: 22075
Date: 1/11/2024
Structure: Outlet from CB6

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of outlet pipe (ft)
D= Width of channel (ft)
z= Channel side slope (H:V ft/ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:	
Outlet elev:	143.7
Tailwater elev:	144.07
Tw:	0.37
Q:	5.7
D_0:	1.25
D:	3
z:	3

Apron Dimensions

w_1=	**11**	(ft)
w_2=	**3**	(ft)
La=	**17**	(ft)

Apron Length:

$Tw > .5D_0$	$Tw < .5D_0$
La: 20.986	La: 16.091

Apron Width:

w_2: 3

w_1: 10.5

w_1=	10.50
w_2=	3.00
La=	16.0914584

RipRap Sizing

d_{50}=	0.44	(ft)
d_{50}=	5.28	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.66	TO	0.88	100
0.57	TO	0.79	85
0.44	TO	0.66	50
0.13	TO	0.22	15

Minimum Depth of Rock= 1.32 (ft)

Summary for Pond CB6: CB6

Inflow Area = 1.304 ac, 71.41% Impervious, Inflow Depth = 5.71" for 25-yr event
Inflow = 5.7 cfs @ 12.00 hrs, Volume= 0.620 af
Outflow = 5.7 cfs @ 12.00 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min
Primary = 5.7 cfs @ 12.00 hrs, Volume= 0.620 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 145.81' @ 12.00 hrs
Flood Elev= 148.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	144.25'	**15.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 144.25' / 143.70' S= 0.0102 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=5.7 cfs @ 12.00 hrs HW=145.81' TW=144.07' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.7 cfs @ 4.64 fps)

OUTLET PROTECTION DESIGN CALCS

DEFINED CHANNEL

Job #: 22075
Date: 1/11/2024
Structure: Outlet from CB7

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of outlet pipe (ft)
D= Width of channel (ft)
z= Channel side slope (H:V ft/ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	143.25
Tailwater elev:	144.24
Tw:	0.99
Q:	1.3
D_0:	1.25
D:	3
z:	3

Apron Dimensions

w_1=	**11**	(ft)
w_2=	**3**	(ft)
La=	**12**	(ft)

Apron Length:

$Tw > .5D_0$	$Tw < .5D_0$
La: 11.541	La: 10.424

Apron Width:

w_2: 3

w_1: 10.5

w_1=	10.50
w_2=	3.00
La=	11.5406128

RipRap Sizing

d_{50}=	0.02	(ft)
d_{50}=	0.28	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.03	TO	0.05	100
0.03	TO	0.04	85
0.02	TO	0.03	50
0.01	TO	0.01	15

Minimum Depth of Rock= 0.07 (ft)

Summary for Pond CB7: CB7

Inflow Area = 0.269 ac, 94.27% Impervious, Inflow Depth = 6.37" for 25-yr event
Inflow = 1.3 cfs @ 12.02 hrs, Volume= 0.143 af
Outflow = 1.3 cfs @ 12.02 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min
Primary = 1.3 cfs @ 12.02 hrs, Volume= 0.143 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 145.55' @ 12.02 hrs
Flood Elev= 149.40'

Device	Routing	Invert	Outlet Devices
#1	Primary	145.00'	**15.0" Round Culvert** L= 42.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 145.00' / 143.25' S= 0.0417 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

Primary OutFlow Max=1.3 cfs @ 12.02 hrs HW=145.55' TW=144.24' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.3 cfs @ 2.52 fps)

OUTLET PROTECTION DESIGN CALCS

Plunge Pool - Circular Pipe

Job #: 22075
Date: 1/11/2024
Structure: Outlet from BR1

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of the pipe (ft)
Tw= Tailwater depth above the invert of the pipe (ft)
F= Scour Hole Depth; 0 = 1/2 Pipe depth, 1 = Full Pipe Depth
La= Scour Hole Bottom Length
Lb= Scour Hole Overall Length
Wa= Scour Hole Bottom Width
Wb= Scour Hole Overall Width

Input:

Outlet elev:	135
Tailwater elev:	135.19
Tw:	0.19
F:	1
Q:	3.9
D_0:	1.25

Scour Hole Dimensions

La=	**3.75**	(ft)
Lb=	**11.25**	(ft)
Wa=	**2.50**	(ft)
Wb=	**10.00**	(ft)

Scour Length:

$F = .5D_0$		$F = D_0$	
La:	3.75	La:	3.75
Lb:	7.50	Lb:	11.25

Scour Width:

$F = .5D_0$		$F = D_0$	
Wa:	2.50	Wa:	2.50
Wb:	6.25	Wb:	10.00

RipRap Sizing

d_{50}=	0.20	(ft)
d_{50}=	2.36	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.30	TO	0.39	100
0.26	TO	0.35	85
0.20	TO	0.30	50
0.06	TO	0.10	15

Minimum Depth of Rock=	1.00	(ft)

Summary for Pond BR1: Bio-Retention 1

Inflow Area = 3.205 ac, 71.52% Impervious, Inflow Depth = 5.65" for 25-yr event
Inflow = 13.3 cfs @ 12.00 hrs, Volume= 1.510 af
Outflow = 3.9 cfs @ 12.30 hrs, Volume= 1.501 af, Atten= 71%, Lag= 17.7 min
Primary = 3.9 cfs @ 12.30 hrs, Volume= 1.501 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 144.68' @ 12.30 hrs Surf.Area= 7,572 sf Storage= 14,829 cf
Flood Elev= 145.60' Surf.Area= 12,445 sf Storage= 22,922 cf

Plug-Flow detention time= 84.6 min calculated for 1.501 af (99% of inflow)
Center-of-Mass det. time= 81.0 min (866.1 - 785.1)

Volume	Invert	Avail.Storage	Storage Description
#1	143.00'	3,058 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	136.92'	19,864 cf	**Rain Garden (Irregular)** Listed below (Recalc)
		22,922 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
143.00	446	301.9	0	0	446
144.00	1,524	356.6	931	931	3,331
145.00	2,793	413.5	2,127	3,058	6,839

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
136.92	3,230	340.4	0.0	0	0	3,230
141.25	3,230	340.4	35.0	4,895	4,895	4,704
141.50	3,230	340.4	20.0	162	5,057	4,789
143.00	3,230	340.4	10.0	485	5,541	5,300
144.00	4,380	387.4	100.0	3,790	9,331	8,046
144.17	4,579	390.6	100.0	761	10,093	8,255
145.00	5,654	425.1	100.0	4,239	14,332	10,520
145.01	8,862	532.2	100.0	72	14,404	18,678
145.60	9,652	542.7	100.0	5,460	19,864	19,631

Device	Routing	Invert	Outlet Devices
#1	Primary	136.00'	**15.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 136.00' / 135.00' S= 0.0667 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Device 1	137.25'	**12.0" Round Culvert** L= 150.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 137.25' / 137.25' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#3	Device 2	136.92'	**10.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#4	Device 1	144.20'	**30.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	144.45'	**11.0" W x 6.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	145.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600

Limited to weir flow at low heads

Primary OutFlow Max=3.9 cfs @ 12.30 hrs HW=144.68' TW=135.19' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.9 cfs of 16.8 cfs potential flow)
  ├─**2=Culvert** (Passes 1.8 cfs of 6.6 cfs potential flow)
  │ └─**3=Exfiltration** (Exfiltration Controls 1.8 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 1.8 cfs @ 2.85 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 0.3 cfs @ 1.54 fps)
  └─**6=Orifice/Grate** (Controls 0.0 cfs)

APPENDIX C

WATERSHED PLANS

C – 1

PRE-DEVELOPMENT CONDITIONS

DISCHARGE PT. A

DISCHARGE PT. B

DISCHARGE PT. C

A1

A2

A3

A4

A5

A6

B

C

QUALITY WAY

EXISTING BUILDING

NH STATE PLANE NAD 83 – GPS OBS.

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING TREELINE
- EXISTING BUILDING
- EDGE OF WETLAND
- **SUBCATCHMENT BOUNDARY**
- **LONGEST FLOW PATH WITH DIRECTION OF FLOW**
- (A4) **SUBCATCHMENT DESIGNATION**

PRE–DEVELOPMENT WATERSHED CHARACTERISTICS

SUBCATCHMENT DESIGNATION	AREA (ACRES)	LONGEST FLOW PATH (FEET)	Tc (MIN)
A1	0.30	108	11.6
A2	0.81	220	10.9
A3	1.75	340	22.9
A4	11.46	1,332	20.3
A5	0.48	233	12.6
A6	0.68	296	13.7
B	0.28	135	12.0
C	0.39	208	15.9

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

NO.	REVISION	APP'D	DATE

DATE: 1–18–24
SCALE: 1"=60'
DRAWN BY: MJM
DESIGN BY: JPG
APPROVED BY: SJH
PROJECT NO: 22075
FILE: 22075–Dm.dwg

PRE–DEVELOPMENT WATERSHED PLAN – OVERALL

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

WS–1

DISCHARGE PT. A

DISCHARGE PT. B

DISCHARGE PT. C

A1

A2

A3

A4

A5

A6

B

C

QUALITY WAY

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING TREELINE
- EXISTING BUILDING
- EDGE OF WETLAND
- **SUBCATCHMENT BOUNDARY**
- **LONGEST FLOW PATH WITH DIRECTION OF FLOW**
- **SUBCATCHMENT DESIGNATION**

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

NH STATE PLANE NAD 83 GPS OBS.

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

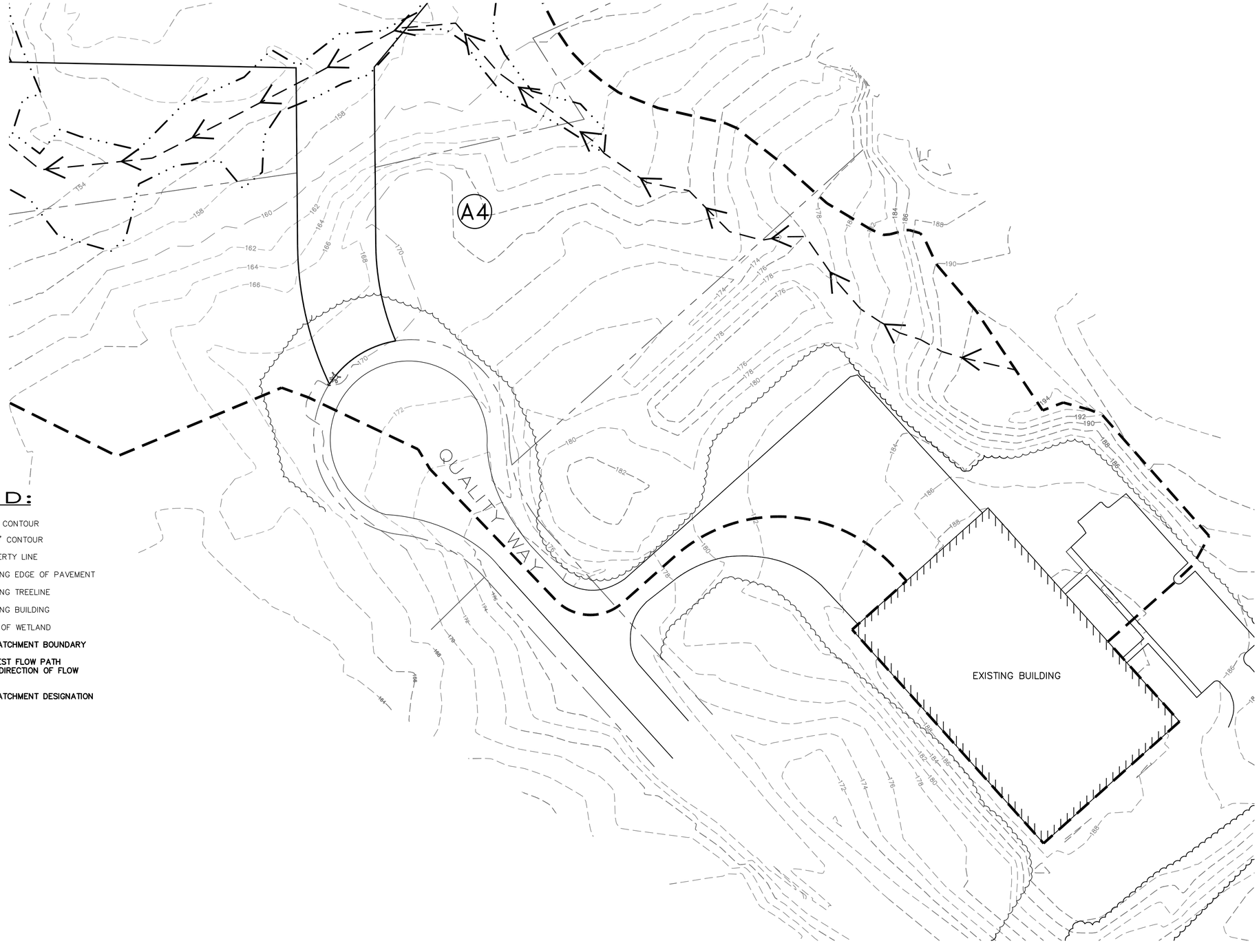
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DATE: 1-18-24			
SCALE: 1"=40'			
DRAWN BY: MJM			
DESIGN BY: JPG			
APPROVED BY: SJH			
PROJECT NO: 22075			
FILE: 22075-Dm.dwg	NO.		

PRE-DEVELOPMENT WATERSHED PLAN - A

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

WS-2



LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING TREELINE
- EXISTING BUILDING
- EDGE OF WETLAND
- **SUBCATCHMENT BOUNDARY**
- **LONGEST FLOW PATH WITH DIRECTION OF FLOW**
- **SUBCATCHMENT DESIGNATION**

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

NE STATE PLANE, NAD 83, US FEET

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CIVIL & WATERFRONT ENGINEERING
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Dover, New Hampshire 03821
603.749.0443

PRE-DEVELOPMENT WATERSHED PLAN - B

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

WS-3

C – 2

POST-DEVELOPMENT CONDITIONS

DISCHARGE PT. A

DISCHARGE PT. B

DISCHARGE PT. C

SEDIMENT FOREBAY

REACH R1

PLUNGE POOL

BIO-RETENTION BASIN 1

RD1

RD2

PCB1

PCB2

PCB3

PCB4

PCB5

PCB6

PCB7

PROPOSED 25,000 S.F. BUILDING F.F.=156.0

PROPOSED 10,000 S.F. BUILDING F.F.=156.0

BOX CULVERT

QUALITY WAY

EXISTING BUILDING

NAD 1983 STATE PLANE NAD 83 - GPS OBS.

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING TREELINE
- EXISTING BUILDING
- EDGE OF WETLAND
- 154 PROPOSED FINISH GRADE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED TREELINE
- PROPOSED BUILDING
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- (14) SUBCATCHMENT DESIGNATION

POST-DEVELOPMENT WATERSHED CHARACTERISTICS

SUBCATCHMENT DESIGNATION	AREA (ACRES)	LONGEST FLOW PATH (FEET)	Tc (MIN)
1	0.24	90	10.9
2	0.41	136	10.4
3	0.27	101	4.8
4	0.23	80	1.2
5	0.14	56	1.4
6	0.14	301	2.4
7	0.15	305	2.4
8	0.32	135	1.7
9	0.06	33	2.7
10	0.27	121	11.3
11	1.06	135	6.4
12	0.18	38	5.7
13	0.57	125	1.2
14	10.28	1,332	20.3
15	0.48	233	12.6
16	0.68	296	13.7
B	0.28	135	12.0
C	0.39	208	15.9

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)

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

POST-DEVELOPMENT WATERSHED PLAN - OVERALL

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

WS-4

DISCHARGE PT. A

DISCHARGE PT. B

DISCHARGE PT. C

SEDIMENT FOREBAY

REACH R1

PLUNGE POOL

BIO-RETENTION BASIN 1

RD1

RD2

PCB1

PCB2

PCB3

PCB4

PCB5

PCB6

PCB7

PROPOSED 10,000 S.F. BUILDING F.F.=156.0

PROPOSED 25,000 S.F. BUILDING F.F.=156.0

BOX CULVERT

QUALITY WAY

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING TREELINE
- EXISTING BUILDING
- EDGE OF WETLAND
- 154 PROPOSED FINISH GRADE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED TREELINE
- PROPOSED BUILDING
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- (14) SUBCATCHMENT DESIGNATION

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

NH STATE PLANE NAD 83 - GPS OBS.

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NO.	REVISION	APP'D	DATE

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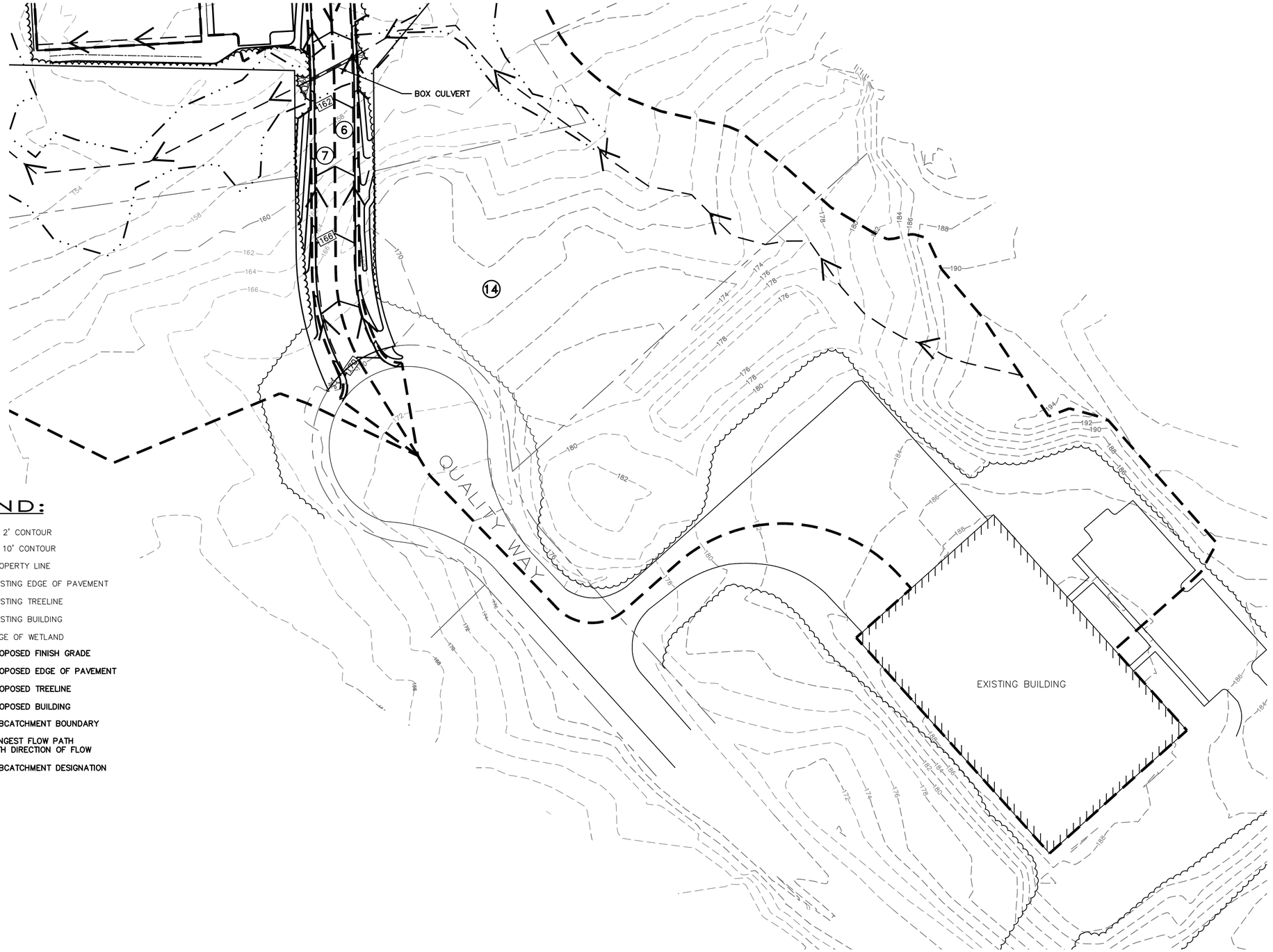
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CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

POST-DEVELOPMENT WATERSHED PLAN - A

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

WS-5



LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING TREELINE
- EXISTING BUILDING
- EDGE OF WETLAND
- 154 PROPOSED FINISH GRADE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED TREELINE
- PROPOSED BUILDING
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- (14) SUBCATCHMENT DESIGNATION

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

NH STATE PLANE NAD 83 - GPS OBS.

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

DATE: 1-18-24	
SCALE: 1"=40'	
DRAWN BY: MJM	
DESIGN BY: JPG	
APPROVED BY: SJH	
PROJECT NO: 22075	
FILE: 22075-Dm.dwg	NO. REVISION APP'D DATE

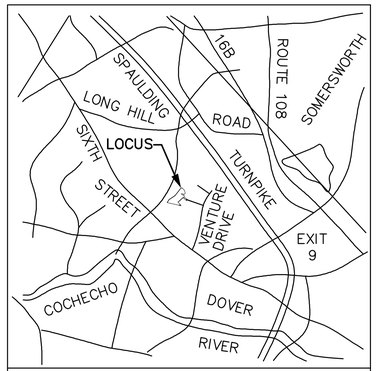
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CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

POST-DEVELOPMENT WATERSHED PLAN - B

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

WS-6



LOCATION PLAN
(NO SCALE)

SITE PLAN
FOR
FUTURE AUTOMATION

TAX MAP D, LOT 11-8

QUALITY WAY

DOVER, NH

JANUARY 2024

OWNER

DOVER BUSINESS AND INDUSTRIAL DEVELOPMENT AUTHORITY
f/k/a DOVER INDUSTRIAL DEVELOPMENT AUTHORITY (D.I.D.A)
288 CENTRAL AVENUE
DOVER, NEW HAMPSHIRE 03820

_____ DATE

APPLICANT

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

_____ DATE

SITE CIVIL ENGINEER

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

LAND SURVEYOR

MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND
P.O. BOX 1166
DOVER, NH 03821
(603) 742–0911

ARCHITECT

JOHN M. TUTTLE, ARCHITECT
TW DESIGNS, LLC
254 DRAKE HILL ROAD
STRAFFORD, NH 03884
(603) 664–2181

WETLAND SCIENTIST

MICHEAL R. CUOMO
6 YORK POND ROAD
YORK, ME 03909
(207) 363–4532

LANDSCAPE ARCHITECT

TERRAIN PLANNING & DESIGN, LLC
311 KAST HILL ROAD
HOPKINTON, NH 03229
(603) 491–2322

WILDLIFE PROTECTION NOTES:

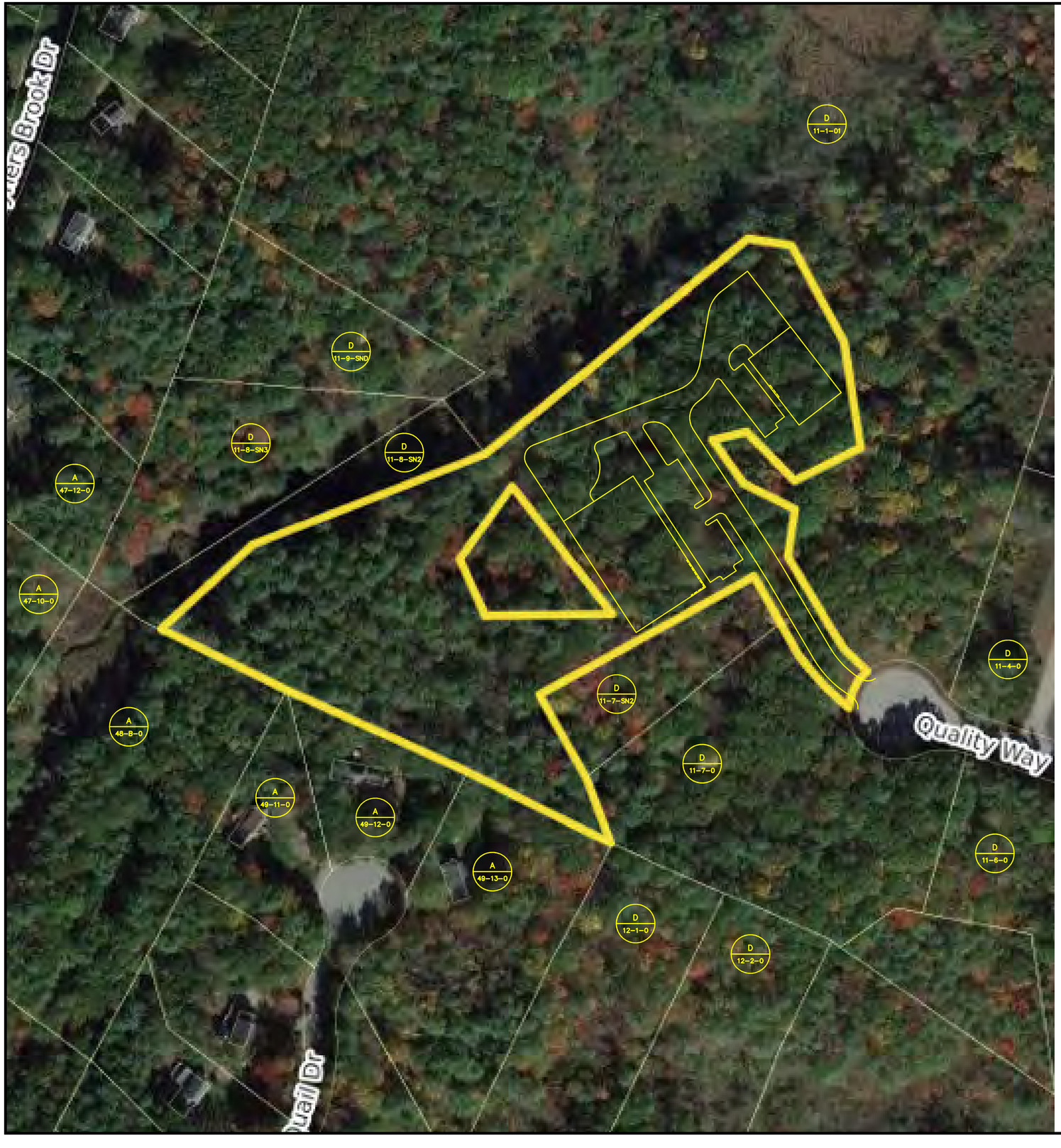
- ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603–271–2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV. EMAIL SUBJECT LINE: NHB22–1697, WEAVE FILTRATION LLC., WILDLIFE SPECIES OBSERVATION.
- PHOTOGRAPHS OF THE OBSERVED SPECIES AND NEARBY ELEMENTS OF HABITAT OR AREAS OF LAND DISTURBANCE SHALL BE PROVIDED TO NHF&G IN DIGITAL FORMAT AT THE ABOVE EMAIL ADDRESS FOR VERIFICATION AS FEASIBLE.
- IN THE EVENT A THREATENED OR ENDANGERED SPECIES IS OBSERVED ON THE PROJECT SITE DURING THE TERM OF THE PERMIT, THE SPECIES SHALL NOT BE DISTURBED, HANDLED, OR HARMED IN ANY WAY PRIOR TO CONSULTATION WITH NHF&G AND IMPLEMENTATION OF CORRECTIVE ACTIONS RECOMMENDED BY NHF&G, IF ANY, TO ASSURE THE PROJECT DOES NOT APPRECIABLY JEOPARDIZE THE CONTINUED EXISTENCE OF THREATENED AND ENDANGERED SPECIES AS DEFINED IN FIS 1002.04.
- THE NHF&G, INCLUDING ITS EMPLOYEES AND AUTHORIZED AGENTS, SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.

SHEET INDEX	SHEET
COVER SHEET	1
NEIGHBORHOOD PLAN	2
EXISTING CONDITIONS PLAN (BY MCENEANEY SURVEY)	3
NOTE SHEET	4
DEMOLITION PLAN	5
SITE PLAN	6
GRADING, DRAINAGE & EROSION CONTROL PLAN	7
WETLAND / WETLAND BUFFER IMPACT PLAN	8
UTILITY PLAN	9
EROSION CONTROL NOTES	10
DETAIL SHEETS	11-19
LIGHTING PLAN	20
LIGHTING DETAILS	21
DOVER LADDER TRUCK MOVEMENT PLAN	22-23
SITE SPECIFIC SOILS PLAN	24
TEST PIT LOGS	25

ARCHITECTURAL PLANS	
MAIN BUILDING 25,000 SF	
PROJECT COVER SHEET	PCS
FLOOR PLAN	A1.1
EXTERIOR ELEVATIONS	A3.1-A3.2
MAIN BUILDING STREET VIEW RENDERING	R1.1
MAIN BUILDING FRNT VIEW RENDERING	R1.2
STREET VIEW RENDERING	R1.3
CAMPUS AERIAL VIEW RENDERING	R1.4
AUX BUILDING 10,000 SF	
PROJECT COVER SHEET	PCS
FLOOR PLAN	A1.1
EXTERIOR ELEVATIONS	A3.1
AUX BUILDING STREET VIEW RENDERING	R1.1

LANDSCAPE PLANS	
LANDSCAPE PLAN	L1.0
LANDSCAPE DETAILS	L2.0

PLANNING FILE NO.: P24–



ABUTTERS LIST
(WITHIN 200 FT)

TAX MAP	LOT NO.	NAME & ADDRESS
D	11-1-0	DOVER BUSINESS & IND DEV AUTHORITY, F/K/A DOVER IND DEV AUTHORITY 288 CENTRAL AVE DOVER, NH 03820
D	11-9-SND	HEINE USA 10 INNOVATION WAY 288 CENTRAL AVE DOVER, NH 03820
D	11-8-SN3	DOVER BUSINESS & IND DEV AUTHORITY, F/K/A DOVER IND DEV AUTHORITY 288 CENTRAL AVE DOVER, NH 03820
D	11-8-SN2	DOVER BUSINESS & IND DEV AUTHORITY, F/K/A DOVER IND DEV AUTHORITY 288 CENTRAL AVE DOVER, NH 03820
A	47-12-0	MCCONNELL GEOFFERY R & DEBORAH TRUSTEE MCCONNELL REVOCABLE LIVING TRUST 15 REYNERS BROOK DRIVE DOVER, NH 03820
A	47-10-0	ARVENITIS KERRY A 11 REYNERS BROOK DRIVE DOVER, NH 03820
A	48-B-0	MENDENHALL JON L & MENDENHALL KAREN E 475 SIXTH STREET DOVER, NH 03820
A	49-11-0	TRICONI CHRISTOPHER E & ELIZABETH C TRUS TRICONI FAMILY LIVING TRUST 2021 28 QUAIL DRIVE DOVER, NH 03820
A	49-12-0	MOREAU SCOTT & CURTIS MARCY 32 QUAIL DRIVE DOVER, NH 03820
A	49-13-0	PORTER DOUGLAS W & PORTER YUKARI 29 QUAIL DRIVE DOVER, NH 03820
D	12-1-0	TSB PROPERTIES LLC 385 SIXTH STREET DOVER, NH 03820
D	12-2-0	TSB PROPERTIES LLC 385 SIXTH STREET DOVER, NH 03820
D	11-7-SN2	DOVER BUSINESS & IND DEV AUTHORITY, F/K/A DOVER IND DEV AUTHORITY 288 CENTRAL AVE DOVER, NH 03820
D	11-7-0	WEAVE FILTRATION QUALITY WAY DOVER, NH 03820
D	11-4-0	QUALITY WAY LLC 55 MAIN STREET, UNIT 407 NEWMARKET, NH 03857
D	11-6-0	DOVER BUSINESS & IND DEV AUTHORITY, F/K/A DOVER IND DEV AUTHORITY 288 CENTRAL AVE DOVER, NH 03820

SYMBOL LEGEND

D / 11 — TAX MAP / LOT NUMBER

NH STATE PLANE NAD 83 - GPS OBS.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

NO.	REVISION	APP'D	DATE

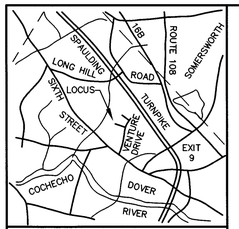
DATE: 1-18-24
SCALE: 1"=100'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

NEIGHBORHOOD PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

2



LOCATION PLAN
(NO SCALE)

REFERENCE PLANS:

1.) AMENDED SUBDIVISION AND LOT LINE ADJUSTMENT PLAN PREPARED FOR GEORGE J. FOSTER & Co., INC. AND DOVER BUSINESS AND INDUSTRIAL DEVELOPMENT AUTHORITY, TAX MAP D, LOT Nos. 9A & 11–1, VENTURE DRIVE AND QUALITY WAY, DOVER, STRAFFORD COUNTY, NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: FEBRUARY 14, 2006, REVISED THROUGH 5/3/06; BY THIS OFFICE. RECORDED S.C.R.D. PLANS 85–99 & 85–100.

2.) ROADWAY AS–BUILT PLAN & PROFILE PREPARED FOR DOVER INDUSTRIAL DEVELOPMENT AUTHORITY, QUALITY WAY AT VENTURE DRIVE, DOVER, STRAFFORD COUNTY, NEW HAMPSHIRE. SCALE: 1" = 40'; DATED: JANUARY 16, 2006, REVISED THROUGH 3/16/06; BY: McENEANEY SURVEY ASSOCIATES, INC. ON FILE WITH CITY OF DOVER ENGINEERING DEPARTMENT.

NOTES:

1.) OWNERS OF RECORD:

DOVER BUSINESS AND INDUSTRIAL DEVELOPMENT AUTHORITY
f/k/a DOVER INDUSTRIAL DEVELOPMENT AUTHORITY (D.I.D.A.)
288 CENTRAL AVENUE
DOVER, NEW HAMPSHIRE 03820
S.C.R.D. VOL. 1559 / 394
TITLE REF. SEE SCRD 1738 / 130, 1027 / 790, 773 / 481

2.) D / 11–8 – DENOTES TAX MAP AND PARCEL NUMBER.

3.) PLAN INTENT: TO SHOW THE SITE EXISTING CONDITIONS.

4.) PARCEL AREA = 375,192 S.F. / 8.61 Ac.

5.) ZONING DISTRICT IS INNOVATIVE TECHNOLOGY (IT)

DIMENSIONAL REQUIREMENTS:	
MINIMUM LOT SIZE	= 2 ACRES
MINIMUM LOT COVERAGE	= 33 PERCENT
MINIMUM FRONTAGE	= 200 FEET
BUILDING SETBACK REQUIREMENTS:	
FRONT SETBACK	= 50 FEET
SIDE SETBACK	= 50 FEET
REAR SETBACK	= 50 FEET
MAXIMUM BUILDING HEIGHT	= 55 FEET MAXIMUM

6.) THE SUBJECT PARCEL IS LOCATED OUTSIDE OF THE 0.2 PERCENT ANNUAL CHANCE FLOODPLAIN AS SHOWN ON FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 330145; PANEL 0310; SUFFIX E; MAP NUMBER 33017C0310E; EFFECTIVE DATE SEPTEMBER 30, 2015.

7.) BASIS OF BEARING IS THE CITY OF DOVER / GEOD CORP. GRID PER REFERENCE PLAN No. 1. (G.I.S. STATIONS TR 390 AND TR 391A) VERTICAL DATUM IS CITY OF DOVER / GEOD CORP. PER CITY G.I.S. STATIONS TR 390 AND TR 391A.

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

9.) WETLANDS SHOWN WERE IDENTIFIED BY DAMON E. BURT, N.H.C.W.S. #163 OF FRAGGLE ROCK ENVIRONMENTAL SERVICES ON SEPTEMBER 2, 2022 IN ACCORDANCE WITH THE 1987 CORPS. OF ENGINEERS WETLANDS DELINEATION MANUAL AND LOCATED BY McENEANEY SURVEY ASSOCIATES OF NEW ENGLAND.

10.) THE PARCEL IS SERVED BY MUNICIPAL SEWER AND WATER.

11.) TOPOGRAPHY DEPICTED IS BASED ON FIELD OBSERVATIONS BY THIS OFFICE.

12.) LOT D/11–8 WAS CREATED USING THE CITY OF DOVER TDR ORDINANCE.

LEGEND

S.F. – SQUARE FEET
Ac. – ACRE
(TYP.) – TYPICAL
± – MORE OR LESS
S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
– STONE WALL
– EDGE OF WET
f/k/a – FORMERLY KNOWN AS
D.H.(fnd) – DRILL HOLE FOUND
S.S.(fnd) – STEEL STAKE FOUND
I.R.(fnd) – IRON ROD FOUND
TBM – TEMPORARY BENCH MARK
– FIRE HYDRANT
– SEWER MANHOLE
8"S – SEWER MAIN PIPE AND SIZE
S – SEWER SERVICE
W – WATER MAIN PIPE AND SIZE
W – WATER SERVICE
– WATER GATE VALVE
G – GAS MAIN
U/G E,T,C – UNDERGROUND ELECTRIC, TELEPHONE AND CABLE BROADBAND
174 – EXISTING CONTOUR (2 FOOT INTERVAL)

No.	Bearing	Distance
L1	N30°30'05"W	55.67'
L2	N30°29'16"W	80.58'
L3	S38°23'21"E	61.89'
L4	S81°38'07"E	66.39'
L5	S77°08'15"W	52.06'
L6	S35°56'47"E	78.76'
L7	S09°40'20"W	72.30'
L8	S30°30'05"E	76.90'
L9	S30°30'05"E	59.35'

No.	Central Angle	Radius	Arc Length	Chord Length	Chord Bearing
C1	24°49'33"	253.78	109.96	109.10	N42°54'51"W
C2	22°24'32"	193.79	75.80	75.31	S41°42'21"E
C3	47°44'43"	75.00	62.50	60.71	S26°56'10"W

NO.	DATE	DESCRIPTION	BY	CHK
		REVISIONS		

22–2463	EC	22–10	53–64
PROJECT NO	TYPE	FIELDBOOK & PAGES	

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

EXISTING CONDITIONS PLAN OF LAND
PREPARED FOR
FUTURE AUTOMATION
TAX MAP D, LOT No. 11–8
QUALITY WAY
CITY of DOVER
COUNTY of STRAFFORD
STATE of NEW HAMPSHIRE

DRAWN BY: KJF	FILE: MSA\2463\D\22–2463
SCALE: 1" = 50'	DATE: NOVEMBER 2, 2022

50 25 0 25 50 100 150 200

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 661 KEVIN M. McENEANEY SEAL SIGNATURE

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

SURVEYING – PLANNING – CONSULTING

File: \\cnetserver1\MSA Projects\2463\Drawings\22-2463.dwg Layout 22x34
11/3/2022 15:45:55

DOVER NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT THE PROPOSED CONSTRUCTION OF A 25,000 S.F. AND A 10,000 S.F. BUILDING WITH ASSOCIATED SITE IMPROVEMENTS.
2. OWNER(S) OF RECORD:
   DOVER BUSINESS AND INDUSTRIAL DEVELOPMENT AUTHORITY
   f/k/a DOVER INDUSTRIAL DEVELOPMENT AUTHORITY (D.I.D.A.)
   288 CENTRAL AVENUE
   DOVER, NEW HAMPSHIRE 03820
3. D/11-8 – DENOTES TAX MAP AND PARCEL NUMBER.
4. PARCEL AREA: 375,192 S.F. / 8.61 Ac.
5. TITLE REFERENCE: SEE SCRD 1559/394, 1738/130, 1027/790, 773/481
6. REFERENCE PLANS:
   A. AMENDED SUBDIVISION AND LOT LINE ADJUSTMENT PLAN PREPARED FOR GEORGE J. FOSTER & Co., INC. AND DOVER BUSINESS AND INDUSTRIAL DEVELOPMENT AUTHORITY, TAX MAP D, LOT Nos. 9A & 11–1, VENTURE DRIVE AND QUALITY WAY, CITY OF DOVER, STRAFFORD COUNTY, NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: FEBRUARY 14, 2006, REVISED THROUGH 5/3/06; BY THIS OFFICE. RECORDED S.C.R.D. PLAN NOS. 85–99 & 85–100
   B. ROADWAY AS–BUILT PLAN & PROFILE PREPARED FOR DOVER INDUSTRIAL DEVELOPMENT AUTHORITY, QUALITY WAY AT VENTURE DRIVE, DOVER, STRAFFORD COUNTY, NEW HAMPSHIRE. SCALE: 1" = 40'; DATED: JANUARY 16, 2006, REVISED THROUGH 3/16/06; BY: McENEANEY SURVEY ASSOCIATES, INC. ON FILE WITH CITY OF THE DOVER ENGINEERING DEPARTMENT.
7. PROJECT DOES NOT PROPOSE ANY RIGHT–OF–WAY, CONSERVATION, SLOPE, CONSTRUCTION, POWER LINE, CROSS TRAVEL, OR OTHER EASEMENTS.
8. ZONING DISTRICT: INNOVATIVE TECHNOLOGY (IT)
   DIMENSIONAL REQUIREMENTS:

	REQUIRED	PROPOSED
MINIMUM LOT SIZE:	2 AC	8.61 AC
MAXIMUM LOT COVERAGE (BUILDING):	33%	±9.3%
MINIMUM FRONTAGE:	*200'	62.5'
MINIMUM OPEN SPACE:	33%	±72.8%
BUILDING SETBACK REQUIREMENTS:		
FRONT SETBACK:	*50'	±280'
SIDE SETBACK:	*50'	11.32'
REAR SETBACK:	50'	>145'
ABUT A STREET:	50'	N/A
MAXIMUM BUILDING HEIGHT:	55'	35'
PARKING SETBACK REQUIREMENTS:		
PARKING AREA SETBACK:	*25'	23.71'

*SENDING AREAS ALLOWED FOR REDUCED LOT FRONTAGE, FRONT SETBACK, SIDE SETBACK, AND PARKING AREA SETBACKS. RELIEF WAS GRANTED PER THE FOLLOWING: LOT D/11–8 WAS CREATED USING THE CITY OF DOVER TDR ORDINANCE THROUGH THE AMENDED SUBDIVISION AND LOT LINE ADJUSTMENT PLAN PREPARED FOR GEORGE J. FOSTER & CO., INC. AND DOVER BUSINESS AND INDUSTRIAL DEVELOPMENT AUTHORITY, TAX MAP D, LOT NOS 9A & 11–1, VENTURE DRIVE AND QUALITY WAY, DOVER, STRAFFORD COUNTY, NEW HAMPSHIRE. SCALE: 1"= 100'; DATED: FEBRUARY 14, 2006, REVISED THROUGH 5–3–06; BY MCENEANEY SURVEY ASSOCIATES, INC.; RECORDED S.C.R.D. PLANS 85–99 & 85–100.
LOT D/11–8 SENDING AREAS ARE IDENTIFIED IN THE EXISTING CONDITIONS PLAN PROVIDED BY MCENEANEY SURVEY ASSOCIATES.

9. LIST ANY VARIANCE 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. (SEE PROJECT VARIANCE/PERMIT SECTION)
10. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY MCENEANEY SURVEY ASSOCIATES, NOVEMBER 2022, WITH AN ERROR NOT GREATER THAN 1 IN 10,000.
11. THE SUBJECT PARCEL IS NOT LOCATED WITHIN THE 0.2 PERCENT ANNUAL CHANCE FLOODPLAIN AS SHOWN ON FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 330145; PANEL 0310; SUFFIX E; MAP NUMBER 33017C0310E; EFFECTIVE DATE SEPTEMBER 30, 2015.
12. WETLANDS WERE DELINEATED BY DAMON E. BURT, CERTIFIED WETLANDS SCIENTIST, CERTIFICATION NUMBER 163, IN ACCORDANCE WITH CHAPTER 170–27.1 OF THE ZONING ORDINANCE, ON SEPTEMBER 2, 2022.
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 IS SERVED BY MUNICIPAL WATER AND SEWER.
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. EROSION CONTROL NOTES 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 50 FT. OF CONSERVATION AND WETLAND DISTRICTS SHALL BE STAKED, FLAGGED AND CLEARLY IDENTIFIED PRIOR TO 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 IS LIGHT MANUFACTURING.
25. THE FOLLOWING FEDERAL AND STATE PERMINTS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY: (SEE PROJECT VARIANCE/PERMIT SECTION)

DOVER NOTES CONTINUED:

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 THE 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://PTAPP.UNH.EDU/
30. IF APPLICABLE, 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 59, INCLUDING 3 ACCESSIBLE SPACES, AND 45, INCLUDING 4 ACCESSIBLE 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 MCENEANEY SURVEY ASSOCIATE, OCTOBER 2022.
35. ELEVATIONS DEPICTED ARE BASED ON INFORMATION OBTAINED FROM THE CITY ENGINEER'S OFFICE AND WAS DERIVED FROM COORDINATES FOR CONTROL STATIONS TR390 AND TR391A. 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.
37. APPROVED BACKFLOW PREVENTERS SHALL BE PROVIDED FOR BOTH FIRE AND DOMESTIC WATER LINES.
38. THE PROPOSED STRUCTURES 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 ALSO BE DESIGNED IN ACCORDANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. (I.E. IBC, ANSI–117.1) AND NH RSA 155–A:5.
42. DESIGN ENGINEER SHALL PROVIDE SIGNED LETTER TO CITY ENGINEER CERTIFYING THAT THE STORMWATER MANAGEMENT SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS.
43. ALL MANHOLE COVERS SHALL BE LIFTMATE R–1743–LM OR APPROVED EQUAL WITH 90 DEGREE HINGE.
44. REQUIRED BLASTING AND EXCAVATION – DOVER FIRE DEPARTMENT SHALL BE NOTIFIED PRIOR TO ANY BLASTING ACTIVITIES AND A BLASTING PERMIT FROM THE DOVER FIRE DEPARTMENT MUST BE OBTAINED.
45. THE WATER MAIN SHALL BE POLY WRAPPED IN ACCORDANCE WITH THE CITY OF DOVER STANDARDS.
46. ALL SEWER MAINS AND MANHOLES SHALL BE TESTED IN ACCORDANCE WITH NHDES ENV–WQ 700 REQUIREMENTS. COPIES OF TEST RESULTS SHALL BE PROVIDED TO THECITY OF DOVER ENGINEERING DEPARTMENT.
47. WETLAND PLACARDS SHOULD IDENTIFY THE NO CUT WETLAND BUFFER AND SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION AND AFTER.
48. ALL FITTINGS MUST BE CLASS 140 WATER FITTINGS.
49. ALL GATE VALVES MUST BE MANUFACTURED BY MUELLER OR CLOW.

DEMOLITION NOTES:

1. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
2. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
3. THE CONTRACTOR SHALL NOTIFY "DIG SAFE" PRIOR TO ANY DEMOLITION/ CONSTRUCTION ACTIVITIES. (811).
4. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, UTILITIES AND PAVEMENT ON THE SITE TO THE LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO FAMILIARIZE HIMSELF WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS NOT ALREADY OBTAINED BY THE OWNER AND ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF–SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
8. STONES FROM REMOVED STONEWALLS SHALL REMAIN ON–SITE. STONES SHALL BE REPURPOSED ON–SITE AND SHALL NOT BE USED AS FILL.
9. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATION IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
10. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF–SITE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES, AND CODES.

SITE NOTES

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO APPLICABLE CITY AND STATE CODES.
3. ALL CONSTRUCTION LAYOUT SHALL BE DONE BY A LICENSED SURVEYOR UNDER CONTRACT WITH THE CONTRACTOR.
4. SEE DETAILS FOR SIGN LEGENDS.
5. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", THE "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICAN WITH DISABILITIES ACT, LATEST EDITIONS.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE CONSTRUCTION PROCEDURES AND SEQUENCE TO ENSURE THE SAFETY OF THE FACILITIES AND THEIR COMPONENTS DURING DEMOLITION AND CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE OWNERS REPRESENTATIVE. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIE–DOWNS. SUCH MATERIALS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AT THE COMPLETION OF THE PROJECT.
7. METHODS OF DEMOLITION, CONSTRUCTION AND ERECTION ARE THE CONTRACTOR'S RESPONSIBILITY UNLESS OTHERWISE SPECIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN ENVIRONMENTAL CONTROLS AS REQUIRED BY FEDERAL, STATE AND MUNICIPAL REGULATIONS AND PERMITS. ENVIRONMENTAL CONTROLS SHALL INCLUDE BUT SHALL NOT BE LIMITED TO DUST CONTROL AND SILT BARRIERS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DONE TO STRUCTURES OR UTILITIES OR INJURIES TO THE PUBLIC DURING THE CONSTRUCTION PHASE CAUSED BY HIMSELF, HIS EMPLOYEES, HIS SUBCONTRACTORS OR EMPLOYEES OF SAME. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES FOR THE PROTECTION OF THE WORK, WORKERS AND PUBLIC SAFETY.
9. THE SITE SHALL BE MAINTAINED TO PROVIDE ACCESSIBILITY IN ALL WEATHER CONDITIONS.
10. REFUSE PICKUP WILL BE BY PRIVATE CONTRACTOR AND WILL BE VIA DUMPSTER ON–SITE.
11. SNOW STORAGE WILL BE ACCORDING TO THE OPERATION AND MAINTENANCE PLAN AND WITHIN AREAS AS INDICATED. ON–SITE SNOW STORAGE SHALL OCCUR ALONG THE EDGES OF PROPOSED PAVEMENT.
12. ALL EXTERIOR DOORS ARE MANUAL AND OPENED FROM THE INTERIOR BY PANIC HARDWARE. ALL EXTERIOR DOORS SHALL COMPLY WITH ADA AND ALL LOCAL BUILDING CODE REQUIREMENTS.
13. ANY DEED RELATED ITEMS TO THE TRANSFER OF THE PROPERTY WILL BE REVIEWED BY THE CITY ATTORNEY WHILE STILL OWNED BY DIBDA.

GRADING NOTES:

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. CONTRACTOR SHALL RETAIN A GEOTECHNICAL ENGINEERING CONSULTANT APPROVED BY THE OWNER, TO CONDUCT COMPACTION TESTING AND FILL GRADATION MONITORING.
3. SEE EROSION CONTROL NOTES & DETAIL SHEET FOR TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
4. ALL DRAINAGE PIPES SHALL BE HDPE OR APPROVED EQUAL UNLESS OTHERWISE NOTED.
5. ALL DISTURBED AREAS NOT OTHERWISE CALLED FOR SURFACE TREATMENT SHALL RECEIVE 6" OF HIGH QUALITY LOAM AND SHALL BE SEEDED WITH GRASS.
6. ALL SITEWORK CONSTRUCTION SHALL BE ADVANCED USING "BEST MANAGEMENT PRACTICES" SANCTIONED BY THE USDA, SCS AND NHDES.
7. TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED, UTILIZED AND MAINTAINED UNTIL BASE MATERIALS ARE CONSTRUCTED.
8. CONTRACTOR SHALL PROVIDE A FINISH GRADED SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE AND UNDER RAISED STRUCTURES.
9. PROVIDE INLET PROTECTION BARRIERS AROUND ALL EXISTING AND PROPOSED STORM DRAINAGE INLETS WITHIN THE WORK LIMITS AND AS SHOWN ON PLAN. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED AND UPSTREAM AREAS HAVE BEEN STABILIZED.
10. INSPECT SILT BARRIERS AFTER EACH RAIN STORM OF 1/4 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF THE FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE STRUCTURE HEIGHT.
11. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IS REQUIRED FOR THIS PROJECT. THE SWPPP MUST INCLUDE THE APPROPRIATE BEST MANAGEMENT PRACTICES (BMP'S) TO MINIMIZE THE DISCHARGE OF POLLUTANTS FROM THE SITE. PARTIES RESPONSIBLE FOR DEVELOPING THE SWPPP SHOULD REFER TO THE EPA NPDES CONSTRUCTION GENERAL PERMITS NOTICE OF INTENT FOR A COMPLETE OUTLINE OF REQUIRED ELEMENTS. THESE PLANS AND THE STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE PLAN PREPARED FOR THIS PROJECT MAY BE UTILIZED IN FULFILLING THE REQUIREMENTS.
12. LIMIT TREE CLEARING TO ONLY THE EXTENT NECESSARY FOR CONSTRUCTION.
13. CONTRACTOR SHALL NOTIFY THE CITY OF DOVER AND THE DESIGN ENGINEER 48 HOURS PRIOR TO THE INSTALLATION OF PERMANENT STORMWATER BMP'S TO PROVIDE THE CITY AND THE ENGINEER THE OPPORTUNITY TO WITNESS THE CONSTRUCTION AND MATERIALS. THE DESIGN ENGINEER MUST CERTIFY THAT THE STORMWATER MANAGEMENT SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS.
14. DENSITY REQUIREMENTS:

LOCATION	MINIMUM DENSITY
BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREA	90%

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

PROJECT VARIANCE / PERMIT SUMMARY:

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

   NHDES ALTERATION OF TERRAIN: PENDING

   NHDES WETLANDS: PENDING

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

   SITE PLAN: P24–XX

   CONDITIONAL USE PERMIT: P24–XX

   WAVERS REQUESTED: NONE REQUESTED

UTILITY NOTES

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
3. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
4. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
5. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
6. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, DOUBLE CEMENT LINED DUCTILE IRON PIPE OR TYPE "K" COPPER, OR CITY APPROVED MATERIAL.
7. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF DOVER WATER DEPARTMENT.
8. ALL GRAVITY SEWER PIPE SHALL BE PVC SDR 35 UNLESS OTHERWISE NOTED AND CONFORM TO THE REQUIREMENTS OF THE CITY OF DOVER SEWER DEPARTMENT STANDARDS.
9. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
10. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
11. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE UTILITY COMPANIES.
12. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
13. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
14. 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.
15. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES. COORDINATE WITH GAS COMPANY.
16. A 10–FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18–INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
17. THE CONTRACTOR SHALL CONTACT "DIG–SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG–SAFE" NUMBER ON SITE AT ALL TIMES.
18. SAWCUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
19. GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF DOVER.
20. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF DOVER.
21. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
22. CONTRACTOR SHALL PHASE UTILITY CONSTRUCTION, PARTICULARLY WATER MAIN AND GAS MAIN CONSTRUCTION AS TO MAINTAIN CONTINUOUS SERVICE TO ABUTTING PROPERTIES. CONTRACTOR SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
23. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PREPARED BY THE PROJECT ELECTRICAL ENGINEER.
24. THE PROPOSED STRUCTURE SHALL COMPLY WITH CHAPTER 81, ARTICLE IV, SECTION 81–27 AND THE STATE BUILDING CODES OF THE CODE OF THE CITY OF DOVER.
25. FIRE SUPPRESSION PLANS SHALL BE PROVIDED TO THE FIRE/INSPECTION DEPARTMENT PRIOR TO INSTALLATION.
26. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
27. SEWAGE LOADING (PER NHDES ENV–WQ 1008.03)
    BUILDING 1:
    – OFFICE = 2,864 SF x 5 GPD/100 SF = 144 GPD
    – LIGHT MANUF. (FACTORY)=25 EMPLOYEES x 10 GPD/ EMPL = 250 GPD
    – TOTAL = 394 GPD
    BUILDING 2:
    – OFFICE = 3,330 SF x 5 GPD/100 SF = 166.5 = 167 GPD
    – LIGHT MANUF. (FACTORY) = 20 EMPLOYEES x 10 GPD/EMP = 200 GPD
    – TOTAL = 367 PGD

UTILITY CONTACTS

NATURAL GAS: –
CONTACT: UNITIL CORPORATION
DAVID MACLEAN
325 WEST ROAD
PORTSMOUTH, NH 03801
TEL: (603)–294–5261
EMAIL: MACLEAND@UNITIL.COM

WATER & SEWER: – CITY OF DOVER COMMUNITY SERVICES DEPARTMENT
PUBLIC WORKS & UTILITIES
CONTACT: KEN MAVROGEORGE, PE
271 MAST ROAD
DOVER, NH 03820
TEL: (603)–516–6450
EMAIL: K.MAVROGEORGE@DOVER.NH.GOV

ELECTRIC: – EVERSOURCE
CONTACT: TREVER EMMONS
4 OLD DOVER ROAD
ROCHESTER, NH 03867
TEL: (603)–332–7515
EMAIL: TREVER.EMMONS@EVERSOURCE.COM

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

NO.	REVISION	APP'D	DATE

DATE: 1–18–24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

NOTE SHEET

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CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 1-18-24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

LEGEND

S.F.	SQUARE FEET
Ac.	ACRE
±	MORE OR LESS
(TYP)	TYPICAL
TBR	TO BE REMOVED
R.O.W.	RIGHT OF WAY
	EXISTING UTILITY POLE
	EXISTING WATER SHUT-OFF
	EXISTING WATER VALVE
	EXISTING GAS VALVE
	EXISTING HYDRANT
S	EXISTING SEWER MANHOLE
U/G T.E.	EXISTING ELECTRIC
W	EXISTING WATER LINE
S	EXISTING SEWER LINE
D	EXISTING DRAINAGE LINE
G	EXISTING GAS LINE
	EDGE OF WET
	50' WETLAND BUFFER

PARCEL AREA
375,192 S.F.
8.61 Ac.

50' WETLAND BUFFER

PROPOSED TREELINE

PROPOSED TREELINE

PROPOSED TREELINE

PROPOSED TREELINE

50' WETLAND BUFFER

TREELINE TO BE REMOVED

REMOVE SEWER CAP FOR PROPOSED SEWER CONNECTION

ELECTRIC CABINET
5C/SC9
TBM NORTHEAST
CORNER CONCRETE
ELEVATION = 170.75'

SMH
RIM = 170.48
INV. IN = 161.28
INV. OUT 161.28

8" S

S 4° W 65'

S 4° W 65'

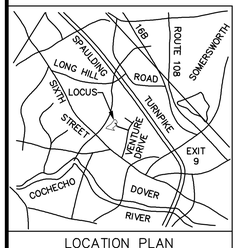
END GAS LINE

W T.E. ELEC.

U/G T.E.

QUALITY WAY

NH STATE PLANE
NAD 83 CPS OBS.



LOCATION PLAN
(NO SCALE)

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

DEMOLITION PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

5

PARCEL AREA
375,192 S.F.
8.61 Ac.

LEGEND

S.F.	SQUARE FEET
Ac.	ACRE
±	MORE OR LESS
(TYP)	TYPICAL
DIA.	DIAMETER
V.I.F.	VERIFY IN FIELD
	EXISTING UTILITY POLE
	EXISTING SIGN
	EXISTING HYDRANT
	EXISTING LIGHT/SIGNAL POLE
5'R	PAVEMENT RADIUS
SGC	SLOPED GRANITE CURB
BCC	BITUMINOUS CONTRETE CURB
ICC	INTERGRATED CONCRETE CURB
	EDGE OF WET
	50' WETLAND BUFFER
	PROPOSED SIGN
	PAVEMENT WITH CURB
	PROPOSED FIRE HYDRANT
	PROPOSED RIPRAP
	PROPOSED CONCRETE

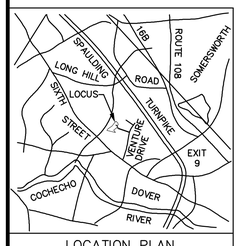
SITE PARKING CALCULATIONS
FOR THE PROPOSED DEVELOPMENT, THE CITY OF DOVER PARKING MAXIMUMS ALLOW FOR THE FOLLOWING:

REQUIRED/PROPOSED -BUILDING 1:
- OFFICE: 1 SPACE PER 300 SF (2,864 SF) = 10 SURFACE SPACES
- MANUFACTURING: 1 SPACE PER 800 SF (22,000 SF) = 28 SURFACE SPACES
- TOTAL MAXIMUM = 38 SURFACE SPACES (INCLUDES 2 ACCESSIBLE SPACES)
- TOTAL PROPOSED = 35 SURFACE SPACES (INCLUDES 2 ACCESSIBLE SPACES)

REQUIRED/PROPOSED -BUILDING 2:
- OFFICE: 1 SPACE PER 300 SF (3,330 SF) = 12 SURFACE SPACES
- MANUFACTURING: 1 SPACE PER 800 SF (6,670 SF) = 9 SURFACE SPACES
- TOTAL MAXIMUM = 21 SURFACE SPACES (INCLUDES 1 ACCESSIBLE SPACES)
- TOTAL PROPOSED = 10 SURFACE SPACES (INCLUDES 2 ACCESSIBLE SPACES)

SNOW STORAGE CALCULATIONS
60,610 SF PAVEMENT 1 SF STORAGE = ±6,061 SF
10 SF PAVEMENT

SNOW STORAGE AREA PROVIDE ± 6,150 SF.



LOCATION PLAN
(NO SCALE)

NO STATE PLANE MAD 83 CORS DBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

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CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

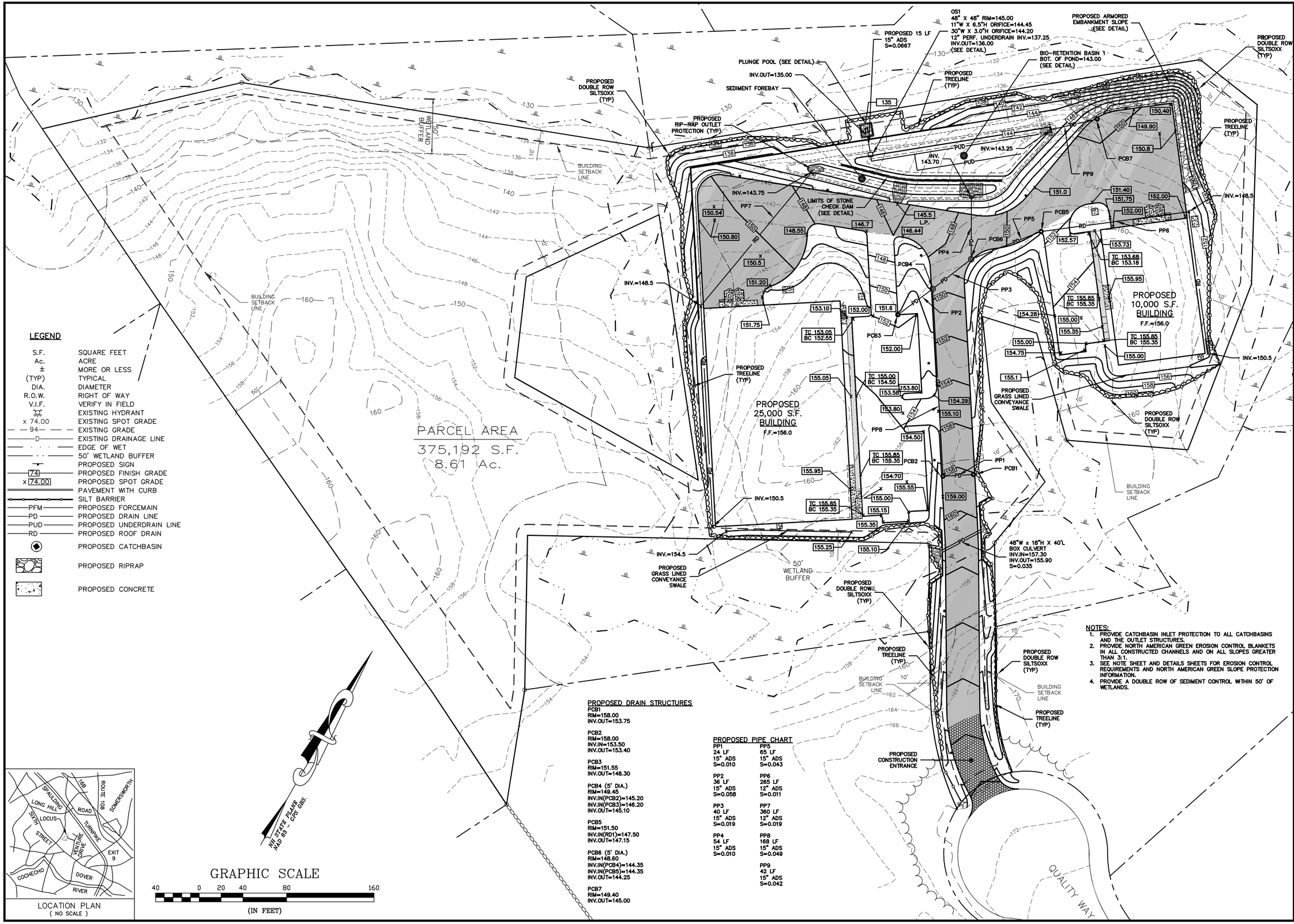
DATE: 1-18-24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

SITE PLAN

6



LEGEND

S.F.	SQUARE FEET
Ac.	ACRE
±	MORE OR LESS
(TYP)	TYPICAL
DIA.	DIAMETER
R.O.W.	RIGHT OF WAY
V.I.F.	VERIFY IN FIELD
	EXISTING HYDRANT
x 74.00	EXISTING SPOT GRADE
94	EXISTING GRADE
D	EXISTING DRAINAGE LINE
	EDGE OF WET
	50' WETLAND BUFFER
	PROPOSED SIGN
74	PROPOSED FINISH GRADE
x 74.00	PROPOSED SPOT GRADE
	PAVEMENT WITH CURB
	SILT BARRIER
PFM	PROPOSED FORCEMAIN
PD	PROPOSED DRAIN LINE
PUD	PROPOSED UNDERDRAIN LINE
RD	PROPOSED ROOF DRAIN
	PROPOSED CATCHBASIN
	PROPOSED RIPRAP
	PROPOSED CONCRETE

PARCEL AREA
375,192 S.F.
8.61 Ac.

NH STATE PLANE
NAD 83 - CRD DBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

LOCATION PLAN
(NO SCALE)

PROPOSED DRAIN STRUCTURES

PCB1
RIM=158.00
INV.OUT=153.75

PCB2
RIM=158.00
INV.IN=153.50
INV.OUT=153.40

PCB3
RIM=151.55
INV.OUT=148.30

PCB4 (5' DIA.)
RIM=149.45
INV.IN(PCB2)=145.20
INV.IN(PCB3)=146.20
INV.OUT=145.10

PCB5
RIM=151.50
INV.IN(RD1)=147.50
INV.OUT=147.15

PCB6 (5' DIA.)
RIM=148.60
INV.IN(PCB4)=144.35
INV.IN(PCB5)=144.35
INV.OUT=144.25

PCB7
RIM=149.40
INV.OUT=145.00

PROPOSED PIPE CHART

PP1 24 LF 15" ADS S=0.010	PP5 65 LF 15" ADS S=0.043
PP2 36 LF 15" ADS S=0.058	PP6 265 LF 12" ADS S=0.011
PP3 40 LF 15" ADS S=0.019	PP7 360 LF 12" ADS S=0.019
PP4 54 LF 15" ADS S=0.010	PP8 168 LF 15" ADS S=0.049
	PP9 42 LF 15" ADS S=0.042

NOTES:
1. PROVIDE CATCHBASIN INLET PROTECTION TO ALL CATCHBASINS AND THE OUTLET STRUCTURES.
2. PROVIDE NORTH AMERICAN GREEN EROSION CONTROL BLANKETS IN ALL CONSTRUCTED CHANNELS AND ON ALL SLOPES GREATER THAN 3:1.
3. SEE NOTE SHEET AND DETAILS SHEETS FOR EROSION CONTROL REQUIREMENTS AND NORTH AMERICAN GREEN SLOPE PROTECTION INFORMATION.
4. PROVIDE A DOUBLE ROW OF SEDIMENT CONTROL WITHIN 50' OF WETLANDS.

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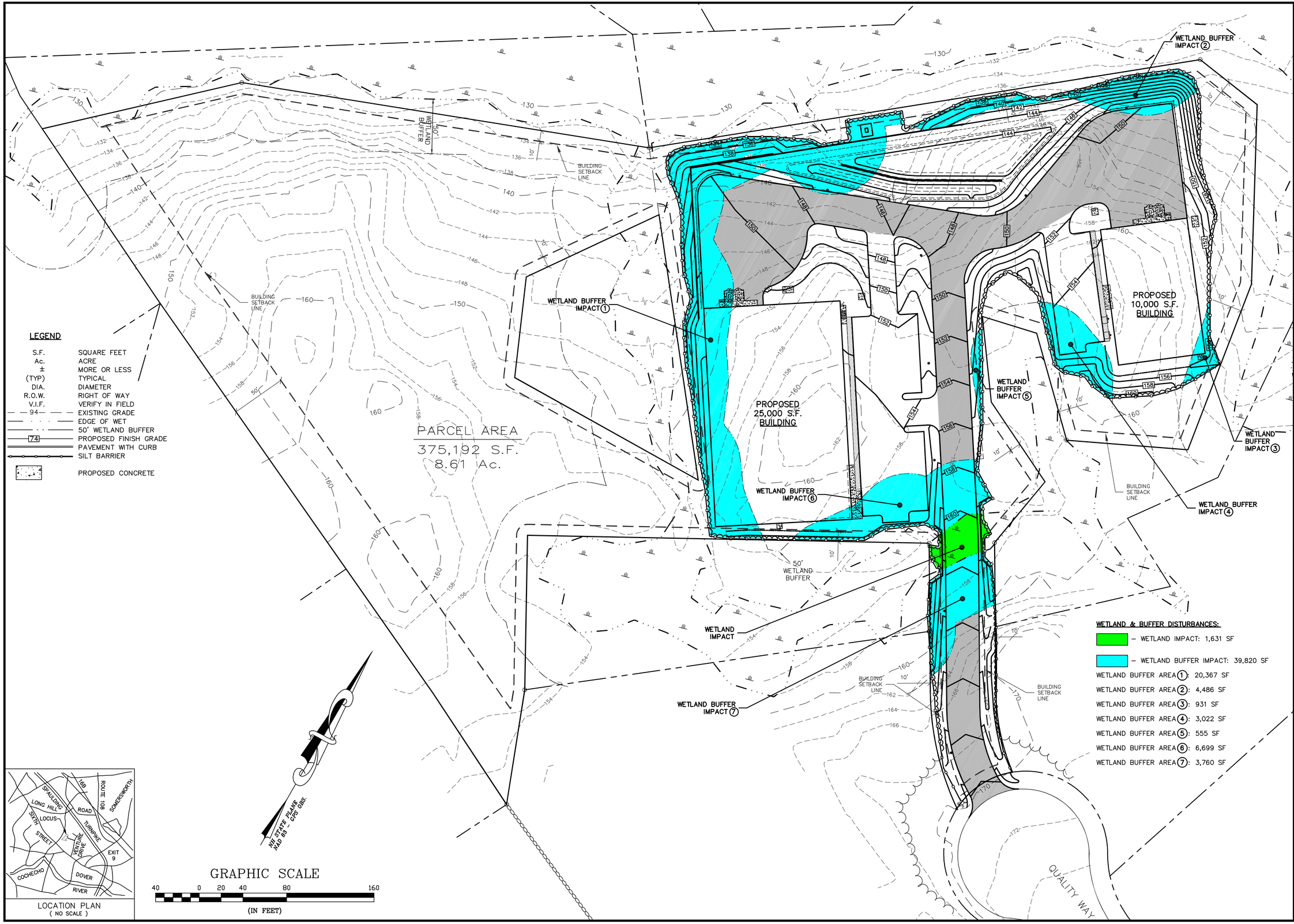
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GRADING, DRAINAGE & EROSION CONTROL PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

7



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WETLAND / WETLAND BUFFER IMPACT PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

8

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LEGEND

S.F.	SQUARE FEET
Ac.	ACRE
±	MORE OR LESS
(TYP)	TYPICAL
DIA.	DIAMETER
V.I.F.	VERIFY IN FIELD
	EXISTING UTILITY POLE
	EXISTING WATER SHUT-OFF
	EXISTING WATER VALVE
	EXISTING GAS VALVE
	EXISTING HYDRANT
	EXISTING LIGHT/SIGNAL POLE
	EXISTING SEWER MANHOLE
OHU	OVERHEAD UTILITY
E	EXISTING ELECTRIC
W	EXISTING WATER LINE
S	EXISTING SEWER LINE
D	EXISTING DRAINAGE LINE
G	EXISTING GAS LINE
	EDGE OF WET
	50' WETLAND BUFFER
	PAVEMENT WITH CURB
	SILT BARRIER
PG	PROPOSED GAS
PW	PROPOSED WATER
PE	PROPOSED ELECTRIC
RD	PROPOSED ROOF DRAIN
PS	PROPOSED SEWER
PFM	PROPOSED FORCEMAIN
PD	PROPOSED DRAIN LINE
PUD	PROPOSED UNDERDRAIN LINE
PFES	PROPOSED FLARED END SECTION
	PROPOSED CATCHBASIN
	PROPOSED THRUST BLOCK
	PROPOSED WATER SHUTOFF
	PROPOSED FIRE HYDRANT
	PROPOSED UTILITY POLE
	PROPOSED RIPRAP
	PROPOSED CONCRETE

PARCEL AREA
375,192 S.F.
8.61 Ac.

50' WETLAND BUFFER

PUMP STATION PS-1 (SEE DETAIL)

PUMP STATION PS-2 (SEE DETAIL)

PROPOSED SEWER LINE

PROPOSED 10,000 S.F. BUILDING

PROPOSED FUTURE EV CHARGING STATION ELECTRICAL LINE

PROPOSED 25,000 S.F. BUILDING

PROPOSED FUTURE EV CHARGING STATION ELECTRICAL LINE

50' WETLAND BUFFER

ELECTRIC CABINET
5C/SC9
TBM NORTHEAST
CORNER CONCRETE
ELEVATION = 170.75'

SMH
RIM = 170.48
INV. IN = 161.28
INV. OUT 161.28

END GAS LINE

QUALITY WAY

U/G T.E.

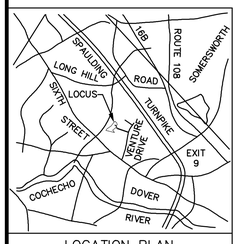
W 12" C.I.P.

4" W

6" S

NH STATE PLANE, NAD 83 - GPS OBS.

LOCATION PLAN
(NO SCALE)



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

UTILITY PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

9

DESCRIPTION

1. THE INTENT OF THIS PLAN IS TO SHOW SITE IMPROVEMENTS ASSOCIATED WITH THE CONSTRUCTION OF A 25,000 S.F. BUILDING AND A 10,000 S.F. BUILDING AS WELL AS DRAINAGE AND UTILITY IMPROVEMENTS, AND SITE ACCESS.

PROJECT NAME AND LOCATION

FUTURE AUTOMATION
TAX MAP D, LOT 11-8
QUALITY WAY
DOVER, NH

LATITUDE N43° 13' 26"
LONGITUDE W70° 54' 46"

DISTURBED AREA

±164,238 S.F..

NOTES:

1. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.

SEQUENCE OF MAJOR ACTIVITIES

1. CONTRACTOR SHALL PREPARE THE SWPPP. FILE FOR AND OBTAIN THE NOI A MINIMUM OF 2 WEEKS PRIOR TO COMMENCEMENT OF SITE WORK.
2. PLACE TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S PRIOR TO EARTH MOVING ACTIVITIES.
3. ALL EROSION CONTROL AND PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO COMMENCING EARTH MOVING OPERATIONS.
4. SELECTIVE DEMOLITION.
5. REGRADE SITE TO SUBGRADE.
6. TEMPORARY WATER DIVERSION (SWALES, BASINS) MUST BE USED AS NECCESSARY UNTIL AREAS ARE STABILIZED.
7. SWALES AND PONDS (AS APPLICABLE) SHALL BE CONSTRUCTED EARLY ON IN THE CONSTRUCTION SEQUENCE AND BEFORE ROUGH GRADING OF THE SITE AND ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. INSTALL DRAINAGE STRUCTURES AND CONTROLS.
9. INSTALL FOUNDATION FOOTINGS AND WALLS.
10. INSTALL UTILITIES.
11. PLACE GRAVELS AND FINE GRADE.
12. STABILIZE ROADWAYS AND PARKING AREAS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
13. ALL CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED (AS APPLICABLE) WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.
14. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EVERY 1/2" OF RAINFALL.
15. IN ALL CASES THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION AND IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
16. WHEN ALL SITE WORK IS COMPLETE AND ALL DISTURBED AREAS ARE STABILIZED REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND FILE THE EPA – N.O.T.

DEFINITIONS

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED.

1. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
2. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
3. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED; OR
4. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED

INSTALLATION, MAINTENANCE, AND INSPECTION PROCEDURES OF EROSION AND SEDIMENT CONTROLS

A. SILT BARRIER

1. INSTALLATION
   a. USE SILT BARRIER AS PERIMETER CONTROLS, PARTICULARLY AT THE LOWER OR DOWN SLOPE EDGE OF A DISTURBED AREA.
   b. LEAVE SPACE FOR MAINTENANCE BETWEEN TOE AND SLOPE OF SILT BARRIER.
   c. TRENCH IN THE SILT BARRIER ON THE UPHILL SIDE (6 INCHES DEEP BY 6 INCHES WIDE).
   d. INSTALL STAKES ON THE DOWNHILL SIDE OF THE SILT BARRIER.
   e. CURVE THE END OF THE SILT BARRIER UP-GRADIENT TO HELP IT CONTAIN RUNOFF.
2. SEQUENCE OF INSTALLATION
   a. SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM.
3. MAINTENANCE
   a. SILT BARRIERS SHOULD BE INSPECTED AND MAINTAINED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.
   b. SILT BARRIERS HAVE A USEFUL LIFE OF ONE SEASON. ON LONGER CONSTRUCTION PROJECTS, SILT BARRIERS SHOULD BE REPLACED PERIODICALLY TO MAINTAIN EFFECTIVENESS.
   c. REMOVE SEDIMENT WHEN IT REACHES ONE-THIRD (1/3) THE HEIGHT OF THE SILT BARRIER.
   d. REPLACE THE SILT BARRIERS WHERE THEY ARE TORN, WORN, OR OTHERWISED DAMAGED AND MONITOR PERFORMANCE TO ENSURE EFFECTIVE PERFORMANCE.
   e. RETRENCH OR REPLACE ANY SILT BARRIER THAT IS NOT PROPERLY ANCHORED TO THE GROUND.
   f. IF THERE IS EVIDENCE OF END FLOW ON PROPERLY INSTALLED BARRIERS, EXTEND BARRIERS UPHILL OR CONSIDER REPLACING THEM WITH OTHER MEASURES, SUCH AS TEMPORARY DIVERSIONS AND SEDIMENT TRAPS.
   g. SILT BARRIERS SHOULD BE REPAIRED IMMEDIATELY IF THERE ARE ANY SIGNS OF EROSION OR SEDIMENTATION BELOW THEM. IF THERE ARE SIGNS OF UNDERCUTTING AT THE CENTER OR THE EDGES OF THE BARRIER, OR IMPOUNDING OF LARGE VOLUMES OF WATER BEHIND THEM, SILT BARRIERS SHOULD BE REPLACED WITH A TEMPORARY CHECK DAM.

B. MULCHING

1. TIMING
   a. APPLY MULCH PRIOR TO ANY STORM EVENT. IT WILL BE NECESSARY TO CLOSELY MONITOR WEATHER PREDICTIONS TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.
   b. IN OTHER AREAS, THE TIME PERIOD CAN RANGE FROM 14 TO 30 DAYS OF INACTIVITY ON A AREA. THE LENGTH OF TIME VARYING WITH SITE CONDITIONS. PROFESSIONAL JUDGEMENT SHALL BE USED TO EVALUATE THE INTERACTION OF SITE CONDITIONS (SOIL ERODIBILITY, SEASON OF YEAR, EXTENT OF DISTURBANCE, PROXIMITY TO SENSITIVE RESOURCES, ETC.) AND THE POTENTIAL IMPACT OF EROSION ON ADJACENT AREAS TO CHOOSE AN APPROPRIATE TIME RESTRICTION.
   c. WITHIN 100 FEET OF RIVERS, STREAMS, WETLANDS, AND IN LAKE AND POND WATERSHEDS, THE TIME PERIOD OF WHICH MULCHING SHOULD TAKE OCCUR SHOULD BE NO GREATER THAN SEVEN (7) DAYS. THIS SEVEN DAY LIMIT SHOULD BE REDUCED FURTHER DURING WET WEATHER PERIODS.
2. APPLICATION RATE
   a. MULCH SHALL BE APPLIED AT A RATE OF BETWEEN 1.5 TO 2 TONS PER ACRE, OR 70 TO 90 POUNDS PER 1000 SQUARE FEET.
   b. GUIDELINES FOR WINTER MULCH APPLICATION. WHEN MULCH IS APPLIED TO PROVIDE PROTECTION OVER WINTER (PAST THE GROWING SEASON) IT SHALL BE AT A RATE OF 150-200 POUNDS OF HAY OR STRAW PER ACRE WITH ABOUT 4 INCHES IN DEPTH. A TACKIFIER MAY BE ADDED TO THE MULCH.
3. MAINTENANCE
   a. ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS. CHECK FOR SIGNS OF EROSION OR DISPLACEMENT OF THE MULCH. IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED.
   b. NETS MUST BE INSPECTED AFTER RAIN EVENTS FOR DISLOCATION OR FAILURE AND SHOULD BE REPAIRED AS NECCESSARY.
   c. INSPECTIONS SHOULD TAKE PLACE UNTIL THE SITE IS ESTABLISHED.
   d. EROSION CONTROL MIX MULCH USED FOR TEMPORARY STABILIZATION SHOULD BE LEFT IN PLACE. VEGETATION ADDS STABILITY AND SHOULD BE PROMOTED.

C. TEMPORARY SEEDING

1. SEEDBED PREPARATION
   a. STONES AND TRASH SHOULD BE REMOVED SO AS NOT TO INTERFERE WITH THE SEEDING AREA.
   b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF 2 INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED.
   c. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS.
      i) APPLY FERTILIZER AT A RATE OF 600 POUNDS PER ACRE OR 13.8 POUNDS PER 1,000 SQUARE FEET OF LOW PHOSPHATE FERTILIZER OR EQUIVALENT.
      ii) APPLY LIMESTONE AT A RATE OF 3 TONS PER ACRE OR 138 POUNDS PER 1,000 SQUARE FEET.
2. SEEDING
   a. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SUMMARY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
   b. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
   c. TEMPORARY SEEDING BETWEEN MAY 15TH AND AUGUST 15TH SHOULD BE COVERED WITH HAY OR STRAW MULCH, ACCORDING TO THE "TEMPORARY AND PERMANENT MULCHING" PRACTICE.
   d. VEGETATED GROWTH COVERING 85% OF THE DISTURBED AREA SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH.
3. MAINTENANCE
   a. TEMPORARY SEEDING SHALL BE INSPECTED PERIODICALLY. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER FABRICS, CHECK DAMS, ETC.).

D. PERMANENT SEEDING

1. BEDDING – STONES LARGER THAN 2 INCHES, TRASH, ROOTS, AND OTHER DEBRIS INTERFERRING WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA SHOULD BE REMOVED. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF 4" TO PREPARE A SEEDBED AND MIX FERTILIZER INTO THE SOIL.
2. FERTILIZER
   a. LIME AND FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 4 INCHES USING A DISC, SPRING TOOTH HARROW, OR OTHER SUITABLE EQUIPMENT PRIOR TO OR AT THE SAME TIME OF SEEDING.
   b. FERTILIZER SHOULD BE RESTRICTED TO A LOW PHOSPHATE, SLOW RELEASE NITORGEN FERTILIZER WHEN APPLIED TO AREAS BETWEEN 25 FEET AND 250 FEET FROM A SURFACE WATER BODY. NO FERTILIZER EXCEPT LIMESTONE SHOULD BE APPLIED WITHIN 25 FEET OF THE SURFACE WATER.
   c. KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
      AGRICULTURAL LIMESTONE @ 138 LBS. PER 1,000 S.F.
      LOW PHOSPHATE (N-P205-K20) FERTILIZER @ 13.8 LBS. PER 1,000 S.F.
3. SEED MIXTURE (RECOMMENDED)
   RATE:

TYPE	LBS. PER ACRE	LBS. PER 1,000 S.F.
TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDSFOOT TREFOIL	8	0.20
TOTAL	48	1.10

4. SEEDING
   a. SPRING SEEDING USUALLY GIVES THE BEST RESULTS FOR ALL SEED MIXES OR WITH LEGUMES. PERMANENT SEEDING SHOULD BE COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST.
   b. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
   c. VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH. IF THIS CONDITION IS NOT ACHIEVED, IMPLEMENT TEMPORARY STABILIZATION MEASURES FOR OVERWINTER PROTECTION.
5. HYDROSEEDING
   a. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. THE USE OF STRAW MULCH ON CRITICAL AREAS IS PREFERRED SINCE IT GRANTS BETTER SLOPE PROTECTION BY USING ADHESIVE MATERIALS.
   b. SLOPES MUST BE NO STEEPER THAN 2 TO 1 (2 FEET HORIZONTALLY TO 1 FOOT VERTICALLY).
   c. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
6. MAINTENANCE
   a. PERMANENT SEEDED AREAS SHOULD BE INSPECTED AT LEAST MONTHLY DURING THE COURSE OF CONSTRUCTION. INSPECTIONS, MAINTENANCE, AND CORRECTIVE ACTIONS SHOULD CONTINUE UNTIL THE OWNER ASSUMES PERMANENT OPERATION OF THE SITE.
   b. SEEDED AREAS SHOULD BE MOWED AS REQUIRED TO MAINTAIN A HEALTHY STAND OF VEGETATION, WITH MOWING HEIGHT AND FREQUENCY DEPENDENT ON TYPE OF GRASS COVER.
   c. BASED ON INSPECTION, AREAS SHOULD BE RESEEDED TO ACHIEVE FULL STABALIZATION OF EXPOSED SOILS.
   d. IF EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHOULD BE MADE AND AREAS RESEEDED. WITH OTHER TEMPORARY MEASURES USED TO PROVIDE EROSION PROTECTION DURING THE PERIOD OF VEGETATION ESTABLISHMENT.
   e. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION.

E. STORM DRAIN INLET PROTECTION

1. SPECIFICATIONS
   a. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE BARRIER SHOULD BE LESS THAN ONE ACRE.
   b. ANY RESULTANT PONDING OF STORMWATER MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.
2. INSTALLATION
   a. INSTALL INLET PROTECTION AS SOON AS STORM DRAIN INLETS ARE INSTALLED AND BEFORE LAND-DISTURBANCE ACTIVITIES BEGIN IN AREAS WITH EXISTING STORM DRAIN SYSTEMS.
   b. PROTECT ALL INLETS THAT COULD RECEIVE STORMWATER FROM YOUR CONSTRUCTION PROJECT.
   c. USE IN CONJUNCTION WITH OTHER EROSION PREVENTION AND SEDIMENT CONTROL BMPS.
   d. DESIGN YOUR INLET PROTECTION TO HANDLE THE VOLUME OF WATER FROM THE AREA BEING DRAINED. ENSURE THAT THE DESIGN IS SIZED APPROPRIATELY.
3. MAINTENANCE
   a. INSPECT INLETS BARRIERS FREQUENTLY, BEFORE AND AFTER EACH RAINFALL EVENT AND REPAIR WHEN NECESSARY.
   b. SEDIMENT SHOULD BE REMOVED AND THE STORM DRAIN SEDIMENT BARRIER RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE BARRIER.
   c. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
   d. SWEEP STREETS, SIDEWALKS, AND OTHER PAVED AREAS REGULARLY.
   e. ALL CATCH BASINS AND STORM DRAIN INLETS MUST BE CLEANED AT THE END OF CONSTRUCTION AND AFTER THE SITE HAS BEEN FULLY STABILIZED

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES THE SILT BARRIERS SHALL BE INSTALLED PRIOR TO COMMENCING ANY CLEARING OR GRADING OF THE SITE. STRUCTURAL CONTROLS SHALL BE INSTALLED CONCURRENTLY WITH THE APPLICABLE ACTIVITY. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN TWENTY ONE (21) DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN FOURTEEN (14) DAYS OF THE LAST DISTURBANCE. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, SILT FENCES AND ANY EARTH/DIKES WILL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED. ALL AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.

WASTE DISPOSAL

a. WASTE MATERIALS
   ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN A DUMPSTER. NO CONSTRUCTION WASTE MATERIALS WILL BE BURIED ON SITE. ALL PERSONEL WILL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
b. HAZARDOUS WASTE
   ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
c. SANITARY WASTE
   ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

MAINTENACE OF STORMWATER MANAGEMENT FACILITIES

THE PROJECT PROPONENT IS RESPONSIBLE FOR THE MAINTENANCE OF ALL STORMWATER FACILITIES DURING CONSTRUCTION AND THE PROPERTY OWNER IS RESPONSIBLE AFTER CONSTRUCTION IS COMPLETE.

CATCH BASINS & STORMWATER TREATMENT STRUCTURES

1. CATCH BASINS & STORMWATER TREATMENT STRUCTURES SHOULD BE INSPECTED ON A MONTHLY BASIS AND/OR AFTER A MAJOR RAINFALL EVENT TO ASSURE THAT DEBRIS OR SEDIMENTS DO NOT REDUCE THE EFFECTIVENESS OF THE SYSTEM.

SPIL PREVENTION

A. MATERIAL MANAGEMENT PRACTICES

THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RICK OF SPILLS OR OTHER ACCIDENTAL SANITARY EXPOSURE OF MATERIALS AND SUBSTANCE DURING CONSTRUCTION TO STORMWATER RUNOFF:
GOOD HOUSEKEEPING:
THE FOLLOWING GOOD HOUSEKEEPING PRACTICES THAT WILL BE FOLLOWED ON SITE DURING

1. THE CONSTRUCTION PROJECT:
   a. AN EFFORT WILL BE MADE TO STORE ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB.
   b. ALL MATERIALS STORED ON SITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE.
   c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.
   d. THE SITE SUPERINTENDENT WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS.
   e. SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
   f. WHENEVER POSSIBLE ALL OF A PRODUCT WILL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
2. HAZARDOUS PRODUCTS:
   a. THE FOLLOWING PRACTICES WILL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
   b. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.
   c. ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION.
   d. SURPLUS PRODUCT THAT MUST BE DISPOSED OF WILL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.

B. PRODUCT SPECIFICATION PRACTICES

THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ON SITE:

1. PETROLEUM PRODUCTS:
   a. ALL ON SITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENACE TO REDUCE LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
2. FERTILIZERS:
   a. FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER. STORAGE WILL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
3. PAINTS:
   a. ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM BUT WILL BE DISPOSED OF PROPERLY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
4. CONCRETE TRUCKS:
   a. CONCRETE TRUCKS WILL DISCHARGE AND WASH OUT SURPLUS CONCRETE OR DRUM WASH WATER IN A CONTAINED AREA ON SITE.

C. SPILL CONTROL PRACTICES

IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION THE FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:

a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.
b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS WILL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST, AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE.
c. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.
d. THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OF LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.
f. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM RECURRING AND HOW TO CLEANUP THE SPILL IF IT OCCURS. A DESCRIPTION OF THE SPILL, ITS CAUSE, AND THE CLEANUP MEASURES WILL BE INCLUDED.
g. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.

THE PROJECT PROPONENT IS REQUIRED TO MANAGE CONSTRUCTION TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO CONTROLLING INVASIVE SPECIES AND CONTROLLING FUGITIVE DUST IN ACCORDANCE WITH ENV-A 1002.

AGR 3800 PROHIBITED INVASIVE PLANT SPECIES RULES

THE RULE, AGR 3800, STATES: NO PERSON SHALL COLLECT, TRANSPORT, IMPORT, EXPORT, MOVE, BUY SELL, DISTRIBUTE, PROPAGATE OR TRANSPLANT ANY LIVING AND VIABLE PORTION OF ANY PLANT SPECIES, WHICH INCLUDED ALL OF THEIR CULTIVARS AND VARIETIES, LISTED IN TABLE 3800.1, NEW HAMPSHIRE PROHIBITED INVASIVE SPECIES LIST'. A COMPLETE COPY OF THE RULES CAN BE ACCESSED ON THE INTERNET AT
HTTP://AGRICULTURE.NH.GOV/TOPICS/PLANTS_INSECTS.HTM.

ENV-A 1002 FUGITIVE DUST: PRECAUTIONS TO PREVENT, ABATE, AND CONTROL FUGITIVE DUST.

a. ANY PERSON ENGAGED IN ANY ACTIVITY WITHIN THE STATE EMITS FUGITIVE DUST, OTHER THAT THOSE LISTED IN ENV-A 1002.02 (b), SHALL TAKE PRECAUTIONS THROUGHOUT THE DURATION OF THE ACTIVITY IN ORDER TO PREVENT, ABATE, AND CONTROL THE EMISSION OF FUGITIVE DUST.
b. PRECAUTIONS REQUIRED BY (a) ABOVE, SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
   i) THE USE OF WATER OR HYDROPHILIC MATERIAL ON OPERATIONS ON SURFACES, OR BOTH;
   ii) THE APPLICATION OF ASPHALT, WATER, OR HYDROPHILIC MATERIAL, OR TARPS OR OTHER SUCH COVERS TO MATERIAL STOCKPILES;
   iii) THE USE OF HOODS, FANS, FABRIC FILTERS, OR OTHER DEVICES TO ENCLOSE AND VENT AREAS WHERE MATERIALS PRONE TO PRODUCING FUGITIVE DUST ARE HANDLED;
   iv) THE USE OF CONTAINMENT METHODS FOR SANDBLASTING OR SIMILAR OPERATIONS; AND
   v) THE USE OF VACUUMS OR OTHER SUCTION DEVICES TO COLLECT AIRBORNE PARTICULATE MATTER.

PER 153-10 F.

ALL SITE IMPROVEMENTS WHICH REQUIRE BLASTING OF LAND SHALL MEET THE FOLLOWING REQUIREMENTS PRIOR TO ANY BLASTING OCCURING.

1. THE APPLICANT SHALL PREPARE A PRE-BLAST SURVEY OF ALL STRUCTURES WITHIN FIVE HUNDRED (500) FEET OF THE EXTERNAL BOUNDARIES OF THE PROPOSED LOT TO BE DEVELOPED. THIS SURVEY, ALONG WITH A MONITORING PLAN, SHALL BE ON FILE WITH THE DOVER FIRE AND RESCUE. UPON RECOMMENDATIONS OF THE CHIEF, THE PLANNING BOARD MAY REQUIRE A PRE-BLAST SURVEY OF ALL STRUCTURES WITHIN ONE THOUSAND (1000) FEET.
2. THE APPLICANT SHALL HOLD A NEIGHBORHOOD MEETING TO REVIEW THE BLASTING PLAN AND PRE-BLAST SURVEY, WITH REPRESENTATIVES OF THE FIRE AND RESCUE AND THE BLASTING COMPANY IN ATTENDANCE, PRIOR TO ANY ON-SITE BLASTING. ABUTTERS WITHIN ONE THOUSAND (1000) FEET OF THE EXTERNAL BOUNDARY OF THE PROJECT PARCEL SHALL BE NOTIFIED BY THE CERTIFIED MAIL (PAID FOR BY THE APPLICANT) OF THE MEETING NO LESS THAN TEN (10) DAYS PRIOR TO THE MEETING AND NO MORE THAN FIFTEEN (15) DAYS PRIOR TO THE MEETING. THE NOTICE SHALL STATE THE TIME AND DATE OF THE BLASTING AND CONTAIN A MAP SHOWING THE BLASTING AREA, THE 1,000-FOOT-RADIUS AREA, AND THE 500-FOOT-RADIUS AREA.
3. PERMIT HOLDERS SHALL BE IN COMPLIANCE WITH NFPA 495, EXPLOSIVE MATERIALS CODE, IN ADDITION TO ALL OTHER ORDINANCES AND CODES SET FORTH IN THE CITY OF DOVER CODE, § 153-14A, STORMWATER MANAGEMENT, EROSION CONTROL AND FLOOD HAZARDS, OF THIS CHAPTER AND THE CITY OF DOVER FIRE PREVENTION CODE, WHICH SPECIFICALLY PROHIBITS THE OVERNIGHT STORAGE OF EXPLOSIVES OR BLASTING AGENTS. FURTHER, ALL STORAGE MAGAZINES SHALL BE LOCKED IN THE OPEN POSITION AT THE END OF THE DAYS OPERATION FOR EASY INSPECTION BY CITY OFFICIALS.
4. BLASTING PERMITS MAY BE OBTAINED BY CALLING THE DOVER FIRE AND RESCUE DURING NORMAL BUSINESS HOURS. THE PERMITS ARE ONLY ACTIVE FOR THE DATES AND TIME SPECIFIED ON THE PERMIT.
5. PERMIT HOLDERS SHALL HOLD INSURANCE AGAINST CLAIMS FOR DAMAGES FOR PERSONAL INJURY AND PROPERTY WHICH MAY ARISE FROM THE PERFORMANCE OF THE WORK.
6. HOURS OF OPERATION FOR THE BLASTING SHALL BE NO EARLIER THAN 8:00AM AND NO LATER THAN 6:00PM, MONDAY THROUGH FRIDAY, EXCLUDING FEDERAL HOLIDAYS.

WINTER CONSTRUCTION NOTES

1. ALL PROPOSED POST-DEVELOPMENT VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE 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 PLACEMENT 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.
2. ALL DITCHES & SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH SHALL BE STABILIZED WITH STONE OR EROSION CONTROL BLANKETS.
3. AFTER OCTOBER 15TH, INCOMPLETE ROAD AND PARKING SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3-INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT.

ENV-WQ 1510: BEST MANAGEMENT PRACTICES FOR BLASTING

1) ALL ACTIVITIES ASSOCIATED WITH BLASTING NEED TO BE OPTIMIZED TO PREVENT THE RELEASE OF CHEMICALS ASSOCIATED WITH BLASTING ACTIVITIES TO THE ENVIROMENT.
2) IF MORE THAN 5,000 CY OF ROCK REMOVAL IS REQUIRED DRINKING WATER WELLS MUST BE IDENTIFIED AND LOCATED WITHIN 2000 FEET OF THE PROPOSED BLASTING ACTIVITIES. DEVELOP A GROUNDWATER QUALITY SAMPLING PROGRAM TO MONITOR FOR NITRATE AND NITRITE EITHER IN THE DRINKING WATER SUPPLY WELLS OR IN OTHER WELLS THAT ARE REPRESENTATIVE OF THE DRINKING WATER SUPPLY WELLS IN THE AREA. THE PLAN MUST INCLUDE PRE AND POST BLAST WATER QUALITY MONITORING AND BE APPROVED BY NHDES PRIOR TO INITIATING BLASTING. THE GROUNDWATER SAMPLING PROGRAM MUST BE IMPLEMENTED ONCE APPROVED BY NHDES.
3) THE FOLLOWING BEST MANAGEMENT PROCEDURES FOR BLASTING SHALL BE COMPLIED WITH:
   (1) LOADING PRACTICES. THE FOLLOWING BLASTHOLE LOADING PRACTICES TO MINIMIZE ENVIRONMENTAL EFFECTS SHALL BE FOLLOWED:
      (A) DRILLING LOGS SHALL BE MAINTAINED BY THE DRILLER AND COMMUNICATED DIRECTLY TO THE BLASTER. THE LOGS SHALL INDIC

SEEKING REPORTS OF RARE TURTLES

The NH Fish & Game Department is collecting observations of four turtle species:



Blanding's turtle (state endangered)

- Large, dark/black domed shell with lighter speckles
- Distinct yellow throat/chin
- Aquatic but often moves on land



Wood turtle (special concern)

- Sculpted, pyramidal brownish shell
- Orange around neck and limbs
- River/stream turtle spending many months on land



Eastern box turtle (state endangered)

- Small terrestrial turtle with highly domed shell
- Irregular yellow or orange markings over brown/black base

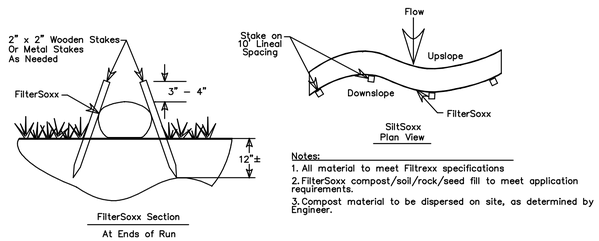


Spotted turtle (state threatened)

- Small, mostly aquatic with black or dark brown with yellow spots.
- Fairly flat shell compared to Blanding's turtle

Report sightings to RAARP@wildlife.nh.gov or 603-271-2461 *Please report promptly, noting specific location and date – Photographs strongly encouraged*

NOTES:
1. ALL OUTSIDE CONSTRUCTION PERSONNEL SHALL RECEIVE TRAINING IN THE IDENTIFICATION OF RARE TURTLE SPECIES AND MADE AWARE OF THEIR PROTECTED STATUS.
2. THE USE OF WELDED PLASTIC OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED
3. THE USE OF EROSION CONTROL BERM, WHITE FILTREXX DEGRADABLE WOVEN SILT SOCK, OR 'WILDLIFE FRIENDLY' WOVEN ORGANIC MATERIAL (E.G. COCO OR JUTE MATTING SUCH AS NORTH AMERICAN GREEN SC150BN OR EQUIVALENT) ARE ACCEPTABLE FOR USE
4. IF WOOD, SPOTTED, OR BLANDING'S TURTLES ARE FOUND LAYING EGGS IN THE WORK AREA, PLEASE CONTACT MELISSA DOPERALSKI AT 271-1738 or JOSH MEGYESY AT 271-1125 FOR FURTHER INSTRUCTIONS.



Notes:
1. All material to meet Filtrexx specifications
2. SiltSoxx compost/soil/rock/seed fill to meet application requirements.
3. SiltSoxx depicted is for minimum slopes. Greater slopes may require larger socks per the Engineer.
4. Compost material to be dispersed on site, as determined by Engineer.

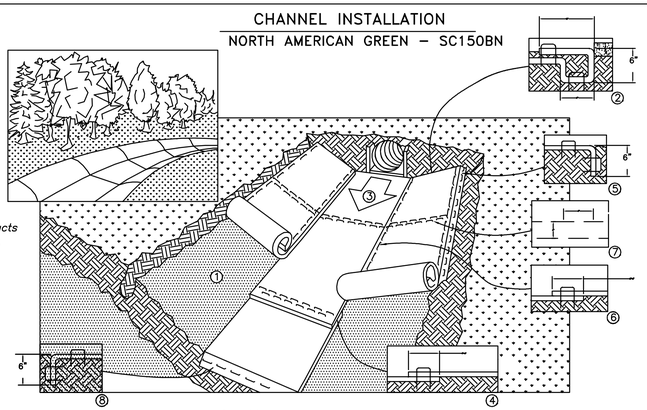
SiltSoxx Details

NOT TO SCALE

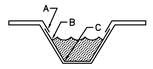
CHANNEL INSTALLATION

NORTH AMERICAN GREEN – SC150BN

NORTH AMERICAN GREEN
EROSION CONTROL *Products Guaranteed* SOLUTIONS



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP's.
3. ROLL CENTER RECP's IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE RECP's END OVER END (SHINGLE STYLE) WITH A 4" – 6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE RECP's.
5. FULL LENGTH EDGE OF RECP's AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT RECP's MUST BE OVERLAPPED APPROXIMATELY 2" – 5" (DEPENDING ON RECP's TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE RECP's MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. NOTE: * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.



CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

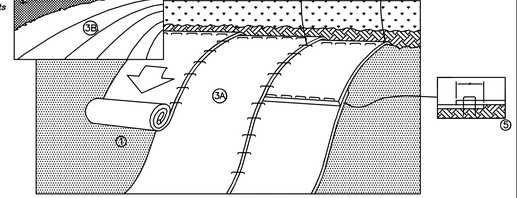
NOTE:
* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

SLOPE INSTALLATION

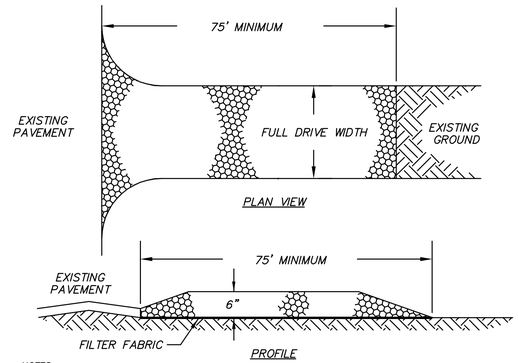
NORTH AMERICAN GREEN – SC150BN

NORTH AMERICAN GREEN
EROSION CONTROL *Products Guaranteed* SOLUTIONS



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM™ , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" (5 CM – 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
NOTE:
*IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

NOTE: THE USE OF WELDED PLASTIC OR BIODEGRADABLE PLASTIC NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED. THE USE OF WILDLIFE FRIENDLY ORGANIC MATERIALS IS RECOMMENDED.



NOTES:
1. SEE EROSION CONTROL NOTES BELOW FOR MATERIAL, INSTALLATION AND MAINTENANCE REQUIREMENTS.
2. TO BE INSTALLED AT EACH POINT OF EGRESS FROM THE WORK AREA.

STABILIZED CONSTRUCTION ENTRANCE

1. SPECIFICATIONS
   A. AGGREGATE SIZE: USE THREE (3) INCHES STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
   B. AGGREGATE THICKNESS: NOT LESS THAN SIX (6) INCHES.
   C. WIDTH TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH OF POINTS WHERE INGRESS OR EGRESS OCCURS.
   D. LENGTH: AS REQUIRED, BUT NOT LESS THAN SEVENTY-FIVE (75) FEET. PIPING OF SURFACE WATER UNDER ENTRANCE SHALL BE PROVIDED AS REQUIRED.
   E. GEOTEXTILE: TO BE PLACED OVER THE ENTIRE AREA TO BE COVERED WITH AGGREGATE.
   F. CRITERIA FOR GEOTEXTILE: THE FABRICS SHALL BE TREVIA SPUNBOND 1135, MIRAFI 600X OR EQUAL.

2. MAINTENANCE
   THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH AGGREGATE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS.

STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

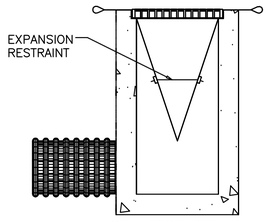
NO.	REVISION	APP'D	DATE

DATE: 1-18-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

DETAIL SHEET

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820



INSTALLATION DETAIL

SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS. AS SUPPLIED BY AH HARRIS OF PORTSMOUTH OR APPROVED EQUAL

REGULAR FLOW SILTSACK®
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

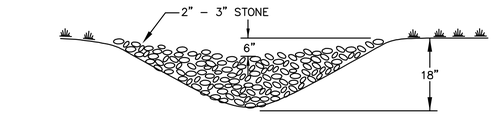
PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

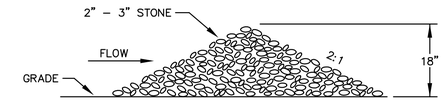
DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK® CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK®, WITH A WOVEN PILLOW INSERT.

DETAIL OF INLET SEDIMENT CONTROL DEVICE
NOT TO SCALE

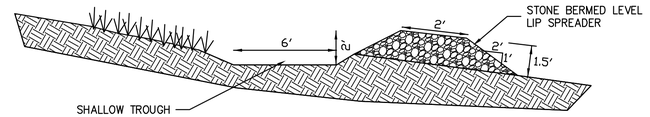
BERM STONE SIZE		
SIEVE DESIGNATION (METRIC)	SIEVE DESIGNATION (US CUSTOMARY)	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVES
300 mm	12 in	100
150 mm	6 in	84-100
75 mm	3 in	68-83
25.4 mm	1 in	42-55
4.75 mm	No. 4	8-12



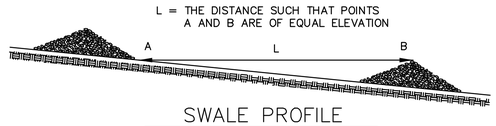
SWALE SECTION



SWALE PROFILE

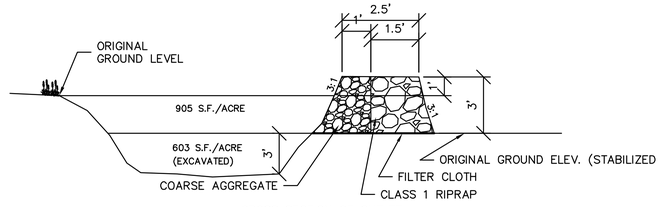


STONE BERMED LEVEL LIP SPREADER DETAIL
NOT TO SCALE

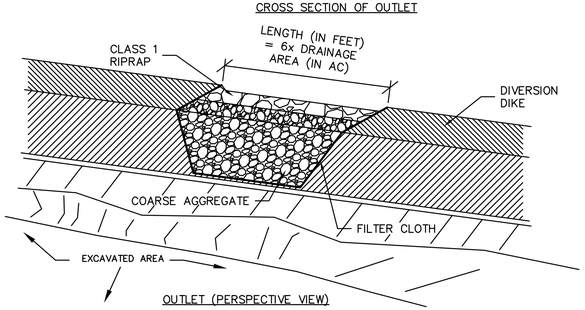


SWALE PROFILE

STONE GRADE STABILIZATION STRUCTURE DETAIL (CHECK DAMS)
NOT TO SCALE



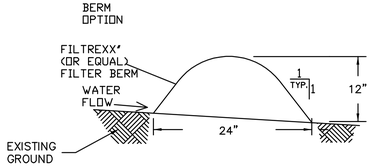
CROSS SECTION OF OUTLET



OUTLET (PERSPECTIVE VIEW)

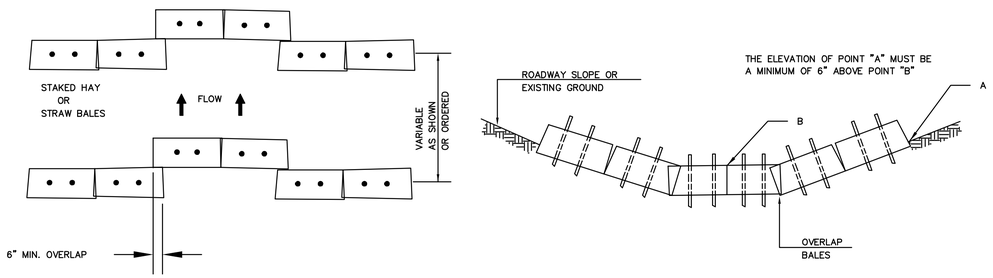
NOTES:
1. COARSE AGGREGATE SHALL MEET NHDOT 304.5 SPECIFICATIONS AND SHALL NOT CONTAIN MORE THAN 5% FINES PASSING THE #200 SIEVE.
2. FILTER CLOTH SHALL BE MIRAFI 700X OR APPROVED EQUAL.
3. CLASS I RIPRAP SHALL MEET NHDOT 583 SS SPECIFICATIONS.
4. THE MAXIMUM CONTRIBUTING AREA TO THE TRAP SHALL BE LESS THAN 5 AC.
5. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED.
6. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

TEMPORARY SEDIMENT TRAP
NOT TO SCALE



MULCH BERM DETAIL
NOT TO SCALE

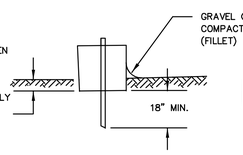
NOTES:
1. CONTRACTOR SHALL DISCUSS THE APPLICATION OF THIS PRODUCT WITH MANUFACTURE TO ENSURE PROPER PRODUCT SPECIFICATIONS.
2. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS OR EQUAL.
3. THE CONTRACTOR SHALL MAINTAIN THE COMPOST FILTER BERM IN A FUNCTIONAL CONDITION AT ALL TIMES AND IT SHALL BE ROUTINELY INSPECTED.
4. WHERE THE BERM REQUIRES REPAIR, IT WILL BE ROUTINELY REPAIRED.
5. THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE BERM WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE BERM, OR AS DIRECTED BY THE ENGINEER.
6. THE COMPOST FILTER BERM WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED, AS DETERMINED BY THE ENGINEER.



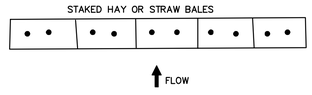
HAYBALE GRADE STABILIZATION STRUCTURE

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY 2" x 2" STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. REMOVE AND PROPERLY DISPOSE OF ALL SEDIMENT PRIOR TO REMOVING HAYBALES.



EMBEDDING DETAIL



HAYBALE BARRIER AT TOE OF SLOPE

HAYBALE NOTES AND DETAILS
NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

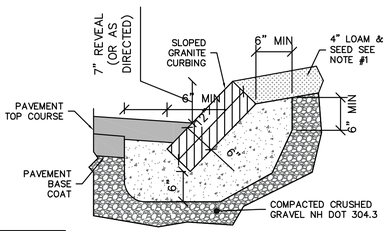
NO.	REVISION	APP'D	DATE

DATE: 1-18-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

DETAIL SHEET

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

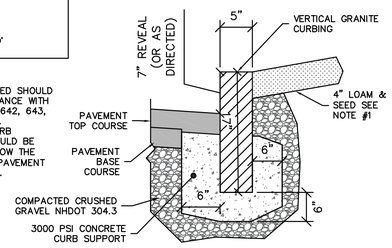
FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820



SLOPED GRANITE CURB

RADIUS	MAX LENGTH
< 21'	USE CURVED CURB
12"	3'
22' – 28'	4'
28' – 35'	5'
36' – 42'	6'
43' – 49'	7'
50' – 56'	8'
57' – 60'	9'
OVER 60'	10'

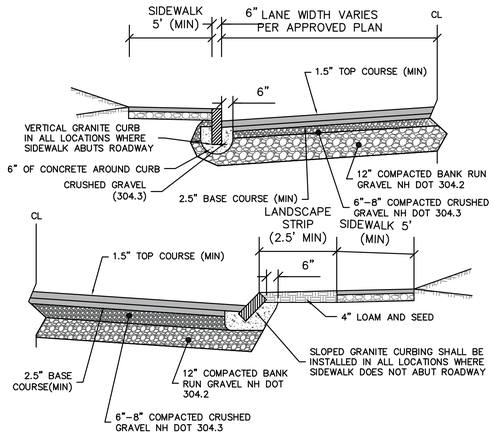
NOTES:
1. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
2. CONCRETE CURB SUPPORT SHOULD BE SET 1/2" BELOW THE TOP OF THE PAVEMENT BASE COURSE.



VERTICAL GRANITE CURB

CITY OF DOVER D–8 GRANITE CURB DETAIL

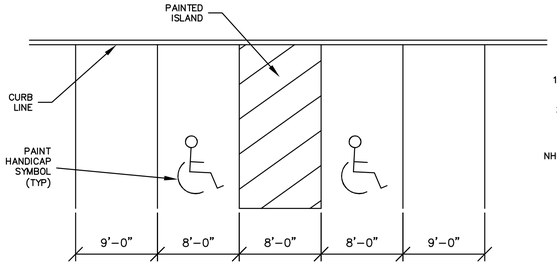
NOT TO SCALE



NOTES:
1. THIS DETAIL IS FOR GENERAL REVIEW PURPOSES ONLY, FINAL DESIGN SHALL BE BASED ON SPECIFIC SITE CONDITIONS AND APPROVED PLANS.
2. SIDEWALK LOCATION AND MATERIAL SHALL BE AS APPROVED BY THE CITY OF DOVER.

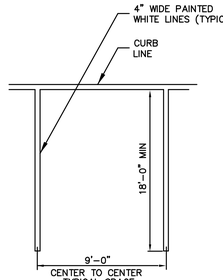
CITY OF DOVER D–5 ROADWAY CROSS SECTION DETAIL

NOT TO SCALE



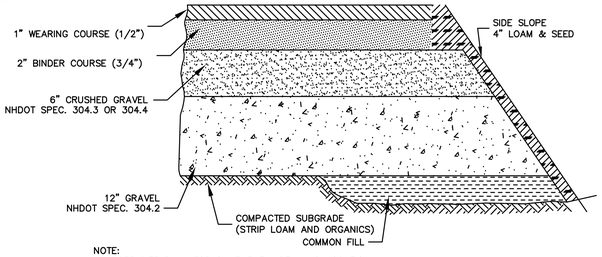
ACCESSIBLE PARKING LAYOUT

NOT TO SCALE



STANDARD PARKING STALL

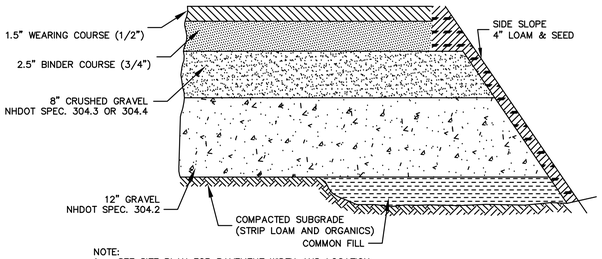
NOT TO SCALE



NOTE:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS–SLOPE.
3. GEOTEXTILE FABRIC MAYBE REQUIRED UNDER THE ROADWAY AND /OR THE PARKING AREAS AS REQUIRED BY THE ENGINEER BASED UPON SITE CONDITIONS.

TYPICAL PAVEMENT SECTION

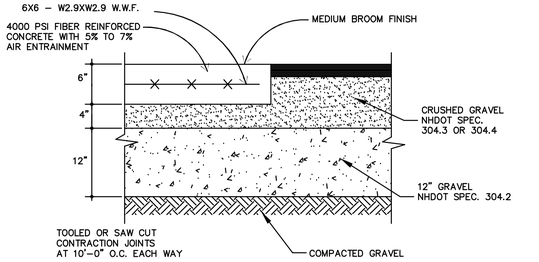
NOT TO SCALE



NOTE:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS–SLOPE.
3. GEOTEXTILE FABRIC MAYBE REQUIRED UNDER THE ROADWAY AND /OR THE PARKING AREAS AS REQUIRED BY THE ENGINEER BASED UPON SITE CONDITIONS.

HEAVY DUTY TYPICAL PAVEMENT SECTION

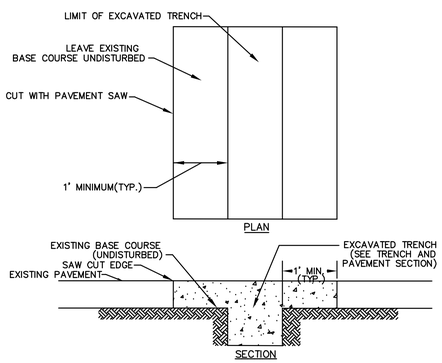
NOT TO SCALE



NOTE: PITCH CONCRETE PAD GRADING TO CENTER

DUMPSTER PAD DETAIL

NOT TO SCALE



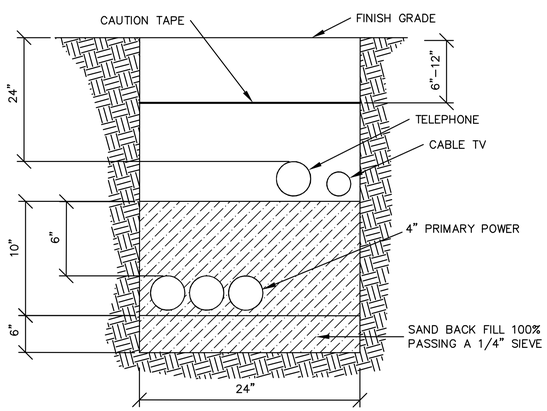
PAINTED

HANDICAP SYMBOL

NOT TO SCALE

TRENCH PATCH

NOT TO SCALE



1. TELEPHONE CONDUIT SHALL BE 3" SCHEDULE 40 PVC, WITH STEEL SWEEPS AT RISER POLE, 90° BENDS AND AT BUILDING.
2. LEAVE PULL ROPE IN ALL CONDUITS FOR CABLE INSTALLATION.
3. FOR COMPLETE SPECIFICATIONS SEE "PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE CONSTRUCTION SPECIFICATIONS FOR UNDERGROUND CONDUIT SYSTEMS".
4. CONTRACTOR SHOULD VERIFY THE NUMBER & SIZE OF CONDUIT WITH THE APPROPRIATE UTILITIES.

UTILITY TRENCH

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

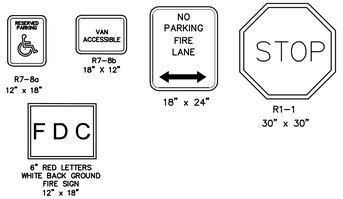
NO.	REVISION	APP'D	DATE

DATE: 1–18–24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

DETAIL SHEET

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

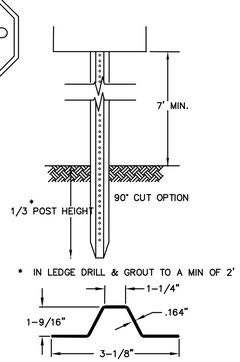
FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820



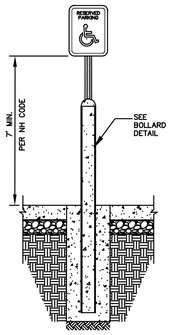
NOTE:
1. ALL SIGNS TO BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.

LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 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

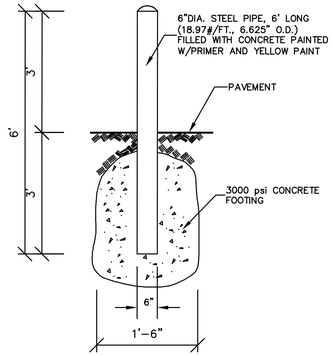
BAKED ON OR AIR DRIED, PAINT OF WEATHER RESISTANT QUALITY. ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.



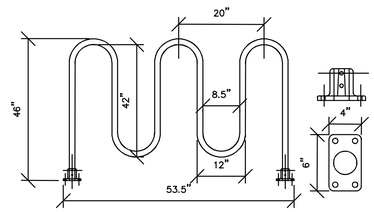
SIGN LEGEND & SIGN POST
NOT TO SCALE



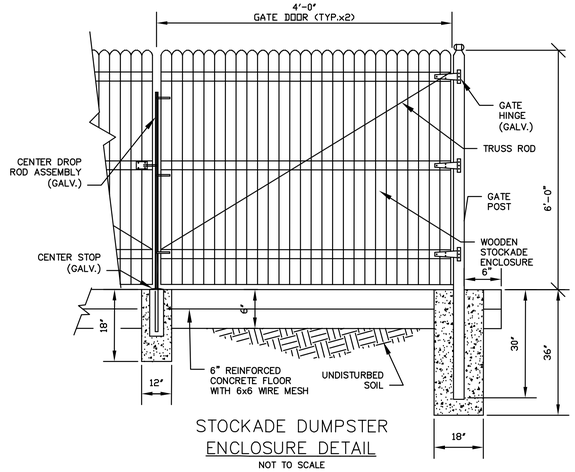
SIGN IN BOLLARD
NOT TO SCALE



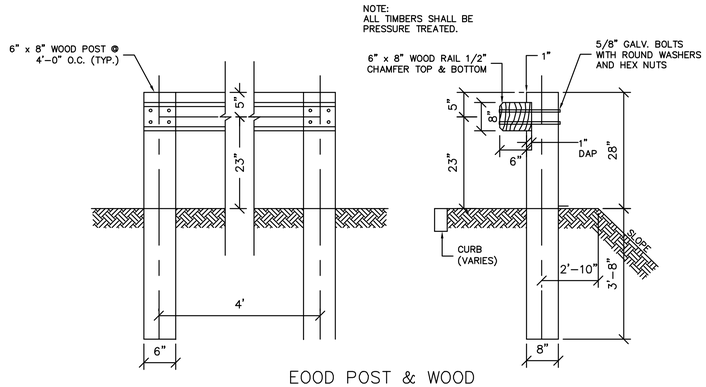
BOLLARD DETAIL
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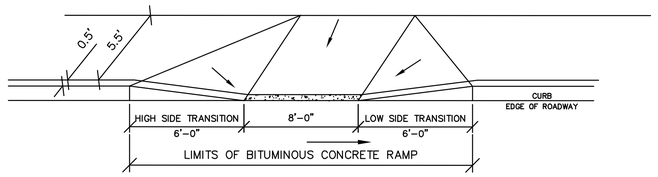
BIKE RACK DETAIL
NOT TO SCALE



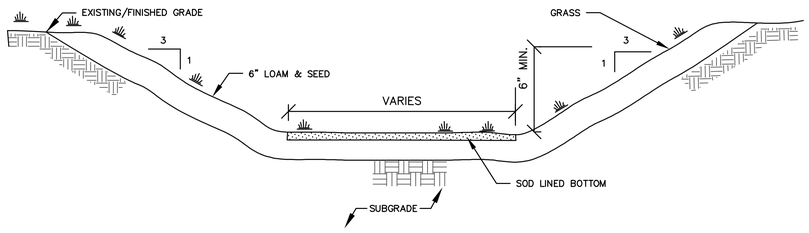
STOCKADE DUMPSTER ENCLOSURE DETAIL
NOT TO SCALE



EOOD POST & WOOD
BEAM GUARDRAIL DETAIL
NOT TO SCALE



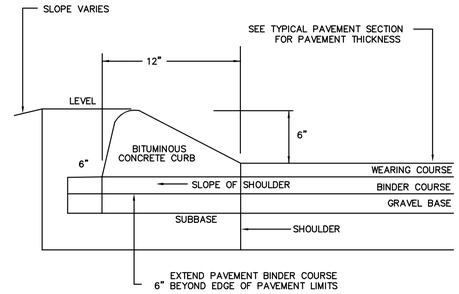
SIDEWALK APRON
NOT TO SCALE



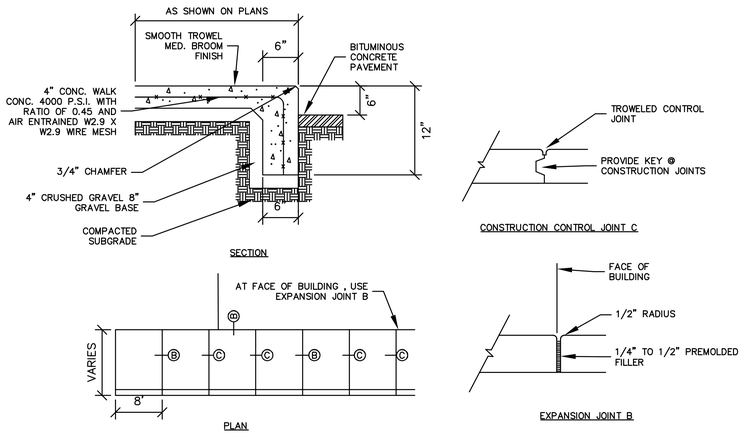
MAINTENANCE
TIMELY MAINTENANCE IS IMPORTANT TO KEEP THE VEGETATION IN THE SWALE IN GOOD CONDITION. MOWING SHOULD BE DONE FREQUENTLY ENOUGH TO KEEP THE VEGETATION IN VIGOROUS CONDITION AND TO CONTROL ENCROACHMENT OF WEEDS AND WOODY VEGETATION, HOWEVER IT SHOULD NOT BE MOWED TOO CLOSELY, MAINTAIN A MINIMUM 4" STAND OF VEGETATION. FERTILIZE ON AN "AS NEEDED" BASIS TO KEEP THE GRASS HEALTHY. OVER FERTILIZATION CAN RESULT IN THE SWALE BECOMING A SOURCE OF POLLUTION.

THE SWALE SHOULD BE INSPECTED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE THE CONDITION OF THE SWALE. RILLS AND DAMAGED AREAS SHOULD BE PROMPTLY REPAIRED AND REVEGETATED AS NECESSARY TO PREVENT FURTHER DETERIORATION.

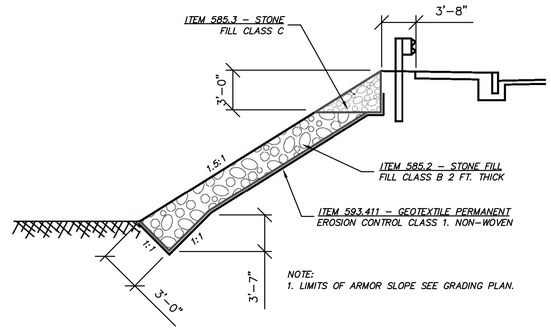
GRASS LINED CONVEYANCE SWALE DETAIL
NOT TO SCALE



BITUMINOUS SLOPED CURB
NOT TO SCALE



CONCRETE WALKWAY WITH MONOLITHIC CONCRETE CURB
NOT TO SCALE



ARMORED EMBANKMENT SLOPE
NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

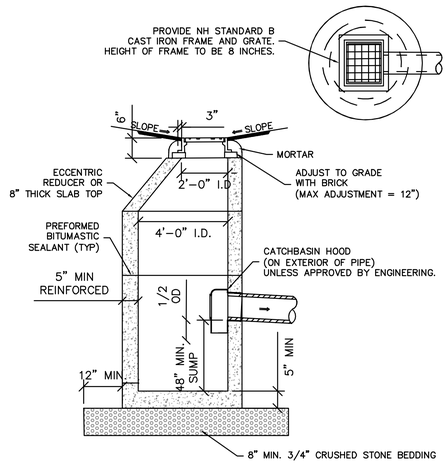
NO.	REVISION	APP'D	DATE

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DETAIL SHEET

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

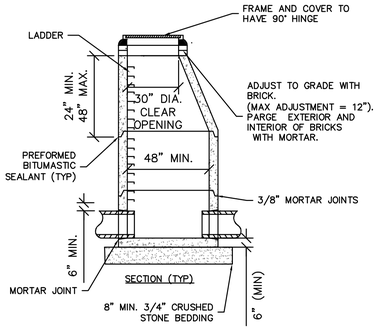
FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820



NOTES:
1. ENTIRE STRUCTURE SHALL BE H-20 LOAD RATED. PROVIDE MANUFACTURER REINFORCEMENT DETAILS TO THE CITY ENGINEER UPON REQUEST.

CITY OF DOVER D-19
CATCHBASIN DETAIL

NOT TO SCALE



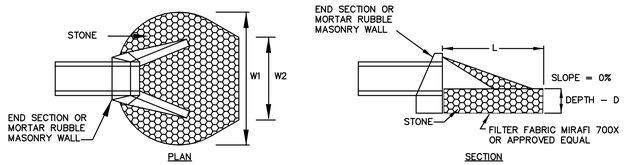
NOTES:
1. CORINGS TO BE SEPARATED BY 6" (MINIMUM) OF MONOLITHIC SECTION

CITY OF DOVER D-20
DRAIN MANHOLE DETAIL

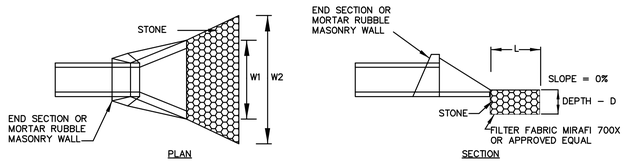
NOT TO SCALE

SPECIFICATIONS

1. ALL CONSTRUCTION SHALL CONFORM WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION (NHDOT), "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", HEREINAFTER REFERRED TO AS THE "STANDARD SPECIFICATIONS".
2. STORM DRAINS SHALL BE ADS N12 OR APPROVED EQUAL, AND SHALL BE JOINTED WITH NEOPRENE "O" RINGS.
3. CATCH BASINS AND MANHOLES SHALL BE PRE-CAST REINFORCED CONCRETE DESIGNED BY AN ENGINEER REGISTERED IN NEW HAMPSHIRE, AND ABLE TO WITHSTAND LOADINGS OF 8 TONS (H20 LOADING).
4. MANHOLES SHALL HAVE CAST IRON FRAMES AND COVERS WITH 30" INSIDE DIAMETER OPENINGS. A 3-INCH (MINIMUM) LETTER "D" FOR DRAIN SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
5. CATCH BASINS AND MANHOLES SHALL BE ADJUSTED TO GRADE WITH COURSES OF BRICK. MAXIMUM ADJUSTMENT TO GRADE SHALL BE 12 INCHES. FRAMES SHALL BE SET ON A FULL BED OF MORTAR, TRUE TO GRADE AND CONCENTRIC WITH THE MASONRY. ALL VOIDS BETWEEN THE TOP OF THE STRUCTURE AND THE BOTTOM FLANGE OF THE FRAME SHALL BE COMPLETELY FILLED TO MAKE A WATERTIGHT FIT. A RING OF MORTAR AT LEAST ONE INCH THICK AND PITCHED TO SHED WATER AWAY FROM THE FRAME, SHALL BE PLACED OVER AND AROUND THE OUTSIDE OF THE BOTTOM FLANGE. THE MORTAR SHALL EXTEND TO THE OUTER EDGE OF THE MASONRY ALL AROUND ITS CIRCUMFERENCE AND SHALL BE FINISHED SMOOTH. NO VISIBLE LEAKAGE WILL BE PERMITTED.
6. INVERT CHANNELS OF SEWER MANHOLES SHALL BE FORMED SMOOTHLY TO THE LARGEST PIPE RADIUS. CHANGES IN GRADE SHALL BE FORMED SMOOTHLY AND EVENLY. THE FLOOR OF THE STRUCTURE OUTSIDE THE CHANNELS SHALL BE SLOPED TOWARDS THE CHANNELS AT APPROXIMATELY 1/2 INCH PER FOOT. THE FLOOR AT THE CHANNEL SHALL MATCH THE CROWN OF THE LARGEST PIPE.
7. TRENCH CONSTRUCTION WILL CONFORM WITH SECTION 603.3.1 OF THE STANDARD SPECIFICATIONS (1974).
8. WOOD SHEETING OR A SUITABLE TRENCH BOX SHALL BE USED TO SUPPORT THE TRENCH AS NECESSARY. IF WOOD SHEETING IS USED, IT SHALL BE DRIVEN AT A DISTANCE OF 1 FOOT FROM THE OUTSIDE DIAMETER OF THE PIPE TO A DEPTH 6 INCHES BELOW THE INVERT OF THE PIPE. WOOD SHEETING SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE, BUT NOT GREATER THAN 3 FEET BELOW THE FINISHED GRADE.
9. BEDDING SHALL CONFORM WITH SECTION 603.3.2 OF THE STANDARD SPECIFICATIONS (1974).
10. BACKFILL MATERIAL WILL CONFORM WITH SECTION 603.3.5 OF THE STANDARD SPECIFICATIONS (1974) AND, IN ADDITION, SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL, FROZEN MATERIAL, ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION, OR ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. BACKFILL SHALL NOT BE PLACED ON FROZEN OR PREVIOUSLY FROZEN MATERIAL.
11. ALL BACKFILL AND BEDDING COMPACTION SHALL MEET THE REQUIREMENTS OF AASHO T 99 METHOD C. DENSITY SHALL BE 95 PERCENT. COMPACTION SHALL BE 6 INCH LIFTS FOR BEDDING AND BACKFILL TO A PLANE 1 FOOT ABOVE THE PIPE AND IN 12 INCH LIFTS THEREAFTER BY AN APPROVED MECHANICAL COMPACTOR.
12. SHOULD FROZEN MATERIAL BE ENCOUNTERED, IT SHALL NOT BE PLACED IN THE BACKFILL NOR SHALL BACKFILL BE PLACED UPON FROZEN MATERIAL PREVIOUSLY FROZEN MATERIAL SHALL BE REMOVED AS REQUIRED BEFORE NEW BACKFILL IS PLACED.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO FRAMES AND GRATES DURING AND FROM THE TIME OF REMOVAL FROM THE EXISTING STRUCTURE TO AND DURING THE TIME OF RESETTING, AND SHALL REPLACE IN KIND ANY DAMAGED FRAMES OR GRATES AT NO ADDITIONAL COMPENSATION.
14. ALL TRENCHES WILL BE COVERED AND DEBRIS, INCLUDING ANY REJECTED MATERIALS, SHALL BE REMOVED DAILY. STRICT SAFETY PRECAUTIONS SHALL BE MAINTAINED AT ALL TIMES.
15. LOCATION OF UTILITIES SHOWN ON THE PLANS ARE APPROXIMATE.
    A) THE CONTRACTOR SHALL, 48 HOURS PRIOR TO CONSTRUCTION, NOTIFY THE UTILITY COMPANIES AND HAVE ALL UTILITIES IN THE VICINITY OF THE CONSTRUCTION MARKED IN THE FIELD.
    B) AFTER THE UTILITIES HAVE BEEN LOCATED AND PRIOR TO CONSTRUCTION, THE CONTRACTOR WITH THE ENGINEER, SHALL LAYOUT THE PROPOSED DRAINAGE SYSTEM IN THE FIELD AND RECTIFY ANY UTILITY CONFLICTS WHICH MAY BE FOUND.
    C) ANY CONFLICTS WITH UTILITIES FOUND DURING CONSTRUCTION BY THE CONTRACTOR SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER AND THE UTILITY COMPANY AND PROPERLY RECTIFIED.
    D) THE CONTRACTOR IS RESPONSIBLE FOR THE COST OF REPAIR FOR ANY UTILITIES DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANY TO REPAIR ANY DAMAGES, HOWEVER, THE CONTRACTOR MAY MAKE APPROPRIATE REPAIRS WITH THE UTILITY COMPANY'S PERMISSION.
16. COMPLETE SHOP DRAWINGS FOR PIPE, MANHOLES, CATCH BASINS, FRAMES, GRATES AND COVERS SHALL BE SUBMITTED IN TRIPLICATE FOR APPROVAL BY THE ENGINEER PRIOR TO THE START OF CONSTRUCTION. EACH SHOP DRAWING SHALL BE CHECKED AND INITIALIZED BY THE CONTRACTOR TO INDICATE APPROVAL BEFORE IT IS SUBMITTED TO THE ENGINEER.
17. SHOP DRAWINGS FOR FLAT CONCRETE COVERS SHALL BE STAMPED PRIOR TO SUBMISSION FOR APPROVAL BY A NEW HAMPSHIRE REGISTERED PROFESSIONAL ENGINEER.
18. BRICK MASONRY FOR SETTING FRAMES AND BRICK AND MORTAR PLUGS SHALL CONFORM TO THE STANDARD SPECIFICATION SECTION 604.2.4.



STONE APRON OUTLET PROTECTION DETAIL
OUTLET TO DEFINED CHANNEL



STONE APRON OUTLET PROTECTION DETAIL
OUTLET TO FLAT AREA, NON DEFINED CHANNEL

MAINTENANCE

THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIPRAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

STONE GRADATION

% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE
100	1.5 TO 2.0 D50
85	1.3 TO 1.8 D50
50	1.0 TO 1.5 D50
15	0.3 TO 0.5 D50

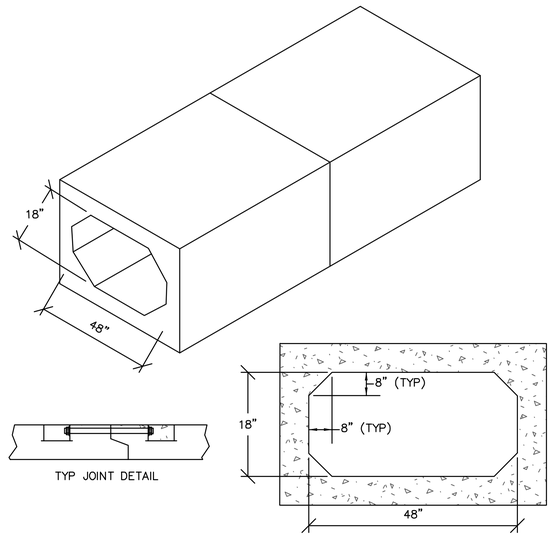
CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIPRAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIPRAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

OUTLET FROM	W1(ft)	W2(ft)	L(ft)	D (ft)	D50(IN)	CHANNEL TYPE
PCB6	11	3	17	1	6	DEFINED
PCB7	11	3	12	1	6	DEFINED
RD2	9	3	13	1	6	DEFINED
BOX CULVERT (IN)	6	10	5	1	6	UNDEFINED
BOX CULVERT (OUT)	6	18	10	1	6	UNDEFINED

RIP RAP OUTLET PROTECTION

NOT TO SCALE



NOTES:
1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS
2. DESIGN PER ASTM C1433 BOX CULVERT
3. ALL REINFORCEMENT PER ASTM A615
4. DESIGNED DOE AASHTO HS-20 LOADING
5. SHEA CONCRETE OR APPROVED EQUAL.

BOX CULVERT

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

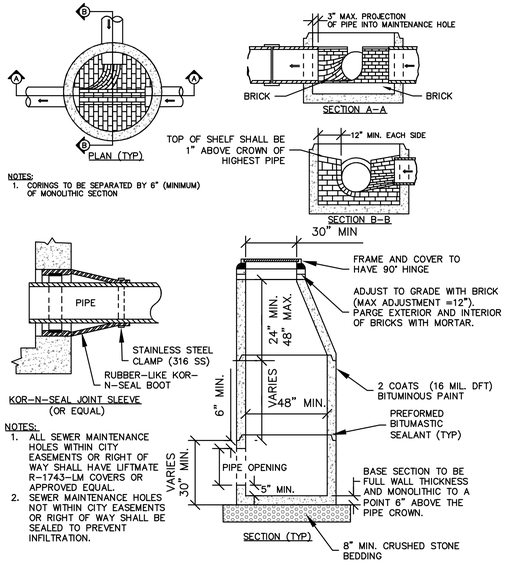
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127 VENTURE DRIVE
DOVER, NH 03820

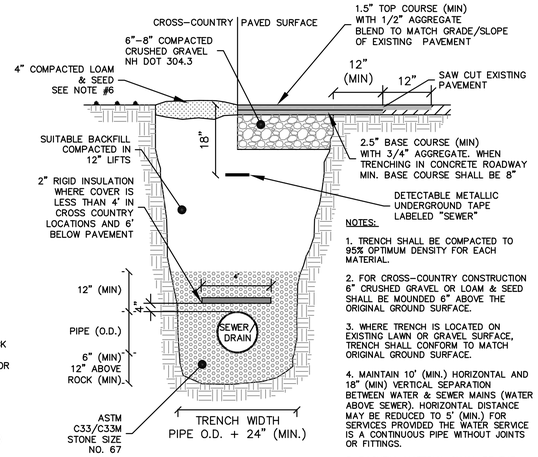
FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820



NOTES:
1. CORINGS TO BE SEPARATED BY 6" (MINIMUM) OF MONOLITHIC SECTION
2. SEWER MAINTENANCE HOLES WITHIN CITY EASEMENTS OR RIGHT OF WAY SHALL HAVE LIFTMATE R-1743-LM COVERS OR APPROVED EQUAL.
3. SEWER MAINTENANCE HOLES NOT WITHIN CITY EASEMENTS OR RIGHT OF WAY SHALL BE SEALED TO PREVENT INFILTRATION.

CITY OF DOVER D-16
SEWER MANHOLE DETAIL

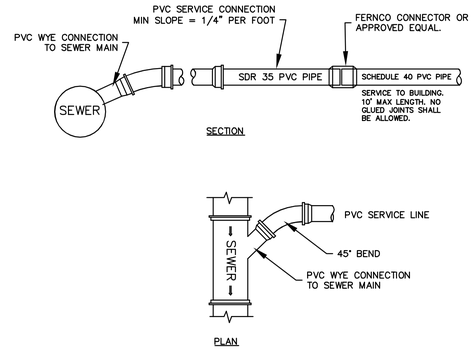
NOT TO SCALE



NOTES:
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT AND ROCKS OVER 6" IN LARGEST DIMENSION
6. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

CITY OF DOVER D-3
SEWER TRENCH DETAIL

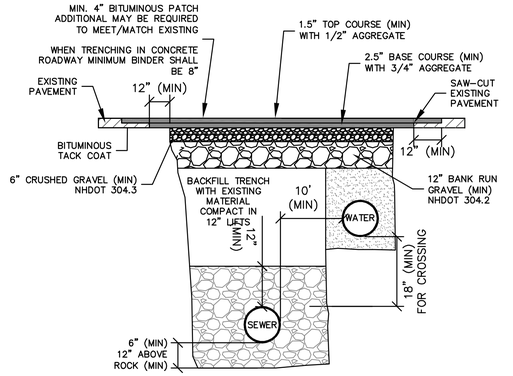
NOT TO SCALE



NOTES:
1. TRENCHING AND BEDDING REQUIREMENTS PER CITY SEWER TRENCH DETAIL (D-3).
2. SERVICE LATERAL DIAMETER VARIES PER APPLICATION. REVIEW SIZE WITH CITY ENGINEER PRIOR TO INSTALLATION.
3. SDR 35 SHALL NOT EXTEND INTO THE BUILDING

CITY OF DOVER D-17
SEWER SERVICE DETAIL

NOT TO SCALE



NOTES:
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY.
2. ALL WORK SHALL COMPLY WITH THE CITY OF DOVER CONSTRUCTION GUIDELINES AND PROCEDURES
3. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.

CITY OF DOVER
TYPICAL TRENCH DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

NO.	REVISION	APP'D	DATE

DATE: 1-18-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

TRELLEBORG PIPE SEALS

TRELLEBORG

Kor-N-Seal® I Stainless Steel Wedge Connector (WS Series)

Installation Instructions

CONNECTOR INSTALLATION

1. Check to be sure the Stainless Steel Waveband® is properly located in Connector groove.
2. Inspect the inside surface of the cored/formed hole. If there is porosity or wire-to-concrete separation, use patching or hydraulic cement to smooth the surface.
3. Insert Connector Assembly into hole with Wedge Expander at top of hole.
4. Position Connector so it is square to manhole both vertically and horizontally.
5. Tighten Wedge Expander using 1/2" socket wrench to 12 foot pounds.
6. Retorquing prior to shipment is recommended but not required.

Note if Vacuum Testing

Testing should be done prior to backfilling so that leaks can be easily located and repaired.

All lift holes need to be plugged with a nonshrinking mortar.

Plug all pipes entering the manhole, taking care to securely brace the pipes and plugs.

Patented Waveband technology "captures" the rubber between itself and the concrete, creating a more effective seal.



*Covered under US Patent No.: 5,738,359

PIPE INSTALLATION

1. Be sure sealing area of pipe is smooth and free of defects. Repair if needed.
2. Center pipe in Connector opening. (Pipe must not rest on Connector Korband)
3. Position the Pipe Clamp in the Connector's Pipe Clamp groove with the screw at the top.
4. Tighten the Pipe Clamp screw to 60 inch pounds with a T-handle Torque Wrench, P/N 80090

Note:

On minimum pipe O.D. installations, tension the rubber under the pipe clamp by lifting the rubber toward pipe clamp screw housing by hand. This will help prevent the rubber from wrinkling or folding over during tightening of hose clamp. Application of a very small amount pipe lube on the pipe clamp track will allow the pipe clamp to slide on the rubber and improve the performance of the hose clamp. Make sure to torque all screw locations on the pipe clamps.

Caution:

Do not use an impact wrench for installation.

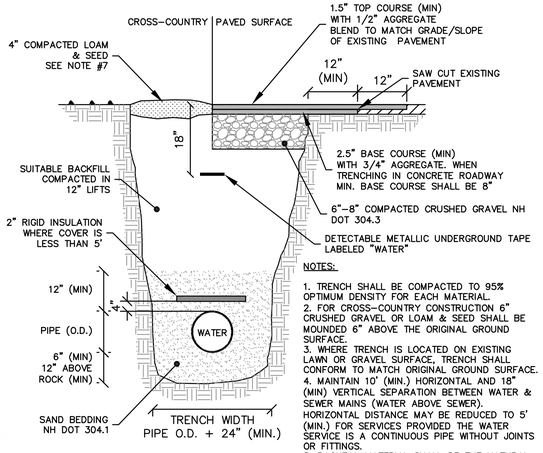
All pipe stubs must be restrained.

Adapters are required when using Corrugated Pipe. Refer to the Corrugated Pipe Adapter Data Sheet for more information.

Check calibration of torque limiters monthly

Torque limiters are available for connectors that can be used with cordless drills and hand or air ratchets.

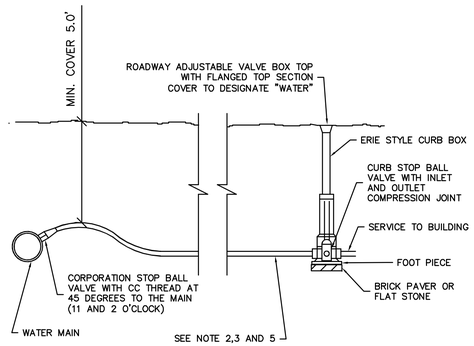
Call 800-626-2180 for information.



NOTES:
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT, AND ROCKS OVER 6" IN LARGEST DIMENSION
6. PROVIDE MINIMUM 5' OF COVER. ENGINEERING APPROVAL REQUIRED FOR LESS THAN 5' OF COVER.
7. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

CITY OF DOVER D-4
WATER TRENCH DETAIL

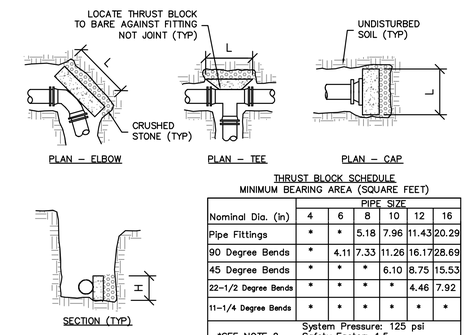
NOT TO SCALE



NOTES:
1. ALL WATER LINES 4" OR GREATER SHALL BE DUCTILE IRON WITH AN 8 MIL POLYETHYLENE WRAP, INCLUDING TEE AND OTHER CONNECTIONS.
2. WATER SERVICE LINES SHALL BE COPPER TUBING (TYPE K) BETWEEN MAIN AND CURB STOP.
3. SERVICE BETWEEN CURB STOP AND BUILDING MAY BE (BLUE OR BLACK) CTS SDR 9 PLASTIC POLYETHYLENE RATED FOR 250 psi.
4. CAM-LOCK REQUIRED FOR CTS OR IPS, MJ ADAPTER REQUIRED FOR HDPE
5. 3/4"- COPPER, CTS
   1"- COPPER, CTS
   2"- CTS, HDPE, IPS

CITY OF DOVER D-13
WATER SERVICE CONNECTION DETAIL

NOT TO SCALE



THRUST BLOCK SCHEDULE
MINIMUM BEARING AREA (SQUARE FEET)

	PIPE SIZE					
Nominal Dia. (in)	4	6	8	10	12	16
Pipe Fittings	*	*	5.18	7.96	11.43	20.29
90 Degree Bends	*	4.11	7.33	11.26	16.17	28.69
45 Degree Bends	*	*	*	6.10	8.75	15.53
22-1/2 Degree Bends	*	*	*	*	4.46	7.92
11-1/4 Degree Bends	*	*	*	*	*	*
*SEE NOTE 2	System Pressure: 125 psi Safety Factor: 1.5 Soil Bearing Capacity: 2,000 psf					

NOTES:
1. ALL THRUST BLOCKS SHALL BE PRE-CAST CONCRETE UNLESS APPROVED BY THE CITY ENGINEER.
2. 2'X2'X3" MINIMUM THRUST BLOCK REQUIRED, ANY BEARING AREA OVER 4SF REQUIRES THRUST BLOCKS, RESTRAINED JOINTS AND CALCULATIONS ASSOCIATED WITH THE JOINT.
3. THE MINIMUM BEARING AREAS SHOWN IN THE THRUST BLOCK SCHEDULE ARE BASED ON A SYSTEM PRESSURE OF 125 PSI. IF THE SYSTEM PRESSURE IS ABOVE 125 PSI, INCREASE THE NOTED AREAS PROPORTIONALLY TO THE ACTUAL SYSTEM PRESSURE.
4. FOR MINIMUM BEARING AREAS OVER 4 SF, THE LENGTH (L) OF THE BLOCK IS APPROXIMATELY TWICE AS LONG AS THE HEIGHT (H).
5. PLACE CRUSHED STONE BEHIND THRUST BLOCK AGAINST UNDISTURBED SOIL.
6. PLACE THRUST BLOCK ALONG MAXIMUM LENGTH OF THE FITTING TO MAXIMIZE BEARING AREA.
7. CONCRETE COMPRESSIVE STRENGTH: 2,000 PSI MINIMUM.
8. USE OF THRUST BLOCKS DOES NOT ELIMINATE THE REQUIREMENT OF OTHER RESTRAINTS OR VICE VERSA.

CITY OF DOVER D-15
THRUST BLOCK DETAIL

NOT TO SCALE

DETAIL SHEET

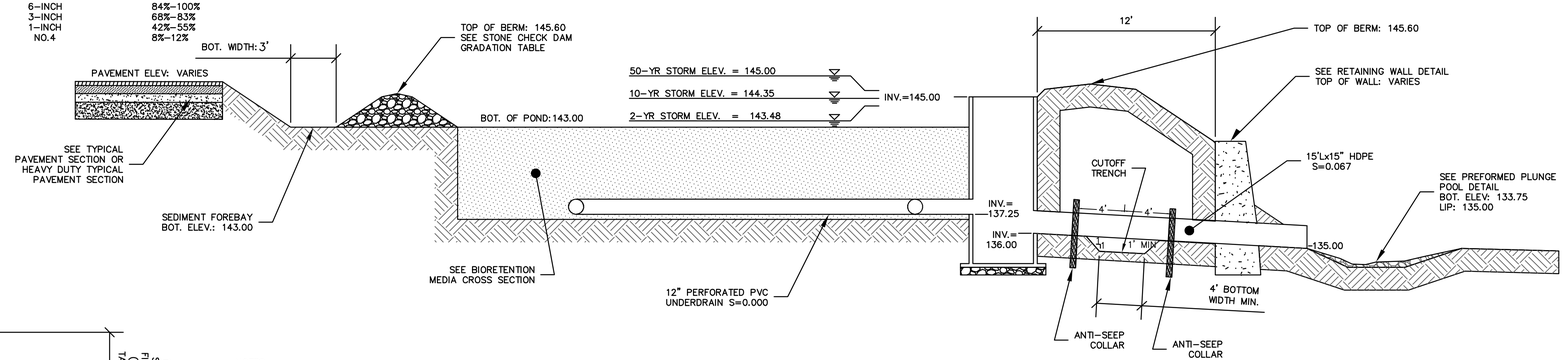
FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

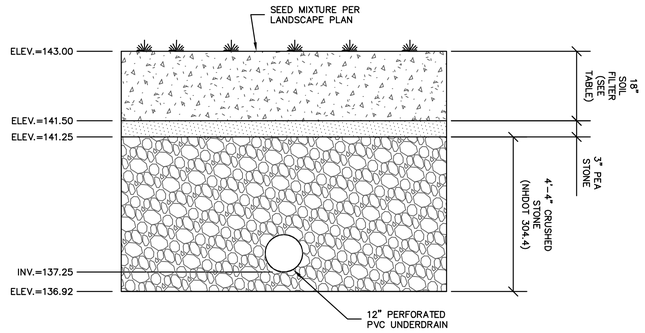
FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

BIORETENTION FILTER MEDIA SPECIFICATIONS			
COMPONENT MATERIAL	PERCENT OF MIXTURE BY VOLUME	GRADATION OF MATERIAL	
		SIEVE NO.	PERCENT BY WEIGHT PASSING STANDARD SIEVE
FILTER MEDIA OPTION A			
ASTM C-33 CONCRETE SAND	50 TO 55		
LOAMY SAND TOPSOIL, WITH FINES AS INDICATED	20 TO 30	200	15 TO 25
MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH, WITH FINES AS INDICATED	20 TO 30	200	< 5
FILTER MEDIA OPTION B			
MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH, WITH FINES AS INDICATED	20 TO 30	200	< 5
LOAMY COARSE SAND	70 TO 80	10	85 TO 100
		20	70 TO 100
		60	15 TO 40
		200	8 TO 15

STONE CHECK DAM GRADATION

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING SQUARE MESH SIEVE
12-INCH	100%
6-INCH	84%-100%
3-INCH	68%-83%
1-INCH	42%-55%
NO.4	8%-12%





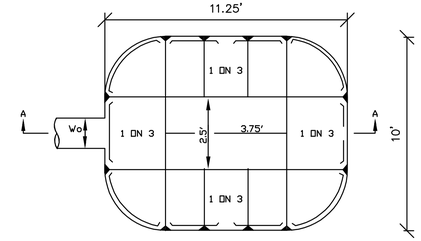
BIORETENTION MEDIA CROSS SECTION

NOT TO SCALE

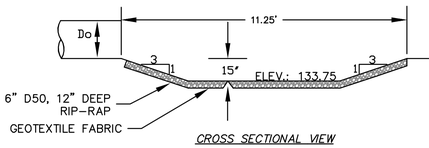
NOTES:
1. CONSTRUCT GRASSED OVERFLOW SPREADER EARLY DURING INITIAL CONSTRUCTION TO ESTABLISH TURF PRIOR TO CONSTRUCTION OF BIORETENTION SYSTEM.
2. DO NOT BEGIN CONSTRUCTION OF THE BIORETENTION AREA UNTIL LAWN AREA ON THE ENTIRE SITE AREA ESTABLISHED WITH AT LEAST 80 PERCENT TURF. FILTER ALL DRAIN INLETS IN THE SEDIMENT FOREBAYS TO PREVENT SILTATION INTO THE BIORETENTION AREA.
3. DO NOT DRIVE CONSTRUCTION EQUIPMENT THE FILTER MATERIAL. INSTALL FILTER MATERIAL BY MEANS OF AN EXCAVATOR LOCATED ADJACENT TO THE FILTER AREA.
4. MATERIALS: CRUSHED STONE LAYER SHALL MEET NHDOT 304.4. STONE SHALL CONTAIN NO MORE THAN 5% FINES PASSING THE #200 SIEVE. TOPSOIL SHALL CONTAIN 15 TO 25% FINES PASSING THE #200 SIEVE.
5. REFER TO LANDSCAPING DRAWINGS FOR GRASS SEED MIXES. FERTILIZATION OF THE FILTER AREA SHALL BE AVOIDED UNLESS ABSOLUTELY NECESSARY TO ESTABLISH VEGETATION.
6. INITIAL ESTABLISHMENT: DURING THE FIRST 2-3 MONTHS OF ESTABLISHMENT WATER THE GARDEN ON A WEEKLY BASIS (TO SUPPLEMENT RAINFALL FOR TOTAL OF 1 INCH PER WEEK).
7. ANNUAL MAINTENANCE: IN THE SPRING OF EACH YEAR, ANY DEAD VEGETATION SHALL BE REMOVED TO ALLOW FOR NEW GROWTH, AND ANY ACCUMULATED SEDIMENT (NORMALLY AT THE ENTRANCE TO THE GARDEN) SHALL ALSO BE REMOVED. TURF AT FILTER SHALL BE MOWED NO MORE THAN 3 TIMES PER GROWING SEASON. IF WATER PONDS ON THE SURFACE FOR MORE THAN 24 HOURS DURING THE FIRST YEAR OR 72 HOURS THEREAFTER, THE FILTER SURFACE SHALL BE AERATED WITH DEEP TINES OR THE SURFACE REPLACED.

BIORETENTION BASIN 1

NOT TO SCALE



PLAN VIEW



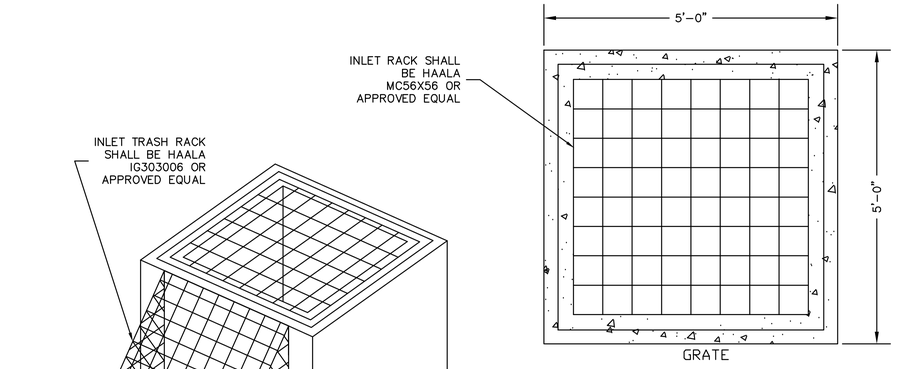
CROSS SECTIONAL VIEW

STONE GRADATION

% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE
100	1.5 TO 2.0 D50
85	1.3 TO 1.8 D50
50	1.0 TO 1.5 D50
15	0.3 TO 0.5 D50

PREFORMED PLUNGE POOL DETAIL

NOT TO SCALE

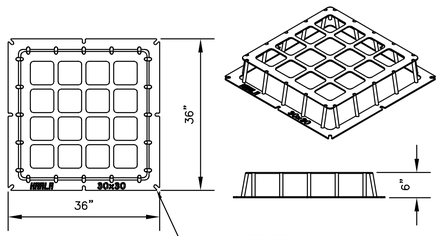


NOTE:

1. OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
2. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.
3. INLET GRATES AND TRASH RACKS SHALL BE HAALA PRODUCTS OR APPROVED EQUAL.

TYPICAL INLET TRASH RACKS

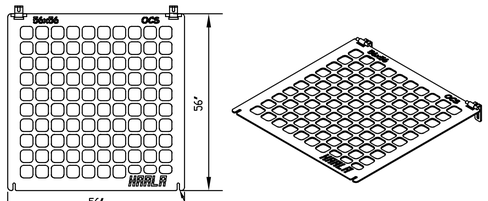
NOT TO SCALE



NOTES:
1. UNIT IS MADE FROM A36 STEEL AND IS HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123.

HAALA IG303006

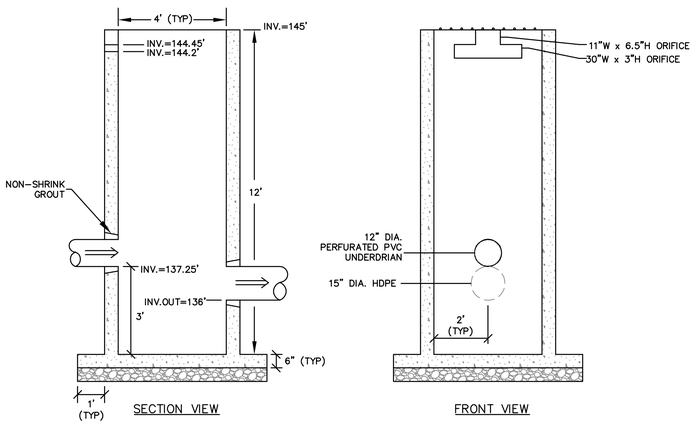
NOT TO SCALE



NOTES:
1. UNIT IS MADE FROM A36 STEEL AND IS HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123.

HAALA MC56X56

NOT TO SCALE



SECTION VIEW

FRONT VIEW

NOTE:
1) ALL OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
2) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.
3) SUMPS SHALL NOT BE GREATER THAN 8 INCHES.

OUTLET STRUCTURE 1 (OS1) DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

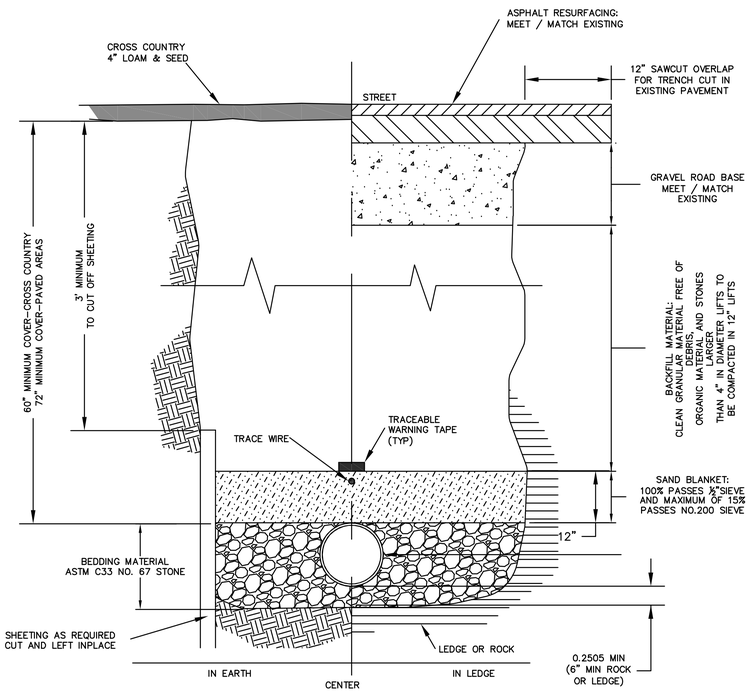
NO.	REVISION	APP'D	DATE

DATE: 1-18-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:JH
PROJECT NO: 22075
FILE: SITE.DWG

DETAIL SHEET

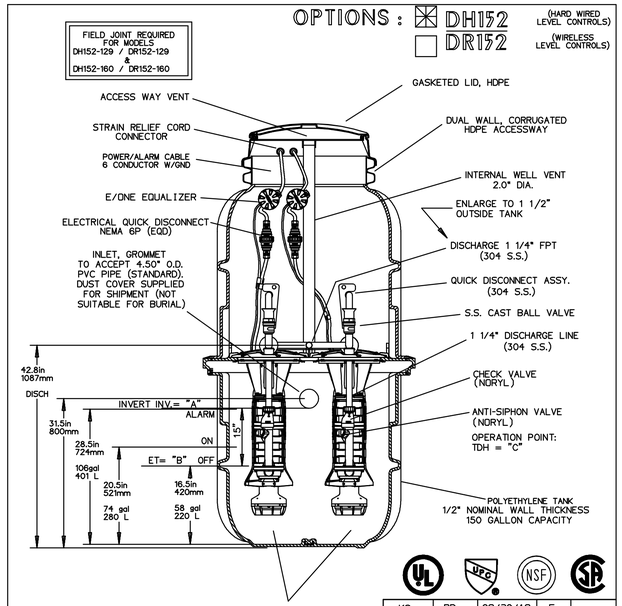
FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820



SEWER FORCEMAIN TRENCH

NOT TO SCALE



KC	PD	09/30/19	F	
DR BY	CHK'D	DATE	ISSUE	SCALE

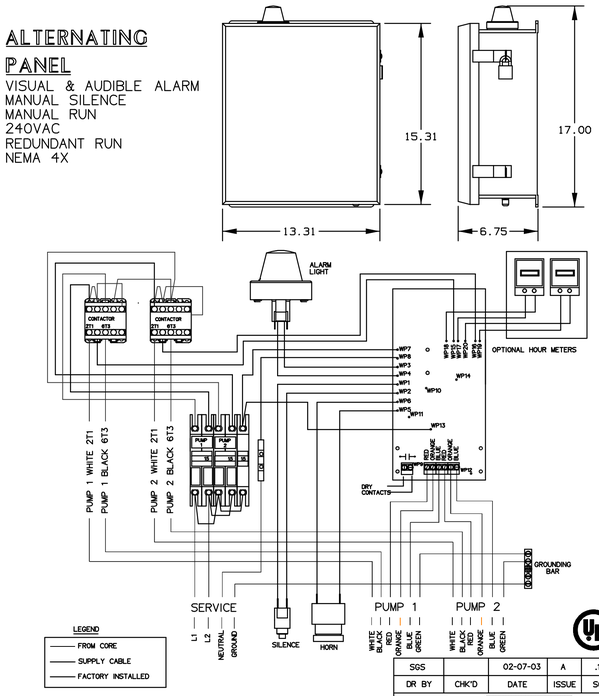
e/one SEWER SYSTEMS

MODEL DH152 / DR152 DETAIL SHEET

NA0052P02

ALTERNATING PANEL

VISUAL & AUDIBLE ALARM
MANUAL SILENCE
MANUAL RUN
240VAC
REDUNDANT RUN
NEMA 4X



SGS		02-07-03	A	.156
DR BY	CHK'D	DATE	ISSUE	SCALE

e/one SEWER SYSTEMS

DUPLEX SPLIT TIME ALTERNATING PANEL

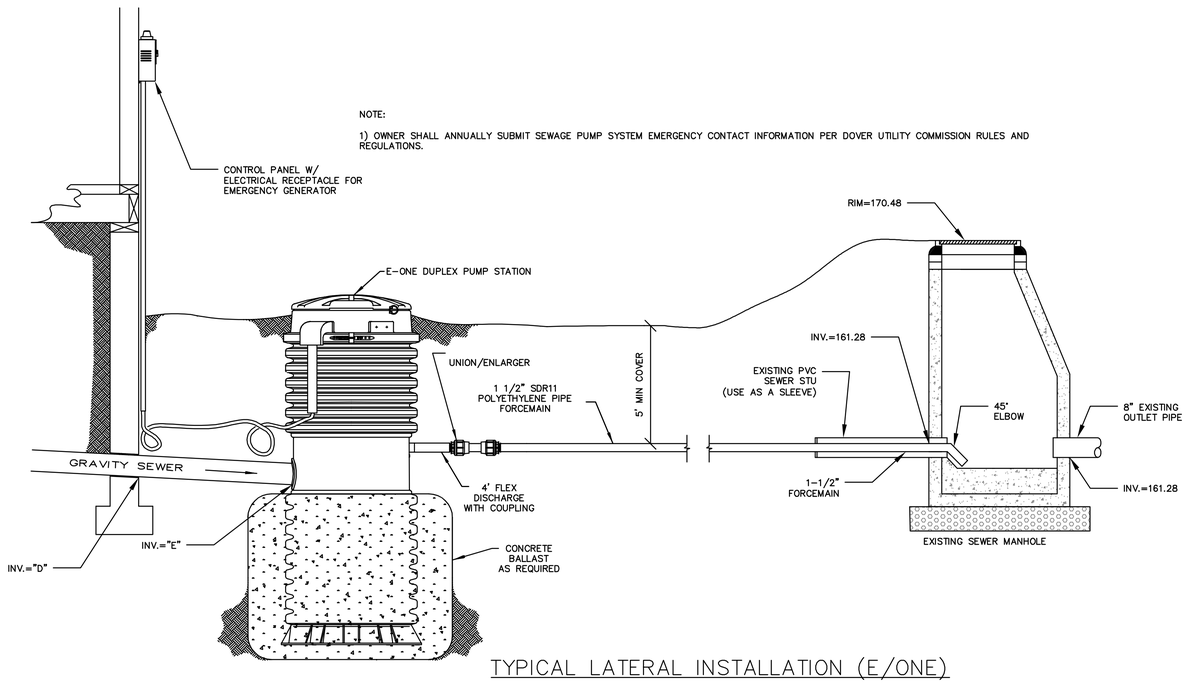
LM000270

BURIED NON-METALLIC UTILITIES SHALL RECEIVE A TRACER WIRE.

1. THE TRACER WIRE SHALL BE INSTALLED ON TOP OF THE BURIED UTILITY CROWN.
2. THE TRACER WIRE SHALL BE POSITIVELY ATTACHED TO THE NON-METALLIC BURIED UTILITIES BY PLASTIC WIRE TIES OF SIMILAR TYPE OF ATTACHMENT EVERY 6 FEET FOR STRAIGHT RUN OF UTILITY AND AT ALL CHANGES OF DIRECTION. TAPE SHALL BE POLYKEN "930-35," PROTECTO-WRAP "310", OR EQUAL.
3. THE ENDS OF THE TRACER WIRE SHALL BE EXPOSED ABOVE THE FINISHED GRADE.
4. INSTALL APPROVED CAST IRON VALVE BOXES AT ALL LOCATIONS WHERE THE ENDS OF THE TRACER WIRE ARE EXPOSED ABOVE THE FINISHED GRADE. THE BOXES SHALL NOT BE MORE THAN 200 FEET APART AND SHALL CONTAIN A 24" COIL OF WIRE FROM EACH END OF THE TRACER WIRE.
5. TRACER WIRE SHALL BE CONTINUOUS BETWEEN BOXES AND SHALL BE TESTED FOR CONTINUITY IN THE PRESENCE OF THE INSPECTOR.
6. TRACER WIRE SHALL BE NO. 10 AWG, COPPER WIRE WITH TW INSULATION (BLUE IN COLOR FOR USE WITH POTABLE WATER, GREEN FOR USE WITH SEWER). CONNECTORS SHALL BE DRY-CON TYPE CONNECTORS FOR SPECIFIED WIRE GAGE AND SUITABLE FOR USE WITH BURIED TRACER WIRE.
7. TRACER WIRE SHALL BE EXPOSED ABOVE FINISHED GRADE IN THE CAST IRON BOXES AT THE TRANSITION WHERE THE NON-METALLIC BURIED UTILITY CONNECTS TO THE EXISTING METALLIC UTILITY.
8. EXTEND WIRE INTO VALVE BOXES AND TERMINATE WITH A WIRE CONNECTOR. TERMINATE WIRE FROM LINES EXTENDING FROM MAINS TO FIRE RISERS OR BUILDING SERVICES 12" (300MM) ABOVE GRADE AND CAP WITH A WIRE CONNECTOR.

NOTE:

1) OWNER SHALL ANNUALLY SUBMIT SEWAGE PUMP SYSTEM EMERGENCY CONTACT INFORMATION PER DOVER UTILITY COMMISSION RULES AND REGULATIONS.



TYPICAL LATERAL INSTALLATION (E/ONE)

NOT TO SCALE

INVERT	PUMP STATION P.S.-1	PUMP STATION P.S.-2
A	148.00	147.50
B	146.90	146.40
C	22 FT @ 12.7 GPM	23.5 FT @ 12.6 GPM
D	148.50	148.0
E	148.00	147.50

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

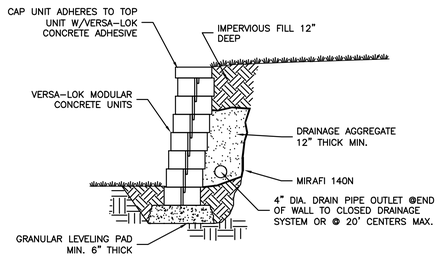
NO.	REVISION	DATE	APP'D

DATE: 1-18-24
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DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

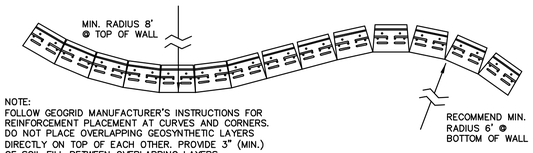
DETAIL SHEET

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

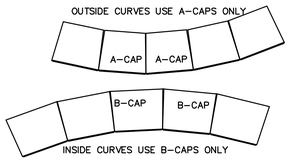


TYPICAL SECTION
UNREINFORCED RETAINING WALL

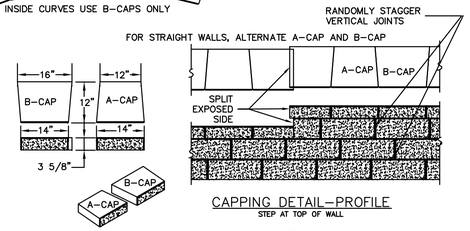


NOTE:
FOLLOW GEOGRID MANUFACTURER'S INSTRUCTIONS FOR REINFORCEMENT PLACEMENT AT CURVES AND CORNERS. DO NOT PLACE OVERLAPPING GEOSYNTHETIC LAYERS DIRECTLY ON TOP OF EACH OTHER. PROVIDE 3" (MIN.) OF SOIL FILL BETWEEN OVERLAPPING LAYERS.

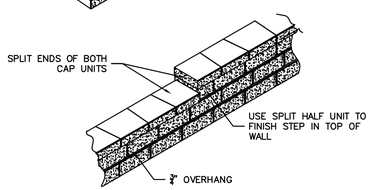
CURVE DETAIL
TYPICAL CURVES



GENERAL NOTES FOR CAPPING:
1. CAPS SHALL BE ADHERED TO WALL USING VERSA-LOK CONCRETE ADHESIVE.
2. CAPS MAY BE PLACED WITH A 1/2" TO 3/4" OVERHANG OF TOP COURSE
3. WHEN SPLITTING CAP UNIT FOR WALL END DO NOT USE A CAP SECTION LESS THAN 6" WIDE
4. DO NOT OVERHANG CAP AT END OF COURSE MORE THAN 1"

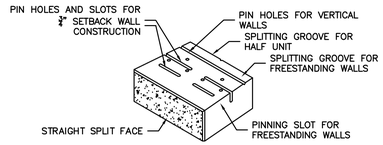


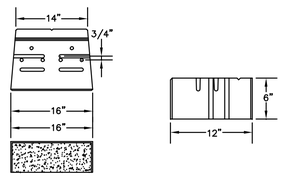
CAPPING DETAIL-PROFILE
STEP AT TOP OF WALL



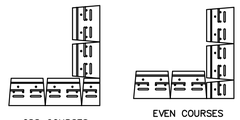
CAPPING DETAIL-PLAN VIEW
CURVES

CAPPING DETAILS

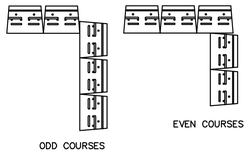




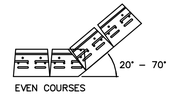
VERSA-LOK UNIT
NOT TO SCALE

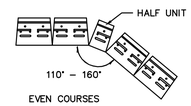


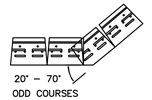
CORNER DETAIL
90° -OUTSIDE
SCALE: NONE



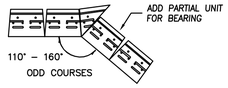
CORNER DETAIL
90° -INSIDE
SCALE: NONE



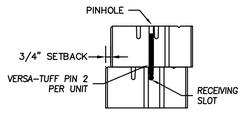




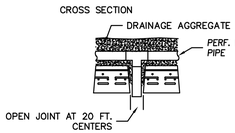
CORNER DETAIL
OBLIQUE ANGLE-OUTSIDE
SCALE: NONE



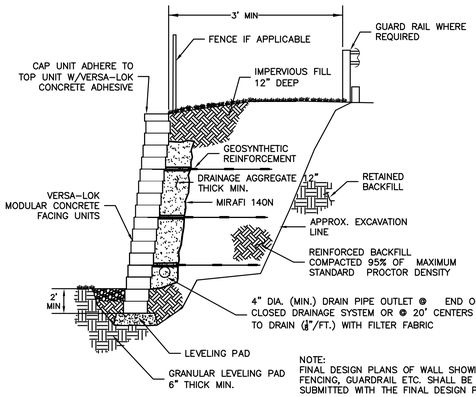
CORNER DETAIL
OBLIQUE ANGLE-INSIDE
SCALE: NONE



PINNING DETAIL

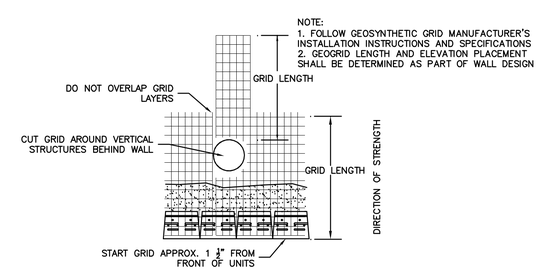


DRAIN DETAIL



NOTE:
FINAL DESIGN PLANS OF WALL SHOWING FENCING, GUARDRAIL ETC. SHALL BE SUBMITTED WITH THE FINAL DESIGN PLANS

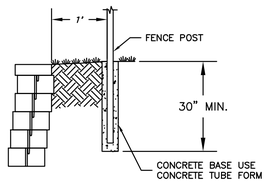
TYPICAL SECTION REINFORCED RETAINING WALL WITH GUARDRAIL
NOT TO SCALE



GEOGRID AT STRUCTURES BEHIND WALL

GENERAL NOTES
1. SEGMENTAL CONCRETE UNIT RETAINING WALL SHALL BE PROVIDED BY VERSA-LOK OR APPROVED EQUAL.
2. RETAINING WALL DESIGN AND INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S STANDARDS.
3. STRIP VEGETATION AND ORGANIC SOIL FROM WALL AND GEOSYNTHETIC ALIGNMENT.
4. BENCH CUT ALL EXCAVATED SLOPES.
5. DO NOT OVER EXCAVATE UNLESS DIRECTED BY SITE SOIL ENGINEER TO REMOVE UNSUITABLE SOIL.
6. SITE SOILS ENGINEER SHALL VERIFY FOUNDATION SOILS AS BEING COMPETENT PER THE DESIGN STANDARDS AND PARAMETERS.
7. LEVELING PAD SHALL CONSIST OF COMPACTED COARSE SAND OR CRUSHED GRAVEL, 6" THICK MIN.
8. CONTRACTOR MAY OPT FOR A LEAN CONCRETE PAD. CONCRETE PAD SHALL BE UNREINFORCED, 3" THICK MAXIMUM.
9. MINIMUM EMBEDMENT OF WALL BELOW FINISH GRADE SHALL BE 6" FOR WALL HEIGHTS UNDER 4 FT. AND 12" FOR WALLS OVER 4 FT. UNLESS SHOWN DIFFERENTLY.
10. FOR UNITS TO BE EMBEDDED, COMPACT FILL IN FRONT OF UNITS AT THE SAME TIME FILL BEHIND UNITS IS COMPACTED.
11. DRAINAGE AGGREGATE SHALL BE INSTALLED DIRECTLY BEHIND THE WALL WITHIN 12" OF THE TOP OF THE WALL. DRAINAGE AGGREGATE SHALL NOT EXTEND BELOW FINAL GRADE IN FRONT OF WALL.
12. COMPACTION SHALL BE TO 95% OF MAXIMUM STANDARD PROCTOR DENSITY.(ASTM D-6938) 13. COMPACTION TESTS SHALL BE TAKEN AS THE WALL IS INSTALLED. THE MINIMUM NUMBER OF TESTS SHALL BE DETERMINED BY THE SITE SOILS ENGINEER.
14. COMPACTION WITHIN 3 FT. OF WALL SHALL BE LIMITED TO HAND OPERATED EQUIPMENT.
15. SEE ELEVATION DRAWINGS FOR GEOSYNTHETIC TYPE, LENGTH AND LOCATION REQUIRED.
16. GEOSYNTHETIC SHALL BE PLACED WITH STRONGEST DIRECTION PERPENDICULAR TO WALL. FOLLOW GEOSYNTHETIC MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WRITTEN SPECIFICATIONS.
17. CONTRACTOR SHALL DIRECT SURFACE RUNOFF TO AVOID DAMAGING WALL WHILE UNDER CONSTRUCTION.
18. ANY SURFACE DRAINAGE FEATURES, FINISH GRADING, PAVEMENT, OR TURF SHALL BE INSTALLED IMMEDIATELY AFTER WALL IS COMPLETED.
19. FOLLOW APPLICABLE PROVISIONS OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WRITTEN SPECIFICATIONS.

RETAINING WALL NOTES



SAFETY FENCING DETAIL
TYPICAL FENCE POST
SCALE: NONE

RETAINING WALL SYSTEM

PART 1.0 - GENERAL

1.1 This work shall consist of furnishing all components and erecting a retaining wall system in accordance with these specifications and in close conformity with the lines, grades, design and dimensions shown on the plans or as ordered.

1.2 This following type of retaining wall systems are acceptable to be used on this project:

Versa-Lock, Nashua, NH - (603) 883-3042

1.3 STRUCTURAL AND GEOTECHNICAL DESIGN REQUIREMENTS

A. The design of the wall system shall be by the Manufacturer.

B. Minimum safety factors shall be as follows:

1.	Overturning:	2.0
2.	Base Sliding:	1.5
3.	Global Stability:	1.3
4.	Grid Pullout:	1.5

C. Allowable Net Bearing Pressure = 6 kips per square foot
Moist Soil Unit Weight = 125 pounds per cubic foot
Friction Angle = 32 degrees

D. Design loading shall consider seismic loads in accordance with the NEW HAMPSHIRE State Building Code.

1.4 REQUIREMENTS FOR CONTRACTOR PREPARED DESIGN AND PLANS

A. The final design to be submitted prior to award of contract and shall include detailed design computations and all details, dimensions, quantities and cross sections necessary to construct the wall. The design shall conform to all of the requirements outlined in section 1.3 above. The fully detailed plans shall be on permanent, archival quality, 24" x 36" double matte mylar with Project Name, Number and Design Firm. The plans to be submitted shall include, but not be limited to, the following items:

1. A plan and elevation sheet or sheets for each wall, containing the following:
   a. An elevation view of the wall which shall indicate the elevation at the top of the wall, at all horizontal and vertical break points and at least every fifty (50) feet along the wall, elevations at the top of leveling pads, the designation as to the type of unit, and the location of the original and final ground line.
   b. A plan view of the wall which shall indicate the offset from the construction centerline or baseline to the face of the wall at all changes in horizontal alignment and the limit of the widest unit.
   c. Any general notes required for design and construction of the wall.
   d. All horizontal and vertical curve data affecting wall construction.
2. All details for leveling pads, as well as allowable and calculated maximum bearing pressures.
3. Detailed design computations.
4. The plans shall be prepared, stamped and signed by a New Hampshire Licensed Professional Engineer.

NOTE:
ENGINEERED SHOP DRAWING SHALL BE SUBMITTED TO CIVILWORKS, INC. FOR REVIEW AND APPROVAL. THE SHOP DRAWING SHALL INCLUDE STRUCTURAL DESIGN INCLUDING PLANS AND CALCULATIONS PREPARED BY A NEW HAMPSHIRE CERTIFIED PROFESSIONAL ENGINEER. DESIGN ENGINEER SHALL INSPECT THE WALL DURING CONSTRUCTION AND CERTIFY THAT IT HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED SHOP DRAWING.

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

NO.	REVISION	APP'D	DATE

DATE: XXX
SCALE: XX
DRAWN BY: XX
DESIGN BY: XX
APPROVED BY:XX
PROJECT NO:XX
FILE: XXX

DETAIL SHEET

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

Luminaire Schedule					
Symbol	Qty	Label	Arrangement	Description	[MANUFAC]
	1	S3	Single	MRS-LED-06L-SIL-3-UNV-DIM-30-70CRI-CXX / 4SQ B3 S11G20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	2	S3-HS	Single	MRS-LED-06L-SIL-3-UNV-DIM-30-70CRI-IL-CXX / 4SQ B3 S11G20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	3	S4-HS	Single	MRS-LED-06L-SIL-4-UNV-DIM-30-70CRI-IH-CXX / 4SQ B3 S11G20 S GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	3	S5-2	Back-Back	MRS-LED-06L-SIL-5W-UNV-DIM-30-70CRI-CXX / 4SQ B3 S11G20 SD180 GA 4BC (20' AFG)	LSI INDUSTRIES, INC.
	2	W3	Single	XWM-3-LED-06L-30-UE-CXX / WALL MTD 18' AFG	LSI INDUSTRIES, INC.
	4	W4	Single	XWM-4-LED-06L-30-UE-CXX / WALL MTD 18' AFG	LSI INDUSTRIES, INC.

50' WETLAND BUFFER

PROPOSED 10,000 S.F. BUILDING

PROPOSED 25,000 S.F. BUILDING

50' WETLAND BUFFER

QUALITY WAY

PARCEL AREA
375,192 S.F.
8.61 Ac.

PARKING LOT AT 25K SF BLDG

Illuminance (Fc)
Average = 1.39
Maximum = 2.8
Minimum = 0.5
Avg/Min Ratio = 2.78
Max/Min Ratio = 5.60

TRUCK YARD-DOCK AREA 25K BLDG

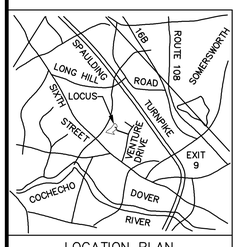
Illuminance (Fc)
Average = 0.87
Maximum = 2.4
Minimum = 0.3
Avg/Min Ratio = 2.90
Max/Min Ratio = 8.00

PARKING LOT AT 10K SF BLDG

Illuminance (Fc)
Average = 1.18
Maximum = 2.3
Minimum = 0.4
Avg/Min Ratio = 2.95
Max/Min Ratio = 5.75

TRUCK YARD-DOCK AREA 10K BLDG_1

Illuminance (Fc)
Average = 0.98
Maximum = 2.3
Minimum = 0.4
Avg/Min Ratio = 2.45
Max/Min Ratio = 5.75



LOCATION PLAN
(NO SCALE)

NO STATE PLANE, MAG BRG. GPS OBS.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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

NO.	REVISION	APP'D	DATE

DATE: 1-18-24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

LIGHTING PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

20

Catalog # _____ Project _____
Prepared By _____ Date _____

Mirada Small Area (MRS)

Outdoor LED Area Light



IP66 IK08

OVERVIEW	
Lumen Package	6,000 - 30,000
Wattage Range	39 - 209
Efficacy Range (LPW)	112 - 163
Weight lbs(kg)	20 (9.1)
Control Options	IMSBT, ALB, ALS, 7-Pin, PCI

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Cast aluminum wiring access door located underneath.
- 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.
- Shipping weight: 27 lbs in carton.

Optical System

- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated seal.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in distribution types 2, 3, 4, 5W, FT, and LC/RC.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93-95%.
- Zero uplight.
- Available in 5000K, 4000K, and 3000K color temperatures per ANSI C78.377.
- Minimum CRI of 70.
- Integral louver (IL) and integral half louver (IH) options available for enhanced backlight control.

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: >60k Hours
- Total harmonic distortion: <20%
- Operating temperature: -40°C to +50°C (-40°F to +122°F). 30L lumen packages rated to +40°C.
- Power factor: >.90
- Input power stays constant over life.
- Field replaceable 10kV 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
- Driver is fully encased in potting material for moisture resistance and complies with FCC standards. Driver and key electronic components can easily be accessed.

Controls

- Optional integral passive infrared Bluetooth™ motion and photocell sensor. Fixtures operate independently and can be commissioned via iOS or Android configuration app.
- LSI's AirLink™ wireless control system options reduce energy and maintenance costs while optimizing light quality 24/7.

Installation

- Designed to mount to square or round poles.
- A single fastener secures the hinged door, underneath the housing and provides quick & easy access to the electrical compartment.
- Included terminal block accepts up to 12 ga. wire.
- Utilizes LSI's traditional B3 drill pattern.

Warranty

- LSI luminaires carry a 5-year limited warranty. Refer to https://www.lsicorp.com/resources/terms-conditions-warranty/ for more information.

Listings

- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 3000K color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet locations.
- IP66 rated Luminaire per IEC 60598-1.
- 3G rated for ANSI C136.31 high vibration applications are qualified.
- IK08 rated luminiare per IEC 66262 mechanical impact code
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

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Catalog # _____ Project _____ Type _____
Prepared By _____ Date _____

Mirada Medium Wall Sconce (XWM)

Outdoor Wall Sconce



IP65 IK08

OVERVIEW	
Lumen Package	3,000 - 21,000
Wattage Range	23 - 175
Efficacy Range (LPW)	125 - 158
Weight lbs(kg)	27 (12.2)
Control Options	IMSBT, ALB, ALS, PCI

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Hinged die-cast aluminum wiring access door located underneath.
- Galvanized-steel universal wall mount bracket comes standard with hinging mechanism to easily access the junction box wire connections without removing the luminaire.
- Optional pole-mounting bracket (XPMA) permits mounting to standard poles.
- 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.
- Max shipping weight: 30lbs in carton.

Optical System

- State-of-the-Art one piece silicone optic provides industry leading optical control while also acting as an integrated gasket reducing system complexity and improving fixture reliability.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in Types 2, 3, 4, and FT distributions.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93-95%.
- Zero uplight.
- Available in 5000K, 4000K and 3000K color temperatures per ANSI C78.377. Also Available in Phosphor Converted Amber with Peak intensity at 610nm.
- Minimum CRI of 70.

Electrical

- High-performance programmable driver features over-voltage, under-voltage, short-circuit and over temperature protection. Custom lumen and wattage packages available.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 Vac) Input 50/60 Hz or optional High Voltage (347-480 Vac).
- L80 Calculated Life: >100k Hours
- Total harmonic distortion (THD): <20%
- 3L to 12L operating temperature: -40°C to +50°C (-40°F to +122°F).
- 15L operating temperature: -40°C to +45°C (-40°F to +113°F).
- 18L operating temperature: -40°C to +40°C (-40°F to +104°F).
- 21L operating temperature: -40°C to +35°C (-40°F to + 95°F).
- Power factor (PF): >.90
- Input power stays constant over life.
- Optional 10kV 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.
- Components are fully encased in potting material for moisture resistance. Driver complies with FCC standards. Driver and key electronic components can easily be accessed via hinged door.
- Optional integral emergency battery pack provides 90-minutes of constant power to the LED system, ensuring code compliance. A test switch/indicator button is installed on the housing for ease of maintenance. The fixture delivers 1500 lumens during emergency mode.

Controls

- Integral passive infrared Bluetooth™ motion sensor options. Fixtures operate independently and can be commissioned via an iOS or Android configuration app. Updates and modifications to the control strategy are easily implemented via an intuitive app.
- LSI's AirLink™ Blue lighting control system is a simple feature rich wireless Bluetooth mesh network. The integrated fixture sensor module provides wireless control of grouped fixtures based on motion sensors, daylight or a fully customizable schedule.

Installation

- Universal wall mounting plate easily mounts directly to 4" octagonal or square junction box.
- 2 fasteners secure the hinged door underneath the housing and provide quick & easy access to the electrical compartment for installing/servicing.
- Optional terminal block accepts up to 12 ga wire.

Warranty

- LSI luminaires carry a 5-year limited warranty. Refer to https://www.lsicorp.com/resources/terms-conditions-warranty/ for more information.
- 1 Year warranty on Battery Back-up option.

Listings

- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 3000K or lower color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet Locations.
- IP65 rated luminaire per IEC 60598.
- 3G rated for ANSI C136.31 high vibration applications when pole mounted (using optional XPMA bracket) or wall mounted.
- IK08 rated luminiare per IEC 66262 mechanical impact code
- DesignLights Consortium® (DLC) Premium qualified product. Not all versions of this product may be DLC Premium qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

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Catalog # : _____ Project : _____
Prepared By : _____ Date : _____

Steel Poles

Square Straight



QUICK LINKS

Ordering Guide | Configurations | Dimensions | EPA

FEATURES & SPECIFICATIONS

Pole Shaft

- Straight poles are 4", 5", or 6" square.
- Pole shaft is electro-welded ASTM-A500 Grade C steel tubing with a minimum yield strength of 50,000 psi.
- On Tenon Mount steel poles, tenon is 2-3/8" O.D. high-strength pipe. Tenon is 4-3/4" in length.

Hand-Hole

- Standard hand-hole location is 12" above pole base.
- Poles 22' 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.

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.

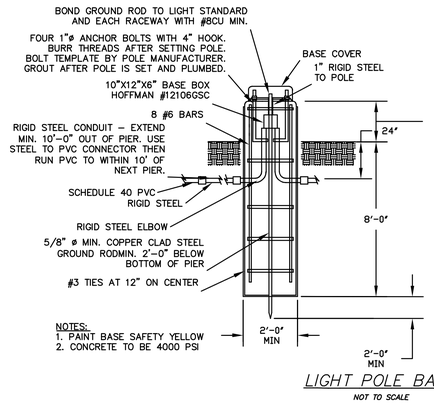
Pole Vibration Damper

- 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

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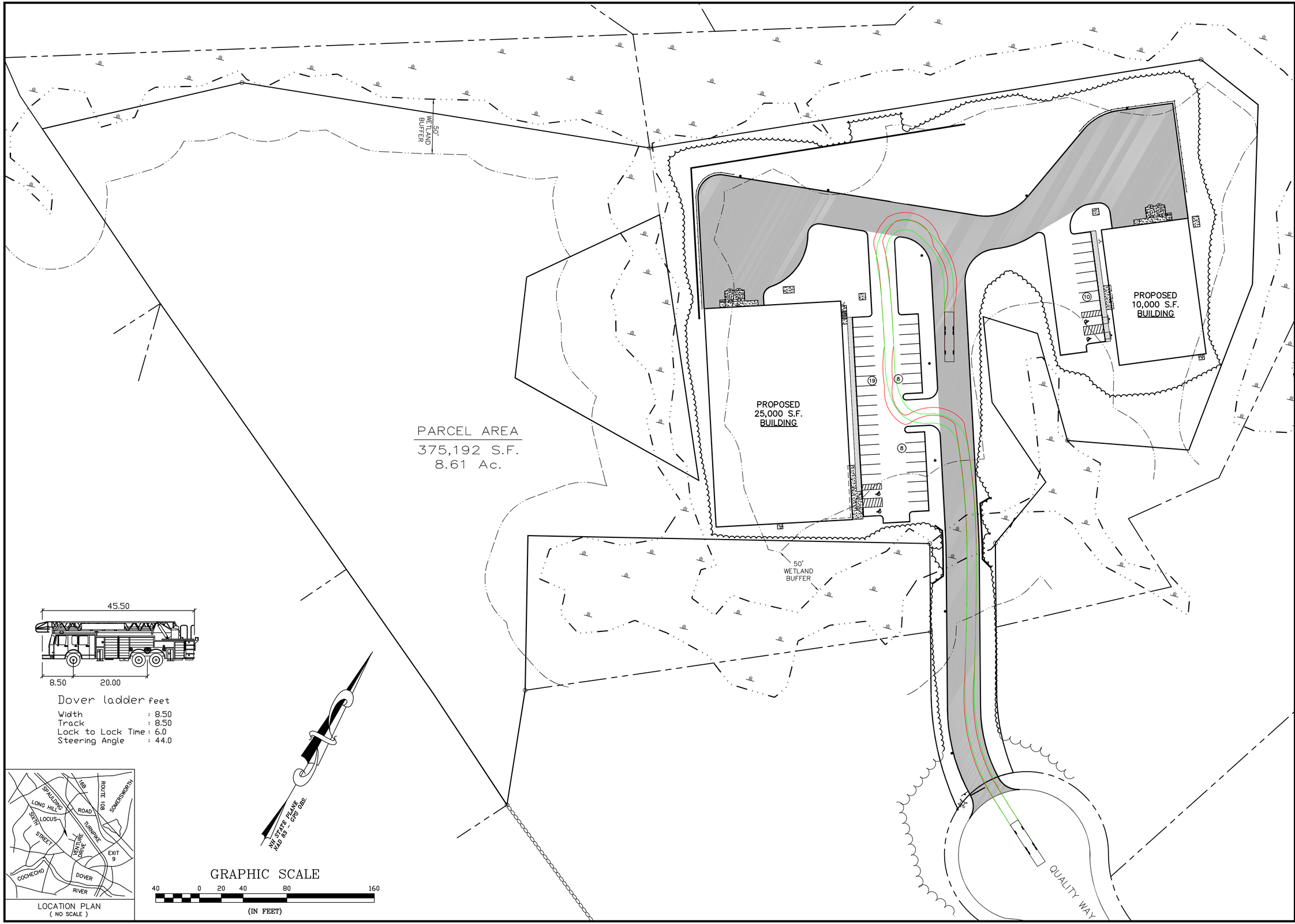
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SCALE: AS SHOWN
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DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

LIHGTING DETAILS

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

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DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 22075
FILE: SITE.DWG

DOVER LADDER TRUCK MOVEMENT PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

22

PROPOSED
25,000 S.F.
BUILDING

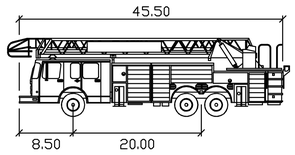
PROPOSED
10,000 S.F.
BUILDING

50'
WETLAND
BUFFER

50'
WETLAND
BUFFER

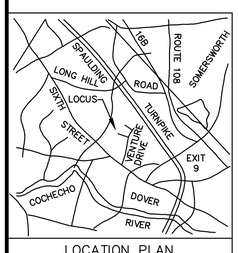
QUALITY WAY

PARCEL AREA
375,192 S.F.
8.61 Ac.

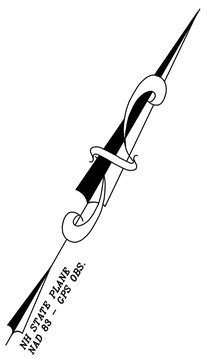


Dover ladder feet

Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 44.0



LOCATION PLAN
(NO SCALE)



GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

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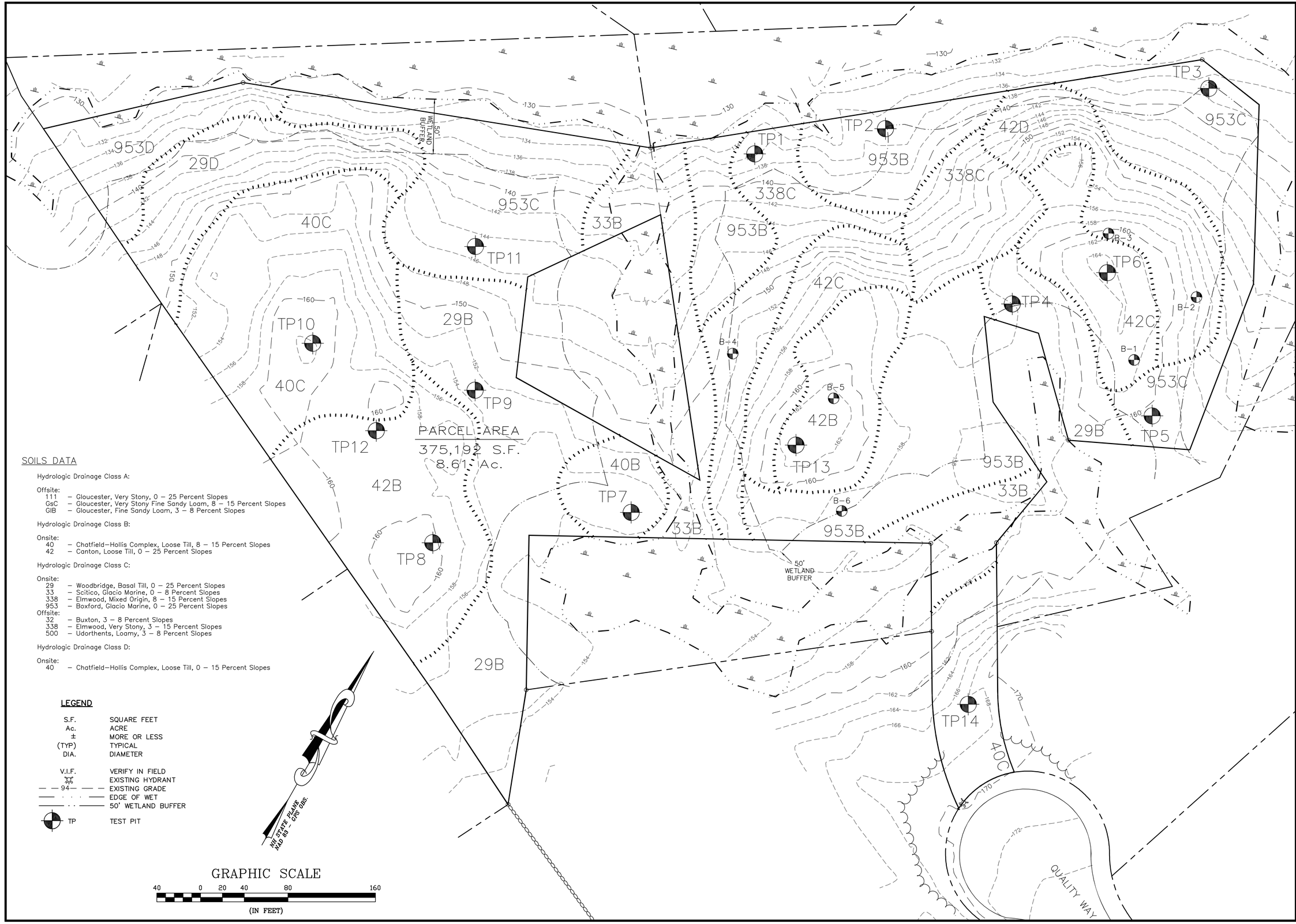
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DOVER LADDER TRUCK MOVEMENT PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

23



SOILS DATA

Hydrologic Drainage Class A:

Offsite:
- 111 – Gloucester, Very Stony, 0 – 25 Percent Slopes
- GsC – Gloucester, Very Stony Fine Sandy Loam, 8 – 15 Percent Slopes
- GlB – Gloucester, Fine Sandy Loam, 3 – 8 Percent Slopes

Hydrologic Drainage Class B:

Onsite:
- 40 – Chatfield–Hollis Complex, Loose Till, 8 – 15 Percent Slopes
- 42 – Canton, Loose Till, 0 – 25 Percent Slopes

Hydrologic Drainage Class C:

Onsite:
- 29 – Woodbridge, Basal Till, 0 – 25 Percent Slopes
- 33 – Scitico, Glacio Marine, 0 – 8 Percent Slopes
- 338 – Elmwood, Mixed Origin, 8 – 15 Percent Slopes
- 953 – Boxford, Glacio Marine, 0 – 25 Percent Slopes

Offsite:
- 32 – Buxton, 3 – 8 Percent Slopes
- 338 – Elmwood, Very Stony, 3 – 15 Percent Slopes
- 500 – Udorthents, Loamy, 3 – 8 Percent Slopes

Hydrologic Drainage Class D:

Onsite:
- 40 – Chatfield–Hollis Complex, Loose Till, 0 – 15 Percent Slopes

LEGEND

S.F.	SQUARE FEET
Ac.	ACRE
±	MORE OR LESS
(TYP)	TYPICAL
DIA.	DIAMETER
V.I.F.	VERIFY IN FIELD
	EXISTING HYDRANT
94	EXISTING GRADE
	EDGE OF WET
	50' WETLAND BUFFER
TP	TEST PIT

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SITE SPECIFIC SOILS PLAN

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

24

Michael Cuomo, Soil Scientist
6 York Pond Road, York, Maine 03909
207 363 4532
mcuomosoil@gmail.com

TEST PIT DATA

Client: Civilworks
Location: Quality Way, Dover, NH
Date: 1 December 2022

Test Pit Number: One

Depth	Description
1"	Leaf litter.
0-8"	Very dark grayish brown (10YR 3/2) stony fine sandy loam, granular, friable.
8-15"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
15-24"	Light olive brown (2.5Y 5/3) silt loam, blocky, friable, redox.
24-36"	Olive gray (5Y 5/2) silt loam, blocky, firm, redox.
36-63"	Olive brown (2.5Y 4/4) stony fine sandy loam, blocky, firm, redox.
63"+	Bedrock.

Soil Series: Elmwood
Depth to Seasonal High Water Table: 15"
Depth to Restrictive Layer: 24"
Observed Water: 60"
Depth to Bedrock: 63"

Test Pit Number: Two

Depth	Description
2"	Leaf litter.
0-4"	Dark grayish brown (2.5Y 4/2) silt loam, granular, friable, redox.
4-10"	Light brownish gray (2.5Y 6/2) silt loam, blocky, friable, redox.
10-20"	Olive brown (2.5Y 4/4) silt loam, blocky, friable, redox.
20-30"	Gray (5Y 5/1) silt loam, blocky, firm, redox.
30-72"	Olive gray (5Y 4/2) silty clay loam, blocky, firm, redox.

Soil Series: Scitico
Depth to Seasonal High Water Table: Surface
Depth to Restrictive Layer: 20"
Observed Water: 6"
Depth to Bedrock: None

Test Pit Number: Three

Depth	Description
1"	Leaf litter.
0-8"	Dark brown (10YR 3/3) silt loam, granular, friable.
8-12"	Olive yellow (2.5Y 6/6) silt loam, blocky, friable.
12-16"	Dark grayish brown (2.5Y 4/2) silt loam, blocky, friable, redox.
16-28"	Olive brown (2.5Y 4/4) silt loam, blocky, firm, redox.
28-72"	Olive (5Y 5/3) silty clay loam, blocky, firm, redox.

Soil Series: Boxford
Depth to Seasonal High Water Table: 12"
Depth to Restrictive Layer: 16"
Observed Water: 12"
Depth to Bedrock: None

Test Pit Number: Four

Depth	Description
1"	Leaf litter.
0-6"	Dark brown (10YR 3/3) very fine sandy loam, granular, friable.
6-15"	Dark yellowish brown (10YR 4/6) very fine sandy loam, blocky, friable.
15-28"	Olive brown (2.5Y 4/4) silt loam, blocky, friable, redox.
28-80"	Light olive brown (2.5Y 5/4) stony fine sandy loam, blocky, firm, redox.
80-96"	Light yellowish brown (2.5Y 6/4) fine sand, massive, friable, redox.

Soil Series: Woodbridge variant
Depth to Seasonal High Water Table: 15"
Depth to Restrictive Layer: 28"
Observed Water: 15"
Depth to Bedrock: None

Test Pit Number: Five

Depth	Description
1"	Leaf litter.
0-8"	Very dark gray (2.5Y 3/1) silt loam, granular, friable.
8-10"	Light olive brown (2.5Y 5/3) silt loam, blocky, friable.
10-15"	Olive (5Y 5/3) silt loam, blocky, friable, redox.
15-38"	Olive (5Y 5/3) silt loam, blocky, firm, redox.
38-60"	Olive brown (2.5Y 4/3) stony fine sandy loam, blocky, firm, redox.
60-84"	Olive gray (5Y 5/2) silt loam, blocky, firm, redox.

Soil Series: Boxford variant
Depth to Seasonal High Water Table: 10"
Depth to Restrictive Layer: 15"
Observed Water: 15"
Depth to Bedrock: None

Test Pit Number: Six

Depth	Description
1"	Leaf litter.
0-6"	Very dark grayish brown (10YR 3/2) fine sandy loam, granular, friable.
6-24"	Yellowish brown (10YR 5/6) stony fine sandy loam, blocky, friable.
24-60"	Light yellowish brown (2.5Y 6/3) stony loamy sand, massive, friable.
60"+	Bedrock

Soil Series: Canton
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: 60"

Test Pit Number: Seven

Depth	Description
2"	Leaf litter.
0-6"	Very dark brown (10YR 2/2) stony fine sandy loam, granular, friable.
6-12"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
12"+	Bedrock.

Soil Series: Hollis
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: 12"

Test Pit Number: Eight

Depth	Description
2"	Leaf litter.
0-6"	Dark brown (10YR 3/3) stony fine sandy loam, granular, friable.
6-12"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
12-33"	Brownish yellow (10YR 6/6) stony fine sandy loam, blocky, friable.
33-60"	Light yellowish brown (2.5Y 6/3) stony loamy sand, massive, friable.

Soil Series: Canton
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: None

Test Pit Number: Nine

Depth	Description
3"	Leaf litter.
0-7"	Dark brown (10YR 3/3) stony fine sandy loam, granular, friable.
7-20"	Yellowish brown (10YR 5/6) stony fine sandy loam, blocky, friable.
20-25"	Light olive brown (2.5Y 5/4) stony fine sandy loam, blocky, friable, redox.
25-57"	Olive brown (2.5Y 4/4) stony fine sandy loam, massive, firm, redox.
57"+	Bedrock

Soil Series: Woodbridge
Depth to Seasonal High Water Table: 20"
Depth to Restrictive Layer: 25"
Observed Water: None
Depth to Bedrock: 57"

Test Pit Number: Ten

Depth	Description
2"	Leaf litter.
0-7"	Dark yellowish brown (10YR 3/6) fine sandy loam, granular, friable.
7-12"	Dark yellowish brown (10YR 4/6) fine sandy loam, blocky, friable.
12"+	Bedrock.

Soil Series: Hollis
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: 12"

Test Pit Number: Eleven

Depth	Description
1"	Leaf litter.
0-6"	Very dark grayish brown (2.5Y 3/2) silt loam, granular, friable.
6-12"	Olive brown (2.5Y 4/4) silt loam, blocky, friable.
12-22"	Light olive brown (2.5Y 5/4) silt loam, blocky, friable, redox.
22-32"	Olive gray (5Y 4/2) silt loam, blocky, firm, redox.
32-63"	Olive brown (2.5Y 4/4) stony fine sandy loam, blocky, firm, redox.

Soil Series: Boxford variant
Depth to Seasonal High Water Table: 12"
Depth to Restrictive Layer: 22"
Observed Water: 15"
Depth to Bedrock: None

Test Pit Number: Twelve

Depth	Description
3"	Leaf litter.
0-7"	Dark brown (10YR 3/3) stony fine sandy loam, granular, friable.
7-17"	Dark yellowish brown (10YR 4/6) stony fine sandy loam, blocky, friable.
17-30"	Brownish yellow (10YR 6/6) stony fine sandy loam, blocky, friable.
30-48"	Light yellowish brown (2.5Y 6/3) stony loamy sand, massive, friable.
48"+	Bedrock

Soil Series: Canton
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: 48"

Test Pit Number: Thirteen

Depth	Description
2"	Leaf litter.
0-6"	Very dark grayish brown (10YR 3/2) fine sandy loam, granular, friable.
6-16"	Dark yellowish brown (10YR 4/6) fine sandy loam, blocky, friable.
16-26"	Brownish yellow (10YR 6/6) fine sandy loam, blocky, friable.
26-64"	Light yellowish brown (2.5Y 6/3) stony loamy sand, massive, friable.

Soil Series: Canton
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: None

Test Pit Number: Fourteen

Depth	Description
3"	Leaf litter.
0-5"	Dark brown (10YR 3/3) fine sandy loam, granular, friable.
5-16"	Dark yellowish brown (10YR 4/6) fine sandy loam, blocky, friable.
16-23"	Yellowish brown (10YR 5/6) fine sandy loam, blocky, friable.
23"+	Bedrock.

Soil Series: Chatfield
Depth to Seasonal High Water Table: None
Depth to Restrictive Layer: None
Observed Water: None
Depth to Bedrock: 23"

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TEST PIT LOGS

FUTURE AUTOMATION, INC.
127 VENTURE DRIVE
DOVER, NH 03820

FUTURE AUTOMATION
QUALITY WAY LOT
DOVER, NH 03820

Future Automation

Dover, NH

Planning Board
N.F.C. - 011024

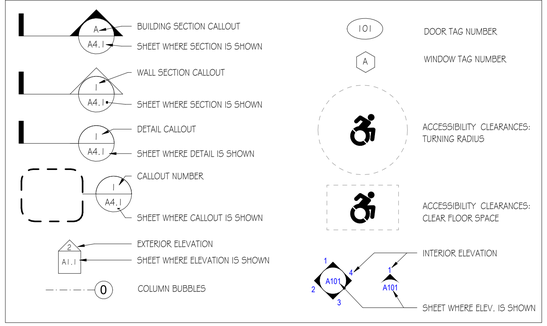
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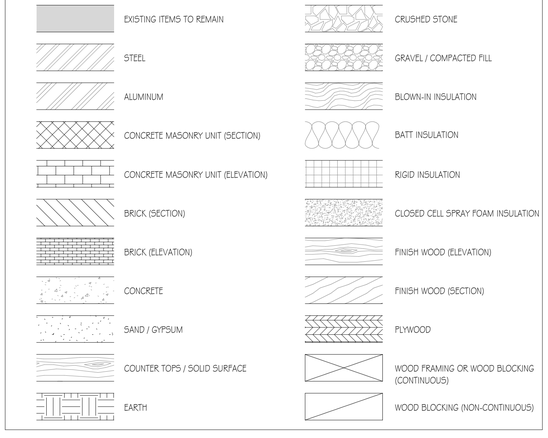
MASTER ABBREVIATION KEY:

AB	ANCHOR BOLT
AC	AIR CONDITIONER
ACI	AMERICAN CONCRETE INSTITUTE
ACOUST	ACOUSTIC
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
ANCH	ANCHOR
ANOD	ANODIZED
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
BD	BOARD
BIT	BITUMINOUS
BL	BUILDING LINE
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BOC	BOTTOM OF CURB
BOF	BOTTOM OF FOOTING ELEVATION
BOT	BOTTOM
BRG	BEARING
BRK	BRICK
BSMT	BASEMENT
BTW	BETWEEN
BUR	BUILT-UP ROOF
CAB	CABINET
CB	CATCH BASIN
CER	CERAMIC
CF	CUBIC FOOT
CI	CAST IRON
CJ	CONTROL JOINT
CL	CLOSET
CLCB	CURBLESS CATCH BASIN
CLG	CEILING
CM	CONTRACT MANAGER
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
COMP	COMPACTED (COMPOSITION)
CONC	CONCRETE
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CORR	CORRUGATED
CP	CONTROL PANEL
CSG	CASING
CSMT	CASEMENT
CT	CERAMIC TILE
CTR	CENTER
CY	CUBIC YARD
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DL	DEAD LOAD
DN	DOWN
DR	DOOR
DS	DOWNSPOUT
DS/C	DRIVE SIDE OF CURB
DTL	DETAIL
DWG	DRAWING
E	EAST
EJ	EXPANSION JOINT
EJC	EXPANSION JOINT COVER
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EQ	EQUAL
EQUIP	EQUIPMENT
ER	EMERGENCY ROOM
EST	ESTIMATE
EWC	ELECTRICAL WATER COOLER
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXPD	EXPANDED
EXT	EXTERIOR
F/F	FACE OF FOUNDATION WALL
FA	FRESH AIR
FAP	FIRE ALARM PANEL
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FIN	FINISH
FL	FLOW LINE
FLR	FLOOR
FND	FOUNDATION
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FR	FIRE RATED
FS	FULL SIZE
FT	FOOT
FTG	FOOTING
FUR	FURRED (FURRING)
FVC	FIRE VALVE CABINET
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERAL
GL	GLASS
GLZ	GLAZING
GRD	GRADE
GYP	GYPSUM
H&V	HEATING & VENTILATING
HC	HANDICAP
HDWD	HARDWOOD
HGT	HEIGHT
HM	HOLLOW METAL
HP	HIGH POINT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HWH	HOT WATER HEATER
ID	INSIDE DIAMETER
IN	INCH
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
JC	JANITOR'S CLOSET
JST	JOIST
JT	JOINT
LAM	LAMINATE
LAV	LAVATORY
MAS	MASONRY
MAT	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MEM	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
METTP	METAL TOILET PARTITION
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTL	METAL
MULL	MULLION
N	NORTH
NAT	NATURAL
NEC	NECESSARY
NIC	NOT IN CONTRACT
NOM	NOMINAL
NRC	NOISE REDUCTION COEFFICIENT
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF/C	OUTSIDE FACE OF CONCRETE
OH	OVERHEAD
OPG	OPENING
OPP	OPPOSITE
OR	OPERATING ROOM
PBD	PARTICLE BOARD
PCF	POUNDS PER CUBIC FOOT
PL	PROPERTY LINE
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLYWD	PLYWOOD
PNL	PANEL
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PAINT
PTD	PAINTED
PTN	PARTITION
PVC	POLYVINYL CHLORIDE
QT	QUARRY TILE
R	RADIUS
R/A	RETURN AIR
RC	REINFORCED CONCRETE
RD	ROOF DRAIN
REF	REFERENCE
REFR	REFRIGERATOR
REINF	REINFORCE
REQD	REQUIRED
RGH	ROUGH
RL	RAIN LEADER
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RQMT	REQUIREMENT
S	SOUTH
S-TRAP	SEDIMENT TRAP
SC	SOLID CORE
SCED	SCHEDULE
SD	STORM DRAIN
SF	SQUARE FOOT
SH	SHOWER
SHT	SHEET
SIM	SIMILAR
SL	SLIDING
SMR	SINGLE PLY MEMBRANE ROOF
SP/PT/FIN	SPECIAL PAINT FINISH
SPEC	SPECIFICATION
SPKR	SPEAKER
SQ	SQUARE
SS	STAINLESS STEEL
STA	STATION
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRG	STRINGER
STRUCT	STRUCTURAL
SU	SITE UTILITY
SUSP	SUSPEND (SUSPENDED)
SYMM	SYMMETRICAL
SYS	SYSTEM
T	TREAD
T&G	TONGUE & GROOVED
T/FRM	TOP OF FRAME
T/SLB	TOP OF SLAB
TB	TACKBOARD
TEL	TELEPHONE
TEMP	TEMPORARY
TERR	TERRAZZO
THK	THICK
THLD	THRESHOLD
TOC	TOP OF CURB
TOF	TOP OF FOUNDATION
TOS	TOP OF SLAB
TOW	TOP OF WALL ELEVATION
TR	TO REMAIN
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES, INC.
UOD	UNDERSIDE OF DECK
UON	UNLESS OTHERWISE NOTED
UR	URINAL
UV	UNIT VENTILATOR
VAR	VARIES OR VARIABLE
VB	VINYL BASE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
VNR	VENEER
VOL	VOLUME
W	WEST
W/	WITH
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WGL	WIRE GLASS
WP	WEATHERPROOF (WATERPROOFING)
WWF	WELDED WIRE FABRIC

GRAPHIC SYMBOLS LEGEND



MATERIAL LEGEND



DRAWING SHEET INDEX:

Sheet	Sheet Name	Issued	Revision	Revision Date
PCS	*PROJECT COVER SHEET*	*N.F.C.*		
A1.1	*FLOOR PLAN*	*N.F.C.*		
A3.1	*EXTERIOR ELEVATIONS*	*N.F.C.*		
A3.2	*EXTERIOR ELEVATIONS*	*N.F.C.*		
R1.1	*Main Building Street View Rendering*	*N.F.C.*		
R1.2	*Main Building Front View Rendering*	*N.F.C.*		
R1.3	*Street View Rendering*	*N.F.C.*		
R1.4	*Campus Aerial View Rendering*	*N.F.C.*		

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T | W DESIGNS
254 Drake Hill Rd. Strafford, NH
TW-Designs.com | 603.664.2181

Revision Schedule

No.	Description	Date

Project Info:
23027
Future Automation
Dover, NH
Planning Board

Architect of Record:
T | W Designs, LLC
254 Drake Hill Rd.
Strafford, NH 03884
603-664-2181

Civil Engineer:
XXX

Structural Engineer:
XXX

Electrical Engineer:
XXX

Mechanical Engineer:
XXX

Plumbing Engineer:
XXX

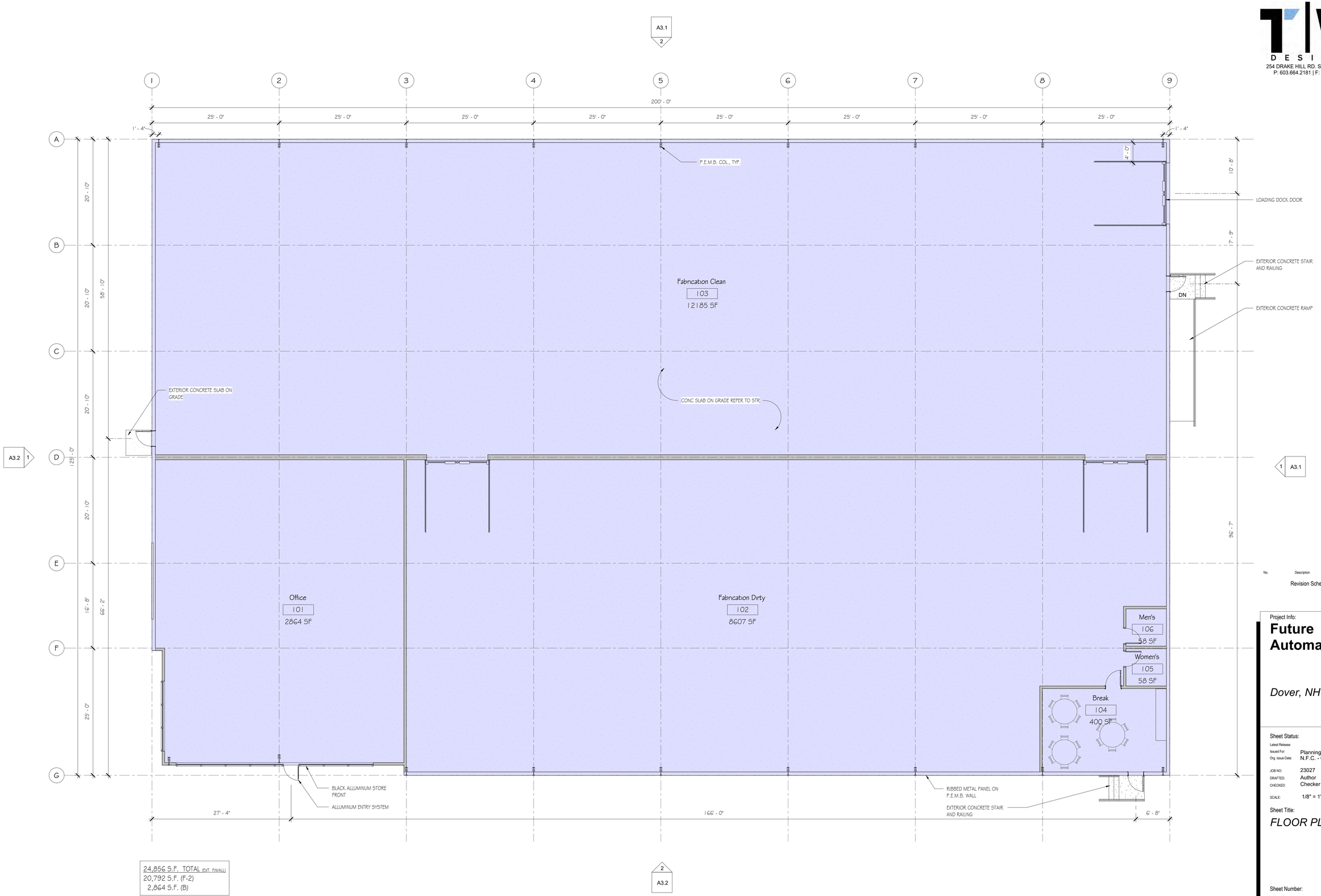
Fire Protection Eng.:
DESIGN / BUILD RESPONSIBILITY OF SPRINKLER CONTRACTOR

Contractor of Record:
XXX

23027
PROJECT COVER SHEET

SHEET NUMBER
PCS

TW DESIGNS LLC
254 DRAKE HILL RD. STRAFFORD, NH
P: 603.664.2181 | F: 603.664.9508



24,856 S.F. TOTAL (EXT. F/WALL)
20,792 S.F. (F-2)
2,864 S.F. (B)

2
A3.2

1 FIRST FLOOR PLAN
1/8" = 1'-0"

No. Description Date

Revision Schedule

Project Info:

Future Automation

Dover, NH

Sheet Status:

Latest Release:
Issued For: Planning Board
Org. Issue Date: N.F.C. - 011024

JOB NO: 23027
DRAFTED: Author
CHECKED: Checker
SCALE: 1/8" = 1'-0"

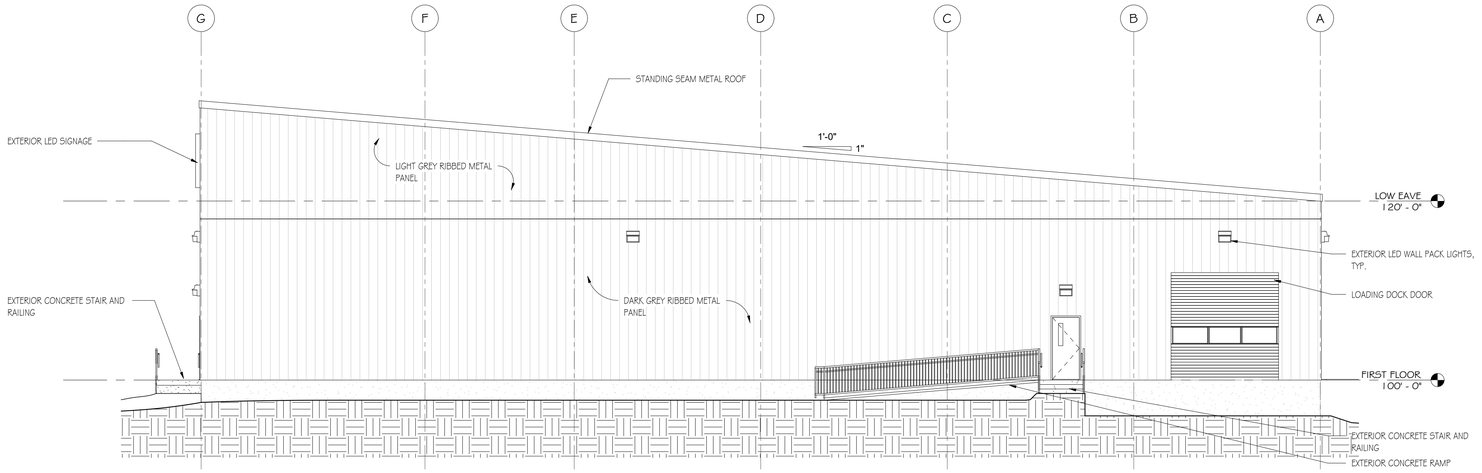
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Sheet Number:
A1.1

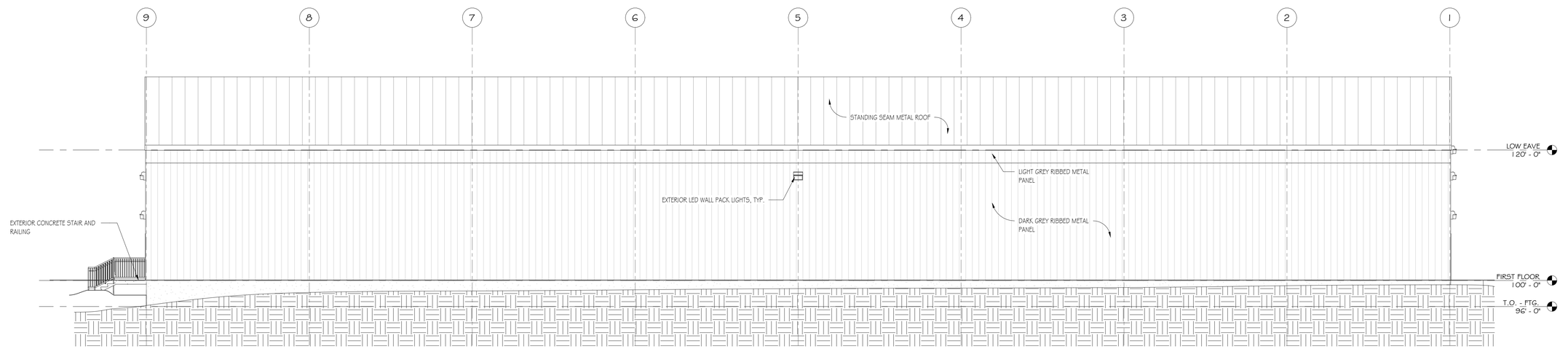
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1 EAST EXTERIOR ELEVATION
1/8" = 1'-0"



2 NORTH EXTERIOR ELEVATION
1/8" = 1'-0"

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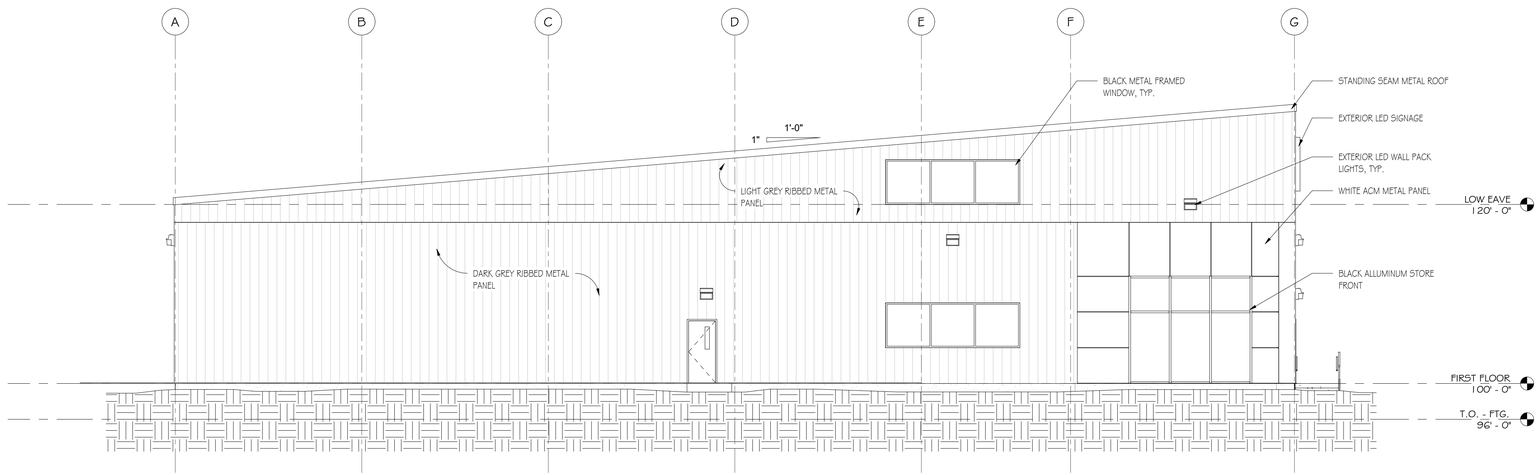
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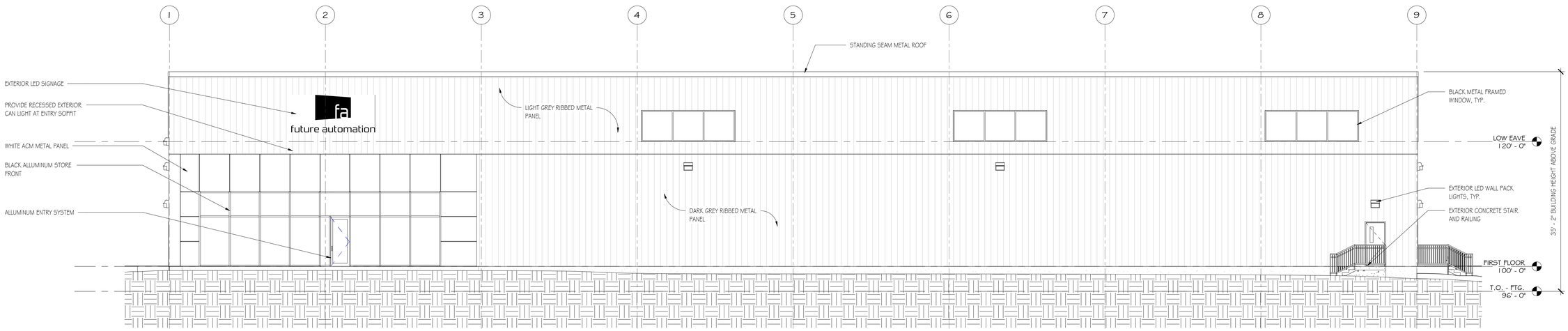
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P: 603.664.2181 | F: 603.664.9508



1 WEST EXTERIOR ELEVATION
1/8" = 1'-0"



2 SOUTH EXTERIOR ELEVATION
1/8" = 1'-0"

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EXTERIOR ELEVATIONS

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A3.2

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TW DESIGNS

Main Building Street View Rendering
Future Automation

R1.1

N.F.C.



TW DESIGNS

Main Building Front View Rendering
Future Automation

R1.2

N.F.C.

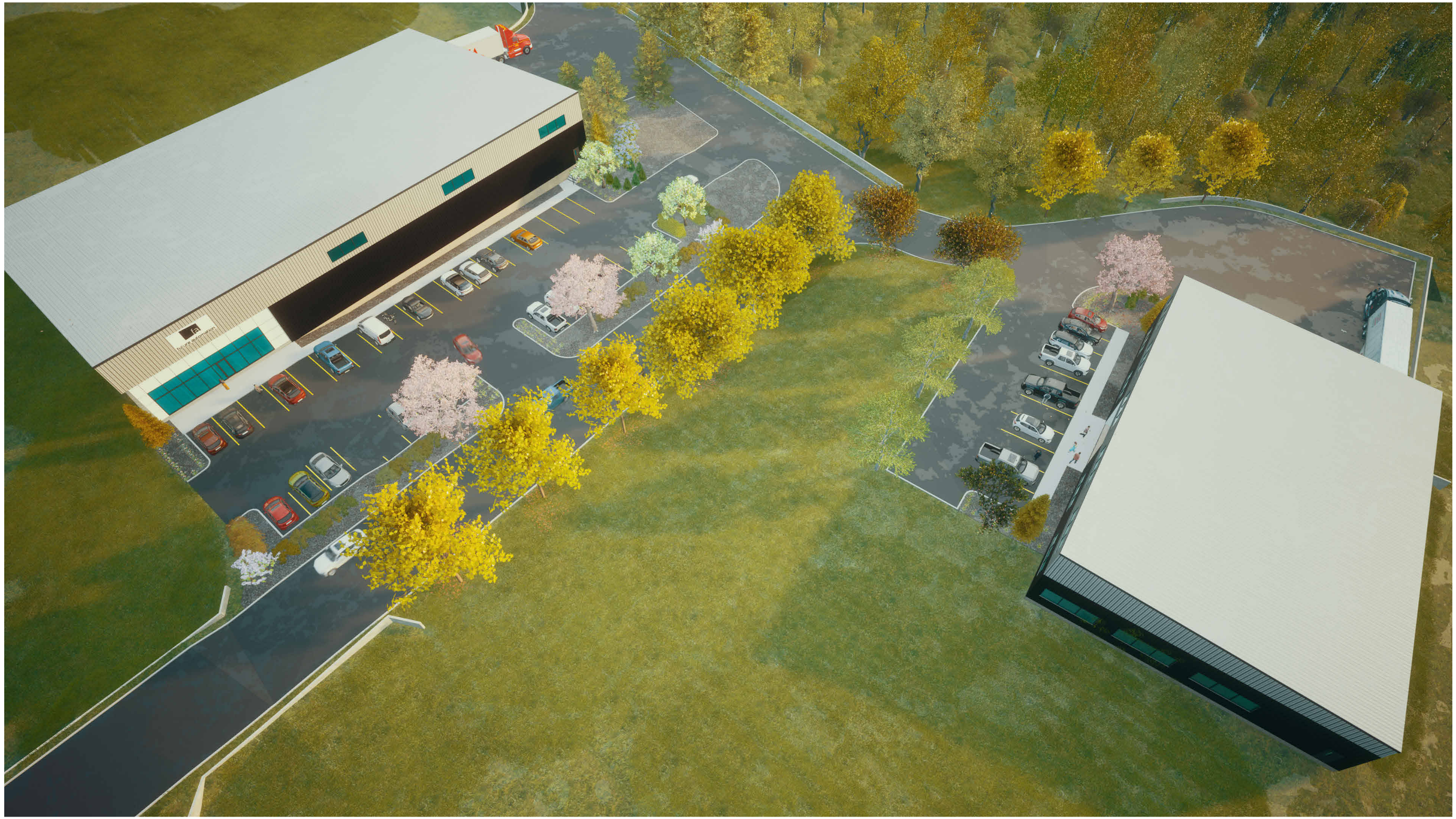


TW DESIGNS

Street View Rendering
Future Automation

R1.3

N.F.C.



TW DESIGNS

Campus Aerial View Rendering
Future Automation

R1.4

N.F.C.

Future Automation - AUX

Dover, NH

Planning Board

N.F.C. - 011024

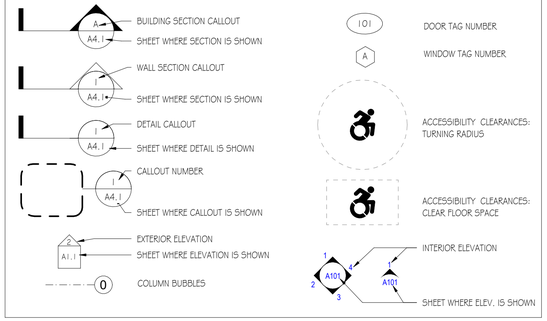
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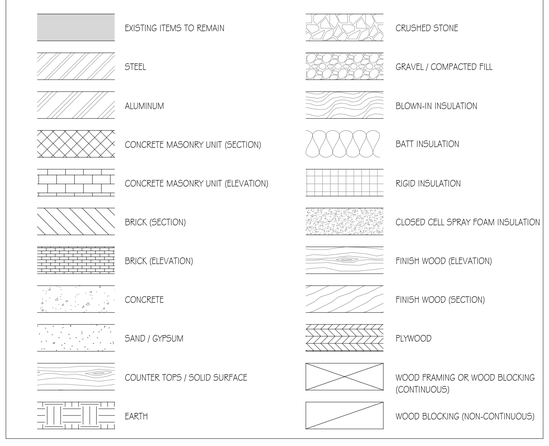
MASTER ABBREVIATION KEY:

AB	ANCHOR BOLT			LAM	LAMINATE	S	SOUTH
AC	AIR CONDITIONER	E	EAST	LAV	LAVATORY	S-TRAP	SEDIMENT TRAP
ACI	AMERICAN CONCRETE INSTITUTE	EJ	EXPANSION JOINT			SC	SOLID CORE
		EJC	EXPANSION JOINT COVER	MAS	MASONRY	SCED	SCHEDULE
ACOUST	ACOUSTIC	EL	ELEVATION	MAT	MATERIAL	SD	STORM DRAIN
AFF	ABOVE FINISH FLOOR	ELEC	ELECTRICAL	MAX	MAXIMUM	SF	SQUARE FOOT
ALT	ALTERNATE	ELEV	ELEVATOR	MECH	MECHANICAL	SH	SHOWER
ALUM	ALUMINUM	EQ	EQUAL	MEM	MEMBRANE	SHT	SHEET
ANCH	ANCHOR	EQUIP	EQUIPMENT	MEP	MECHANICAL, ELECTRICAL, PLUMBING	SIM	SIMILAR
ANOD	ANODIZED	ER	EMERGENCY ROOM			SL	SLIDING
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS	EST	ESTIMATE	METTP	METAL TOILET PARTITION	SMR	SINGLE PLY MEMBRANE ROOF
		EWC	ELECTRICAL WATER COOLER	MFR	MANUFACTURER		
				MH	MANHOLE	SP/PT/FIN	SPECIAL PAINT FINISH
BD	BOARD	EXH	EXHAUST	MIN	MINIMUM	SPEC	SPECIFICATION
BIT	BITUMINOUS	EXIST	EXISTING	MISC	MISCELLANEOUS	SPKR	SPEAKER
BL	BUILDING LINE	EXP	EXPANSION	MO	MASONRY OPENING	SQ	SQUARE
BLDG	BUILDING	EXPD	EXPANDED	MTL	METAL	SS	STAINLESS STEEL
BLK	BLOCK	EXT	EXTERIOR	MULL	MULLION	STA	STATION
BLKG	BLOCKING					STD	STANDARD
BM	BEAM	F/F	FACE OF FOUNDATION WALL	N	NORTH	STL	STEEL
BOC	BOTTOM OF CURB			NAT	NATURAL	STOR	STORAGE
BOF	BOTTOM OF FOOTING ELEVATION	FA	FRESH AIR	NEC	NECESSARY	STRG	STRINGER
		FAP	FIRE ALARM PANEL	NIC	NOT IN CONTRACT	STRUCT	STRUCTURAL
BOT	BOTTOM	FD	FLOOR DRAIN	NOM	NOMINAL	SU	SITE UTILITY
BRG	BEARING	FE	FIRE EXTINGUISHER	NRC	NOISE REDUCTION COEFFICIENT	SUSP	SUSPEND (SUSPENDED)
BRK	BRICK	FEC	FIRE EXTINGUISHER CABINET			SYMM	SYMMETRICAL
BSMT	BASEMENT			NTS	NOT TO SCALE	SYS	SYSTEM
BTW	BETWEEN	FIN	FINISH				
BUR	BUILT-UP ROOF	FL	FLOW LINE	OC	ON CENTER	T	TREAD
		FLR	FLOOR	OD	OUTSIDE DIAMETER	T&G	TONGUE & GROOVED
CAB	CABINET	FND	FOUNDATION	OF/C	OUTSIDE FACE OF CONCRETE	T/FRM	TOP OF FRAME
CB	CATCH BASIN	FOF	FACE OF FINISH			T/SLB	TOP OF SLAB
CER	CERAMIC	FOM	FACE OF MASONRY	OH	OVERHEAD	TB	TACKBOARD
CF	CUBIC FOOT	FOS	FACE OF STUD	OPG	OPENING	TEL	TELEPHONE
CI	CAST IRON	FR	FIRE RATED	OPP	OPPOSITE	TEMP	TEMPORARY
CJ	CONTROL JOINT	FS	FULL SIZE	OR	OPERATING ROOM	TERR	TERRAZZO
CL	CLOSET	FT	FOOT			THK	THICK
CLCB	CURBLESS CATCH BASIN	FTG	FOOTING	PBD	PARTICLE BOARD	THLD	THRESHOLD
CLG	CEILING	FUR	FURRED (FURRING)	PCF	POUNDS PER CUBIC FOOT	TOC	TOP OF CURB
CM	CONTRACT MANAGER	FVC	FIRE VALVE CABINET			TOF	TOP OF FOUNDATION
CMU	CONCRETE MASONRY UNIT			PL	PROPERTY LINE	TOS	TOP OF SLAB
		GA	GAUGE	PLAM	PLASTIC LAMINATE	TOW	TOP OF WALL ELEVATION
CO	CLEAN OUT	GALV	GALVANIZED	PLAS	PLASTER	TR	TO REMAIN
COL	COLUMN	GC	GENERAL CONTRACTOR	PLYWD	PLYWOOD	TYP	TYPICAL
COMP	COMPACTED (COMPOSITION)	GEN	GENERAL	PNL	PANEL		
		GL	GLASS	PSF	POUNDS PER SQUARE FOOT	UH	UNIT HEATER
CONC	CONCRETE	GLZ	GLAZING			UL	UNDERWRITERS LABORATORIES, INC.
CONST	CONSTRUCTION	GRD	GRADE	PSI	POUNDS PER SQUARE INCH	UOD	UNDERSIDE OF DECK
CONT	CONTINUOUS	GYP	GYPSUM			UON	UNLESS OTHERWISE NOTED
CONTR	CONTRACTOR			PT	PAINT		
CORR	CORRUGATED	H&V	HEATING & VENTILATING	PTD	PAINTED	UR	URINAL
CP	CONTROL PANEL	HC	HANDICAP	PTN	PARTITION	UV	UNIT VENTILATOR
CSG	CASING	HDWD	HARDWOOD	PVC	POLYVINYL CHLORIDE		
CSMT	CASEMENT	HGT	HEIGHT			VAR	VARIES OR VARIABLE
CT	CERAMIC TILE	HM	HOLLOW METAL	QT	QUARRY TILE	VB	VINYL BASE
CTR	CENTER	HP	HIGH POINT			VCT	VINYL COMPOSITION TILE
CY	CUBIC YARD	HVAC	HEATING, VENTILATION, AIR CONDITIONING	R	RADIUS	VERT	VERTICAL
				R/A	RETURN AIR	VEST	VESTIBULE
DF	DRINKING FOUNTAIN	HWH	HOT WATER HEATER	RC	REINFORCED CONCRETE	VIF	VERIFY IN FIELD
DIA	DIAMETER			RD	ROOF DRAIN	VNR	VENEER
DIAG	DIAGONAL	ID	INSIDE DIAMETER	REF	REFERENCE	VOL	VOLUME
DIM	DIMENSION	IN	INCH	REFR	REFRIGERATOR		
DL	DEAD LOAD	INSUL	INSULATION	REINF	REINFORCE	W	WEST
DN	DOWN	INT	INTERIOR	REQD	REQUIRED	W	WITH
DR	DOOR	INV	INVERT	RGH	ROUGH	WC	WATER CLOSET
DS	DOWNSPOUT			RL	RAIN LEADER	WD	WOOD
DS/C	DRIVE SIDE OF CURB	JC	JANITOR'S CLOSET	RM	ROOM	WDW	WINDOW
DTL	DETAIL	JST	JOIST	RO	ROUGH OPENING	WGL	WIRE GLASS
DWG	DRAWING	JT	JOINT	ROW	RIGHT OF WAY	WP	WEATHERPROOF (WATERPROOFING)
				RQMT	REQUIREMENT	WWF	WELDED WIRE FABRIC

GRAPHIC SYMBOLS LEGEND



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R1.1	*AUX Buidling Street View Rendering*	*N.F.C.*		

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T | W DESIGNS

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TW-Designs.com | 603.664.2181

Revision Schedule

No.	Description	Date

Project Info:

23027
Future Automation - AUX
Dover, NH
Planning Board

Architect of Record:

T | W Designs, LLC
254 Drake Hill Rd.
Strafford, NH 03884
603-664-2181

Civil Engineer:

XXX

Structural Engineer:

XXX

Electrical Engineer:

XXX

Mechanical Engineer:

XXX

Plumbing Engineer:

XXX

Fire Protection Eng.:

DESIGN / BUILD RESPONSIBILITY OF SPRINKLER CONTRACTOR

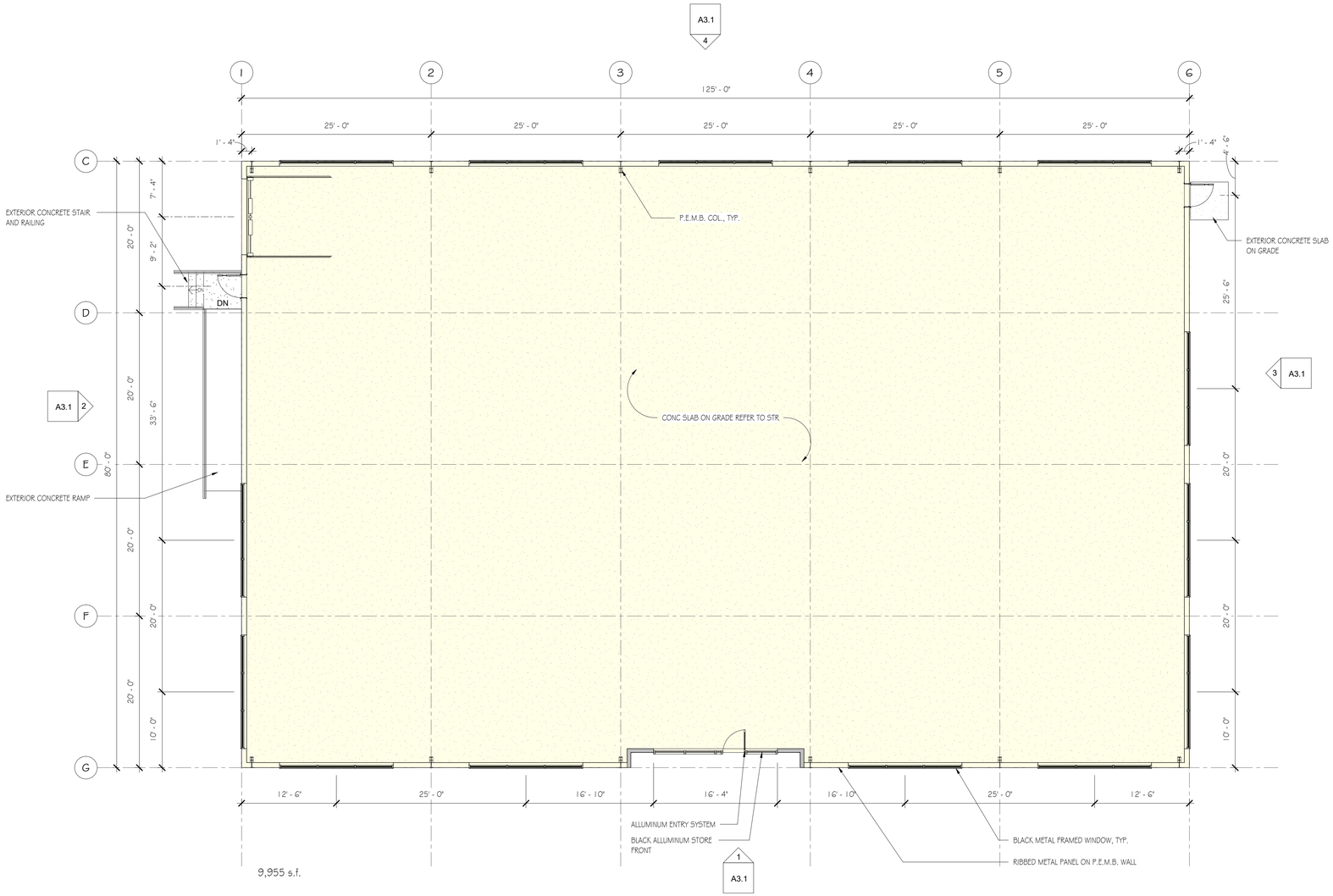
Contractor of Record:

XXX

23027
PROJECT COVER SHEET

SHEET NUMBER
PCS

TW DESIGNS LLC
254 DRAKE HILL RD. STRAFFORD, NH
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1 FIRST FLOOR
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SCALE: 1/8" = 1'-0"

Sheet Title:

FLOOR PLAN

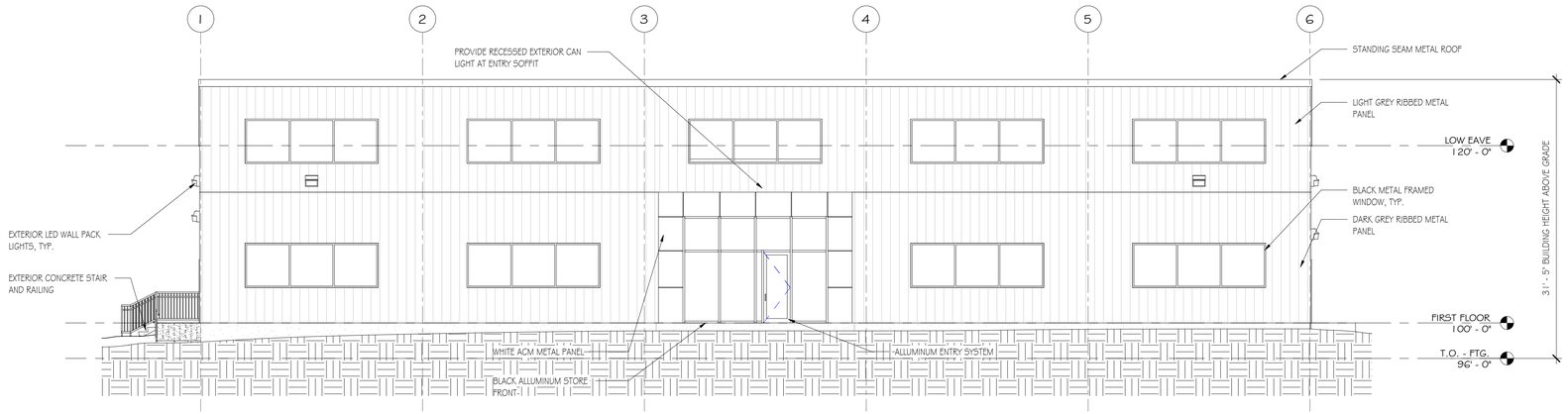
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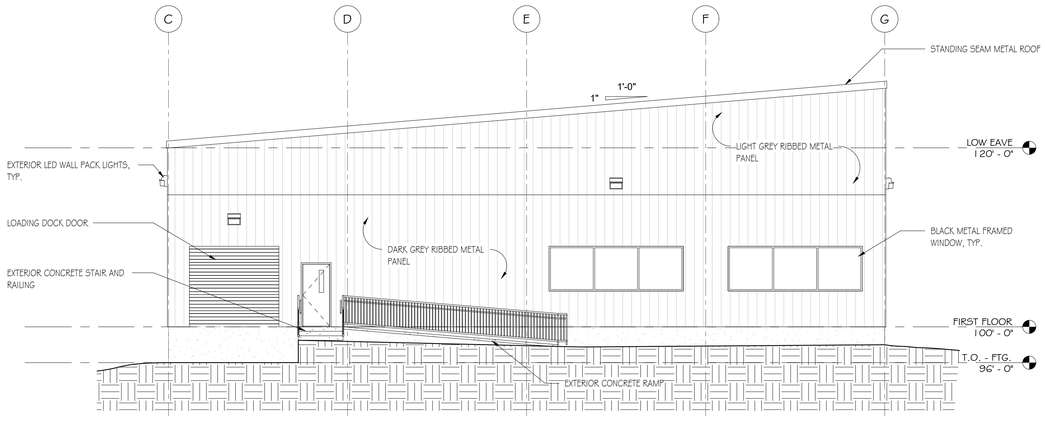
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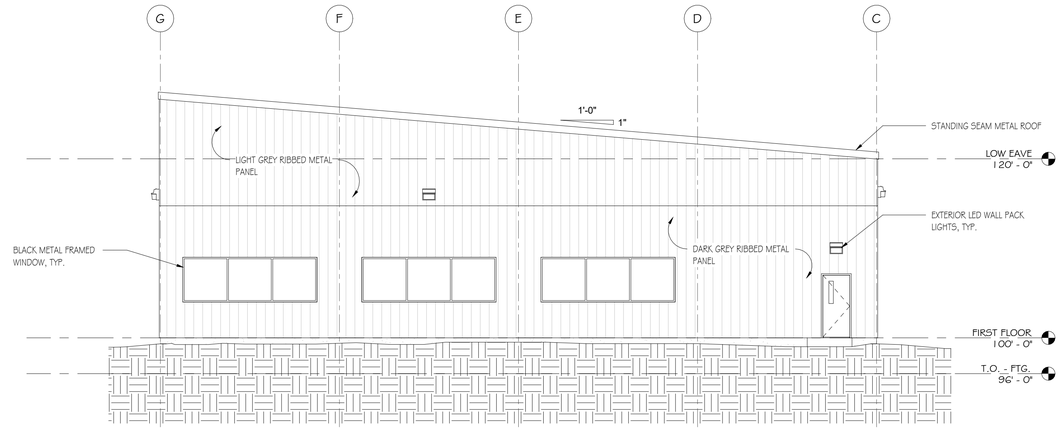
TW DESIGNS LLC
254 DRAKE HILL RD. STRAFFORD, NH
P: 603.664.2181 | F: 603.664.9508



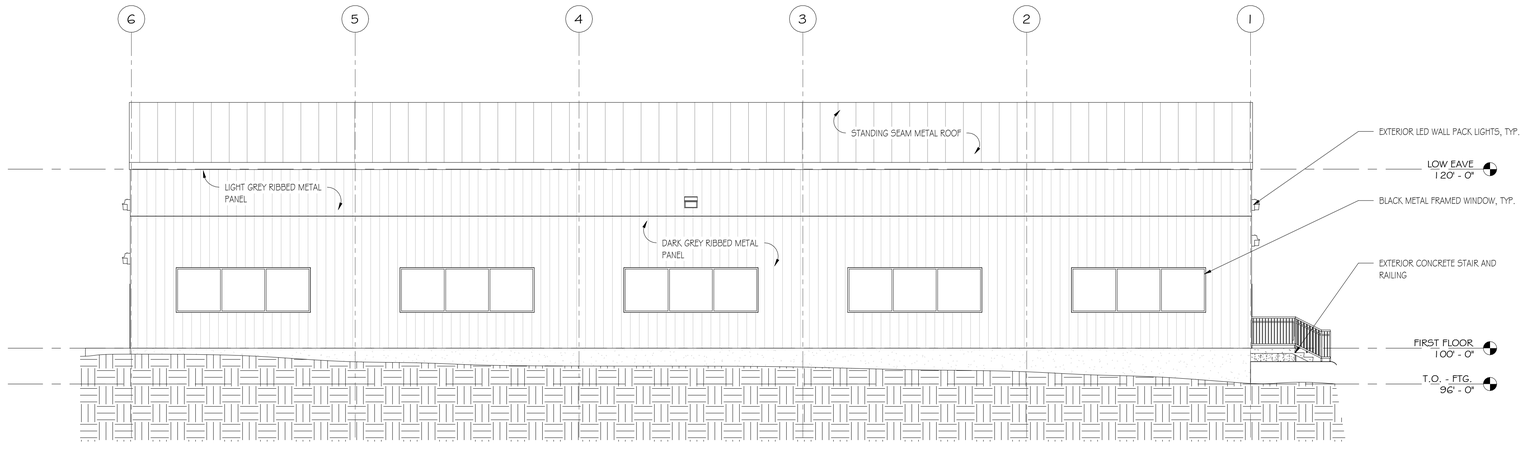
1 SOUTH EXTERIOR ELEVATION
1/8" = 1'-0"



2 WEST EXTERIOR ELEVATION
1/8" = 1'-0"



3 EAST EXTERIOR ELEVATION
1/8" = 1'-0"



4 NORTH EXTERIOR ELEVATION
1/8" = 1'-0"

No.	Description	Date

Revision Schedule

Project Info:

Future Automation - AUX

Dover, NH

Sheet Status:

Latest Release:
Issued For: Planning Board
Org. Issue Date: N.F.C. - 011024

JOB NO: 23027
DRAFTED: JMT
CHECKED: Checker
SCALE: 1/8" = 1'-0"

Sheet Title:

EXTERIOR ELEVATIONS

Sheet Number:

A3.1

Printed on: 1/10/2024 3:08:58 PM

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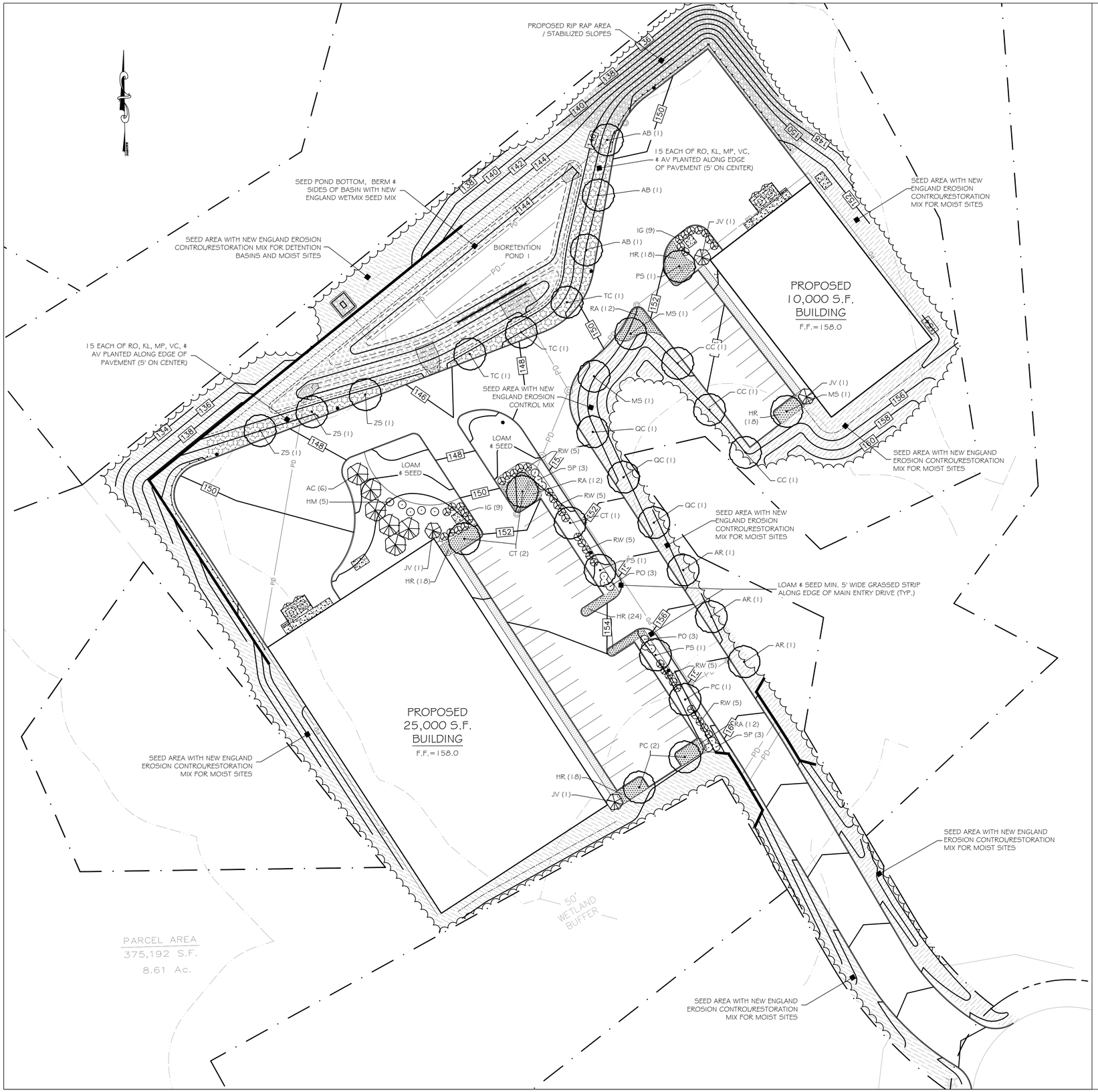


TW DESIGNS

AUX Buidling Street View Rendering
Future Automation - AUX

R1.1

N.F.C.



PLANTING SCHEDULE Botanical Name/ Common Name	Size	Label	Quantity
TREES			
Abies concolor / White Fir	6-7' B&B	AC	6
Acer rubrum 'Bowhall' / Bowhall Red Maple	2.5-3" Cal	AB	3
Acer rubrum 'October Glory' / October Glory Red Maple	2.5-3" CAL.	AR	3
Carpinus betulus 'Frans Fontaine' / Frans Fontaine European Hornbeam	2.5-3" CAL.	CC	3
Crataegus crusgalli inermis ' Crusader' / Crusader Thornless Hawthorne	2.5-3" CAL.	CT	3
Juniperus virginiana 'Hillspire' / Hillspire Eastern Red Cedar	5-6' B&B	JV	4
Malus 'Spring Snow' / Spring Snow Crabapple	2.5-3" CAL.	MS	3
Prunus serrulata 'Kwanzan' / Kwanzan Flowering Cherry	2.5-3" CAL.	PS	3
Pyrus calleryanna 'Aristocrat' / Aristocrat Flowering Pear	2.5-3" CAL.	PC	3
Quercus coccinea / Scartlet Oak	2.5-3" CAL.	QC	3
Tilia cordata 'Greenspire' / Greenspire Littleleaf Linden	2.5-3" CAL.	TC	3
Zelkova serrata 'Village Green' / Village Green Zelkova	2.5-3" Cal	ZS	3
SHRUBS			
Hydrangea macrophylla 'Endless Summer' / Endless Summer Bigleaf Hydrangea	2-2.5'	HM	5
Ilex glabra 'Compacta' / Compact Inkberry Holly	2-2.5'	IG	18
Physocarpus opulifolius 'Little Devil' / Little Devil Ninebark	2-2.5'	PO	6
Rhododendron 'Wilsoni' / Wilson Rhododendron	2-2.5'	RW	25
Syringa x hyacinthiflora 'Pocahontas' / Pocahontas Lilac	2-2.5'	SP	6
PERENNIALS			
Hemerocallis 'Happy Returns'/ Happy Returns Daylily	#1	HR	96
GROUNDCOVER			
Rhus aromatica 'Grow Low' / Grow Low Sumac	18-24"	RA	36
BIORETENTION POND #1			
Cornus sericea / Red-Osier Dogwood	#1	RO	15
Kalmia latifolia / Mountain Laurel	#1	KL	15
Myrica pensylvanica / Northern Bayberry	#1	MP	15
Vaccinium corymbosum / Highbush Blueberry	#1	VC	15
Viburnum dentatum / Arrowwood Viburnum	#1	AV	15
SEED MIX			
Grass Seed Mix			3,000 S.F.
New England Wetmix			10,000 S.F.
New England Erosion Control / Restoration Mix for Detention Basins & Moist Sites			35,000 S.F.

PLANTING NOTES

1. CONTRACTOR SHALL OBTAIN APPROVAL FROM LANDSCAPE ARCHITECT PRIOR TO PURCHASING AND/OR INSTALLING SUBSTITUTE PLANT MATERIAL PRIOR TO PURCHASE OF ANY SUBSTITUTE MATERIALS.
2. CONSTRUCTION ACCESS WILL BE AS DIRECTED BY LANDSCAPE ARCHITECT. CONTRACTOR IS RESPONSIBLE FOR RESTORATION OF ACCESS ROUTE AND ALL AREAS DISTURBED BY PLANTING OPERATIONS UPON COMPLETION OF CONSTRUCTION OPERATIONS, AT NO ADDITIONAL COST TO THE OWNER.
3. LAYOUT OF ALL PLANTING BEDS AND LOCATION OF PLANTS TO BE APPROVED BY LANDSCAPE ARCHITECT ON SITE PRIOR TO CONSTRUCTION AND INSTALLATION.
4. CONTRACTOR TO REMOVE ALL DEBRIS GENERATED BY PLANT INSTALLATION. DEBRIS TO BE DISPOSED OF IN A LEGAL MANNER.
5. ALL PLANT MATERIAL SHALL BE GUARANTEED TO BE IN GOOD, HEALTHY AND FLOURISHING CONDITION FOR TWO (2) YEARS FROM THE DATE OF FINAL INSTALLATION APPROVAL BY LANDSCAPE ARCHITECT. CONTRACTOR SHALL REPLACE, WITHOUT COST TO OWNER, AND AS SOON AS WEATHER CONDITIONS PERMIT, ALL DEAD AND NON-FLOURISHING PLANTS AS DETERMINED BY THE LANDSCAPE ARCHITECT. REPLACEMENT PLANTS SHALL BE BE GUARANTEED IDENTICALLY TO ORIGINAL PLANTS, TIME PERIOD COMMENCING FROM DATE OF REPLACEMENT PLANTING APPROVAL BY LANDSCAPE ARCHITECT.
6. ALL BEDS TO BE MULCHED WITH 4" DEPTH SHREDDED BARK MULCH UNLESS NOTED OTHERWISE.
7. CONTRACTOR TO PROVIDE NECESSARY TEMPORARY IRRIGATION IF NEEDED BASED ON TIME OF YEAR THE PROJECT IS IMPLEMENTED.
8. ALL LANDSCAPED AREAS SHALL RECEIVE REGULAR MAINTENANCE AND UPKEEP. SEVERELY INJURED, DISEASED, OR DEAD PLANT MATERIAL SHALL BE REPLACED IN KIND IN PERPETUITY (AVOID REPLACING LANDSCAPE MATERIALS IN THE PERIOD FROM NOVEMBER TO MARCH.)
9. BEST PRACTICES TO MINIMIZE ENVIRONMENTAL IMPACTS SUCH AS THE USE OF LOW PHOSPHOROUS FERTILIZER AND SLOW RELEASE NITROGEN, SHALL BE IMPLEMENTED.
10. IF OWNERSHIP OF A SITE IS CONVEYED TO A NEW PROPERTY OWNER, THE NEW OWNER SHALL BE RESPONSIBLE FOR MAINTAINING ALL LANDSCAPING IN ACCORDANCE WITH THE APPROVED FINAL LANDSCAPING PLAN.

LANDSCAPE CALCULATIONS:

INTERIOR PARKING LOT LANDSCAPING:
5% MIN. INTERIOR LANDSCAPING REQUIRED FOR LOTS WITH BETWEEN 21-125 PARKING SPACES
47 PARKING SPACES PROPOSED - 37,000 SF PARKING LOT AREA X .05 = 1,850 SF INTERIOR LANDSCAPING REQUIRED
PROVIDED: 5,800 SF INTERIOR PARKING LOT LANDSCAPING

PERIMETER LANDSCAPING:
REQUIRED: 1 DECIDUOUS SHADE TREE / 35' OF PARKING LOT PERIMETER
533 L.F.OF PARKING LOT PERIMETER / 35 = 15.2 = 15 TREES REQUIRED
PROVIDED: 30 TREES PROPOSED

0 15' 30' 60' 90' 150'

terrain
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311 kast hill road
hopkinton nh 03229
603. 491. 2322
terrainplanning.com

QUALITY WAY

Site Location:
Quality Way
Dover, NH 03820

Prepared For:
Civilworks New England
181 Watson Road
PO Box 1166
Dover, NH 03821

LANDSCAPE PLAN

DATE: 11 - 30 - 23

SCALE: 1"=30'

PROJECT #: 23090

Drawn By: ID

Checked By: RM

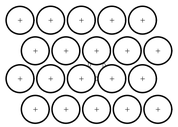
REVISIONS: DATE:
Issued for Review 11-30-23

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REGISTERED LANDSCAPE ARCHITECT STATE OF NEW HAMPSHIRE

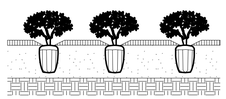


TYPICAL BED PLANT SPACING

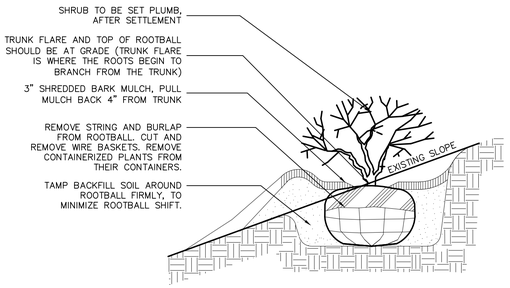
NOTE:
D = DIMENSION OF PLANT SPACING (SHRUB OR GROUNDCOVER AS INDICATED ON PLANS)

12" LOAM BACKFILL (CONTINUOUS THROUGHOUTBED AREA)

3" DEEP SHREDDED BARK MULCH

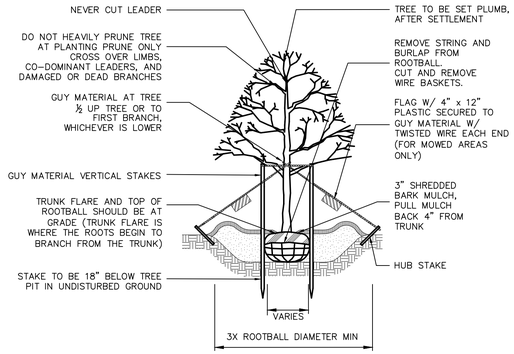


1 TYPICAL PERENNIAL PLANTING
NO SCALE



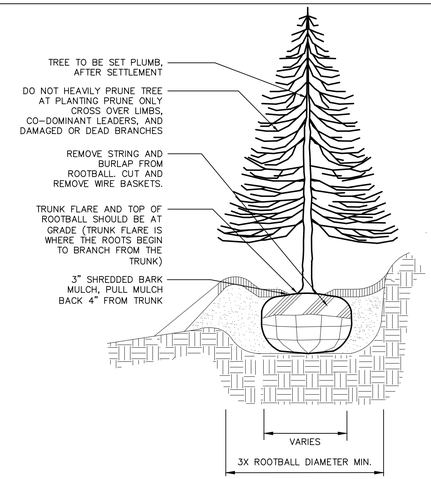
NOTE:
1. DO NOT HEAVILY PRUNE SHRUB AT PLANTING, PRUNE ONLY CROSSOVER LIMBS AND DAMAGED OR DEAD BRANCHES.
2. BACKFILL WITH LOAM, AMEND AS REQUIRED BY LANDSCAPE ARCHITECT.
3. SHRUBS & GROUNDCOVER PLANTED ADJACENT TO CITY SIDEWALKS NEED TO BE PLACED SO THE PLANTS, AT THEIR MATURE HEIGHT & WIDTH, WILL NOT ENCROACH INTO THE CITY'S SIDEWALK.

2 TYPICAL SHRUB PLANTING
NO SCALE



NOTES:
1. GUYING AND STAKING TO BE DETERMINED IN THE FIELD BY THE LANDSCAPE ARCHITECT. LOCAL FIELD CONDITIONS AS WELL AS PLANT CHARACTERISTICS WILL DETERMINE THE NECESSITY OF GUYING AND STAKING.
2. TYPICALLY ONLY TREES WITH A 3" OR GREATER CALIPER NEED TO BE STAKED. TREES WITH LESS THAN A 3" CALIPER NEED TO BE STAKED ONLY AS REQUIRED BY LANDSCAPE ARCHITECT.
3. ONLY WRAP TREE TRUNKS AS REQUIRED BY LANDSCAPE ARCHITECT.
4. TREE SHALL BE SET PLUMB, AFTER SETTLEMENT.
5. LOAM FOR BACKFILLING SHALL BE AMENDED AS REQUIRED BY LANDSCAPE ARCHITECT.
6. CITY TREES PLANTED ON PRIVATE PROPERTY, ADJACENT TO A PUBLIC RIGHT-OF-WAY, NEED TO BE PLANTED A MINIMUM OF 5 FEET FROM THE EDGE OF THE CITY SIDEWALK.

3 DECIDIOUS TREE PLANTING
NO SCALE



NOTES:
1. DO NOT STAKE EVERGREEN TREES.
2. LOAM FOR BACKFILLING SHALL BE AMENDED AS REQUIRED BY LANDSCAPE ARCHITECT.
3. TAMP BACKFILL SOIL AROUND ROOTBALL FIRMLY TO MINIMIZE ROOTBALL SHIFT.

4 EVERGREEN TREE PLANTING
NO SCALE

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QUALITY WAY

Site Location:
Quality Way
Dover, NH 03820

Prepared For:
Civilworks New England
181 Watson Road
PO Box 1166
Dover, NH 03821

LANDSCAPE DETAILS

DATE: 11 - 30 - 23

SCALE: AS NOTED

PROJECT #: 23090

Drawn By: ID

Checked By: RM

REVISIONS:	DATE:
Issued for Review	11-30-23

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