August 18, 2023

Portsmouth Technical Advisory Committee
Attn: Peter Stith
1 Junkins Avenue, Suite 3rd Floor
Portsmouth, NH 03801

RE: Site Plan Review
ATDG, LLC
360 Corporate Drive
Portsmouth, NG 03801

Dear Mr. Stith:

On behalf of the Applicant, ATDG, LLC, Apex Design Build respectfully submits an application for Site Plan Review for the construction of a new Medical Office Building at 360 Corporate Drive, Portsmouth, NH 03801. The Applicant is proposing a new state-of-the-art 52,401 GSF facility which features three-floors of dedicated Healthcare Space for up to (10) Healthcare Tenants which includes an Ambulatory Surgery Center, Imaging Center, and Plastic Surgery Center. Access to this site will be administered via a new entrance constructed at both Corporate Drive and International Drive and features enhancements to the public accessibility along both Corporate Drive and International Drive, along with substantial enhancement to the surrounding landscape at the respective roadways and within the site.

This building features a modern aesthetic with neutral color palette which has been carefully designed to incorporate colors from surrounding developments within the Pease Development District. Aside from the building design, the site has also been carefully planned to provide no impact to the surrounding wetlands through enhanced setbacks from wetlands and their respective buffers. Additionally, all stormwater will be retained on-site via ADS Underground Stormwater Structures, and stormwater will receive proper treatment prior to release into neighboring wetlands. The site includes (125) parking spots, dedicated delivery areas, and an Imaging Trailer location in order to provide equitable balance for the current proposed tenants. This site design also allows accommodation for future growth, along with a net-positive soil design to ensure all associated spoils/materials are retained to the site during construction activities.

Should there be any questions or concerns about the aforementioned application, please do not hesitate to reach out to me directly.

Sincerely,

Jeff Kilburg
Project Director

Encl: Application Materials

Pease Development Authority
55 International Drive, Portsmouth, NH 03801, (603) 433-6088

PEASE INTERNATIONAL TRADEPORT PORTSMOUTH NH

Application for Site Review

For PDA Use Only			
Date Submitted:_____	Municipal Review:_____	Fee:_____	
Application Complete:_____	Date Forwarded:_____	Paid:_____	Check #:_____

Applicant Information

Applicant: ATDG, LLC - Contact: Dr. Alexander Slocum	Agent: Raquelle Kemnitz, Apex Design Build
Address: 1 Merrill Crossing, Bow, NH 03304	Address: 9550 W Higgins Rd, Ste 170, Rosemont, IL 60018
Business Phone: 603-777-6506	Business Phone: 847-288-0100
Mobile Phone: 603-777-6506	Mobile Phone: 708-610-5000
Fax: n/a	Fax: n/a

Site Information

Portsmouth Tax Map: 0315-0005-0000	Lot #: 0005	Zone: ABC
Site Address / Location : 360 Corporate Dr, Portsmouth, NH 03801		
Site Address / Location : n/a		Area of On-site Wetlands: 41, 526 SF

Area of On-site Wetlands + Wetlands Buffer Area: 86, 044 SF

Activity Information

Change of Use: Yes [ ] No [X]

Existing Use: 9010

Proposed Use: n/a

Description of Project: // Please see attachment //

All above information shall be shown on a site plan submitted with this application. Provide 3 full size hard copies and one PDF copy of all application materials as well as one half-size set of drawings to PDA. Applicant shall supply additional copies as may be required by applicable municipality. Refer to Chapter 400 of PDA land Use Controls for additional information.

Certification

I hereby certify under the penalties of perjury that the foregoing information and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I hereby apply for Site Review and acknowledge I will comply with all regulations and any conditions established by the Review Committee(s) and PDA Board in the development and construction of this project.

DocuSigned by:
Alexander H Slocum Jr
3D12526E...

Signature of Applicant

8/16/2023 | 2:06:01 PM CDT
Date

Dr. Alexander Slocum
Printed Name

N:\Engineer\ ApplicationforSiteReview.xlsx

Application for Site Review Cont.

Portsmouth Tax Map: 0315-0005-0000
Lot #: 0005
Site Address: 360 Corporate Dr, Portsmouth, NH 03801

Description of Project
The proposed development will be located at 360 Corporate Drive in Portsmouth, NH on a 6.12 acre lease lot created from existing Map Lot 0315-0005-0000. The project includes a three-story Healthcare Complex which will feature approximately 52,000 GSF. As proposed, the building and parking abide by all PDA setbacks and no variances are being sought. The design includes (125) vehicle parking spaces with a total of (2) loading docks. There will be a singular below grade loading dock at the eastern extent of the building (back), which will be appropriately accommodating of a WB-62 truck configuration, as well as a loading dock at grade (parallel and separated by a retaining wall) to the below grade loading dock. This area will feature a concrete sidewalk which properly allows for unloading/loading of all delivery trucks, as well as an additional area for bicycle parking. Along the same extent of the building, the emergency backup generator will be located parallel to the recessed loading dock and the primary electrical transformer will be located parallel to the at-grade loading dock. The refuse area also resides parallel to the at-grade loading dock for easy maneuverability as well as efficient proximity to the building for staff utilization.

Site access will be provided by two new driveways; one located along International Drive and the other located along Corporate Drive. Existing sidewalks are comprised of concrete with sections of asphalt; all existing asphalt sidewalks will be appropriately removed and replaced along with the proposed site development. The aforementioned site access provides adequate flow for both deliveries as well as patient/staff accessibility across the site. The International Drive entrance provides accessibility for a WB-62, and proper sizing for maneuvers in order to deliver/pickup a mobile MRI Trailer for intermittent usage at the future Imaging Practice.

Authorization Form

I, Dr. Alexander Slocum, of ATDG, LLC, authorize Apex Design Build and Allen & Major Associates, Inc., to act as an agent on behalf of ATDG, LLC. I authorize Apex Design Build and Allen & Major Associates, Inc. to sign any permit related documents and speak on my behalf regarding the proposed Medical and Ambulatory Surgery Center Project at 360 Corporate Dr, Portsmouth, New Hampshire.

DocuSigned by:

3D12526EBF66412...

Signature

7/20/2023 | 5:49:32 AM CDT

Date

“Green” Statement
360 Corporate Dr.
Portsmouth, NH

Pursuant to Section 2.5.3.1(a) of the Site Plan Review Regulations, Apex Design Build Respectfully submits the following list of the project’s “green” components for the new construction at 360 Corporate Dr., Portsmouth, NH:

- The project will meet or exceed all applicable current energy codes.
- All features, rooms, pathways, and means of conveyance will be installed to meet or exceed ADA requirements.
- The project and tenants are located with intent to maximize the usage of the public transit bus stop.
- All collected stormwater runoff is being directed, managed, and stored on-site, limiting the impact on the city stormwater system and limiting sheet flow towards the street.
- The footprint of the proposed developed area has been strategically and meticulously designed to avoid disruption of any existing Wet Lands.
- All landscaping to use native or adaptive species to limit the use of additional resources to maintain the landscaping.

Vanasse & Associates inc
Transportation Engineers & Planners

35 New England Business Center Drive
Suite 140
Andover, MA 01810

Ref: 9694

August 11, 2023

Mr. Jeff Kilbury
Apex Design Build
9550 West Higgins Road
Suite 170
Rosemont, IL 60018

Re: Trip Generation for Medical Office Building
360 Corporate Drive
Portsmouth, New Hampshire

Dear Mr. Kilbury:

Vanasse & Associates, Inc. (VAI) has identified the traffic generation associated with the proposed Medical Office Building (hereinafter, the "Project") to be located at 360 Corporate Drive in Portsmouth, New Hampshire. The Project site is bordered by International Drive to the north, areas of open and wooden space to the east and south, and Corporate Drive to the east. The Project site was previously an office building with two curb cuts; one onto International Drive, and one onto Corporate Drive.

The Project involves the construction of a three-story medical office building where 10,000 square feet (sf) of the building is a ambulatory surgery center and 42,000 sf is medical office space. A total of 125 parking spaces are proposed. Access to the site via the Corporate Drive curb cut is expected to be for patients and medical supply vehicles, while the International Drive curb cut is expected to be for employee vehicles.

In order to develop the traffic characteristics of the proposed Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE)[1] for Land Use Code (LUC) 650, "Free-Standing Emergency Room" and LUC 720, "Medical-Dental Office Building" were used. Table 1 summarizes the anticipated trip generation from the proposed development.

[1] *Trip Generation,* 11th Edition; Institute of Transportation Engineers; Washington, DC; 2021.

Table 1
PROJECT TRIP GENERATION

Time Period	Office Space Trips[a] (A)	Surgery Center Trips[b] (B)	Total Trips (C=A+B)
Weekday Daily	1,698	250	1,948
Weekday Morning Peak Hour:			
Entering	87	6	93
Exiting	23	5	28
Total	110	11	121
Weekday Evening Peak Hour:			
Entering	50	7	57
Exiting	118	8	126
Total	168	15	183

[a]Based on ITE LUC 720, Medical-Dental Offic Building; 42,000 sf.
[b]Based on ITE LUC 650, Free-Standing Emergency Room; 10,000sf.

A comparison of previous and future trip generation of the site was conducted. Although the site is currently vacant, aerial images indicate that an office building was on site circa 2012. Estimates of the building size were obtained from aerial imagery. In order to develop the traffic characteristics of the previous site, trip-generation statistics published by the ITE for LUC 710, "General Office Building" was used. Table 2 summarizes the anticipated change in trip generation from the previous site to the proposed development.

Table 2
PROJECT TRIP GENERATION COMPARISON

Time Period	Previous Vehicle Trips[a]	Proposed Vehicle Trips[b]	Change (Trips)
Weekday Daily	262	1,948	+1,686
Weekday Morning Peak Hour:			
Entering	24	93	+69
Exiting	3	28	+25
Total	27	121	+94
Weekday Evening Peak Hour:			
Entering	4	57	+53
Exiting	22	126	+104
Total	26	183	+157

[a]Based on ITE LUC 710, General Office Building; 18,000 sf.
[b]Based on Table 1.

As shown in Table 1, the project is expected to generate 1,686 more vehicle trips (approximately 843 vehicles entering and exiting) on an average weekday (two-way, 24-hour volume), with 94 more vehicle trips (69 entering and 25 exiting) expected during the weekday morning peak hour and 157 more trips (53 entering and 104 exiting) during the weekday evening peak hour.

If you have any questions on the conclusions reached herein, feel free to contact us at sthornton@rdva.com thannon@rdva.com.

Sincerely,

VANASSE & ASSOCIATES, INC.

Scott W. Thornton, P.E.
Principal

Thomas J. Hannon, EIT
Transportation Engineer

cc: File

Attachment: Trip Calculations

TECHNICAL APPENDIX

Free-Standing Emergency Room
(650)

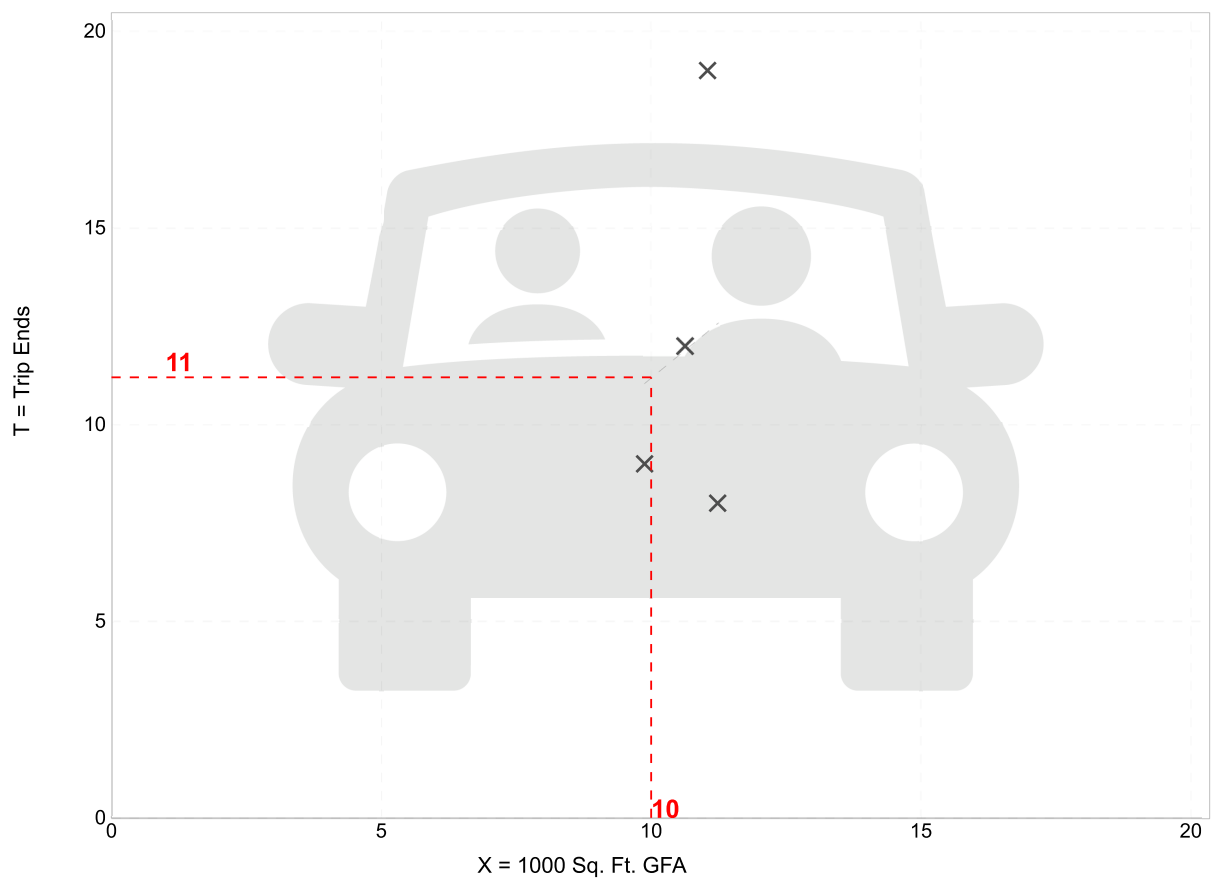
Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	4
Avg. 1000 Sq. Ft. GFA:	11
Directional Distribution:	50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.12	0.71 - 1.72	0.44

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** — — — **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

Free-Standing Emergency Room
(650)

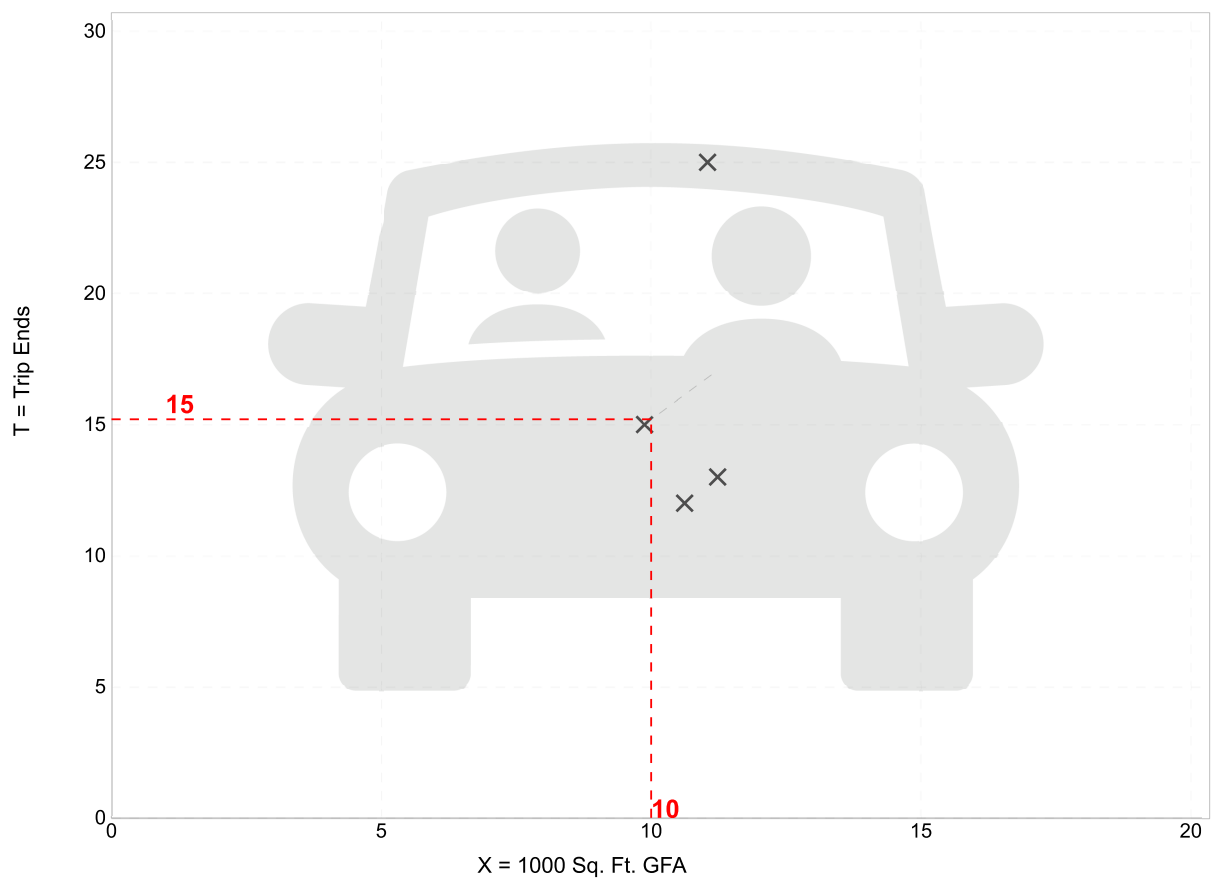
Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	4
Avg. 1000 Sq. Ft. GFA:	11
Directional Distribution:	46% entering, 54% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.52	1.13 - 2.26	0.54

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ****

Free-Standing Emergency Room
(650)

Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

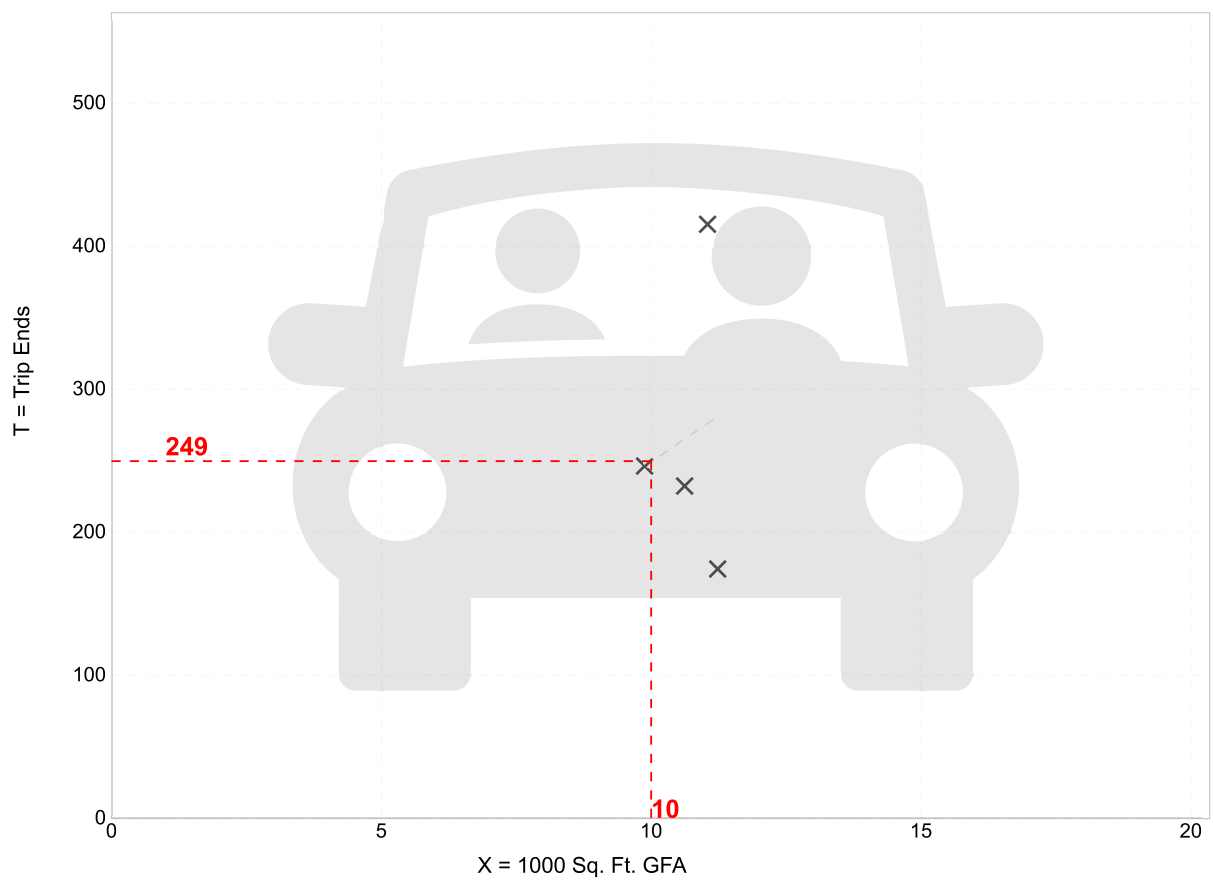
Setting/Location: **General Urban/Suburban**
Number of Studies: 4
Avg. 1000 Sq. Ft. GFA: 11
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
24.94	15.49 - 37.57	9.45

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** — — — **Average Rate**

Fitted Curve Equation: Not Given **R^2= ******

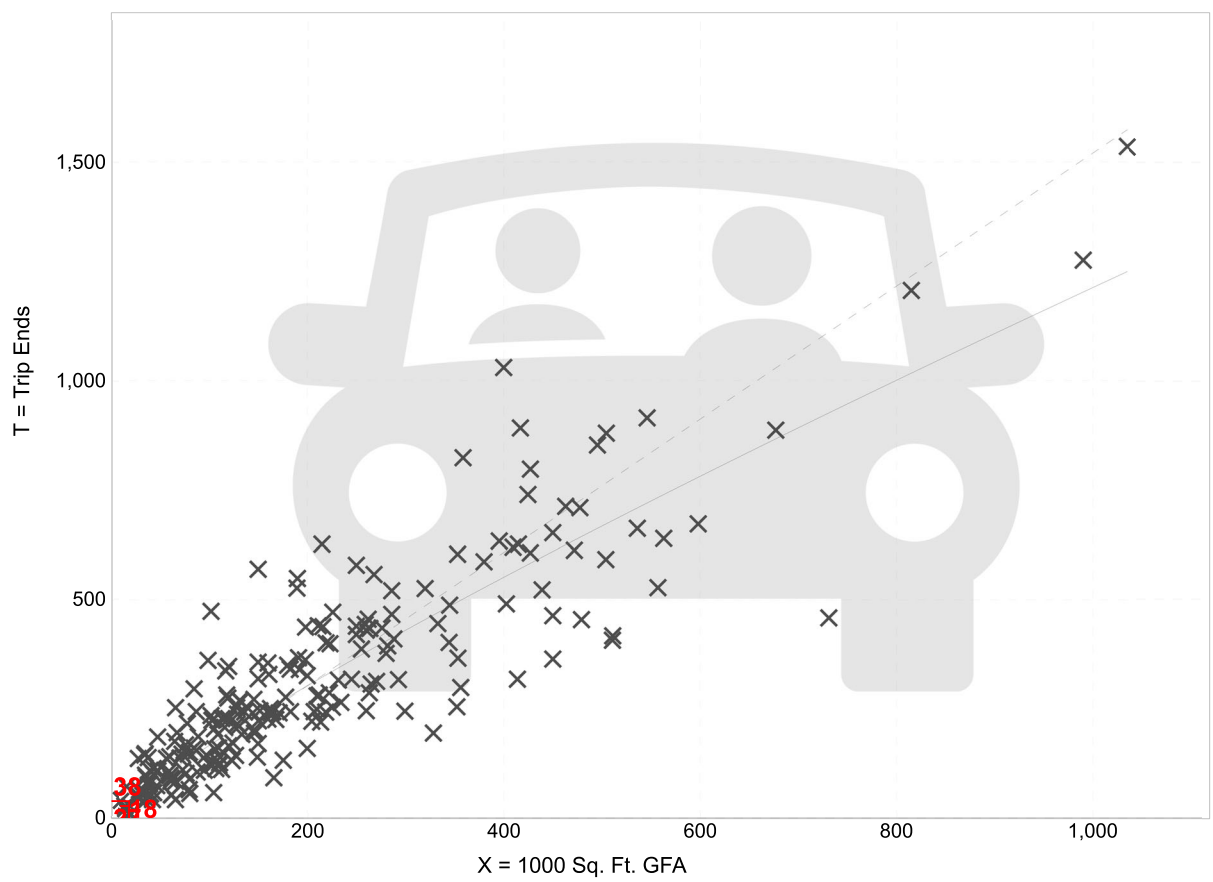
General Office Building
(710)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	221
Avg. 1000 Sq. Ft. GFA:	201
Directional Distribution:	88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.52	0.32 - 4.93	0.58

Data Plot and Equation



× **Study Site** ——— **Fitted Curve** - - - - **Average Rate**

Fitted Curve Equation: Ln(T) = 0.86 Ln(X) + 1.16 **R^2= 0.78**

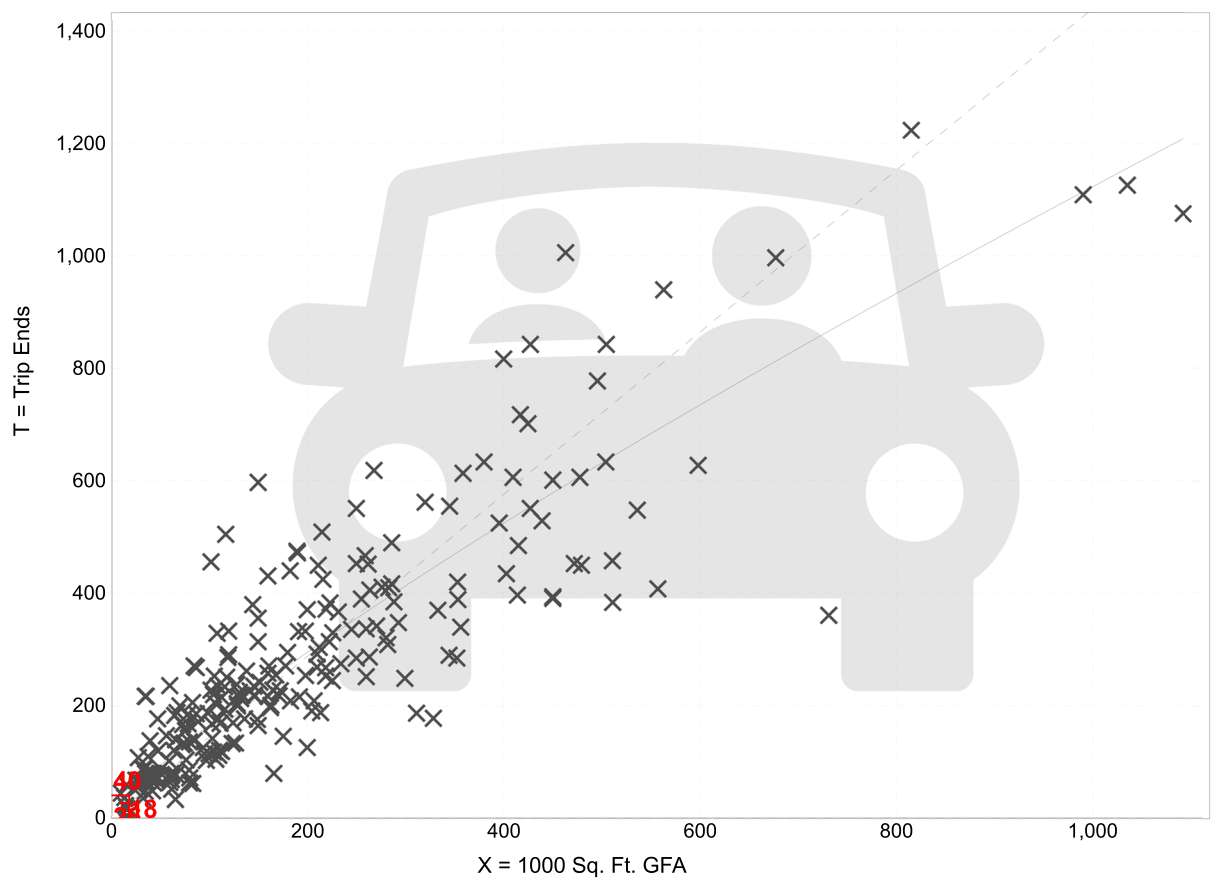
General Office Building
(710)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	232
Avg. 1000 Sq. Ft. GFA:	199
Directional Distribution:	17% entering, 83% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.44	0.26 - 6.20	0.60

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.83 Ln(X) + 1.29 **R^2= 0.77**

General Office Building
(710)

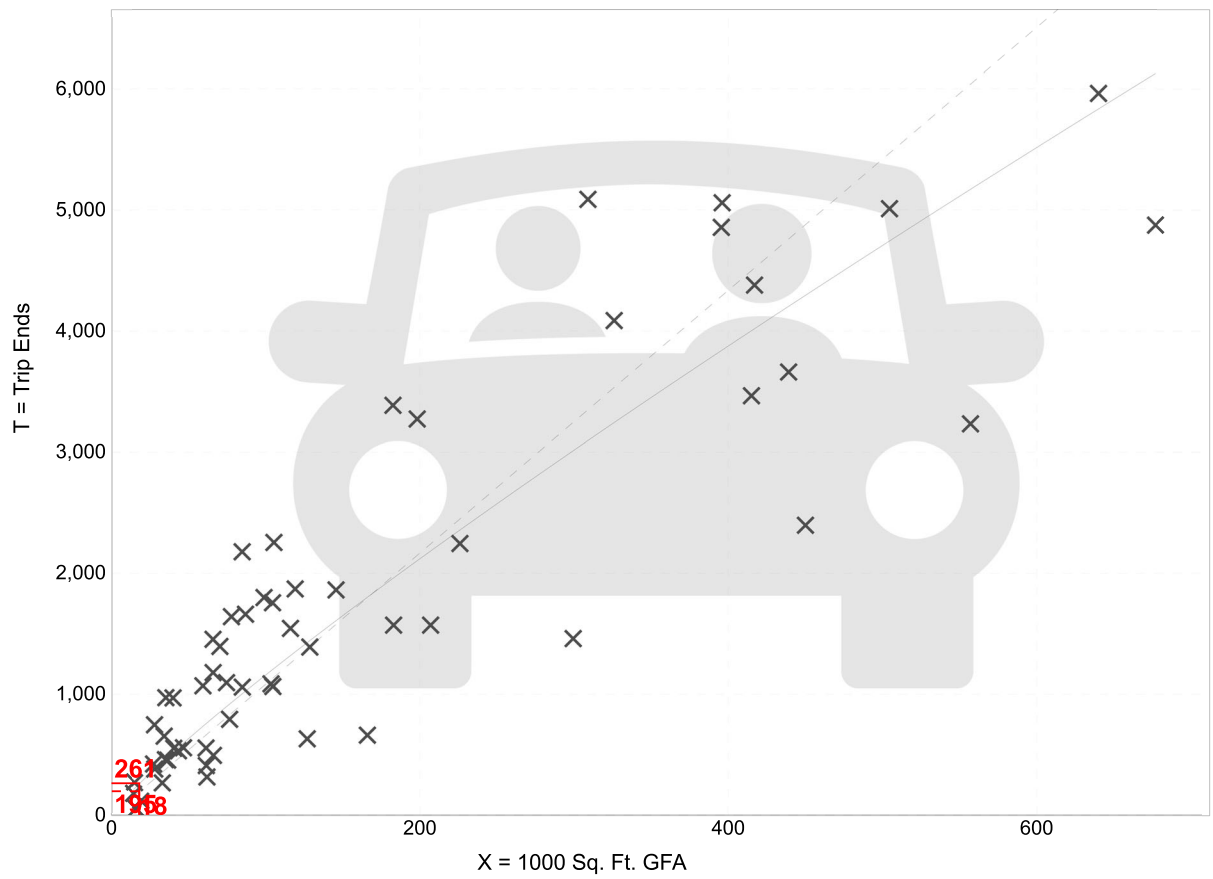
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 59
Avg. 1000 Sq. Ft. GFA: 163
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.84	3.27 - 27.56	4.76

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.87 Ln(X) + 3.05 **R^2= 0.78**

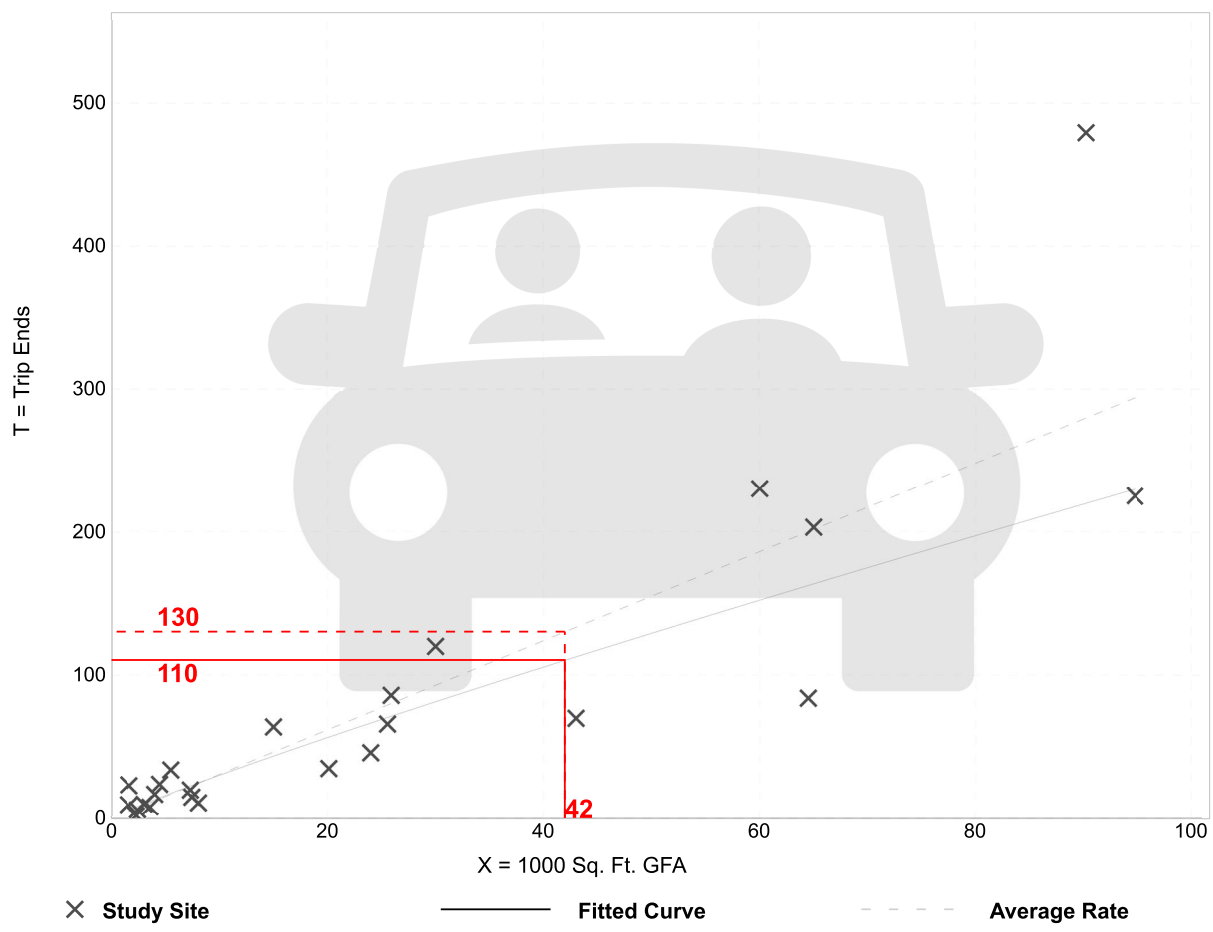
Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	24
Avg. 1000 Sq. Ft. GFA:	25
Directional Distribution:	79% entering, 21% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.10	0.87 - 14.30	1.49

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.90 Ln(X) + 1.34 **R^2= 0.80**

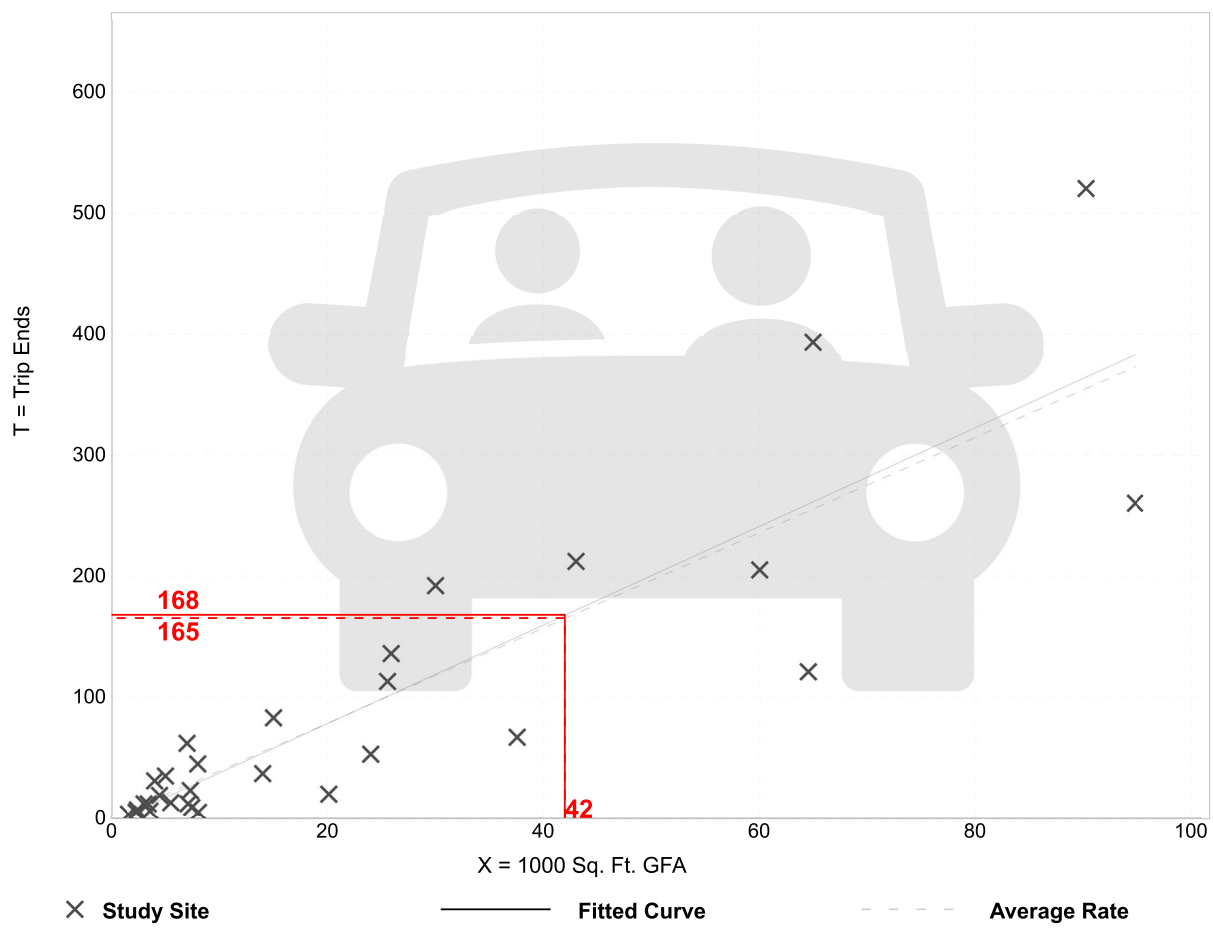
Medical-Dental Office Building - Stand-Alone
(720)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	30
Avg. 1000 Sq. Ft. GFA:	23
Directional Distribution:	30% entering, 70% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.93	0.62 - 8.86	1.86

Data Plot and Equation



Fitted Curve Equation: T = 4.07(X) - 3.17

R^2= 0.77

Medical-Dental Office Building - Stand-Alone
(720)

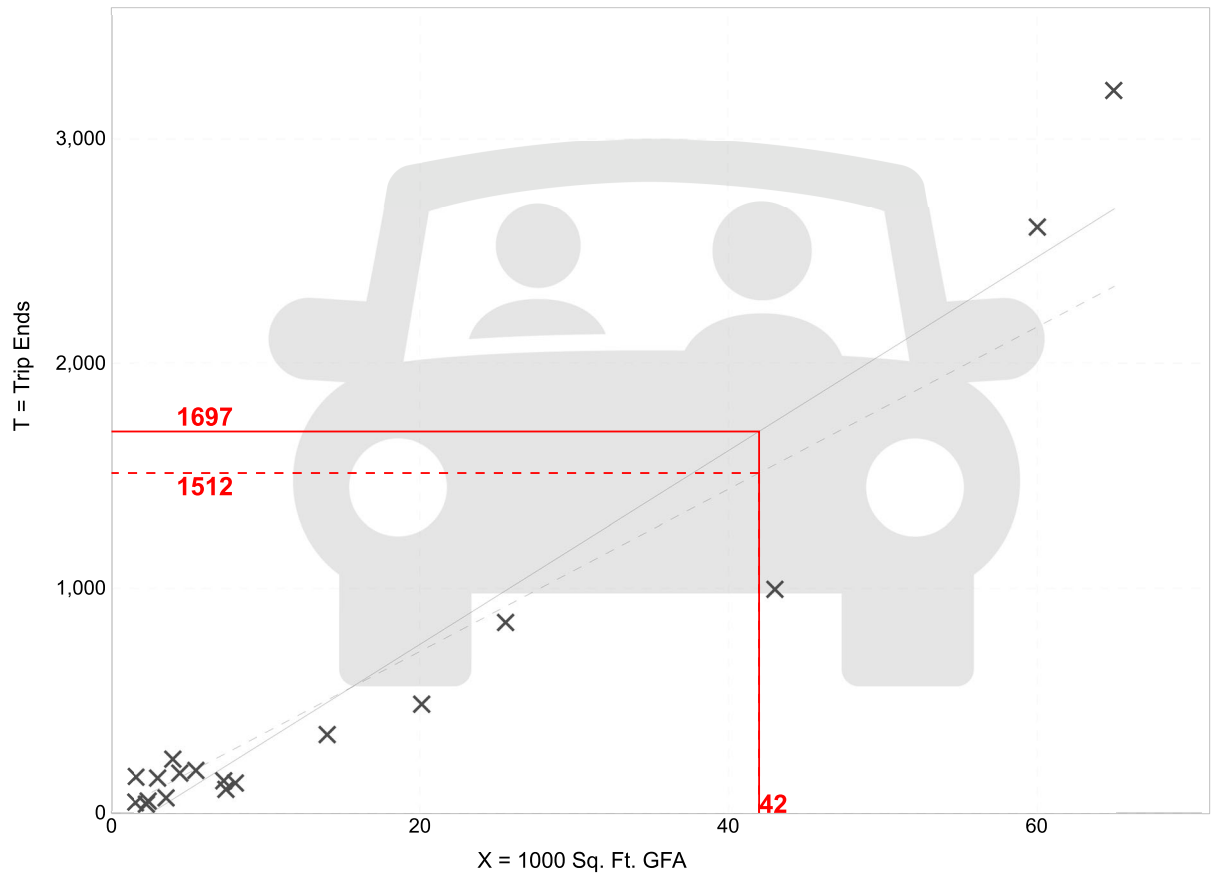
Vehicle Trip Ends vs: **1000 Sq. Ft. GFA**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 18
Avg. 1000 Sq. Ft. GFA: 15
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
36.00	14.52 - 100.75	13.38

Data Plot and Equation



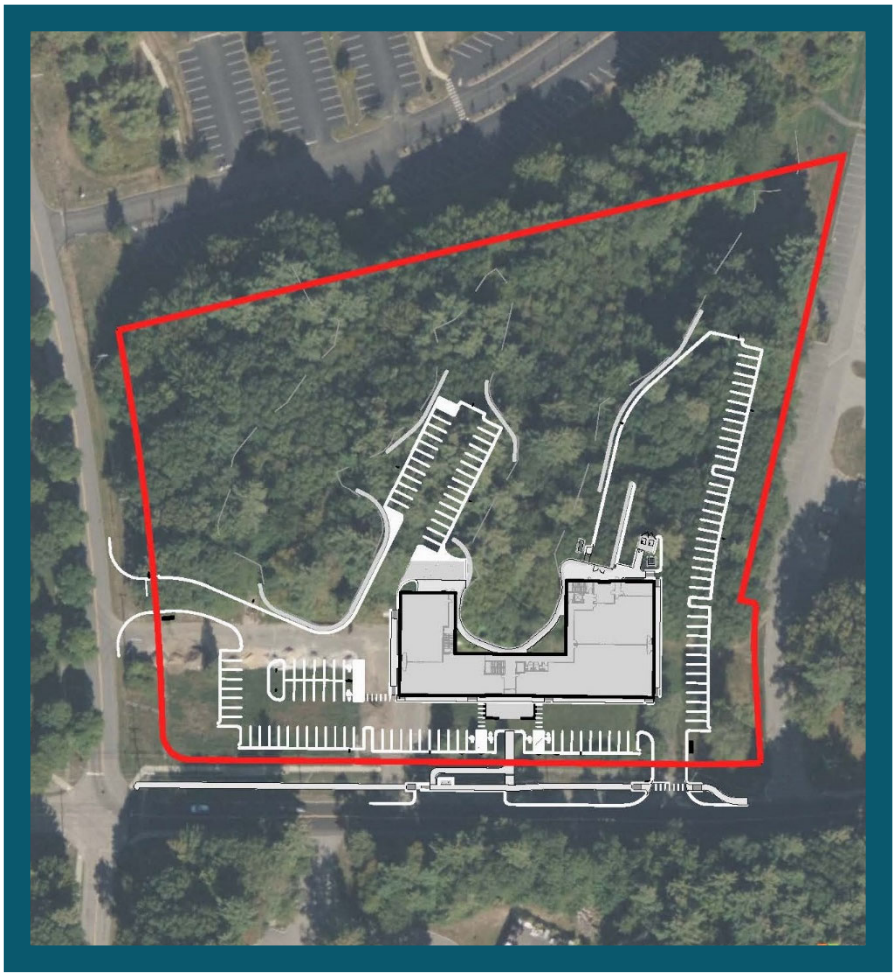
× **Study Site** ——— **Fitted Curve** - - - - **Average Rate**

Fitted Curve Equation: T = 42.97(X) - 108.01 **R^2= 0.92**

ALLEN & MAJOR
ASSOCIATES, INC.

DRAINAGE REPORT

ASC / Medical Office
360 Corporate Drive
Portsmouth, New Hampshire



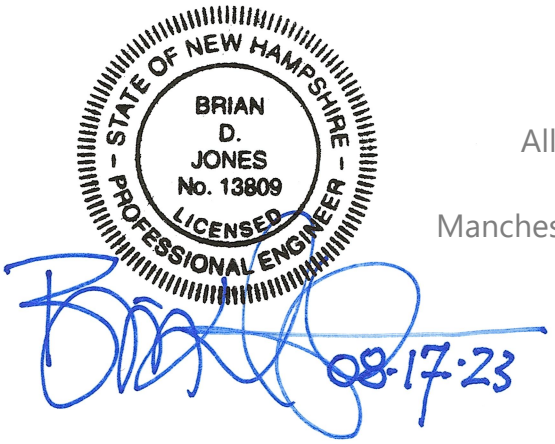
APPLICANT:
ATDG, LLC
7 Sinclair Drive
Exeter, NH 03833

PREPARED BY:
Allen & Major Associates, Inc.
400 Harvey Road
Manchester, New Hampshire 03103

DRAINAGE REPORT

ASC / Medical Office
360 Corporate Drive
Portsmouth, New Hampshire

APPLICANT:
ATDG, LLC
7 Sinclair Drive
Exeter, NH 03833



PREPARED BY:
Allen & Major Associates, Inc.
400 Harvey Road, Suite D
Manchester, New Hampshire 03103

ISSUED:
August 14, 2023

REVISED:
August 17, 2023

A&M PROJECT NO.:
3250-01

TABLE OF CONTENTS

SECTION 1.0 -
OVERVIEW

Executive Summary

The purpose of this drainage report is to provide a detailed review of the stormwater runoff, both quality and quantity, as it pertains to the existing and proposed developed conditions. This report will show by means of narrative, calculations and exhibits that appropriate best management practices have been implemented into the design to mitigate the impacts from the proposed development. This report and following tables demonstrate that there is no increase in total peak rate of runoff from the site for all design storm events.

Study Point #1 - Wetlands				
	2-Year	10-Year	25-Year	50-Year
Existing Flow (CFS)	1.46	5.06	8.52	12.08
Proposed Flow (CFS)	0.98	4.19	8.36	12.08
Change (CFS)	**-0.48**	**-0.87**	**-0.16**	**0.00**
Existing Volume (CF)	8,284	22,410	35,999	50,076
Proposed Volume (CF)	6,482	20,546	35,010	50,858
Change (CF)	**-1,802**	**-1,864**	**-989**	**782**

Study Point #2 - Abutter				
	2-Year	10-Year	25-Year	50-Year
Existing Flow (CFS)	0.12	0.46	0.79	1.14
Proposed Flow (CFS)	0.12	0.40	0.67	0.94
Change (CFS)	**0.00**	**-0.06**	**-0.12**	**-0.20**
Existing Volume (CF)	612	1,747	2,860	4,025
Proposed Volume (CF)	513	1,354	2,155	2,981
Change (CF)	**-99**	**-393**	**-705**	**-1,044**

Study Point #3 - Corporate Drive				
	2-Year	10-Year	25-Year	50-Year
Existing Flow (CFS)	0.63	1.76	2.77	3.78
Proposed Flow (CFS)	0.32	1.04	1.55	1.99
Change (CFS)	**-0.31**	**-0.72**	**-1.22**	**-1.79**
Existing Volume (CF)	2,479	5,996	9,234	12,516
Proposed Volume (CF)	1,291	2,990	4,461	6,180
Change (CF)	**-1,188**	**-3,006**	**-4,773**	**-6,336**

Study Point #4 - International Drive				
	2-Year	10-Year	25-Year	50-Year
Existing Flow (CFS)	0.07	0.34	0.62	0.92
Proposed Flow (CFS)	0.06	0.21	0.34	0.48
Change (CFS)	**-0.01**	**-0.13**	**-0.28**	**-0.44**
Existing Volume (CF)	491	1,541	2,606	3,738
Proposed Volume (CF)	298	786	1,251	1,731
Change (CF)	**-193**	**-755**	**-1,355**	**-2,007**

Site Location and Description

The overall project site is comprised of one parcel totaling approximately 6.11± acres. The parcel is listed on the City of Portsmouth's Assessors 315, as Lot 5, and is located at 360 Corporate Drive. The project proposes to develop the site into a 3-story surgical center.

The site is located east of Portsmouth International Airport, north of Great Bay Community College, and west of Hodgson Brook and Route 16. The property was previously developed for the Greater Portsmouth Transportation Management Association; to date, the building has been razed. Currently, the parcel is unoccupied and comprised of 2 existing curb cuts, a paved parking area, lawn, wetlands, and woodlands. The existing tract of land is clear-cut along its frontage on Corporate Drive, with woods and wetlands extending from the centralized portion of the parcel to the rear property line. Elevations on-site range from elevation 61 at the northwest property corner along Corporate Drive to elevation 52 at the southeast property corner, adjacent to the wetland area.

The proposed development consists of the construction of a 3-story surgical center with associated parking. The proposed building has a footprint of 16,700± square feet with gross floor area of 52,400± square feet. The proposed sitework incorporates various walls to protect the existing wetland resources on site and utilize the developable area. A total of 124 spaces are provided for the building. The proposed condition of the site accommodates loading and delivery areas for building operations.

The underlying soils were identified using the USDA Natural Resources Conservation Service (NRCS) soil survey for Rockingham County. The site is shown to primarily have a soil type of Urban Land which does not have a classified Hydrologic Soil Group. A copy of the NRCS Soil Report is included in the Appendix of this report.

Symbol	Soil Taxonomic Name	Hydrologic Soil Group
699	Urban Land	-
799	Urban Land-Canton Complex, 3 to 15 percent slopes	-

The saturated hydraulic conductivity (Ksat) rate assigned in the NRCS Report for Chatfield-Hollis-Canton Complex soils, which are soils identified adjacent to the site in the NRCS report, were utilized for the design infiltration rate on the site. These soils are consistent in composition with what was observed in the test pits performed by A&M and during the site-specific survey, described below. The Ksat value of this soil is 10.19 micrometers per second. This value was converted to 1.44 inches per hour which was assigned a 2x safety factor to achieve the design infiltration rate of 0.72 inches per hour. Additional soil information is provided in the NRCS Soil Report within the appendix of this report.

A site-specific soil survey was performed by TES Environmental Consultants, on August 9, 2023, to determine the on-site soil classification. It was determined that the uplands on site are predominantly hydrologic soil group "B", and include Canton fine sandy loam, Newfields fine sandy loam, and Udorthents, loamy soils. The wetland soils are hydrologic soil type "C" and are classified as Squamscott fine sandy loam. The site-specific soil survey was used for determining the Hydrologic Soil Group for the development. Please see the appendix section for the Hydrologic Soil Plans used for the drainage design. The TES Environmental Consultants survey classified the onsite soils as the following:

SITE SPECIFIC SOIL MAP UNIT KEY

Symbol*	Map Unit	Slope Class	Drainage Class	HISS Symbol	Hydrologic Soil Group
42B	Canton fine sandy loam	0-8%	Well	221BH	B
42C	Canton fine sandy loam	8-15%	Well	221CH	B
444B	Newfields fine sandy loam	0-8%	Moderately well	321BH	B
444C	Newfields fine sandy loam	8-15%	Moderately well	321CH	B
500B/ccabb	Udorthents, loamy	0-8%	Well	261BH	B
500C/ccabb	Udorthents, loamy	8-15%	Well	261CH	B
500D/ccabb	Udorthents, loamy	15-25%	Well	261DH	B
500E/ccabb	Udorthents, loamy	25% +	Well	261EH	B
500B/hchbb	Udorthents, loamy	0-8%	Undeterminable	761BH**	B**
538B	Squamscott fine sandy loam	0-8%	Poorly	551BH	C
921B	Newfields Variant (SPD)	0-8%	Somewhat poorly	421BH	C

* Refer to accompanying report for 5-unit supplemental symbol explanation.

** Assumed based upon adjacent soils without impervious surfaces.

A stormwater analysis has been performed for two project site situations. The first analysis consists of the existing site conditions and the second consists of the proposed site conditions. There are four study points where the stormwater flows were analyzed. The study points and contributing watersheds are further outlined in the accompanying text and calculations.

Site Data for Stormwater Modeling

The proposed project will disturb approximately 181,000 square feet. This disturbance includes the construction of the proposed building, parking and drive aisles, utility improvements, and stormwater management BMP's.

The proposed watershed is comprised of approximately 90,058 square feet of impervious an increase of 72,916 square feet from the existing conditions. This impervious area includes roof cover, pavement, and sidewalks. Rainfall data used for modeling the stormwater runoff was derived from the "Extreme Precipitation Tables" from the Northeast Regional Climate Center at Cornell University. The design storm events utilized in this analysis are the 2, 10, 25, and 50-year storms. Per Env-Wq 1503.08(l), a 15% multiplier was applied to the storm events because the site is within a Coastal and Great Bay Community.

Existing Site Conditions

Stormwater runoff exits the site to four (4) different study point locations. To exhibit no increase in runoff to these points, stormwater runoff flows were analyzed at these four "Study Points." The included Existing Watershed Plan (EWS-1) outlines the boundaries and contributing watershed for the Study Points.

1. Study Point 1: This study point is located at the existing wetland. It is examining the contributing flow from the centralized portion of the site that discharges to the wetland area on site.

2. Study Point 2: This study point is located at the 320 Corporate Drive property. It is examining the contributing flow from the southern portion of the site which travels off site, to the abutter. The stormwater which flows to this study point will be captured within the drainage network of the abutting parcel.

3. Study Point 3: This study point is located at the Corporate Drive roadway. It is examining the contributing flow from the western portion of the site along the frontage of the property. The stormwater which flows to this study point will be

managed by the existing stormwater management facilities within the Corporate Drive right-of-way.

4. Study Point 4: This study point is located at the International Drive roadway. It is examining the contributing flow from the northeastern portion of the site. The stormwater which flows to this study point will be managed by the existing stormwater management facilities within the International Drive right-of-way.

Proposed Site Conditions

The project proposes to construct a 16,700± square foot surgical center with associated parking, lighting, utilities, and stormwater infrastructure. The proposed stormwater management facilities have been designed to control the runoff using a combination of structural and non-structural best management practices (BMPs). Runoff from the rear parking lots will be collected by deep sump catch basins, and Nyloplast drains, and directed to Infiltration System #1 or #2. These systems are comprised of Stormtech SC-310 chambers which are backfilled and surrounded with coarse washed stone. The runoff is pretreated when entering these systems through the isolator row, which is lined with filter fabric to trap sediment and debris. The majority of the roof runoff is also directed to these two systems which have been designed to infiltrate the water quality volume per Env-Wq 1504.10. Runoff beyond the water quality volume will overflow to a rip rap apron. Runoff from the front roof canopy and a portion of the front parking lot will be directed to Infiltration System #3. This system is comprised of Stormtech SC-160LP chambers and backfilled with coarse washed stone. This system is designed to infiltrate the water quality volume. Due to the location of this system, it has not been designed with an overflow. Therefore, the system has been designed to infiltrate all runoff which is directed to it, up to and including the 50-year storm event. Runoff from the remainder of the parking lot will sheet flow over the pavement to one of several Rain Guardian Turret devices before entering one of four sediment forebays which overflow to one of four bioretention systems. The Turret is a precast concrete curb inlet structure with a grate and filter screen which traps trash and large debris. The sediment forebays provide pretreatment of the runoff before entering the bioretention systems. The bioretention systems have been designed to infiltrate the required water quality volume. Runoff from the loading dock area will be collected by a deep sump catch basin and treated by a proprietary filter (Jellyfish) before discharge to a rip rap apron.

A hydrologic study of the site was conducted to determine the impact of the proposed development on the existing stormwater runoff. The study determined the rate of runoff at these study points have decreased or remain unchanged. The included Proposed Watershed Plan (PWS-1) outlines the boundaries and contributing watershed for the Study Points.

SECTION 2.0 - DISCUSSION

Methodology

The peak discharge rates were determined using techniques and data found in the following:

1. Urban Hydrology for Small Watersheds – Technical Release 55 by the United States Department of Agriculture Soils Conservation Service, June 1986. Runoff curve numbers and 24-hour precipitation values were obtained from this reference.
2. HydroCAD© Stormwater Modeling System by HydroCAD Software Solutions, LLC, version 10.20-3c. The HydroCAD program was used to generate the runoff hydrographs for the watershed areas, to determine discharge, stage, and storage characteristics for the bioretention system, to perform drainage routing and to combine the results of the runoff hydrographs.
3. Soil Survey of Rockingham County, New Hampshire by the United States Department of Agriculture, Natural Resources Conservation Services (NRCS). Soil types and boundaries were obtained from this reference.

Peak Discharge Rates

The stormwater runoff analysis of the existing and proposed conditions includes an estimation of the peak discharge rate from various rainfall events. Peak discharge rates were developed using TR-55 Urban Hydrology for Small Watersheds, developed by the United States Department of Commerce, Engineering Division and the HydroCAD 10.20 computer program. Further, the analysis has been prepared in accordance with the New Hampshire Stormwater Management Manual and standard engineering practices. The peak discharge rate has been estimated for each watershed during the 2, 10, 25, and 50-year storm events.

The stormwater runoff model shows that the proposed site design results in no increase in the total rate of runoff during all storm events. This is accomplished through the construction of the three infiltration systems and four bioretention systems. The table in *Section 1: Executive Summary* provides a summary of the estimated peak discharge rates for each study point during each of the design storm events. The HydroCAD worksheets for the existing and proposed drainage conditions are included within Sections 5 and 6 of this report.

Performance Standards

Stormwater performance standards have been implemented as part of the overall stormwater management plan for the proposed development. The goal of these standards is to improve water quality and protect the waters of New Hampshire from adverse impacts due to development. The performance standards are met by implementing appropriate Best Management Practices (BMPs). BMPs were designed in accordance with the NH Stormwater Management Manual and Env.Wq. 1500.

BMPs implemented in the design include:

- Deep sump catch basins
- Subsurface infiltration systems
- Rain Guardian Turret curb inlets
- Sediment Forebays
- Bioretention Systems
- Proprietary filter device (Jellyfish)
- Specific maintenance schedule

Water Quality Volume (WQV)

The Water Quality Volume (WQV) is the amount of stormwater runoff from a rainfall event that should be captured and treated to remove the majority of stormwater pollutants on an average annual basis. The recommended WQV is the volume of runoff associated with the first one-inch of rainfall, which is equivalent to capturing and treating the runoff from the 90th percentile of all rainfall.

The WQV has been calculated for the proposed site development and adequate treatment is proposed within the Infiltration System. Refer to Appendix Section 7.8 for *NHDES BMP Worksheets* for specific requirements.

Water Quality Flow (WQF)

The Water Quality Flow (WQF) is used to determine a flow rate associated with the WQV, for sizing flow-based treatment and pre-treatment practices.

The WQF has been calculated for the treatment train for the proposed work. Refer to Appendix Section 7.8 for *NHDES BMP Worksheets* for specific requirements.

Groundwater Recharge Volume (GRV)

The purpose of the groundwater recharge volume criterion is to protect groundwater resources by minimizing the loss of annual pre-development groundwater recharge as a result of the proposed development.
The required Groundwater Recharge Volume (GRV) should be based on the site soils and the following equation:

$$\mathbf{GRV = (A_I)(Rd)}$$

Where:
A_I = the total effective area of impervious surfaces that will exist on the site after development
Rd = the groundwater recharge depth based on the USDA/NRCS hydrologic soil group, as follows:

HSG	Impervious Area For GRV			AoT Requirement		
	Existing Area (SF)	Proposed Area (SF)	**A_I**, Change (SF)	**Rd**, Recharge Depth (inches)	**Rd**, Recharge Depth (feet)	Recharge Required (CF)
A	0	0	0	0.40	0.0333	0
B	17,142	90,023	72,881	0.25	0.0208	1,518
C	0	35	35	0.10	0.0083	0
D	0	0	0	0.00	0.0000	0
Total	17,142	90,058	72,916			1,519

Recharge required = 1,519 ft^3

Provided

Recharge provided:
1,582 ft^3 (IS1) + 4,514 ft^3 (IS2) + 2,057 ft^3 (IS3) + 2,429 ft^3 (Bioretention 1) + 425 ft^3 (Bioretention 2) + 5,898 ft^3 (Bioretention 3) + 2,057 ft^3 (Bioretention 4)

= 17,994 ft^3 (provided) > 1,519 ft^3 (required)

See stage storage plots within the calculation pages in the appendix of this report.

Explanation of Drainage System

References:

1. **New Hampshire Stormwater Management Manual, Volumes 2 & 3, December 2008 and Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas In New Hampshire**
2. **SCS - TR55** *(Second Ed., 1986) - for runoff curve numbers.*

Stormwater runoff is collected in various catch basins, curb inlet structures, and roof drains that are placed throughout the site. Runoff is then routed to an infiltration or bioretention system before recharge or discharge. The 2, 10, 25, and 50-year storm events were analyzed for existing versus proposed conditions (see Drainage Summary). See complete results in the Appendix.

Deep Sump Catch Basin & Nyloplast Drains:
Deep sump catch basins are proposed on site in order to catch and route runoff to various stormwater systems.

Roof Drain:
Roof drains are located on the buildings to capture and route clean stormwater runoff.

Infiltration Systems:
Two Stormtech SC-310 and one SC-160LP infiltration systems by ADS will be utilized to capture, treat, and infiltrate stormwater.

Rain Guardian – Turret:
The Rain Guardian – Turret is a concrete structure with inlet grate to capture trash and debris prior to discharge to the bioretention systems.

Sediment Forebay:
Sediment forebays are shallow depressions which receive runoff from the Turret structures and are placed upstream of the bioretention systems to provide pretreatment.

Bioretention System:
Four bioretention systems are proposed to collect and filter stormwater runoff using conditioned planting soil beds, gravel beds and vegetation within a shallow depression.

Proprietary Filter Device (Jellyfish):
The Jellyfish filtering device uses high flow rate membrane filtration to remove a high level and a wide variety of stormwater pollutants.

SECTION 3.0 - OPERATION AND MAINTENANCE PLAN

General Information

Allen & Major Associates, Inc. has prepared the following Operation and Maintenance Plan for the ASC / Medical Office project located at 360 Corporate Drive, Portsmouth, NH. The plan is broken down into the following major sections. The first section gives general information about ownership and responsibility (General Information). The next section describes the erosion and sediment control measures used during construction (Construction Period). The third section describes the long-term pollution prevention measures (Long Term Pollution Prevention Plan). The last section describes the maintenance requirements for the stormwater management practices (Maintenance Plan).

Contact Information

Stormwater Management System Owner:

ATDG, LLC
7 Sinclair Drive
Exeter, NH 03833
603-799-6787

Notification Procedures for Change of Responsibility for O&M

The Stormwater Management System (SMS) for this project is owned by ATDG, LLC. The owner shall be legally responsible for the long-term operation and maintenance of this SMS as outlined in this Operation and Maintenance (O&M) Plan. Should ownership of the SMS change, the owner will continue to be responsible until the succeeding owner shall notify the City and Pease Development Authority (PDA) that the succeeding owner has assumed such responsibility. Upon subsequent transfers, the responsibility shall continue to be that of transferring owner until the transferee owner notifies the City of Portsmouth and Pease Development Authority of its assumption of responsibility.

In the event the SMS will serve multiple lots/owners, such as the subdivision of the existing parcel, the owner(s) shall establish an association or other legally enforceable arrangements under which the association or a single party shall have legal responsibility for the operation and maintenance of the entire SMS.

Construction Period

1. Contact the City of Portsmouth's Engineering Department and Pease Development Authority at least two (2) weeks prior to start of construction.

2. Install the catch basin filters (silt sacks) and tubular barriers as shown on the Site Preparation Plan.

3. Site access shall be achieved only from the designated construction entrances.

4. All erosion control measures shall be inspected weekly and after all rainfall events exceeding 0.25" and shall be maintained, repaired, or replaced as required or at the direction of the owner's engineer, the City's Engineer, or the Pease Development Authority's Engineer.

5. Sediment accumulation up-gradient of the tubular sediment barrier greater than 6" in depth shall be removed and disposed of in accordance with all applicable regulations.

6. Catch basin filters shall be installed in all catch basins adjacent to the site. Sediment accumulation on all adjacent catch basin inlets shall be removed and the silt sacks shall be replaced if torn or damaged.

7. The contractor shall comply with the General and Erosion Notes listed on the Site Development Plans.

Post-Development Activities

1. Upon completion of all terrain alteration activities that direct stormwater to a particular practice, the responsible party shall initiate the O&M activities.

2. Paved Areas – Paved areas should be swept as part of the routine site maintenance. Pavement sweeping is an excellent source control for sedimentation to the existing drainage system and is typically performed in the spring of each year following the snow melt.

3. Paved Areas – Salt for de-icing on the paved areas during the winter months shall be limited to the minimum amount practicable. Sand containing the minimum amount of calcium chloride (or approved equivalent) needed for handling may be applied as part of the routine winter maintenance activities.

4. All sediments removed from site drainage facilities shall be disposed of properly, and in accordance with applicable local and state regulations.

5. All vegetated areas on the site shall be stabilized and maintained to control erosion. Any disturbed areas shall be re-seeded as soon as practicable.

6. Work within any drainage structures shall be performed in accordance with the latest OSHA regulations, and only by individuals with appropriate OSHA certification.

7. Maintenance Responsibilities – All post-construction maintenance activities shall be documented and kept on file and made available to the proper City, PDA, and State authorities upon request.

8. If ownership of the property is transferred, the new owner(s) shall become the responsible party.

Long-Term Pollution Prevention Plan

The Long-Term Pollution Prevention Plan (LTPPP) has been prepared and incorporated as part of the Operation and Maintenance of the Stormwater Management System. The purpose of the LTPPP is to identify potential sources of pollution that may affect the quality of stormwater discharges, and to describe the implementation of practices to reduce the pollutants in stormwater discharges. The following items describe the source control and proper procedures for the LTPPP.

Housekeeping

The proposed site development has been designed to maintain a high level of water quality treatment for all stormwater discharge and groundwater. An Operation and Maintenance (O&M) plan has been prepared and is included in this section of the report. The Owner (or its designee) is responsible for adherence to the O&M plan in a strict and complete manner.

Storing of Materials and Waste Products

There are no proposed exterior (un-covered) storage areas. The trash and waste program for the site includes a dedicated space adjacent to the building for waste & recyclables.

Vehicle Washing

Outdoor vehicle washing has the potential to result in high loads of nutrients, metals, and hydrocarbons during dry weather conditions, as the detergent-rich water used to wash the grime off the vehicle enters the stormwater drainage system. The proposed site

improvements do not have accommodations for outdoor car washing. Vehicle washing is not an allowable stormwater discharge under PDA's NPDES Permit with the EPA.

Maintenance of Lawns, Gardens and other Landscaped Areas

It should be recognized that this is a general guideline towards achieving high quality and well-groomed landscaped areas. The grounds staff / landscape contractor must recognize the shortcomings of a general maintenance plan such as this and modify and/or augment it based on weekly, monthly, and yearly observations. In order to ensure the highest quality conditions, the staff must also recognize and appreciate the need to be aware of the constantly changing conditions of the landscaping and be able to respond to them on a proactive basis. No trash or landscape debris (including lawn clippings) shall be stored or dumped within the landscaped or naturalized areas.

Fertilizer

Maintenance practices should be aimed at reducing environmental, mechanical and pest stresses to promote healthy and vigorous growth. When necessary, pest outbreaks should be treated with the most sensitive control measures available. Synthetic chemical controls should be used only as a last resort to organic and biological control methods. Fertilizer, synthetic chemical controls, and pest management applications (when necessary) shall be performed only by licensed applicators in accordance with the manufacturer's label instructions when environmental conditions are conducive to controlled product application.

Only slow-release organic fertilizers should be used in the landscaped areas to limit the amount of nutrients that could enter downstream resource areas. Fertilization of developed areas on site will be performed within manufacturers labeling instructions and shall not exceed an NPK ratio of 1:1:1 (i.e. Triple 10 fertilizer mix), considered a low nitrogen mixture. Additionally, the fertilizer will include a slow release element.

Suggested Aeration program

In-season aeration of lawn areas is good cultural practice and is recommended whenever feasible. It should be accomplished with a solid thin tine aeration method to reduce disruption to the use of the area. The depth of solid tine aeration is similar to core type but should be performed when the soil is somewhat drier for a greater overall effect.

Depending on the intensity of use, it can be expected that all landscaped lawn areas will need aeration to reduce compaction at least once per year. The first operation should occur in late May following the spring season. Methods of reducing compaction will vary based on the nature of the compaction. Compaction on newly

established landscaped areas is generally limited to the top 2-3" and can be alleviated using hollow core or thin tine aeration methods.

Landscape Maintenance Program Practices:

- **Lawn**
  1. Mow a minimum of once a week in spring, to a height of 2" to 2 1/2" high. Mowing should be frequent enough so that no more than 1/3 of the grass blade is removed at each mowing. The top growth supports the roots; the shorter the grass is cut, the less the roots will grow. Short cutting also dries out the soil and encourages weeds to germinate.
  2. Mow approximately once every two weeks from July 1st to August 15th depending on lawn growth.
  3. Mow on a ten-day cycle in fall, when growth is stimulated by cooler nights and increased moisture.
  4. Do not remove grass clippings after mowing.
  5. Keep mower blades sharp to prevent ragged cuts on grass leaves, which cause a brownish appearance and increase the chance for disease to enter a leaf.
- **Shrubs**
  1. Mulch not more than 3" depth with shredded pine or fir bark.
  2. Hand prune annually, immediately after blooming, to remove 1/3 of the above-ground biomass (older stems). Stem removals are to occur within 6" of the ground to open up shrub and maintain two-year wood (the blooming wood).
  3. Hand-prune evergreen shrubs only as needed to remove dead and damaged wood and to maintain the naturalistic form of the shrub. Never mechanically shear evergreen shrubs.
  4. Fertilize with ½ lb. slow-release fertilizer (see above section on Fertilizer) every second year.
- **Trees**
  1. Provide aftercare of new tree plantings for the first three years.
  2. Do not fertilize trees, it artificially stimulates them (unless tree health warrants).
  3. Water once a week for the first year; twice a month for the second; once a month for the third year.
  4. Prune trees on a four-year cycle.

Management of Deicing Chemicals and Snow

Snow shall only be stockpiled on site. If the stockpiles of snow do not fit then snow will be disposed off-site. It will be the responsibility of the snow removal contractor to properly dispose of transported snow according NHDES. It will be the responsibility of

the snow removal contractor to follow these guidelines and all applicable laws and regulations.

The owner (or its designee) will be responsible for the clearing of the sidewalk and building entrances. The Owner may be required to use a de-icing agent such as potassium chloride to maintain a safe walking surface; however, these are to be used at the minimum amount practicable. The de-icing agent for the walkways and building entrances will be kept within the storage rooms located within the buildings. De-icing agents will not be stored outside.

To address the concerns associated with the application of chlorides and other deicing materials, NHDES recommends the development of a Road Salt and Deicing Minimization Plan when a development will create one acre or more of pavement, including parking lots and roadways. A component of the plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually. Snow and ice management operators shall be Green SnowPro certified, trained and certified as a New Hampshire salt applicator, in accordance with Env-Wq 2203, and the UNH Technology Transfer Center online tool (http://www.roadsalt.unh.edu/Salt/).

In the spring, following snow melt, the pavement on site should be swept, with special attention paid to locations where snow was stockpiled. Snow stockpiles can contain higher sediment loads to due sanding and plowing operations, so these areas may require more sweeping than other areas. In addition to sweeping, following the snow melt, the grounds should be inspected for sediment and debris, with special attention paid to the landscaping along the perimeter of the parking areas as well as along the toe of slopes adjacent to parking areas, where debris might collect.

Maintenance Plan

Documentation

Maintenance documents shall include a completed maintenance checklist (attached) that will include any applicable notes or other documents as described in this section.

Operation and Maintenance Schedule Summary

The following is a summary of the maintenance schedule for each of the stormwater BMPs. Note all anomalies, signs of degradation, or corrective actions on the annual Maintenance Checklist.

Rain Guardian - Turret:

The Rain Guardian Turret is a concrete curb-inlet device that discharges to a bioretention system. It is recommended that the Rain Guardian - Turret be inspected at least twice per year. If observed, remove trash and debris at each inspection. Replace the grate if damaged.

Deep Sump Catch Basins and Nyloplast Drains:

These consist of a man-hole type structure that contains inlet and or outlet pipes to further advance stormwater through the proposed drainage system. The size of the pipes and invert elevations vary throughout the project site. The catch basins utilize an inlet grate that is flush to grade to capture runoff and sediment, passing the water through the system and capturing the sediment to be removed. The sediment that accumulates within the bottom of the structures needs to be cleaned periodically, before it reaches a depth of 2' or 50% of its capacity.

Sediment Forebays:

The design proposes four sediment forebays which discharge to the bioretention systems. Maintenance of sediment forebays includes:

- Inspection at least annually
- Conduct periodic mowing of embankments (generally two times per year) to control growth of woody vegetation on embankments
- Remove debris from outlet structures at least once annually
- Remove and dispose of accumulated sediment based on inspection

Bioretention Area:

It is recommended that the bioretention systems and their overflow devices be inspected at least twice per year and with any rainfall event exceeding 2.5 inches in a 24-hour period. Trash and debris observed in the bioretention area (if any) shall be removed.

The Owner or its designee shall keep records of the maintenance of the Stormwater BMPs on a yearly basis. Maintenance documents shall include a completed maintenance checklist.

Proprietary Filter Device (Jellyfish)

It is recommended that the Jellyfish be inspected quarterly during the first year of operation. The frequency of inspections during subsequent years shall be based on the plan developed during that first year. It is recommended the device be inspected after

any rainfall event exceeding 2.5 inches in a 24-hour period. The device shall be cleaned as directed by the manufacturer. An inspection and maintenance document is provided herewith.

Supplemental Information

- Operation and Maintenance Plan Schedule
- Operation and Maintenance Plan Log Form (During Construction)
- Operation & Maintenance Figure
- Anti-Icing Log Form
- UNH Extension - Mechanical Control of Terrestrial Invasive Plants
- Isolator® Row Plus O&M Manual
- Jellfish® Filter Maintenance Guide

OPERATION AND MAINTENANCE PLAN SCHEDULE

ALLEN & MAJOR ASSOCIATES, INC.

Project: 3250-01
Project Address: Surgical Center - 360 Corporate Drive, Portsmouth, NH

Responsible for O&M Plan: ATDG, LLC
Address: 7 Sinclair Drive, Exeter, NH 03833
Phone: (603) 799-6787

All information within table is derived from New Hampshire Stormwater Manual: Chapter 4, Sections 3 and 4

BMP CATEGORY	BMP OR MAINTENANCE ACTIVITY	SCHEDULE/ FREQUENCY	NOTES	ESTIMATED ANNUAL MAINTENANCE COST	INSPECTION PERFORMED	
					DATE:	BY:
PRETREATMENT PRACTICES	PROPRIETARY FILTER DEVICE (JELLYFISH)	Inspect quarterly, or more frequently as recommended by manufacturer. It is recommended that the unit be cleaned at least once per year.	Remove and legally dispose of floating debris at each inspection. Remove sediment when it reaches level specified by manufacturer. Remove floating hydrocarbons immediately whenever detected by inspection.	$2,000		
	DEEP SUMP CATCH BASINS & NYLOPLAST DRAINS	May require frequent maintenance. It is recommended that catch basins be inspected at least twice annually.	Sediment should be removed when it approaches half the sump depth. If floating hydrocarbons are observed the material should be removed immediately. Damaged hoods should be replaced when noted by inspection.	$1,000		
TREATMENT PRACTICES	UNDERGROUND INFILTRATION SYSTEMS	Inspect at least twice annually and with any rainfall event exceeding 2.5 inches in a 24-hour period.	Removal of debris from inlet and outlet structures. Removal of accumulated sediment. Inspection and repair of outlet structures and appurtenances. If system does not drain within a 72-hour period following a rainfall event, a professional should assess the facility's condition.	$1,000		
	BIORETENTION SYSTEM (includes Turret curb-inlets & sediment forebays)	Inspect at least twice annually and with any rainfall event exceeding 2.5 inches in a 24-hour period.	Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection. Annually the system should be inspected for drawdown time. Trash and debris should be removed at each inspection.	$2,000		
OTHER MAINTENANCE	SNOW STORAGE	Clear and remove snow to approved storage locations as necessary to ensure systems are working properly and are protected from meltwater pollutants.	Carefully select snow disposal sites before winter. Avoid dumping removed snow over catch basins, or in detention ponds, sediment forebays, rivers, wetlands, and flood plains. It is also prohibited to dump snow in the bioretention basins or gravel swales.	$500		
	STREET SWEEPING	Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring.	Sweep, power broom or vacuum paved areas. Submit information that confirms that all street sweepings have been completed in accordance with state and local requirements	$2,000		

SURGICAL CENTER
360 CORPORATE DRIVE
PORTSMOUTH, NH

MAINTENANCE LOG FORM

INSPECTOR:_____

DATE MAINTENANCE PERFORMED:_____

INSPECTOR'S QUALIFICATIONS:_____

_____

_____

MAINTENANCE LOG

TYPE OF MAINTENANCE PERFORMED	DATE SINCE LAST MAINTENANCE	STAFF MEMBER OR CONTRACTOR WHO PERFORMED MAINTENANCE	CONDITION	ISSUE RESOLVED (YES/NO)

FOLLOW-UP REQUIRED:

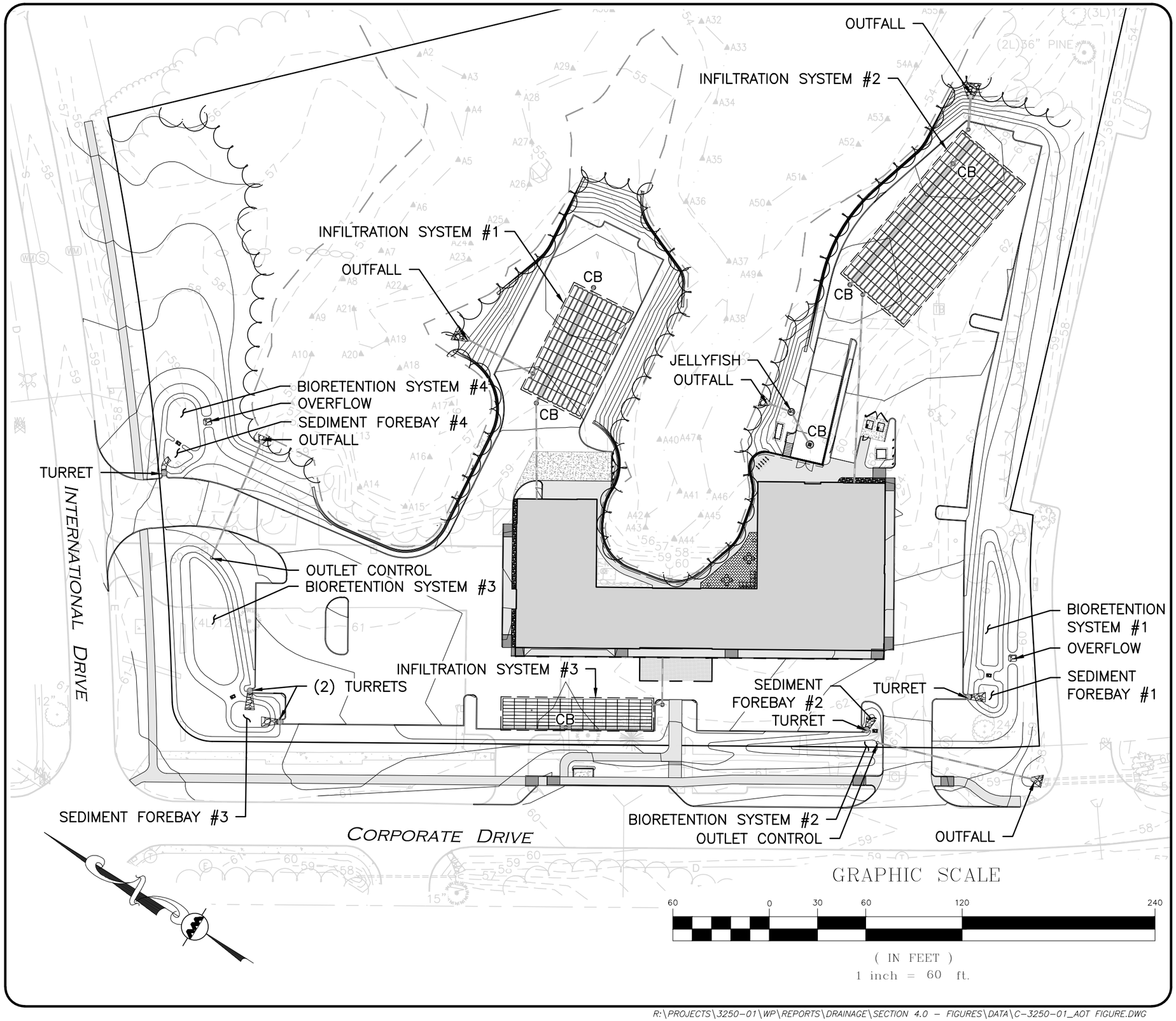
_____

_____

TO BE PERFORMED BY:_____ ON OR BEFORE:_____

NOTES:

1. Attach copies of maintenance work orders.
2. Owner must keep a minimum of the past 7 years of inspections / operations and maintenance records onsite.



REV	DATE	DESCRIPTION

APPLICANT/LESSEE:

ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:

ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
PORTSMOUTH, NH

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 60'	DWG. NAME:	C3250-01-FIGURES
DESIGNED BY:	SM	CHECKED BY:	BDJ

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:

OPERATION & MAINTENANCE FIGURE

SHEET No.

5

R:\PROJECTS\3250-01\WP\REPORTS\DRAINAGE\SECTION 4.0 – FIGURES\DATA\C-3250-01_AOT FIGURE.DWG

Mechanical Control of Terrestrial Invasives Plants

Mechanical control strategies for managing terrestial invasive plants.

It's important to begin a project with a goal in mind, in this case clearing a treeline to allow native shrubs and seedlings to thrive.

The best tools and techniques for controlling invasive plants will be determined by a site's characteristics, the type of plants present, the size of the infestation, and the resources available to implement a control plan. Since each invasive plant species responds to a given control method differently, it is important to determine which methods are best suited to a situation. Often a combination of control techniques is needed, including mechanical, chemical or biological techniques.

Here we focus on prevention and mechanical methods, which are common techniques used at the start of a project, and techniques that can work on a range of projects from small to large.

Prevention

Preventing invasive plants from getting a foothold is always the best strategy of control. It is fairly easy to snuff out a small population of invasive plants, but once the infestation spreads, the cost and effort needed to control the plants escalates and they become harder to remove. This is the idea behind "early detection and rapid response."

A major avenue for invasive plants spreading is via materials moved around by humans. A seed or fragment of an invasive plant can stow away in a potted plant or in haybales, in mulch, soil, gravel or other material, or on boots or clothing. Invasive plants can be inadvertently moved along roadsides by mowers, graders, or plows.

Here are some strategies to prevent invasive plants from hitching a ride to new areas:

- Know the source of purchased plants to ensure the soil is free of invasive plant material
- Compost food waste, leaves, and grass clippings and make your own wood chips to reduce the need to buy mulch, which may contain invasive seeds
- When buying or selling haybales, ask the farmer about invasive plants in their fields
- When building trails, use on-site rocks, soil, sand, and gravel whenever possible
- Consult with your town's Department of Public Works to ensure they use local materials when possible, have roadside mowing protocols for invasive plants, and employ other best practices to prevent invasive plant spread
- Consult with your town planner to ensure zoning ordinances require developers to pay attention to invasive plants
- When working around invasive plants, clean off tools and shoes before moving to another location, and avoid wearing clothing (such as fleece) that enables seeds to stick to you and catch a ride

Before embarking on the physical removal or treatment of invasive plants, recognize that it will require a long-term plan and a multi-year effort. Once an invasive plant infestation spreads, the cost and effort escalate.

Mechanical Control

Mechanical removal can be very labor intensive and may create significant site disturbance. Before embarking on the physical removal or treatment of invasive plants, recognize that it will require a long-term plan and a multi-year effort. Otherwise, efforts may not succeed and may even get worse. “Picking Our Battles: A Guide to Planning Successful Invasive Plant Projects” published by the New Hampshire Fish and Game Department is helpful in crafting a plan. Mechanical methods for controlling invasive plants usually do not require special permits or licensing. However, there are a few situations, such as around historical foundations or in wetland areas, where mechanical control requires special care and in some cases a permit if disturbing soil in sensitive areas.

Your on-site project goal when conducting mechanical control will usually be to halt seed production of the invasive plants, which can remain viable for years. The seed bank in the soil already dictates a multi-year project. Without halting seed production, the project timeframe will continue to stretch into the future. There is a lot to consider even before pulling or digging any plants. Have a vison for the future and find incremental successes along the way.

Plants that are pulled, dug, or cut should be piled on site. Depending on the size of the project, you can pile the material on a tarp or pallet or directly on the ground if there is little chance that the plants will take root. Create “weed drying stations” where non-viable, seed-free plants are piled to desiccate in the sun. Pile plants that contain seeds or other viable plant parts in separate “hot spots,” where any resprouts can be easily contained. See “Methods for Disposing Non-Native Invasive Plants,” by UNH Cooperative Extension for more information.

Recognize that repeat visits are almost always needed whether you use mechanical techniques, herbicides, or a combination of methods. The number of repeat treatments may depend on site conditions as well as the species of plant.

Safety is an important consideration when working with invasive plants. Woodchuck holes, barbed wire, wasp nests, poison ivy, dehydration, thorns, ticks, and skin rashes are all potential hazards. Additional care is needed when pulling plants, such as wild parsnip or giant hogweed, that can cause a severe rash if skin comes in contact with the plant sap; consider getting guidance from a professional before trying to handle these plants. Be prepared for field work: wear eye protection, long-sleeved shirt and pants, gloves, sturdy shoes, and a sun hat; carry water and a first aid kit; consider using a white 5-gallon bucket to carry your gear.

Sturdy hoes and similar tools are useful for digging out roots.

Make sure to remove the entire root system when hand pulling, which is easiest in moist soil.

When smothering a woody stem, the covering should left in place for at least one year.

Methods

Hand Pulling & Digging

Gloved hands work amazingly well on soft or small stems. Rubber kitchen gloves offer protection when pulling plants that exude sap that can cause a rash, such as wild parsnip. Soft, well-fitting garden gloves work well for pulling soft-stemmed plants such as garlic mustard or small seedlings of woody plants. Thicker work gloves are a must for larger shrubs, especially when pulling plants with thorns, such as barberry and multiflora rose.

The best approach to hand pulling is slow and steady. Reach down to the base of the plant and pull with both hands. This will help ensure that you pull up all or most of the roots. Hand-pulling is most effective if the ground is somewhat moist. Dry, hard-packed ground will often result in plants snapping off before the entire root system is extracted. Plants should be pulled when viable fruits or seeds are not present on the plant, to avoid spreading the fruits to a new spot.

Plants that are less than 2-3 inches in diameter, but too large to hand pull, can be removed by digging. Dig using traditional gardening tools, such as a mattock, hoe, or soil knife, or try specialized invasive plant tools available on the market today. Some tools use body weight to lever the root system out of the ground. When selecting a tool, consider the weight and size, as some may be cumbersome to carry around a large project area.

Areas of disturbed soil provide ideal conditions for invasive plant and weed germination. After a plant is pulled or dug up, tamp down the soil and replace any leaf litter or other native plant material. Repeat visits are essential to check for resprouts or sprouts from the soil seed bank.

Smothering

The smothering or suffocating of small seedlings or herbaceous plants may be effective with some infestations. This technique is also used with some stands of Japanese knotweed, but it requires vigilance and patience to maintain a heavy plastic layer for five continuous years. This technique will kill all vegetation in the affected area such that replanting will be required when plastic is removed.

Another smothering technique involves cutting a woody stem at six inches above ground and covering with a heavy plastic bag, tying it closed with a zip-tie. The covering should be left in place for at least one year before removing.

Cutting*

Repeated cutting of invasive shrubs and vines can help stop seed production of large plants. This may be accomplished with loppers or hand saws. With some training or supervision, weed trimmers, brush saws and chain saws may also be used.

Woody invasive shrubs will need to be cut multiple times over several years. The number of repeat treatments may depend on the site conditions as well as the species of plant. The goal is to initially stop seed production and then with each subsequent cut to reduce the plant's energy reserves. Time the first cut for late spring or early summer (before July 4th), followed by a second cut in late summer or fall (as late as November), and do the third cut the following spring.

Cut the stems at ground level or at waist height. The latter technique allows you to find the plants for the repeat treatments and it is easier on your body. Large bittersweet vines should be cut as close to the ground as possible and then cut off another 4 to 5 feet along the stem to create a gap between the ground and the treetop vines. Again, monitoring is important, so check back every year for a while.

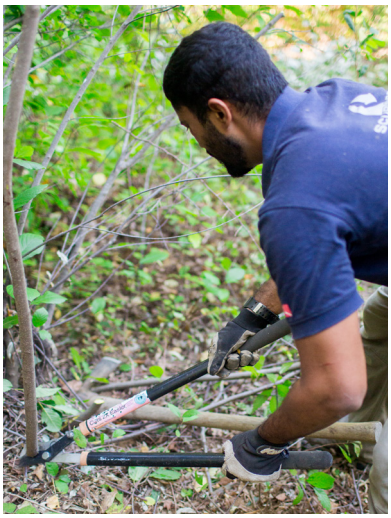
Girdling*

Girdling can be used on large invasive shrubs if other techniques are not viable. At waist height, cut into the bark approximately ¼ - ½" and all the way around the tree. Repeat 6 inches above that cut, then strip off all the bark in between. This severs the phloem, which is the living tissue just under the bark, and cuts off the flow of sugars from the leaves to the roots. While the portion of the plant above the cut will die back it may sprout below the cut, so you will need to check back to see if there are any new sprouts. If so, just strip them off with gloved hands or use clippers and continue removing any new sprouts until the entire plant is dead. Girdling can be done with hand tools including an ax, hand saw or specialized tool. Similar to cutting, spring and early summer are the best time to girdle a plant after it has used energy from its reserves for leaf production. The bark is also more easily removed at this time of year.

Mowing/Shredding*

Some large invasive plant infestations may require large equipment, such as tractors with brush or rotary mowers or excavators with special attachments (such as a "brontosaurus"). It is best to use this equipment before seed production (usually before July 4th) to avoid disturbing the soil when the plants have viable seeds. Some contractors have the ability to uproot and shred large shrubs. Others can grind shrubs down to the ground. As long as some of the root system remains in the ground, repeat visits with hand tools or other methods will be needed. When plants are top-killed, the size of the root system increases, resulting in more vigorous re-spouting after the initial mowing. In order to deplete the energy reserves, repeat

*Cutting, girdling and mowing are sometimes used in combination with herbicide treatments. Cutting and mowing can be used to reduce the above-ground biomass and foliage, thus reducing the amount of herbicide needed as well as improving access to the site.



Cut woody invasives at ground level or waist height, best done late spring to early summer.

Girdling is best done in spring and early summer after a plant has used energy to produce leaves.

Use mowing equipment before seeds are produced, and avoid disturbing soil after plants have viable seeds.

Mechanical equipment has the potential to spread invasives. Inspection and cleaning is essential.

A "weed drying station"

mowing is necessary. This can mean re-mowing 3-4 times a year for multiple years following the initial mow.

Mowing or shredding have the benefit of halting seed production over a large area. Make sure to ask the contractor details about their equipment, technique, and expected outcomes before embarking on a project. While it can increase the complexity of a project, depending on the plant composition on the site, you can flag and retain mature native plants during mowing projects. Skilled operators will be able to maneuver around retained plants. All mechanical equipment used in treating invasive plant infestation has the potential to transport seeds, roots, rhizomes, and spores to other sites. Equipment inspection and cleaning is essential to stop subsequent invasive plant spread.

Monitoring

Persistence and monitoring are key for all invasive plant projects to be successful. A monitoring schedule should be built into your project plan. It may be necessary to adapt your plan based on the results of your monitoring.

It's important to wear appropriate protective equipment when managing invasive plants, including work gloves.

Always map and monitor your invasive plant control efforts.

References

Invasive Species Outreach Group. *Methods for Disposing Non-Native Invasive Plants*. UNH Extension, 2010.

Invasive Plant Working Group. *Picking Our Battles: A Guide to Planning Successful Invasive Plant Management Projects*. NH Fish and Game, 2015.

Learn More

For more information on invasive plants and management options, see UNH Extension's webpage *nhinvasives.org.*

Photo Credits

Many of the photos are courtesy of Ellen Snyder.

About the Author

Ellen Snyder is a certified wildlife biologist and sole owner of Ibis Wildlife Consulting.

She specializes in habitat management, invasive plant control, land stewardship planning, biodiversity conservation, and ecological writing

Ellen served as the Land Stewardship Coordinator for the Town of Durham from 2017-2021. From 1993-2003 she was the Wildlife Specialist for UNH Cooperative Extension. Ellen currently serves on her Conservation Commission in Newmarket, NH.

Contact Information

Ellen Snyder | (603) 583-0039 | ellensnyder1@gmail.com

Editing Assitance

Mike Bald, Got Weeds?

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row Plus is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

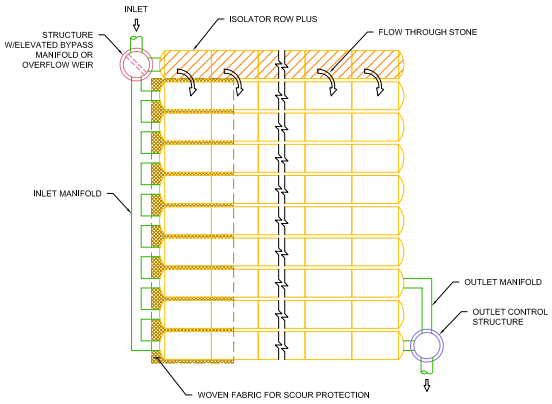
The Isolator Row FLAMP™ (patent pending) is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row PLUS from the manhole opening, ADS PLUS Fabric is shown between the chamber and stone base.

StormTech Isolator Row PLUS with Overflow Spillway (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

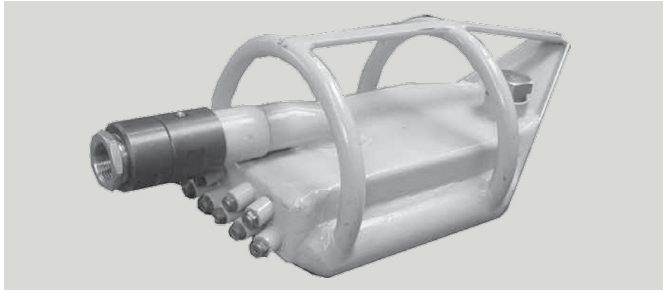
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row Plus, clean-out should be performed.

Maintenance

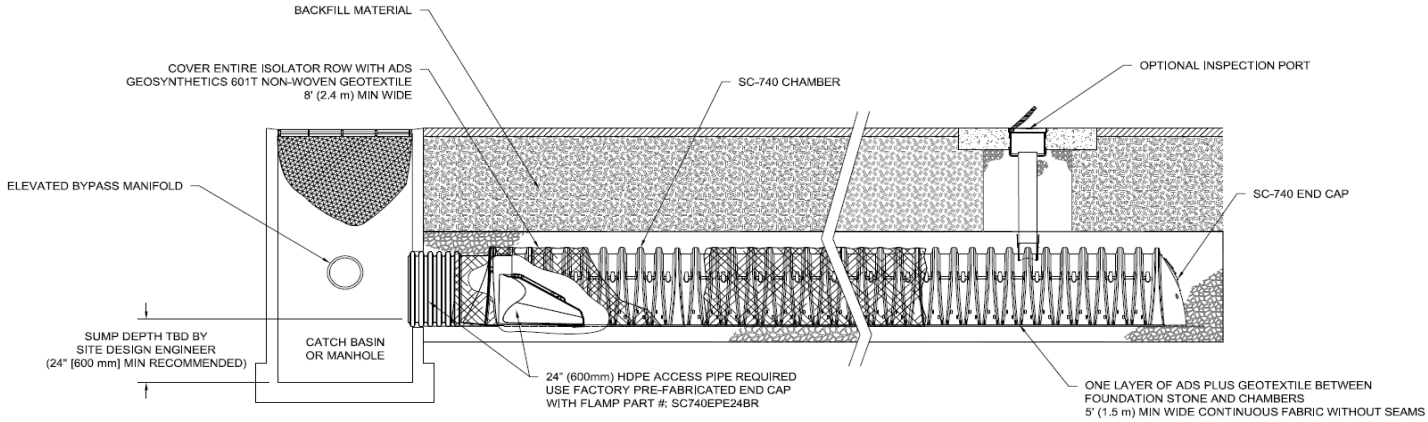
The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row PLUS (*not to scale*)

Note: *Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row PLUS.*



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

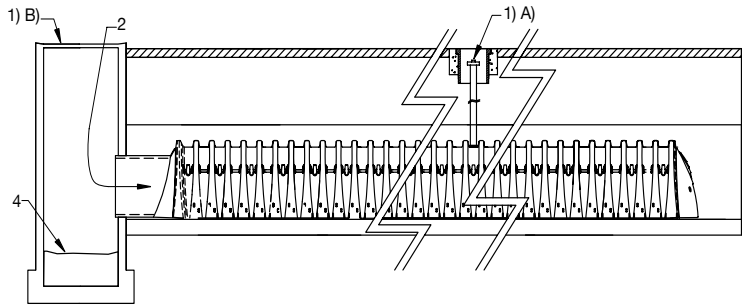
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



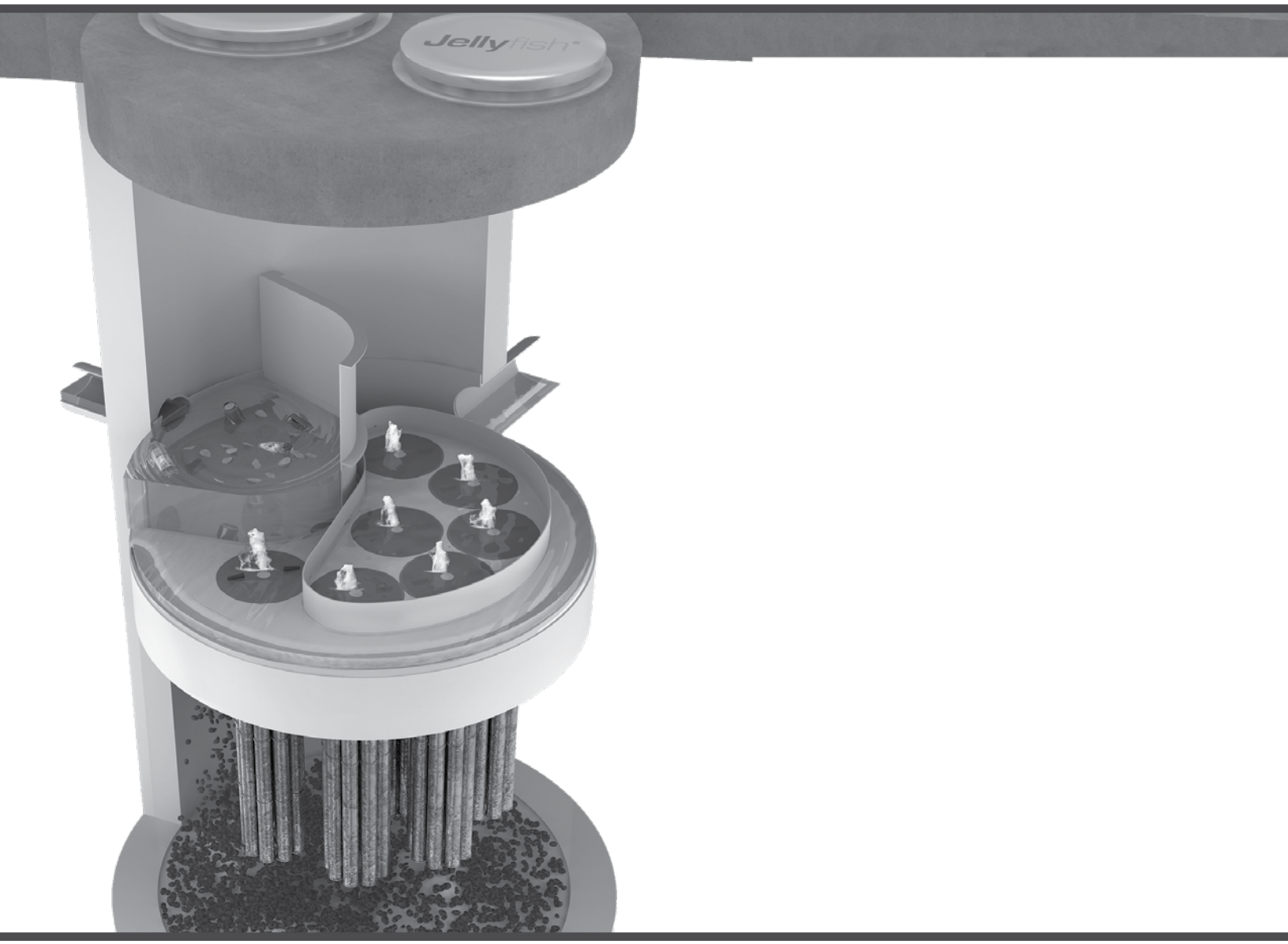
Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row PLUS, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com
800-821-6710

CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter Maintenance Guide



Jellyfish®

JELLYFISH® FILTER
INSPECTION & MAINTENANCE GUIDE

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

TABLE OF CONTENTS

1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

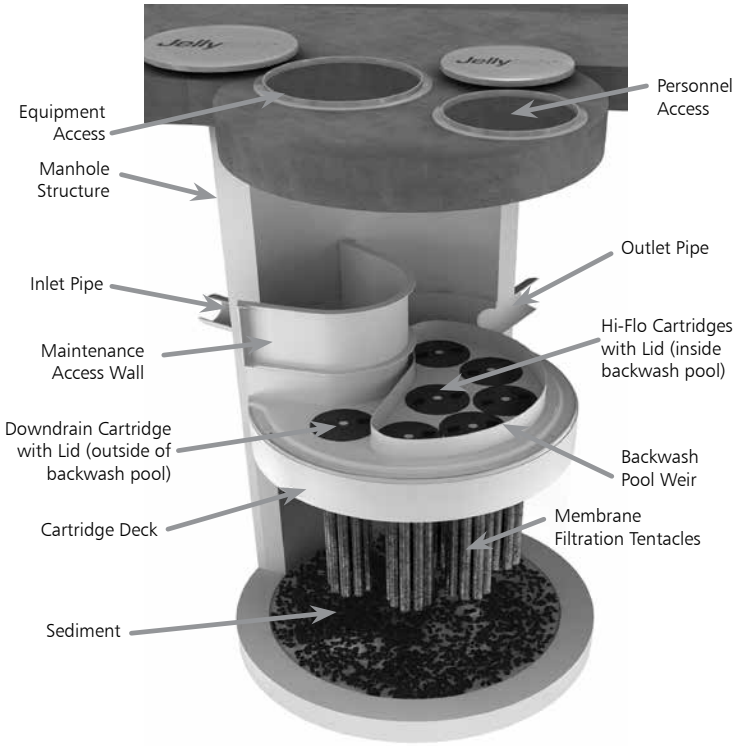
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥1/16") accumulated on the deck surface should be removed.

3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

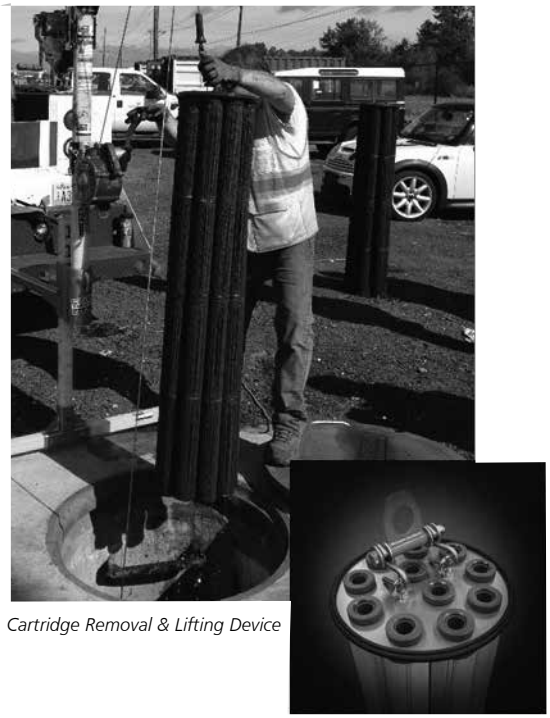
1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. ***Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs***.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.



Cartridge Removal & Lifting Device

2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.
3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. ***Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane***.

4. Collected rinse water is typically removed by vacuum hose.
5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

5.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.

Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.

Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

5.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. ***Caution: Do not force the cartridge downward; damage may occur.***
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

5.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

5.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

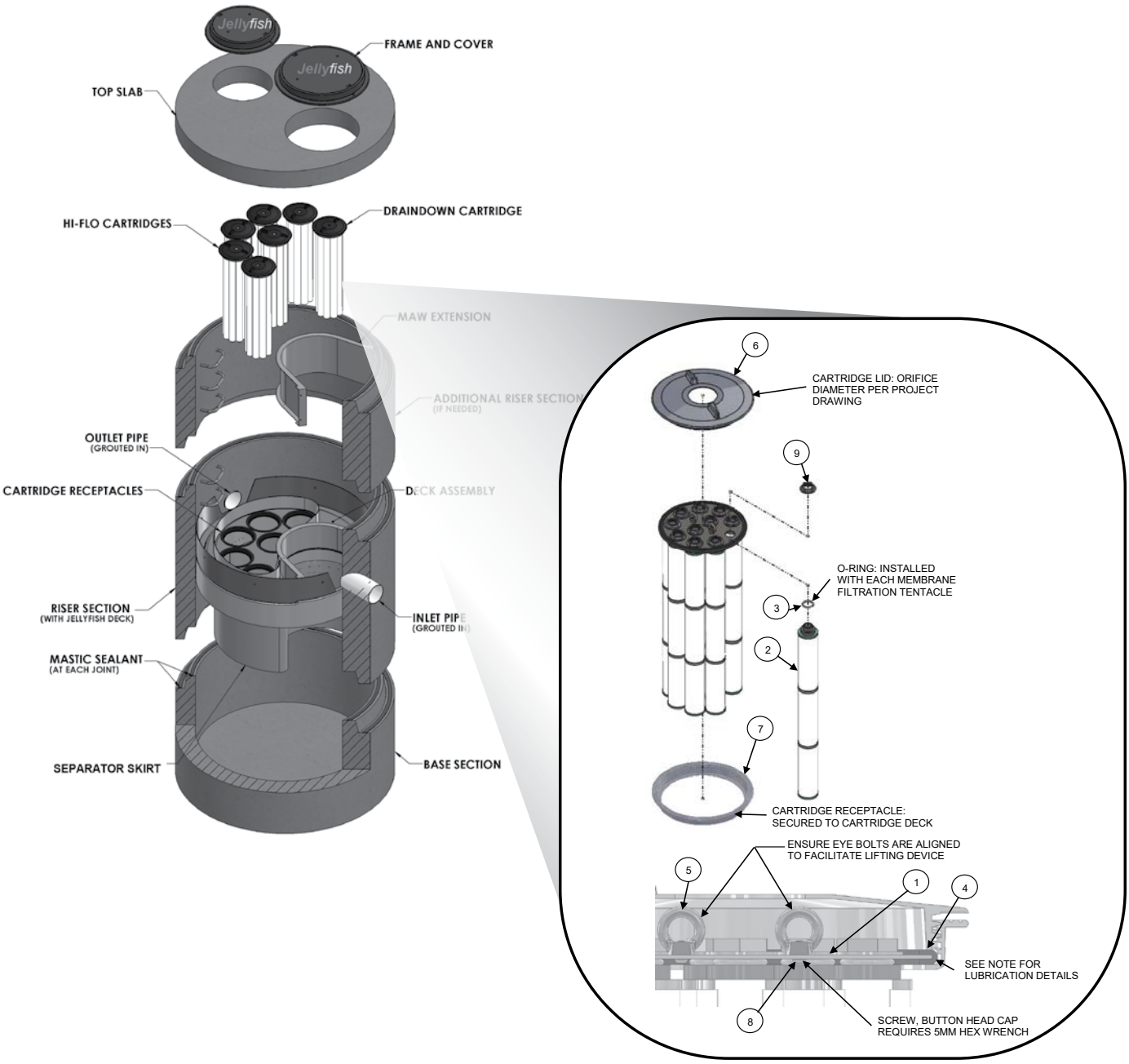


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:
Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lide (ITem 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:
Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner:				Jellyfish Model No:		
Location:				GPS Coordinates:		
Land Use:	Commercial:		Industrial:		Service Station:	
	Roadway/Highway:		Airport:		Residential:	

Date/Time:						
Inspector:						
Maintenance Contractor:						
Visible Oil Present: (Y/N)						
Oil Quantity Removed:						
Floatable Debris Present: (Y/N)						
Floatable Debris Removed: (Y/N)						
Water Depth in Backwash Pool						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Draindown Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo Cartridges: (Y/N)						
Sediment Depth Measured: (Y/N)						
Sediment Depth (inches or mm):						
Sediment Removed: (Y/N)						
Cartridge Lids intact: (Y/N)						
Observed Damage:						
Comments:						

Jellyfish®

CONTECH ENGINEERED SOLUTIONS

800.338.1122
www.ContechES.com

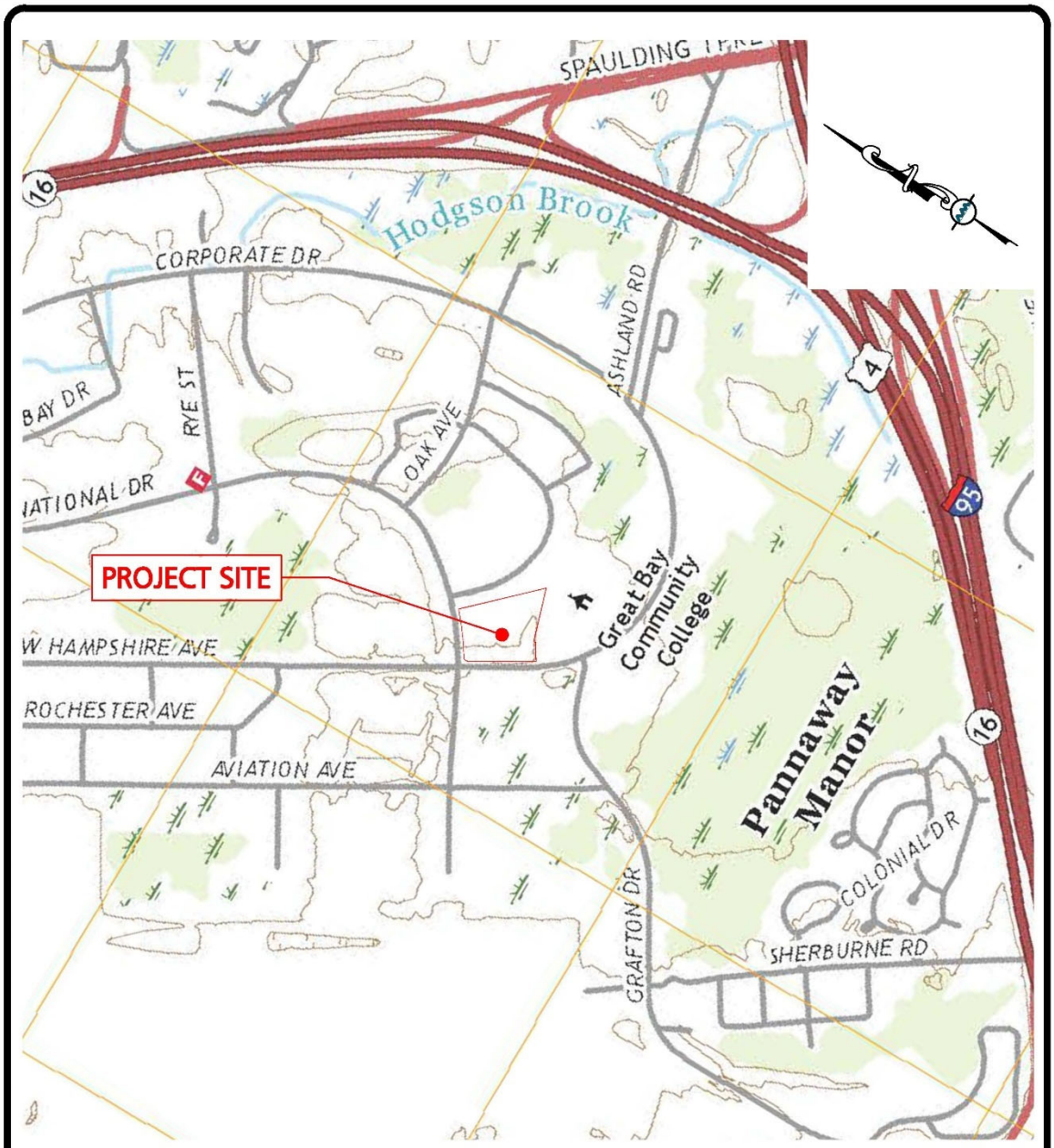
Support

- Drawings and specifications are available at www.conteches.com/jellyfish.
- Site-specific design support is available from Contech Engineered Solutions.
- Find a Certified Maintenance Provider at www.conteches.com/ccmp

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, wastewater treatment and earth stabilization products. For information on other Contech segment offerings, visit ContechES.com or call 800.338.1122

SECTION 4.0 -
FIGURES

USGS Map



PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
SUITE D
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

PROJECT:
SURGICAL CENTER
360 CORPORATE DRIVE
PORTSMOUTH, NH 03801

USGS SITE LOCUS MAP

PROJECT NO.	3250-01	DATE:	08-14-2023
SCALE:	1"=1000'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JRG	CHECKED BY:	BDJ

THIS DRAWING HAS BEEN PREPARED IN ELECTRONIC FORMAT. CLIENT/CLIENT'S REPRESENTATIVE OR CONSULTANT MAY BE PROVIDED COPIES OF DRAWINGS AND SPECIFICATIONS ON MAGNETIC MEDIA FOR HIS/HER INFORMATION AND USE FOR SPECIFIC APPLICATION TO THIS PROJECT. DUE TO THE POTENTIAL THAT THE MAGNETIC INFORMATION MAY BE MODIFIED UNINTENTIONALLY OR OTHERWISE, ALLEN & MAJOR ASSOCIATES, INC. MAY REMOVE ALL INDICATION OF THE DOCUMENT'S AUTHORSHIP ON THE MAGNETIC MEDIA. PRINTED REPRESENTATIONS OF THE DRAWINGS AND SPECIFICATIONS ISSUED SHALL BE THE ONLY RECORD COPIES OF ALLEN & MAJOR ASSOCIATES, INC.'S WORK PRODUCT.

SHEET No.
EX-1

Aerial Map

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
SUITE D
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

PROJECT:
SURGICAL CENTER
360 CORPORATE DRIVE
PORTSMOUTH, NH 03801

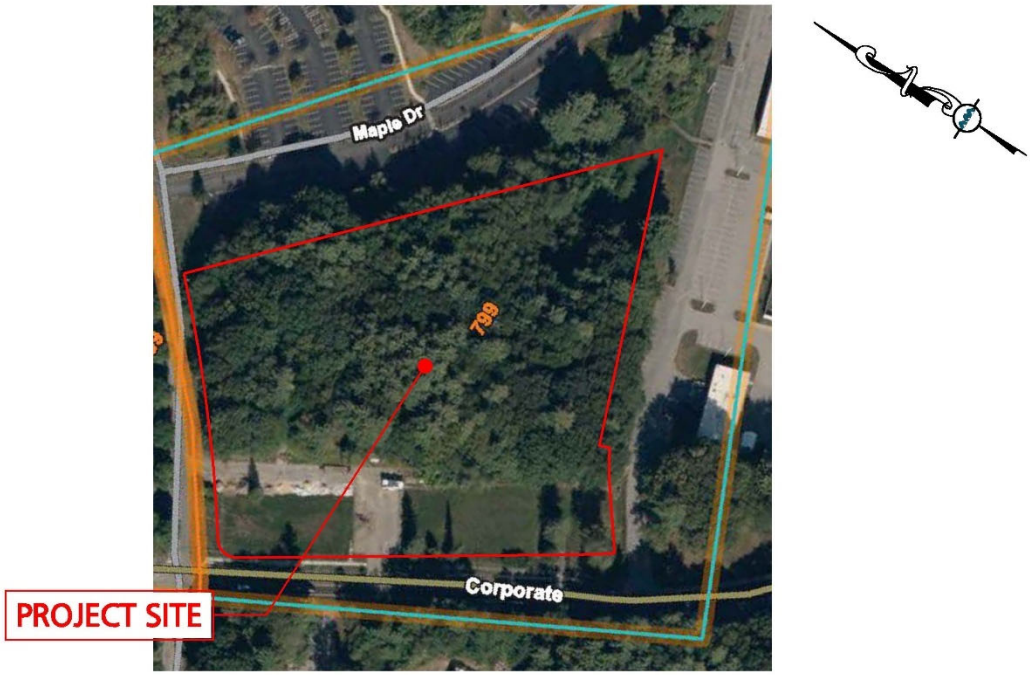
AERIAL PHOTO

PROJECT NO.	3250-01	DATE:	08-14-2023
SCALE:	1"=300'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JRG	CHECKED BY:	BDJ

THIS DRAWING HAS BEEN PREPARED IN ELECTRONIC FORMAT. CLIENT/CLIENT'S REPRESENTATIVE OR CONSULTANT MAY BE PROVIDED COPIES OF DRAWINGS AND SPECIFICATIONS ON MAGNETIC MEDIA FOR HIS/HER INFORMATION AND USE FOR SPECIFIC APPLICATION TO THIS PROJECT. DUE TO THE POTENTIAL THAT THE MAGNETIC INFORMATION MAY BE MODIFIED UNINTENTIONALLY OR OTHERWISE, ALLEN & MAJOR ASSOCIATES, INC. MAY REMOVE ALL INDICATION OF THE DOCUMENT'S AUTHORSHIP ON THE MAGNETIC MEDIA. PRINTED REPRESENTATIONS OF THE DRAWINGS AND SPECIFICATIONS ISSUED SHALL BE THE ONLY RECORD COPIES OF ALLEN & MAJOR ASSOCIATES, INC.'S WORK PRODUCT.

SHEET No.
EX-2

NRCS Soils Map



LEGEND

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
699	Urban land	0.9	6.3%
799	Urban land-Canton complex, 3 to 15 percent slopes	13.5	93.7%
Totals for Area of Interest		14.4	100.0%

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
SUITE D
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

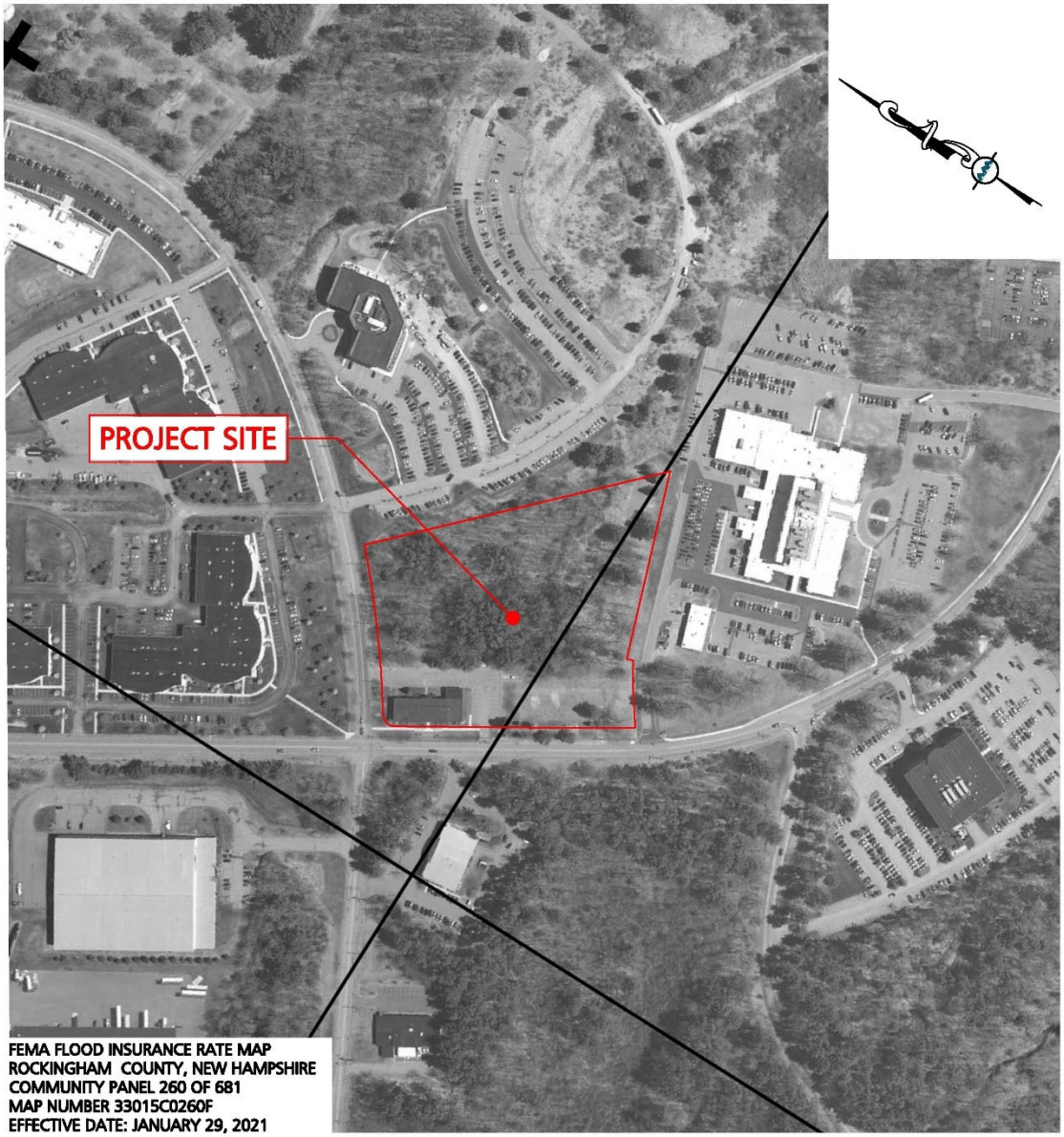
PROJECT:
SURGICAL CENTER
360 CORPORATE DRIVE
PORTSMOUTH, NH 03801

NRCS SOILS MAP

PROJECT NO.	3250-01	DATE:	08-14-2023
SCALE:	1"=200'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JRG	CHECKED BY:	BDJ

SHEET No.
EX-3

Flood Insurance Rate (FIRM) Map



PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
SUITE D
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

PROJECT:
SURGICAL CENTER
360 CORPORATE DRIVE
PORTSMOUTH, NH 03801

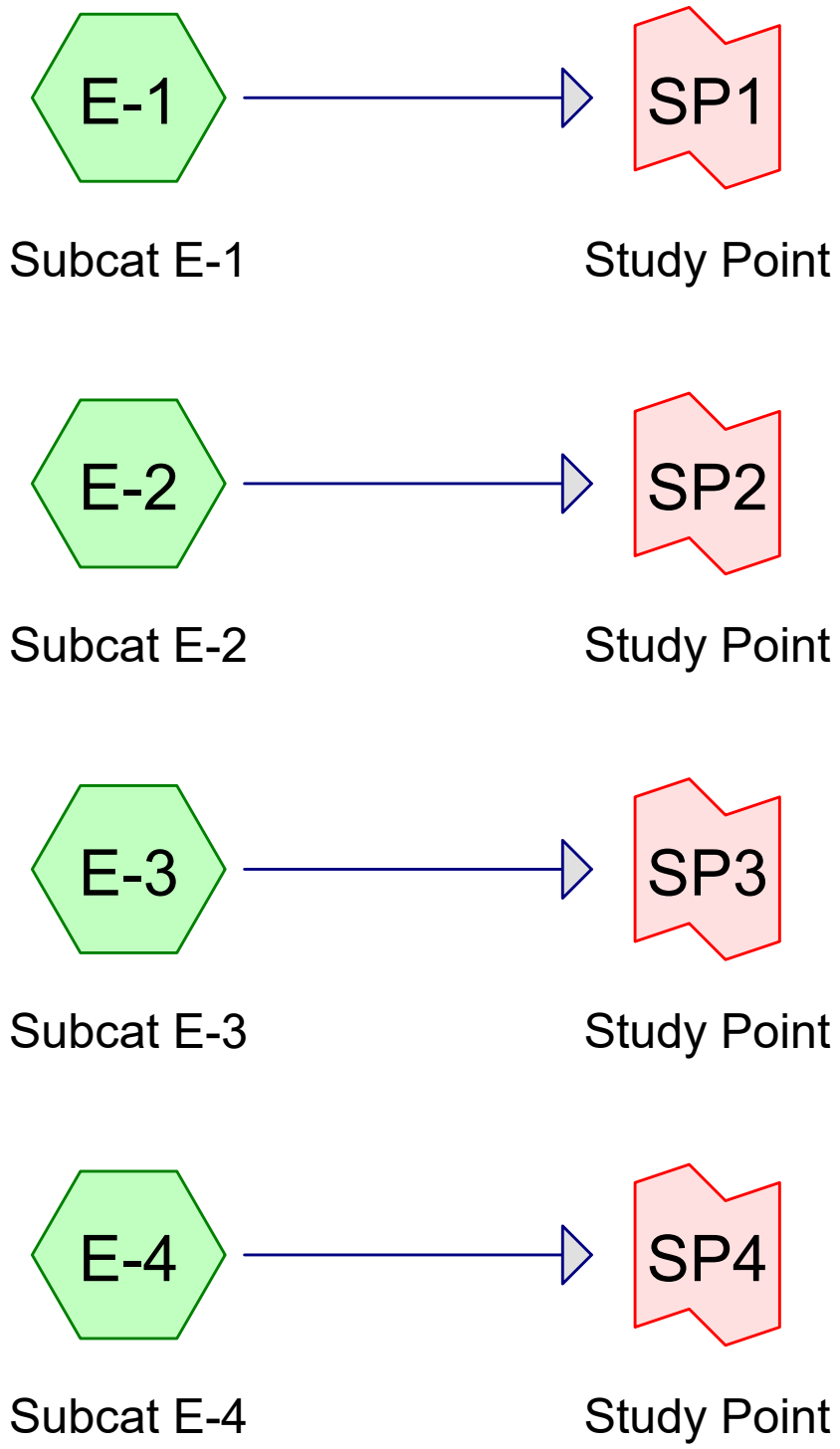
FEMA FIRM MAP

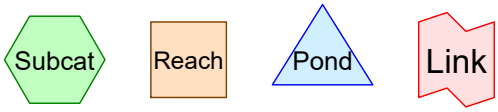
PROJECT NO.	3250-01	DATE:	08-14-2023
SCALE:	1"=300'	DWG. NAME:	EXHIBITS
DESIGNED BY:	JRG	CHECKED BY:	BDJ

SHEET No.
EX-4

SECTION 5.0 -
EXISTING DRAINAGE ANALYSIS

Existing HydroCAD





Routing Diagram for 3250-01 - Existing HydroCAD
Prepared by Allen & Major Associates, Inc, Printed 8/10/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.69	2
2	10-year	Type III 24-hr		Default	24.00	1	5.60	2
3	25-year	Type III 24-hr		Default	24.00	1	7.10	2
4	50-year	Type III 24-hr		Default	24.00	1	8.51	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
66,856	61	>75% Grass cover, Good, HSG B (E-1, E-2, E-3, E-4)
16,949	98	Paved parking, HSG B (E-1, E-3)
193	98	Roofs, HSG B (E-1)
134,965	55	Woods, Good, HSG B (E-1, E-2, E-3, E-4)
5,544	70	Woods, Good, HSG C (E-1)
224,507	**60**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
218,963	HSG B	E-1, E-2, E-3, E-4
5,544	HSG C	E-1
0	HSG D	
0	Other	
224,507		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	66,856	0	0	0	66,856	>75% Grass cover, Good	
0	16,949	0	0	0	16,949	Paved parking	
0	193	0	0	0	193	Roofs	
0	134,965	5,544	0	0	140,509	Woods, Good	
0	**218,963**	**5,544**	**0**	**0**	**224,507**	**TOTAL AREA**	

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	For Coastal and Great Bay Communities, a 15% increase was added to each storm event per Env-Wq 1503.08(I).

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=161,512 sf 8.19% Impervious Runoff Depth=0.62"
Flow Length=178' Tc=14.8 min CN=60 Runoff=1.46 cfs 8,284 cf

Subcatchment E-2: Subcat E-2 Runoff Area=13,855 sf 0.00% Impervious Runoff Depth=0.53"
Flow Length=67' Tc=8.5 min CN=58 Runoff=0.12 cfs 612 cf

Subcatchment E-3: Subcat E-3 Runoff Area=34,845 sf 11.24% Impervious Runoff Depth=0.85"
Flow Length=151' Tc=7.5 min CN=65 Runoff=0.63 cfs 2,479 cf

Subcatchment E-4: Subcat E-4 Runoff Area=14,295 sf 0.00% Impervious Runoff Depth=0.41"
Flow Length=134' Tc=13.0 min CN=55 Runoff=0.07 cfs 491 cf

Link SP1: Study Point Inflow=1.46 cfs 8,284 cf
Primary=1.46 cfs 8,284 cf

Link SP2: Study Point Inflow=0.12 cfs 612 cf
Primary=0.12 cfs 612 cf

Link SP3: Study Point Inflow=0.63 cfs 2,479 cf
Primary=0.63 cfs 2,479 cf

Link SP4: Study Point Inflow=0.07 cfs 491 cf
Primary=0.07 cfs 491 cf

Total Runoff Area = 224,507 sf Runoff Volume = 11,866 cf Average Runoff Depth = 0.63"
92.36% Pervious = 207,365 sf 7.64% Impervious = 17,142 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 1.46 cfs @ 12.27 hrs, Volume= 8,284 cf, Depth= 0.62"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
5,544	70	Woods, Good, HSG C
114,320	55	Woods, Good, HSG B
28,424	61	>75% Grass cover, Good, HSG B
13,031	98	Paved parking, HSG B
193	98	Roofs, HSG B
161,512	60	Weighted Average
148,288		91.81% Pervious Area
13,224		8.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	128	0.0270	0.82		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	178	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.12 cfs @ 12.17 hrs, Volume= 612 cf, Depth= 0.53"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
6,956	61	>75% Grass cover, Good, HSG B
6,899	55	Woods, Good, HSG B
13,855	58	Weighted Average
13,855		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
0.1	17	0.0400	3.00		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
8.5	67	Total			

Summary for Subcatchment E-3: Subcat E-3

Runoff = 0.63 cfs @ 12.13 hrs, Volume= 2,479 cf, Depth= 0.85"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
3,918	98	Paved parking, HSG B
169	55	Woods, Good, HSG B
30,757	61	>75% Grass cover, Good, HSG B
34,845	65	Weighted Average
30,927		88.76% Pervious Area
3,918		11.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.28"
1.9	101	0.0300	0.87		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
7.5	151	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.07 cfs @ 12.34 hrs, Volume= 491 cf, Depth= 0.41"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
718	61	>75% Grass cover, Good, HSG B
13,577	55	Woods, Good, HSG B
14,295	55	Weighted Average
14,295		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	84	0.0120	0.55		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.0	134	Total			

Summary for Link SP1: Study Point

Inflow Area = 161,512 sf, 8.19% Impervious, Inflow Depth = 0.62" for 2-year event
Inflow = 1.46 cfs @ 12.27 hrs, Volume= 8,284 cf
Primary = 1.46 cfs @ 12.27 hrs, Volume= 8,284 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 13,855 sf, 0.00% Impervious, Inflow Depth = 0.53" for 2-year event
Inflow = 0.12 cfs @ 12.17 hrs, Volume= 612 cf
Primary = 0.12 cfs @ 12.17 hrs, Volume= 612 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 34,845 sf, 11.24% Impervious, Inflow Depth = 0.85" for 2-year event
Inflow = 0.63 cfs @ 12.13 hrs, Volume= 2,479 cf
Primary = 0.63 cfs @ 12.13 hrs, Volume= 2,479 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 14,295 sf, 0.00% Impervious, Inflow Depth = 0.41" for 2-year event
Inflow = 0.07 cfs @ 12.34 hrs, Volume= 491 cf
Primary = 0.07 cfs @ 12.34 hrs, Volume= 491 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=161,512 sf 8.19% Impervious Runoff Depth=1.67"
Flow Length=178' Tc=14.8 min CN=60 Runoff=5.06 cfs 22,410 cf

Subcatchment E-2: Subcat E-2 Runoff Area=13,855 sf 0.00% Impervious Runoff Depth=1.51"
Flow Length=67' Tc=8.5 min CN=58 Runoff=0.46 cfs 1,747 cf

Subcatchment E-3: Subcat E-3 Runoff Area=34,845 sf 11.24% Impervious Runoff Depth=2.06"
Flow Length=151' Tc=7.5 min CN=65 Runoff=1.76 cfs 5,996 cf

Subcatchment E-4: Subcat E-4 Runoff Area=14,295 sf 0.00% Impervious Runoff Depth=1.29"
Flow Length=134' Tc=13.0 min CN=55 Runoff=0.34 cfs 1,541 cf

Link SP1: Study Point Inflow=5.06 cfs 22,410 cf
Primary=5.06 cfs 22,410 cf

Link SP2: Study Point Inflow=0.46 cfs 1,747 cf
Primary=0.46 cfs 1,747 cf

Link SP3: Study Point Inflow=1.76 cfs 5,996 cf
Primary=1.76 cfs 5,996 cf

Link SP4: Study Point Inflow=0.34 cfs 1,541 cf
Primary=0.34 cfs 1,541 cf

Total Runoff Area = 224,507 sf Runoff Volume = 31,694 cf Average Runoff Depth = 1.69"
92.36% Pervious = 207,365 sf 7.64% Impervious = 17,142 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 5.06 cfs @ 12.22 hrs, Volume= 22,410 cf, Depth= 1.67"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
5,544	70	Woods, Good, HSG C
114,320	55	Woods, Good, HSG B
28,424	61	>75% Grass cover, Good, HSG B
13,031	98	Paved parking, HSG B
193	98	Roofs, HSG B
161,512	60	Weighted Average
148,288		91.81% Pervious Area
13,224		8.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	128	0.0270	0.82		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	178	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.46 cfs @ 12.14 hrs, Volume= 1,747 cf, Depth= 1.51"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
6,956	61	>75% Grass cover, Good, HSG B
6,899	55	Woods, Good, HSG B
13,855	58	Weighted Average
13,855		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
0.1	17	0.0400	3.00		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
8.5	67	Total			

Summary for Subcatchment E-3: Subcat E-3

Runoff = 1.76 cfs @ 12.12 hrs, Volume= 5,996 cf, Depth= 2.06"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
3,918	98	Paved parking, HSG B
169	55	Woods, Good, HSG B
30,757	61	>75% Grass cover, Good, HSG B
34,845	65	Weighted Average
30,927		88.76% Pervious Area
3,918		11.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.28"
1.9	101	0.0300	0.87		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
7.5	151	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.34 cfs @ 12.21 hrs, Volume= 1,541 cf, Depth= 1.29"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
718	61	>75% Grass cover, Good, HSG B
13,577	55	Woods, Good, HSG B
14,295	55	Weighted Average
14,295		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	84	0.0120	0.55		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.0	134	Total			

Summary for Link SP1: Study Point

Inflow Area = 161,512 sf, 8.19% Impervious, Inflow Depth = 1.67" for 10-year event
Inflow = 5.06 cfs @ 12.22 hrs, Volume= 22,410 cf
Primary = 5.06 cfs @ 12.22 hrs, Volume= 22,410 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 13,855 sf, 0.00% Impervious, Inflow Depth = 1.51" for 10-year event
Inflow = 0.46 cfs @ 12.14 hrs, Volume= 1,747 cf
Primary = 0.46 cfs @ 12.14 hrs, Volume= 1,747 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 34,845 sf, 11.24% Impervious, Inflow Depth = 2.06" for 10-year event
Inflow = 1.76 cfs @ 12.12 hrs, Volume= 5,996 cf
Primary = 1.76 cfs @ 12.12 hrs, Volume= 5,996 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 14,295 sf, 0.00% Impervious, Inflow Depth = 1.29" for 10-year event
Inflow = 0.34 cfs @ 12.21 hrs, Volume= 1,541 cf
Primary = 0.34 cfs @ 12.21 hrs, Volume= 1,541 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=161,512 sf 8.19% Impervious Runoff Depth=2.67"
Flow Length=178' Tc=14.8 min CN=60 Runoff=8.52 cfs 35,999 cf

Subcatchment E-2: Subcat E-2 Runoff Area=13,855 sf 0.00% Impervious Runoff Depth=2.48"
Flow Length=67' Tc=8.5 min CN=58 Runoff=0.79 cfs 2,860 cf

Subcatchment E-3: Subcat E-3 Runoff Area=34,845 sf 11.24% Impervious Runoff Depth=3.18"
Flow Length=151' Tc=7.5 min CN=65 Runoff=2.77 cfs 9,234 cf

Subcatchment E-4: Subcat E-4 Runoff Area=14,295 sf 0.00% Impervious Runoff Depth=2.19"
Flow Length=134' Tc=13.0 min CN=55 Runoff=0.62 cfs 2,606 cf

Link SP1: Study Point Inflow=8.52 cfs 35,999 cf
Primary=8.52 cfs 35,999 cf

Link SP2: Study Point Inflow=0.79 cfs 2,860 cf
Primary=0.79 cfs 2,860 cf

Link SP3: Study Point Inflow=2.77 cfs 9,234 cf
Primary=2.77 cfs 9,234 cf

Link SP4: Study Point Inflow=0.62 cfs 2,606 cf
Primary=0.62 cfs 2,606 cf

Total Runoff Area = 224,507 sf Runoff Volume = 50,699 cf Average Runoff Depth = 2.71"
92.36% Pervious = 207,365 sf 7.64% Impervious = 17,142 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 8.52 cfs @ 12.22 hrs, Volume= 35,999 cf, Depth= 2.67"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
5,544	70	Woods, Good, HSG C
114,320	55	Woods, Good, HSG B
28,424	61	>75% Grass cover, Good, HSG B
13,031	98	Paved parking, HSG B
193	98	Roofs, HSG B
161,512	60	Weighted Average
148,288		91.81% Pervious Area
13,224		8.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	128	0.0270	0.82		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	178	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 0.79 cfs @ 12.13 hrs, Volume= 2,860 cf, Depth= 2.48"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
6,956	61	>75% Grass cover, Good, HSG B
6,899	55	Woods, Good, HSG B
13,855	58	Weighted Average
13,855		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
0.1	17	0.0400	3.00		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
8.5	67	Total			

Summary for Subcatchment E-3: Subcat E-3

Runoff = 2.77 cfs @ 12.11 hrs, Volume= 9,234 cf, Depth= 3.18"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
3,918	98	Paved parking, HSG B
169	55	Woods, Good, HSG B
30,757	61	>75% Grass cover, Good, HSG B
34,845	65	Weighted Average
30,927		88.76% Pervious Area
3,918		11.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.28"
1.9	101	0.0300	0.87		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
7.5	151	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.62 cfs @ 12.20 hrs, Volume= 2,606 cf, Depth= 2.19"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
718	61	>75% Grass cover, Good, HSG B
13,577	55	Woods, Good, HSG B
14,295	55	Weighted Average
14,295		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	84	0.0120	0.55		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.0	134	Total			

Summary for Link SP1: Study Point

Inflow Area = 161,512 sf, 8.19% Impervious, Inflow Depth = 2.67" for 25-year event
Inflow = 8.52 cfs @ 12.22 hrs, Volume= 35,999 cf
Primary = 8.52 cfs @ 12.22 hrs, Volume= 35,999 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 13,855 sf, 0.00% Impervious, Inflow Depth = 2.48" for 25-year event
Inflow = 0.79 cfs @ 12.13 hrs, Volume= 2,860 cf
Primary = 0.79 cfs @ 12.13 hrs, Volume= 2,860 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 34,845 sf, 11.24% Impervious, Inflow Depth = 3.18" for 25-year event
Inflow = 2.77 cfs @ 12.11 hrs, Volume= 9,234 cf
Primary = 2.77 cfs @ 12.11 hrs, Volume= 9,234 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 14,295 sf, 0.00% Impervious, Inflow Depth = 2.19" for 25-year event
Inflow = 0.62 cfs @ 12.20 hrs, Volume= 2,606 cf
Primary = 0.62 cfs @ 12.20 hrs, Volume= 2,606 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: Subcat E-1 Runoff Area=161,512 sf 8.19% Impervious Runoff Depth=3.72"
Flow Length=178' Tc=14.8 min CN=60 Runoff=12.08 cfs 50,076 cf

Subcatchment E-2: Subcat E-2 Runoff Area=13,855 sf 0.00% Impervious Runoff Depth=3.49"
Flow Length=67' Tc=8.5 min CN=58 Runoff=1.14 cfs 4,025 cf

Subcatchment E-3: Subcat E-3 Runoff Area=34,845 sf 11.24% Impervious Runoff Depth=4.31"
Flow Length=151' Tc=7.5 min CN=65 Runoff=3.78 cfs 12,516 cf

Subcatchment E-4: Subcat E-4 Runoff Area=14,295 sf 0.00% Impervious Runoff Depth=3.14"
Flow Length=134' Tc=13.0 min CN=55 Runoff=0.92 cfs 3,738 cf

Link SP1: Study Point Inflow=12.08 cfs 50,076 cf
Primary=12.08 cfs 50,076 cf

Link SP2: Study Point Inflow=1.14 cfs 4,025 cf
Primary=1.14 cfs 4,025 cf

Link SP3: Study Point Inflow=3.78 cfs 12,516 cf
Primary=3.78 cfs 12,516 cf

Link SP4: Study Point Inflow=0.92 cfs 3,738 cf
Primary=0.92 cfs 3,738 cf

Total Runoff Area = 224,507 sf Runoff Volume = 70,356 cf Average Runoff Depth = 3.76"
92.36% Pervious = 207,365 sf 7.64% Impervious = 17,142 sf

Summary for Subcatchment E-1: Subcat E-1

Runoff = 12.08 cfs @ 12.21 hrs, Volume= 50,076 cf, Depth= 3.72"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
5,544	70	Woods, Good, HSG C
114,320	55	Woods, Good, HSG B
28,424	61	>75% Grass cover, Good, HSG B
13,031	98	Paved parking, HSG B
193	98	Roofs, HSG B
161,512	60	Weighted Average
148,288		91.81% Pervious Area
13,224		8.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	128	0.0270	0.82		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
14.8	178	Total			

Summary for Subcatchment E-2: Subcat E-2

Runoff = 1.14 cfs @ 12.13 hrs, Volume= 4,025 cf, Depth= 3.49"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
6,956	61	>75% Grass cover, Good, HSG B
6,899	55	Woods, Good, HSG B
13,855	58	Weighted Average
13,855		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0500	0.10		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
0.1	17	0.0400	3.00		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
8.5	67	Total			

Summary for Subcatchment E-3: Subcat E-3

Runoff = 3.78 cfs @ 12.11 hrs, Volume= 12,516 cf, Depth= 4.31"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
3,918	98	Paved parking, HSG B
169	55	Woods, Good, HSG B
30,757	61	>75% Grass cover, Good, HSG B
34,845	65	Weighted Average
30,927		88.76% Pervious Area
3,918		11.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.28"
1.9	101	0.0300	0.87		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
7.5	151	Total			

Summary for Subcatchment E-4: Subcat E-4

Runoff = 0.92 cfs @ 12.19 hrs, Volume= 3,738 cf, Depth= 3.14"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
718	61	>75% Grass cover, Good, HSG B
13,577	55	Woods, Good, HSG B
14,295	55	Weighted Average
14,295		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	50	0.0300	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
2.6	84	0.0120	0.55		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.0	134	Total			

Summary for Link SP1: Study Point

Inflow Area = 161,512 sf, 8.19% Impervious, Inflow Depth = 3.72" for 50-year event
Inflow = 12.08 cfs @ 12.21 hrs, Volume= 50,076 cf
Primary = 12.08 cfs @ 12.21 hrs, Volume= 50,076 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 13,855 sf, 0.00% Impervious, Inflow Depth = 3.49" for 50-year event
Inflow = 1.14 cfs @ 12.13 hrs, Volume= 4,025 cf
Primary = 1.14 cfs @ 12.13 hrs, Volume= 4,025 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 34,845 sf, 11.24% Impervious, Inflow Depth = 4.31" for 50-year event
Inflow = 3.78 cfs @ 12.11 hrs, Volume= 12,516 cf
Primary = 3.78 cfs @ 12.11 hrs, Volume= 12,516 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 14,295 sf, 0.00% Impervious, Inflow Depth = 3.14" for 50-year event
Inflow = 0.92 cfs @ 12.19 hrs, Volume= 3,738 cf
Primary = 0.92 cfs @ 12.19 hrs, Volume= 3,738 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Existing Watershed Plan

LEGEND

SUBCATCHMENT BOUNDARY	
SUBCATCHMENT LABEL	E-1
Tc FLOW PATH	A — B
SCS SOILS BOUNDARY	
FLOW DIRECTION	⟹

PLAN NOTES:

1. THE EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED TO ALLEN & MAJOR ASSOCIATES, INC. (A&M) BY THE APPLICANT AND ARE TAKEN FROM A DRAWING ENTITLED "EXISTING CONDITIONS PLAN FOR ATDG, LLC", PREPARED BY DOUCET SURVEY LLC, DATED APRIL 5, 2023.
2. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. IT'S INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:

ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:

ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 40'	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

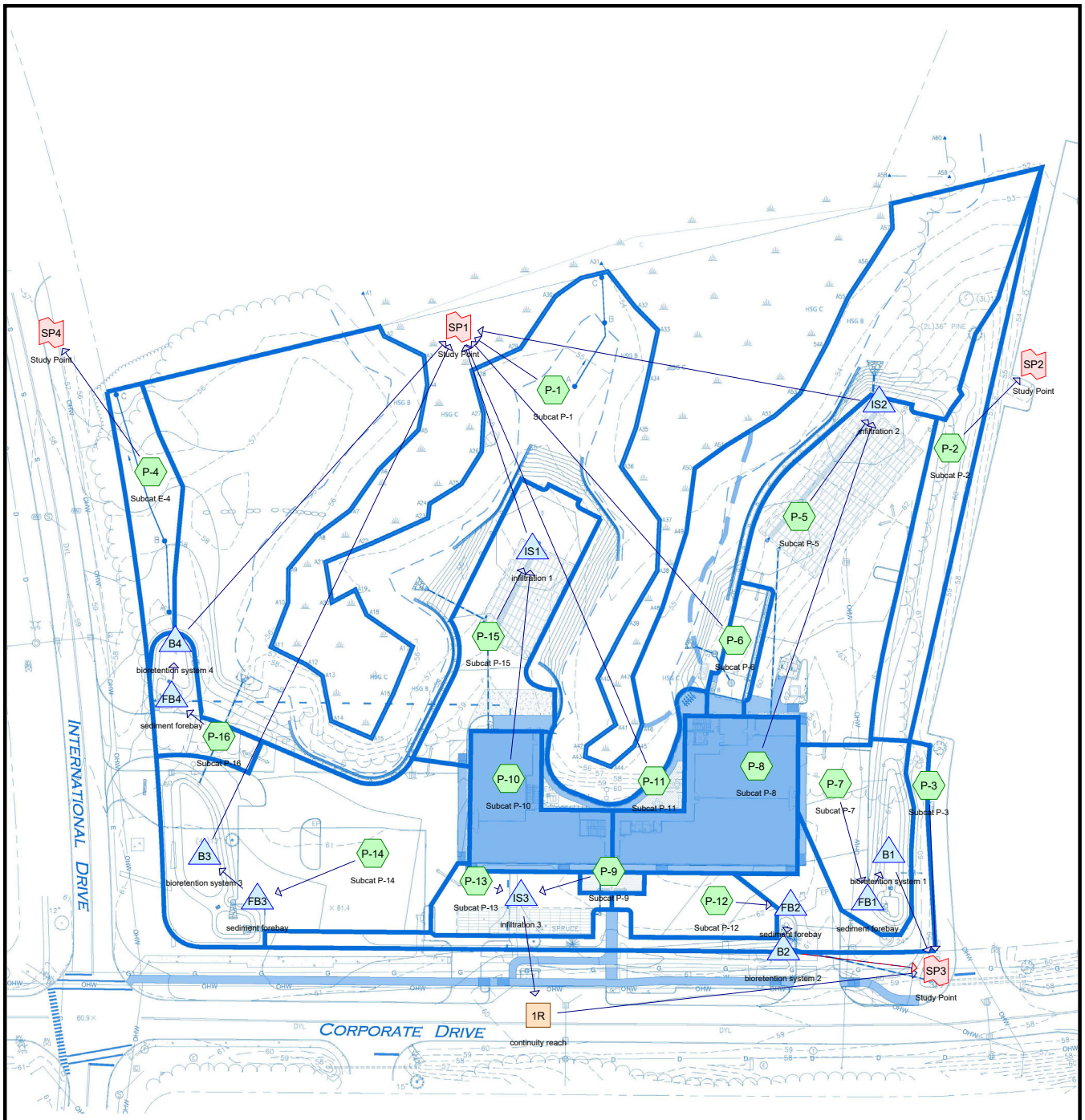
DRAWING TITLE: EXISTING WATERSHED PLAN

SHEET No. EWS-1

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_WATERSHED-EXISTING.DWG

SECTION 6.0 -
PROPOSED DRAINAGE ANALYSIS

Proposed HydroCAD



Subcat Reach Pond Link

Routing Diagram for 3250-01 - Proposed HydroCAD
Prepared by Allen & Major Associates, Inc, Printed 8/10/2023
HydroCAD® 10.20-3c s/n 02881 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-year	Type III 24-hr		Default	24.00	1	3.69	2
2	10-year	Type III 24-hr		Default	24.00	1	5.60	2
3	25-year	Type III 24-hr		Default	24.00	1	7.10	2
4	50-year	Type III 24-hr		Default	24.00	1	8.51	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
71,209	61	>75% Grass cover, Good, HSG B (P-1, P-11, P-13, P-14, P-15, P-16, P-2, P-3, P-4, P-5, P-6, P-7)
478	74	>75% Grass cover, Good, HSG C (P-1)
71,444	98	Paved parking, HSG B (P-1, P-11, P-12, P-13, P-14, P-15, P-16, P-3, P-5, P-6, P-7)
35	98	Paved parking, HSG C (P-11)
18,579	98	Roofs, HSG B (P-10, P-8, P-9)
57,731	55	Woods, Good, HSG B (P-1)
5,030	70	Woods, Good, HSG C (P-1)
224,507	**75**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
218,963	HSG B	P-1, P-10, P-11, P-12, P-13, P-14, P-15, P-16, P-2, P-3, P-4, P-5, P-6, P-7, P-8, P-9
5,544	HSG C	P-1, P-11
0	HSG D	
0	Other	
224,507		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	71,209	478	0	0	71,687	>75% Grass cover, Good	
0	71,444	35	0	0	71,479	Paved parking	
0	18,579	0	0	0	18,579	Roofs	
0	57,731	5,030	0	0	62,761	Woods, Good	
0	**218,963**	**5,544**	**0**	**0**	**224,507**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	B2	58.00	57.50	98.0	0.0051	0.013	0.0	8.0	0.0	
2	B3	58.40	57.00	77.0	0.0182	0.013	0.0	8.0	0.0	
3	IS1	59.50	57.25	32.0	0.0703	0.013	0.0	8.0	0.0	
4	IS2	58.92	58.00	20.0	0.0460	0.013	0.0	12.0	0.0	

Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	For Coastal and Great Bay Communities, a 15% increase was added to each storm event per Env-Wq 1503.08(I).
2	B1	GW from TP4
3		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.
4	B2	GW from TP4
5		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.
6	B3	GW from TP1
7		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.
8	B4	GW assumed based on surrounding data. confirmatory TP to be performed.
9		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.
10	IS1	GW elevation from TP8
11		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.
12	IS2	GW from TP5
13		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.
14	IS3	GW from TP2
15		NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1: Subcat P-1 Runoff Area=96,521 sf 0.06% Impervious Runoff Depth=0.53"
Flow Length=85' Tc=13.7 min CN=58 Runoff=0.69 cfs 4,262 cf

Subcatchment P-10: Subcat P-10 Runoff Area=7,046 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=0.57 cfs 2,029 cf

Subcatchment P-11: Subcat P-11 Runoff Area=2,310 sf 85.16% Impervious Runoff Depth=2.92"
Tc=6.0 min CN=93 Runoff=0.17 cfs 562 cf

Subcatchment P-12: Subcat P-12 Runoff Area=4,268 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=0.34 cfs 1,229 cf

Subcatchment P-13: Subcat P-13 Runoff Area=4,999 sf 98.84% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=0.40 cfs 1,440 cf

Subcatchment P-14: Subcat P-14 Runoff Area=24,922 sf 65.26% Impervious Runoff Depth=2.18"
Tc=6.0 min CN=85 Runoff=1.43 cfs 4,533 cf

Subcatchment P-15: Subcat P-15 Runoff Area=11,933 sf 98.07% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=97 Runoff=0.95 cfs 3,324 cf

Subcatchment P-16: Subcat P-16 Runoff Area=3,691 sf 53.10% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=81 Runoff=0.18 cfs 573 cf

Subcatchment P-2: Subcat P-2 Runoff Area=9,321 sf 0.00% Impervious Runoff Depth=0.66"
Tc=6.0 min CN=61 Runoff=0.12 cfs 513 cf

Subcatchment P-3: Subcat P-3 Runoff Area=10,121 sf 28.87% Impervious Runoff Depth=1.25"
Tc=6.0 min CN=72 Runoff=0.32 cfs 1,052 cf

Subcatchment P-4: Subcat E-4 Runoff Area=5,412 sf 0.00% Impervious Runoff Depth=0.66"
Flow Length=162' Tc=9.6 min CN=61 Runoff=0.06 cfs 298 cf

Subcatchment P-5: Subcat P-5 Runoff Area=21,307 sf 97.31% Impervious Runoff Depth=3.34"
Tc=6.0 min CN=97 Runoff=1.70 cfs 5,936 cf

Subcatchment P-6: Subcat P-6 Runoff Area=2,391 sf 88.45% Impervious Runoff Depth=3.02"
Tc=6.0 min CN=94 Runoff=0.18 cfs 602 cf

Subcatchment P-7: Subcat P-7 Runoff Area=8,731 sf 52.04% Impervious Runoff Depth=1.79"
Tc=6.0 min CN=80 Runoff=0.41 cfs 1,301 cf

Subcatchment P-8: Subcat P-8 Runoff Area=10,876 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=0.88 cfs 3,132 cf

Subcatchment P-9: Subcat P-9 Runoff Area=657 sf 100.00% Impervious Runoff Depth=3.46"
Tc=6.0 min CN=98 Runoff=0.05 cfs 189 cf

Reach 1R: continuity reach Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond B1: bioretention system 1 Peak Elev=58.95' Storage=548 cf Inflow=0.40 cfs 1,210 cf
Discarded=0.04 cfs 1,210 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,210 cf

Pond B2: bioretention system 2 Peak Elev=60.65' Storage=502 cf Inflow=0.34 cfs 1,179 cf
Discarded=0.02 cfs 940 cf Primary=0.11 cfs 239 cf Outflow=0.12 cfs 1,179 cf

Pond B3: bioretention system 3 Peak Elev=59.67' Storage=2,288 cf Inflow=1.39 cfs 4,335 cf
Discarded=0.09 cfs 4,335 cf Primary=0.00 cfs 0 cf Outflow=0.09 cfs 4,335 cf

Pond B4: bioretention system 4 Peak Elev=58.99' Storage=231 cf Inflow=0.18 cfs 529 cf
Discarded=0.02 cfs 529 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 529 cf

Pond FB1: sediment forebay Peak Elev=59.64' Storage=125 cf Inflow=0.41 cfs 1,301 cf
Outflow=0.40 cfs 1,210 cf

Pond FB2: sediment forebay Peak Elev=60.88' Storage=64 cf Inflow=0.34 cfs 1,229 cf
Outflow=0.34 cfs 1,179 cf

Pond FB3: sediment forebay Peak Elev=59.82' Storage=355 cf Inflow=1.43 cfs 4,533 cf
Outflow=1.39 cfs 4,335 cf

Pond FB4: sediment forebay Peak Elev=59.88' Storage=58 cf Inflow=0.18 cfs 573 cf
Outflow=0.18 cfs 529 cf

Pond IS1: infiltration 1 Peak Elev=59.78' Storage=2,198 cf Inflow=1.52 cfs 5,354 cf
Discarded=0.07 cfs 4,298 cf Primary=0.24 cfs 1,055 cf Outflow=0.31 cfs 5,354 cf

Pond IS2: infiltration 2 Peak Elev=58.89' Storage=4,394 cf Inflow=2.57 cfs 9,068 cf
Discarded=0.13 cfs 9,068 cf Primary=0.00 cfs 0 cf Outflow=0.13 cfs 9,068 cf

Pond IS3: infiltration 3 Peak Elev=60.25' Storage=616 cf Inflow=0.46 cfs 1,629 cf
Discarded=0.04 cfs 1,629 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,629 cf

Link SP1: Study Point Inflow=0.98 cfs 6,482 cf
Primary=0.98 cfs 6,482 cf

Link SP2: Study Point Inflow=0.12 cfs 513 cf
Primary=0.12 cfs 513 cf

Link SP3: Study Point Inflow=0.32 cfs 1,291 cf
Primary=0.32 cfs 1,291 cf

Link SP4: Study Point Inflow=0.06 cfs 298 cf
Primary=0.06 cfs 298 cf

Total Runoff Area = 224,507 sf Runoff Volume = 30,977 cf Average Runoff Depth = 1.66"
59.89% Pervious = 134,448 sf 40.11% Impervious = 90,059 sf

Summary for Subcatchment P-1: Subcat P-1

Runoff = 0.69 cfs @ 12.27 hrs, Volume= 4,262 cf, Depth= 0.53"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
33,219	61	>75% Grass cover, Good, HSG B
478	74	>75% Grass cover, Good, HSG C
57,731	55	Woods, Good, HSG B
5,030	70	Woods, Good, HSG C
63	98	Paved parking, HSG B
96,521	58	Weighted Average
96,458		99.94% Pervious Area
63		0.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.5	35	0.0060	0.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.7	85	Total			

Summary for Subcatchment P-10: Subcat P-10

Runoff = 0.57 cfs @ 12.09 hrs, Volume= 2,029 cf, Depth= 3.46"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
7,046	98	Roofs, HSG B
7,046		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-11: Subcat P-11

Runoff = 0.17 cfs @ 12.09 hrs, Volume= 562 cf, Depth= 2.92"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
35	98	Paved parking, HSG C
343	61	>75% Grass cover, Good, HSG B
1,933	98	Paved parking, HSG B
2,310	93	Weighted Average
343		14.84% Pervious Area
1,967		85.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-12: Subcat P-12

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 1,229 cf, Depth= 3.46"
Routed to Pond FB2 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
4,268	98	Paved parking, HSG B
4,268		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-13: Subcat P-13

Runoff = 0.40 cfs @ 12.09 hrs, Volume= 1,440 cf, Depth= 3.46"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
4,941	98	Paved parking, HSG B
58	61	>75% Grass cover, Good, HSG B
4,999	98	Weighted Average
58		1.16% Pervious Area
4,941		98.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-14: Subcat P-14

Runoff = 1.43 cfs @ 12.09 hrs, Volume= 4,533 cf, Depth= 2.18"
Routed to Pond FB3 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
8,658	61	>75% Grass cover, Good, HSG B
16,263	98	Paved parking, HSG B
24,922	85	Weighted Average
8,658		34.74% Pervious Area
16,263		65.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-15: Subcat P-15

Runoff = 0.95 cfs @ 12.09 hrs, Volume= 3,324 cf, Depth= 3.34"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
230	61	>75% Grass cover, Good, HSG B
11,703	98	Paved parking, HSG B
11,933	97	Weighted Average
230		1.93% Pervious Area
11,703		98.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-16: Subcat P-16

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 573 cf, Depth= 1.86"
Routed to Pond FB4 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
1,960	98	Paved parking, HSG B
1,731	61	>75% Grass cover, Good, HSG B
3,691	81	Weighted Average
1,731		46.90% Pervious Area
1,960		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.12 cfs @ 12.11 hrs, Volume= 513 cf, Depth= 0.66"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
9,321	61	>75% Grass cover, Good, HSG B
9,321		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 min**

Summary for Subcatchment P-3: Subcat P-3

Runoff = 0.32 cfs @ 12.10 hrs, Volume= 1,052 cf, Depth= 1.25"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
7,199	61	>75% Grass cover, Good, HSG B
2,922	98	Paved parking, HSG B
10,121	72	Weighted Average
7,199		71.13% Pervious Area
2,922		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.06 cfs @ 12.17 hrs, Volume= 298 cf, Depth= 0.66"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
5,412	61	>75% Grass cover, Good, HSG B
5,412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.28"
1.5	112	0.0310	1.23		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	162	Total			

Summary for Subcatchment P-5: Subcat P-5

Runoff = 1.70 cfs @ 12.09 hrs, Volume= 5,936 cf, Depth= 3.34"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
574	61	>75% Grass cover, Good, HSG B
20,733	98	Paved parking, HSG B
21,307	97	Weighted Average
574		2.69% Pervious Area
20,733		97.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-6: Subcat P-6

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 602 cf, Depth= 3.02"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
276	61	>75% Grass cover, Good, HSG B
2,115	98	Paved parking, HSG B
2,391	94	Weighted Average
276		11.55% Pervious Area
2,115		88.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-7: Subcat P-7

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 1,301 cf, Depth= 1.79"
Routed to Pond FB1 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
4,544	98	Paved parking, HSG B
4,188	61	>75% Grass cover, Good, HSG B
8,731	80	Weighted Average
4,188		47.96% Pervious Area
4,544		52.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-8: Subcat P-8

Runoff = 0.88 cfs @ 12.09 hrs, Volume= 3,132 cf, Depth= 3.46"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
10,876	98	Roofs, HSG B
10,876		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.05 cfs @ 12.09 hrs, Volume= 189 cf, Depth= 3.46"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=3.69"

Area (sf)	CN	Description
657	98	Roofs, HSG B
657		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Reach 1R: continuity reach

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

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 0.00" for 2-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Routed to Link SP3 : Study Point

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond B1: bioretention system 1

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 1.66" for 2-year event
Inflow = 0.40 cfs @ 12.11 hrs, Volume= 1,210 cf
Outflow = 0.04 cfs @ 13.45 hrs, Volume= 1,210 cf, Atten= 91%, Lag= 80.4 min
Discarded = 0.04 cfs @ 13.45 hrs, Volume= 1,210 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 58.95' @ 13.45 hrs Surf.Area= 571 sf Storage= 548 cf
Flood Elev= 61.00' Surf.Area= 571 sf Storage= 3,054 cf

Plug-Flow detention time= 186.1 min calculated for 1,208 cf (100% of inflow)
Center-of-Mass det. time= 186.0 min (1,037.7 - 851.7)

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	2,712 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	56.50'	343 cf	**media storage (Irregular)**Listed below (Recalc) 1,142 cf Overall x 30.0% Voids
		3,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.50	365	133.0	0	0	365
59.00	571	142.0	232	232	574
60.00	1,101	180.0	822	1,054	1,561
61.00	2,286	255.0	1,658	2,712	4,166

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	571	142.0	0	0	571
58.50	571	142.0	1,142	1,142	855

Device	Routing	Invert	Outlet Devices
#1	Primary	60.70'	**4.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	56.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 13.45 hrs HW=58.95' (Free Discharge)
└**2=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.50' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: bioretention system 2

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 3.31" for 2-year event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 1,179 cf
Outflow = 0.12 cfs @ 12.36 hrs, Volume= 1,179 cf, Atten= 65%, Lag= 16.0 min
Discarded = 0.02 cfs @ 12.36 hrs, Volume= 940 cf
Primary = 0.11 cfs @ 12.36 hrs, Volume= 239 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 60.65' @ 12.36 hrs Surf.Area= 258 sf Storage= 502 cf
Flood Elev= 61.00' Surf.Area= 258 sf Storage= 743 cf

Plug-Flow detention time= 234.6 min calculated for 1,177 cf (100% of inflow)
Center-of-Mass det. time= 234.7 min (1,009.5 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	588 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	155 cf	**media storage (Irregular)**Listed below (Recalc) 516 cf Overall x 30.0% Voids
		743 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	98	88.0	0	0	98
60.00	258	114.0	86	86	519
61.00	796	185.0	502	588	2,215

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	258	114.0	0	0	258
59.50	258	114.0	516	516	486

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'
#2	Device 3	60.50'	**15.0" Vert. overflow orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**8.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 12.36 hrs HW=60.65' (Free Discharge)
└─**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.10 cfs @ 12.36 hrs HW=60.65' (Free Discharge)
└─**3=Culvert** (Passes 0.10 cfs of 1.69 cfs potential flow)
└─**2=overflow orifice** (Orifice Controls 0.10 cfs @ 1.30 fps)

Summary for Pond B3: bioretention system 3

GW from TP1

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB3 by 0.12' @ 14.45 hrs

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 2.09" for 2-year event
Inflow = 1.39 cfs @ 12.11 hrs, Volume= 4,335 cf
Outflow = 0.09 cfs @ 14.20 hrs, Volume= 4,335 cf, Atten= 94%, Lag= 125.0 min
Discarded = 0.09 cfs @ 14.20 hrs, Volume= 4,335 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.67' @ 14.20 hrs Surf.Area= 1,639 sf Storage= 2,288 cf
Flood Elev= 61.00' Surf.Area= 1,639 sf Storage= 6,870 cf

Plug-Flow detention time= 304.2 min calculated for 4,329 cf (100% of inflow)
Center-of-Mass det. time= 304.2 min (1,138.5 - 834.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	5,886 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.00'	983 cf	**media storage (Irregular)**Listed below (Recalc) 3,278 cf Overall x 30.0% Voids
		6,870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	1,639	184.0	0	0	1,639
60.00	2,580	217.0	2,092	2,092	2,711
61.00	5,156	323.0	3,794	5,886	7,274

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.00	1,639	184.0	0	0	1,639
59.00	1,639	184.0	3,278	3,278	2,007

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	58.40'	**8.0" Round Culvert** L= 77.0' Ke= 0.500 Inlet / Outlet Invert= 58.40' / 57.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Discarded	57.00'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.01'

Discarded OutFlow Max=0.09 cfs @ 14.20 hrs HW=59.67' (Free Discharge)
└─**3=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond B4: bioretention system 4

GW assumed based on surrounding data. confirmatory TP to be performed.

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 1.72" for 2-year event
Inflow = 0.18 cfs @ 12.11 hrs, Volume= 529 cf
Outflow = 0.02 cfs @ 13.10 hrs, Volume= 529 cf, Atten= 90%, Lag= 59.5 min
Discarded = 0.02 cfs @ 13.10 hrs, Volume= 529 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 58.99' @ 13.10 hrs Surf.Area= 516 sf Storage= 231 cf
Flood Elev= 61.00' Surf.Area= 516 sf Storage= 1,358 cf

Plug-Flow detention time= 151.3 min calculated for 529 cf (100% of inflow)
Center-of-Mass det. time= 151.2 min (1,001.4 - 850.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	1,049 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	310 cf	**media storage (Irregular)**Listed below (Recalc) 1,032 cf Overall x 30.0% Voids
		1,358 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	391	79.0	0	0	391
60.00	516	88.0	226	226	518
61.00	1,174	135.0	823	1,049	1,359

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	516	88.0	0	0	516
59.50	516	88.0	1,032	1,032	692

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 13.10 hrs HW=58.99' (Free Discharge)
└─**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond FB1: sediment forebay

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 1.79" for 2-year event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 1,301 cf
Outflow = 0.40 cfs @ 12.11 hrs, Volume= 1,210 cf, Atten= 2%, Lag= 1.0 min
Primary = 0.40 cfs @ 12.11 hrs, Volume= 1,210 cf
Routed to Pond B1 : bioretention system 1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.64' @ 12.11 hrs Surf.Area= 249 sf Storage= 125 cf
Flood Elev= 61.00' Surf.Area= 489 sf Storage= 627 cf

Plug-Flow detention time= 52.3 min calculated for 1,208 cf (93% of inflow)
Center-of-Mass det. time= 16.1 min (851.7 - 835.7)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	627 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	146	45.0	0	0	146
60.00	318	66.0	226	226	340
61.00	489	84.0	400	627	567

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.39 cfs @ 12.11 hrs HW=59.64' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.39 cfs @ 0.95 fps)

Summary for Pond FB2: sediment forebay

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 3.46" for 2-year event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 1,229 cf
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 1,179 cf, Atten= 0%, Lag= 0.5 min
Primary = 0.34 cfs @ 12.10 hrs, Volume= 1,179 cf
Routed to Pond B2 : bioretention system 2

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 60.88' @ 12.10 hrs Surf.Area= 113 sf Storage= 64 cf
Flood Elev= 61.00' Surf.Area= 130 sf Storage= 78 cf

Plug-Flow detention time= 45.3 min calculated for 1,177 cf (96% of inflow)
Center-of-Mass det. time= 21.3 min (774.8 - 753.5)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	78 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	1	1.0	0	0	1
60.00	28	23.0	6	6	43
61.00	130	44.0	73	78	160

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.34 cfs @ 12.10 hrs HW=60.88' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 0.90 fps)

Summary for Pond FB3: sediment forebay

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 2.18" for 2-year event
Inflow = 1.43 cfs @ 12.09 hrs, Volume= 4,533 cf
Outflow = 1.39 cfs @ 12.11 hrs, Volume= 4,335 cf, Atten= 3%, Lag= 1.3 min
Primary = 1.39 cfs @ 12.11 hrs, Volume= 4,335 cf
Routed to Pond B3 : bioretention system 3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.82' @ 12.11 hrs Surf.Area= 536 sf Storage= 355 cf
Flood Elev= 61.00' Surf.Area= 586 sf Storage= 457 cf

Plug-Flow detention time= 38.5 min calculated for 4,329 cf (96% of inflow)
Center-of-Mass det. time= 14.4 min (834.3 - 819.9)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	457 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	340	70.0	0	0	340
60.00	586	91.0	457	457	621

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

2.50 3.00 3.50
Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88
2.85 3.07 3.20 3.32

Primary OutFlow Max=1.35 cfs @ 12.11 hrs HW=59.81' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.35 cfs @ 1.44 fps)

Summary for Pond FB4: sediment forebay

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 1.86" for 2-year event
Inflow = 0.18 cfs @ 12.09 hrs, Volume= 573 cf
Outflow = 0.18 cfs @ 12.11 hrs, Volume= 529 cf, Atten= 2%, Lag= 1.0 min
Primary = 0.18 cfs @ 12.11 hrs, Volume= 529 cf
Routed to Pond B4 : bioretention system 4

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.88' @ 12.11 hrs Surf.Area= 184 sf Storage= 58 cf
Flood Elev= 60.00' Surf.Area= 205 sf Storage= 81 cf

Plug-Flow detention time= 56.6 min calculated for 529 cf (92% of inflow)
Center-of-Mass det. time= 17.7 min (850.3 - 832.6)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	81 cf	**surface storage (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	124	42.0	0	0	124
60.00	205	56.0	81	81	236

Device	Routing	Invert	Outlet Devices
#1	Primary	59.80'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.17 cfs @ 12.11 hrs HW=59.88' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.72 fps)

Summary for Pond IS1: infiltration 1

GW elevation from TP8

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 18,979 sf, 98.79% Impervious, Inflow Depth = 3.39" for 2-year event
Inflow = 1.52 cfs @ 12.09 hrs, Volume= 5,354 cf
Outflow = 0.31 cfs @ 12.51 hrs, Volume= 5,354 cf, Atten= 80%, Lag= 25.4 min
Discarded = 0.07 cfs @ 12.51 hrs, Volume= 4,298 cf
Primary = 0.24 cfs @ 12.51 hrs, Volume= 1,055 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.78' @ 12.51 hrs Surf.Area= 3,088 sf Storage= 2,198 cf
Flood Elev= 60.93' Surf.Area= 3,088 sf Storage= 3,939 cf

Plug-Flow detention time= 205.6 min calculated for 5,346 cf (100% of inflow)
Center-of-Mass det. time= 205.5 min (964.6 - 759.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.60'	2,174 cf	**41.50'W x 74.40'L x 2.33'H Field A** 7,204 cf Overall - 1,769 cf Embedded = 5,435 cf x 40.0% Voids
#2A	59.10'	1,769 cf	**ADS_StormTech SC-310 +Cap** x 120 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 12 Rows
		3,943 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	58.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 54.60' Phase-In= 0.01'
#2	Primary	59.50'	**8.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 59.50' / 57.25' S= 0.0703 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.07 cfs @ 12.51 hrs HW=59.78' (Free Discharge)
└**1=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=0.24 cfs @ 12.51 hrs HW=59.78' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.24 cfs @ 1.79 fps)

Summary for Pond IS2: infiltration 2

GW from TP5

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 32,183 sf, 98.22% Impervious, Inflow Depth = 3.38" for 2-year event
Inflow = 2.57 cfs @ 12.09 hrs, Volume= 9,068 cf
Outflow = 0.13 cfs @ 14.20 hrs, Volume= 9,068 cf, Atten= 95%, Lag= 126.7 min
Discarded = 0.13 cfs @ 14.20 hrs, Volume= 9,068 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 58.89' @ 14.20 hrs Surf.Area= 6,032 sf Storage= 4,394 cf
Flood Elev= 60.03' Surf.Area= 6,032 sf Storage= 7,744 cf

Plug-Flow detention time= 305.9 min calculated for 9,056 cf (100% of inflow)
Center-of-Mass det. time= 305.8 min (1,065.3 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	57.70'	4,214 cf	**51.50'W x 117.12'L x 2.33'H Field A** 14,074 cf Overall - 3,538 cf Embedded = 10,536 cf x 40.0% Voids
#2A	58.20'	3,538 cf	**ADS_StormTech SC-310 +Cap** x 240 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 240 Chambers in 15 Rows
		7,752 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.70'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 53.70' Phase-In= 0.01'
#2	Primary	58.92'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 58.92' / 58.00' S= 0.0460 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.13 cfs @ 14.20 hrs HW=58.89' (Free Discharge)
└**1=Exfiltration** (Controls 0.13 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.70' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond IS3: infiltration 3

GW from TP2

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 3.46" for 2-year event
Inflow = 0.46 cfs @ 12.09 hrs, Volume= 1,629 cf
Outflow = 0.04 cfs @ 13.02 hrs, Volume= 1,629 cf, Atten= 92%, Lag= 56.3 min
Discarded = 0.04 cfs @ 13.02 hrs, Volume= 1,629 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 1R : continuity reach

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.25' @ 13.02 hrs Surf.Area= 1,972 sf Storage= 616 cf
Flood Elev= 61.60' Surf.Area= 1,972 sf Storage= 2,057 cf

Plug-Flow detention time= 123.9 min calculated for 1,627 cf (100% of inflow)
Center-of-Mass det. time= 123.8 min (877.3 - 753.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.60'	1,257 cf	**20.75'W x 95.03'L x 2.00'H Field A** 3,944 cf Overall - 800 cf Embedded = 3,144 cf x 40.0% Voids
#2A	60.10'	800 cf	**ADS_StormTech SC-160LP +Cap** x 117 Inside #1 Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap 117 Chambers in 9 Rows
		2,057 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	61.60'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	59.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 55.60' Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 13.02 hrs HW=60.25' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=59.60' (Free Discharge)

Summary for Link SP1: Study Point

Inflow Area = 180,997 sf, 40.18% Impervious, Inflow Depth = 0.43" for 2-year event
Inflow = 0.98 cfs @ 12.32 hrs, Volume= 6,482 cf
Primary = 0.98 cfs @ 12.32 hrs, Volume= 6,482 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 9,321 sf, 0.00% Impervious, Inflow Depth = 0.66" for 2-year event
Inflow = 0.12 cfs @ 12.11 hrs, Volume= 513 cf
Primary = 0.12 cfs @ 12.11 hrs, Volume= 513 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 28,777 sf, 60.23% Impervious, Inflow Depth = 0.54" for 2-year event
Inflow = 0.32 cfs @ 12.10 hrs, Volume= 1,291 cf
Primary = 0.32 cfs @ 12.10 hrs, Volume= 1,291 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 5,412 sf, 0.00% Impervious, Inflow Depth = 0.66" for 2-year event
Inflow = 0.06 cfs @ 12.17 hrs, Volume= 298 cf
Primary = 0.06 cfs @ 12.17 hrs, Volume= 298 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1: Subcat P-1 Runoff Area=96,521 sf 0.06% Impervious Runoff Depth=1.51"
Flow Length=85' Tc=13.7 min CN=58 Runoff=2.75 cfs 12,169 cf

Subcatchment P-10: Subcat P-10 Runoff Area=7,046 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=0.87 cfs 3,149 cf

Subcatchment P-11: Subcat P-11 Runoff Area=2,310 sf 85.16% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=93 Runoff=0.27 cfs 922 cf

Subcatchment P-12: Subcat P-12 Runoff Area=4,268 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=0.52 cfs 1,907 cf

Subcatchment P-13: Subcat P-13 Runoff Area=4,999 sf 98.84% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=0.61 cfs 2,234 cf

Subcatchment P-14: Subcat P-14 Runoff Area=24,922 sf 65.26% Impervious Runoff Depth=3.93"
Tc=6.0 min CN=85 Runoff=2.54 cfs 8,155 cf

Subcatchment P-15: Subcat P-15 Runoff Area=11,933 sf 98.07% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=97 Runoff=1.46 cfs 5,216 cf

Subcatchment P-16: Subcat P-16 Runoff Area=3,691 sf 53.10% Impervious Runoff Depth=3.52"
Tc=6.0 min CN=81 Runoff=0.34 cfs 1,083 cf

Subcatchment P-2: Subcat P-2 Runoff Area=9,321 sf 0.00% Impervious Runoff Depth=1.74"
Tc=6.0 min CN=61 Runoff=0.40 cfs 1,354 cf

Subcatchment P-3: Subcat P-3 Runoff Area=10,121 sf 28.87% Impervious Runoff Depth=2.67"
Tc=6.0 min CN=72 Runoff=0.71 cfs 2,251 cf

Subcatchment P-4: Subcat E-4 Runoff Area=5,412 sf 0.00% Impervious Runoff Depth=1.74"
Flow Length=162' Tc=9.6 min CN=61 Runoff=0.21 cfs 786 cf

Subcatchment P-5: Subcat P-5 Runoff Area=21,307 sf 97.31% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=97 Runoff=2.60 cfs 9,313 cf

Subcatchment P-6: Subcat P-6 Runoff Area=2,391 sf 88.45% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=94 Runoff=0.28 cfs 977 cf

Subcatchment P-7: Subcat P-7 Runoff Area=8,731 sf 52.04% Impervious Runoff Depth=3.42"
Tc=6.0 min CN=80 Runoff=0.79 cfs 2,490 cf

Subcatchment P-8: Subcat P-8 Runoff Area=10,876 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=1.34 cfs 4,860 cf

Subcatchment P-9: Subcat P-9 Runoff Area=657 sf 100.00% Impervious Runoff Depth=5.36"
Tc=6.0 min CN=98 Runoff=0.08 cfs 294 cf

Reach 1R: continuity reach Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond B1: bioretention system 1 Peak Elev=59.92' Storage=1,308 cf Inflow=0.78 cfs 2,398 cf
Discarded=0.04 cfs 2,398 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 2,398 cf

Pond B2: bioretention system 2 Peak Elev=60.79' Storage=590 cf Inflow=0.53 cfs 1,857 cf
Discarded=0.02 cfs 1,119 cf Primary=0.39 cfs 738 cf Outflow=0.41 cfs 1,857 cf

Pond B3: bioretention system 3 Peak Elev=60.54' Storage=4,814 cf Inflow=2.47 cfs 7,957 cf
Discarded=0.10 cfs 7,829 cf Primary=0.00 cfs 0 cf Outflow=0.10 cfs 7,829 cf

Pond B4: bioretention system 4 Peak Elev=59.98' Storage=526 cf Inflow=0.34 cfs 1,039 cf
Discarded=0.02 cfs 1,039 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 1,039 cf

Pond FB1: sediment forebay Peak Elev=59.72' Storage=145 cf Inflow=0.79 cfs 2,490 cf
Outflow=0.78 cfs 2,398 cf

Pond FB2: sediment forebay Peak Elev=60.92' Storage=68 cf Inflow=0.52 cfs 1,907 cf
Outflow=0.53 cfs 1,857 cf

Pond FB3: sediment forebay Peak Elev=59.96' Storage=436 cf Inflow=2.54 cfs 8,155 cf
Outflow=2.47 cfs 7,957 cf

Pond FB4: sediment forebay Peak Elev=59.93' Storage=67 cf Inflow=0.34 cfs 1,083 cf
Outflow=0.34 cfs 1,039 cf

Pond IS1: infiltration 1 Peak Elev=60.15' Storage=2,919 cf Inflow=2.33 cfs 8,364 cf
Discarded=0.07 cfs 5,058 cf Primary=0.95 cfs 3,307 cf Outflow=1.02 cfs 8,364 cf

Pond IS2: infiltration 2 Peak Elev=59.36' Storage=6,098 cf Inflow=3.94 cfs 14,173 cf
Discarded=0.14 cfs 11,002 cf Primary=0.76 cfs 3,172 cf Outflow=0.90 cfs 14,173 cf

Pond IS3: infiltration 3 Peak Elev=60.59' Storage=1,112 cf Inflow=0.70 cfs 2,528 cf
Discarded=0.04 cfs 2,528 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 2,528 cf

Link SP1: Study Point Inflow=4.19 cfs 20,546 cf
Primary=4.19 cfs 20,546 cf

Link SP2: Study Point Inflow=0.40 cfs 1,354 cf
Primary=0.40 cfs 1,354 cf

Link SP3: Study Point Inflow=1.04 cfs 2,990 cf
Primary=1.04 cfs 2,990 cf

Link SP4: Study Point Inflow=0.21 cfs 786 cf
Primary=0.21 cfs 786 cf

Total Runoff Area = 224,507 sf Runoff Volume = 57,159 cf Average Runoff Depth = 3.06"
59.89% Pervious = 134,448 sf 40.11% Impervious = 90,059 sf

Summary for Subcatchment P-1: Subcat P-1

Runoff = 2.75 cfs @ 12.21 hrs, Volume= 12,169 cf, Depth= 1.51"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
33,219	61	>75% Grass cover, Good, HSG B
478	74	>75% Grass cover, Good, HSG C
57,731	55	Woods, Good, HSG B
5,030	70	Woods, Good, HSG C
63	98	Paved parking, HSG B
96,521	58	Weighted Average
96,458		99.94% Pervious Area
63		0.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.5	35	0.0060	0.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.7	85	Total			

Summary for Subcatchment P-10: Subcat P-10

Runoff = 0.87 cfs @ 12.09 hrs, Volume= 3,149 cf, Depth= 5.36"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
7,046	98	Roofs, HSG B
7,046		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-11: Subcat P-11

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 922 cf, Depth= 4.79"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
35	98	Paved parking, HSG C
343	61	>75% Grass cover, Good, HSG B
1,933	98	Paved parking, HSG B
2,310	93	Weighted Average
343		14.84% Pervious Area
1,967		85.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-12: Subcat P-12

Runoff = 0.52 cfs @ 12.09 hrs, Volume= 1,907 cf, Depth= 5.36"
Routed to Pond FB2 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
4,268	98	Paved parking, HSG B
4,268		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-13: Subcat P-13

Runoff = 0.61 cfs @ 12.09 hrs, Volume= 2,234 cf, Depth= 5.36"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
4,941	98	Paved parking, HSG B
58	61	>75% Grass cover, Good, HSG B
4,999	98	Weighted Average
58		1.16% Pervious Area
4,941		98.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-14: Subcat P-14

Runoff = 2.54 cfs @ 12.09 hrs, Volume= 8,155 cf, Depth= 3.93"
Routed to Pond FB3 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
8,658	61	>75% Grass cover, Good, HSG B
16,263	98	Paved parking, HSG B
24,922	85	Weighted Average
8,658		34.74% Pervious Area
16,263		65.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-15: Subcat P-15

Runoff = 1.46 cfs @ 12.09 hrs, Volume= 5,216 cf, Depth= 5.25"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
230	61	>75% Grass cover, Good, HSG B
11,703	98	Paved parking, HSG B
11,933	97	Weighted Average
230		1.93% Pervious Area
11,703		98.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-16: Subcat P-16

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 1,083 cf, Depth= 3.52"
Routed to Pond FB4 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
1,960	98	Paved parking, HSG B
1,731	61	>75% Grass cover, Good, HSG B
3,691	81	Weighted Average
1,731		46.90% Pervious Area
1,960		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.40 cfs @ 12.10 hrs, Volume= 1,354 cf, Depth= 1.74"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
9,321	61	>75% Grass cover, Good, HSG B
9,321		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 min**

Summary for Subcatchment P-3: Subcat P-3

Runoff = 0.71 cfs @ 12.09 hrs, Volume= 2,251 cf, Depth= 2.67"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
7,199	61	>75% Grass cover, Good, HSG B
2,922	98	Paved parking, HSG B
10,121	72	Weighted Average
7,199		71.13% Pervious Area
2,922		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.21 cfs @ 12.15 hrs, Volume= 786 cf, Depth= 1.74"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
5,412	61	>75% Grass cover, Good, HSG B
5,412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.28"
1.5	112	0.0310	1.23		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	162	Total			

Summary for Subcatchment P-5: Subcat P-5

Runoff = 2.60 cfs @ 12.09 hrs, Volume= 9,313 cf, Depth= 5.25"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
574	61	>75% Grass cover, Good, HSG B
20,733	98	Paved parking, HSG B
21,307	97	Weighted Average
574		2.69% Pervious Area
20,733		97.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-6: Subcat P-6

Runoff = 0.28 cfs @ 12.09 hrs, Volume= 977 cf, Depth= 4.90"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
276	61	>75% Grass cover, Good, HSG B
2,115	98	Paved parking, HSG B
2,391	94	Weighted Average
276		11.55% Pervious Area
2,115		88.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-7: Subcat P-7

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 2,490 cf, Depth= 3.42"
Routed to Pond FB1 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
4,544	98	Paved parking, HSG B
4,188	61	>75% Grass cover, Good, HSG B
8,731	80	Weighted Average
4,188		47.96% Pervious Area
4,544		52.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-8: Subcat P-8

Runoff = 1.34 cfs @ 12.09 hrs, Volume= 4,860 cf, Depth= 5.36"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
10,876	98	Roofs, HSG B
10,876		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.08 cfs @ 12.09 hrs, Volume= 294 cf, Depth= 5.36"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=5.60"

Area (sf)	CN	Description
657	98	Roofs, HSG B
657		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Reach 1R: continuity reach

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

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 0.00" for 10-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Routed to Link SP3 : Study Point

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond B1: bioretention system 1

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB1 by 0.39' @ 14.50 hrs

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 3.30" for 10-year event
Inflow = 0.78 cfs @ 12.11 hrs, Volume= 2,398 cf
Outflow = 0.04 cfs @ 14.36 hrs, Volume= 2,398 cf, Atten= 94%, Lag= 135.3 min
Discarded = 0.04 cfs @ 14.36 hrs, Volume= 2,398 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.92' @ 14.36 hrs Surf.Area= 571 sf Storage= 1,308 cf
Flood Elev= 61.00' Surf.Area= 571 sf Storage= 3,054 cf

Plug-Flow detention time= 339.6 min calculated for 2,398 cf (100% of inflow)
Center-of-Mass det. time= 339.4 min (1,168.2 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	2,712 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	56.50'	343 cf	**media storage (Irregular)**Listed below (Recalc) 1,142 cf Overall x 30.0% Voids
		3,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.50	365	133.0	0	0	365
59.00	571	142.0	232	232	574
60.00	1,101	180.0	822	1,054	1,561
61.00	2,286	255.0	1,658	2,712	4,166

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	571	142.0	0	0	571
58.50	571	142.0	1,142	1,142	855

Device	Routing	Invert	Outlet Devices
#1	Primary	60.70'	**4.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	56.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 14.36 hrs HW=59.92' (Free Discharge)
└**2=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.50' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: bioretention system 2

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[79] Warning: Submerged Pond FB2 Primary device # 1 by 0.04'

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 5.22" for 10-year event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 1,857 cf
Outflow = 0.41 cfs @ 12.17 hrs, Volume= 1,857 cf, Atten= 22%, Lag= 4.3 min
Discarded = 0.02 cfs @ 12.17 hrs, Volume= 1,119 cf
Primary = 0.39 cfs @ 12.17 hrs, Volume= 738 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.79' @ 12.17 hrs Surf.Area= 258 sf Storage= 590 cf
Flood Elev= 61.00' Surf.Area= 258 sf Storage= 743 cf

Plug-Flow detention time= 186.8 min calculated for 1,855 cf (100% of inflow)
Center-of-Mass det. time= 187.1 min (949.2 - 762.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	588 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	155 cf	**media storage (Irregular)**Listed below (Recalc) 516 cf Overall x 30.0% Voids
		743 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	98	88.0	0	0	98
60.00	258	114.0	86	86	519
61.00	796	185.0	502	588	2,215

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	258	114.0	0	0	258
59.50	258	114.0	516	516	486

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'
#2	Device 3	60.50'	**15.0" Vert. overflow orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**8.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 12.17 hrs HW=60.78' (Free Discharge)
└─**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.38 cfs @ 12.17 hrs HW=60.78' (Free Discharge)
└─**3=Culvert** (Passes 0.38 cfs of 1.74 cfs potential flow)
  └─**2=overflow orifice** (Orifice Controls 0.38 cfs @ 1.82 fps)

Summary for Pond B3: bioretention system 3

GW from TP1

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB3 by 0.99' @ 15.75 hrs

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 3.83" for 10-year event
Inflow = 2.47 cfs @ 12.11 hrs, Volume= 7,957 cf
Outflow = 0.10 cfs @ 15.34 hrs, Volume= 7,829 cf, Atten= 96%, Lag= 193.5 min
Discarded = 0.10 cfs @ 15.34 hrs, Volume= 7,829 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.54' @ 15.34 hrs Surf.Area= 1,639 sf Storage= 4,814 cf
Flood Elev= 61.00' Surf.Area= 1,639 sf Storage= 6,870 cf

Plug-Flow detention time= 510.6 min calculated for 7,818 cf (98% of inflow)
Center-of-Mass det. time= 501.2 min (1,315.5 - 814.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	5,886 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.00'	983 cf	**media storage (Irregular)**Listed below (Recalc) 3,278 cf Overall x 30.0% Voids
		6,870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	1,639	184.0	0	0	1,639
60.00	2,580	217.0	2,092	2,092	2,711
61.00	5,156	323.0	3,794	5,886	7,274

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.00	1,639	184.0	0	0	1,639
59.00	1,639	184.0	3,278	3,278	2,007

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	58.40'	**8.0" Round Culvert** L= 77.0' Ke= 0.500 Inlet / Outlet Invert= 58.40' / 57.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Discarded	57.00'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.01'

Discarded OutFlow Max=0.10 cfs @ 15.34 hrs HW=60.54' (Free Discharge)
└─**3=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.00' (Free Discharge)
└─**2=Culvert** (Controls 0.00 cfs)
└─**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond B4: bioretention system 4

GW assumed based on surrounding data. confirmatory TP to be performed.

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB4 by 0.16' @ 13.85 hrs

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 3.38" for 10-year event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 1,039 cf
Outflow = 0.02 cfs @ 13.76 hrs, Volume= 1,039 cf, Atten= 93%, Lag= 99.1 min
Discarded = 0.02 cfs @ 13.76 hrs, Volume= 1,039 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.98' @ 13.76 hrs Surf.Area= 516 sf Storage= 526 cf
Flood Elev= 61.00' Surf.Area= 516 sf Storage= 1,358 cf

Plug-Flow detention time= 253.4 min calculated for 1,038 cf (100% of inflow)
Center-of-Mass det. time= 253.3 min (1,080.6 - 827.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	1,049 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	310 cf	**media storage (Irregular)**Listed below (Recalc) 1,032 cf Overall x 30.0% Voids
		1,358 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	391	79.0	0	0	391
60.00	516	88.0	226	226	518
61.00	1,174	135.0	823	1,049	1,359

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	516	88.0	0	0	516
59.50	516	88.0	1,032	1,032	692

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.10'

Discarded OutFlow Max=0.02 cfs @ 13.76 hrs HW=59.98' (Free Discharge)
└─**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond FB1: sediment forebay

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 3.42" for 10-year event
Inflow = 0.79 cfs @ 12.09 hrs, Volume= 2,490 cf
Outflow = 0.78 cfs @ 12.11 hrs, Volume= 2,398 cf, Atten= 1%, Lag= 0.8 min
Primary = 0.78 cfs @ 12.11 hrs, Volume= 2,398 cf
Routed to Pond B1 : bioretention system 1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.72' @ 12.11 hrs Surf.Area= 263 sf Storage= 145 cf
Flood Elev= 61.00' Surf.Area= 489 sf Storage= 627 cf

Plug-Flow detention time= 32.7 min calculated for 2,398 cf (96% of inflow)
Center-of-Mass det. time= 11.8 min (828.8 - 817.0)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	627 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	146	45.0	0	0	146
60.00	318	66.0	226	226	340
61.00	489	84.0	400	627	567

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.77 cfs @ 12.11 hrs HW=59.72' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.77 cfs @ 1.18 fps)

Summary for Pond FB2: sediment forebay

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 5.36" for 10-year event
Inflow = 0.52 cfs @ 12.09 hrs, Volume= 1,907 cf
Outflow = 0.53 cfs @ 12.09 hrs, Volume= 1,857 cf, Atten= 0%, Lag= 0.5 min
Primary = 0.53 cfs @ 12.09 hrs, Volume= 1,857 cf
Routed to Pond B2 : bioretention system 2

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 60.92' @ 12.09 hrs Surf.Area= 119 sf Storage= 68 cf
Flood Elev= 61.00' Surf.Area= 130 sf Storage= 78 cf

Plug-Flow detention time= 32.3 min calculated for 1,855 cf (97% of inflow)
Center-of-Mass det. time= 15.9 min (762.1 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	78 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	1	1.0	0	0	1
60.00	28	23.0	6	6	43
61.00	130	44.0	73	78	160

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.52 cfs @ 12.09 hrs HW=60.92' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.52 cfs @ 1.04 fps)

Summary for Pond FB3: sediment forebay

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 3.93" for 10-year event
Inflow = 2.54 cfs @ 12.09 hrs, Volume= 8,155 cf
Outflow = 2.47 cfs @ 12.11 hrs, Volume= 7,957 cf, Atten= 3%, Lag= 1.2 min
Primary = 2.47 cfs @ 12.11 hrs, Volume= 7,957 cf
Routed to Pond B3 : bioretention system 3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.96' @ 12.11 hrs Surf.Area= 576 sf Storage= 436 cf
Flood Elev= 61.00' Surf.Area= 586 sf Storage= 457 cf

Plug-Flow detention time= 25.6 min calculated for 7,957 cf (98% of inflow)
Center-of-Mass det. time= 11.1 min (814.3 - 803.2)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	457 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	340	70.0	0	0	340
60.00	586	91.0	457	457	621

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00

2.50 3.00 3.50
Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88
2.85 3.07 3.20 3.32

Primary OutFlow Max=2.42 cfs @ 12.11 hrs HW=59.96' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.42 cfs @ 1.76 fps)

Summary for Pond FB4: sediment forebay

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 3.52" for 10-year event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 1,083 cf
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 1,039 cf, Atten= 1%, Lag= 0.8 min
Primary = 0.34 cfs @ 12.10 hrs, Volume= 1,039 cf
Routed to Pond B4 : bioretention system 4

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.93' @ 12.11 hrs Surf.Area= 192 sf Storage= 67 cf
Flood Elev= 60.00' Surf.Area= 205 sf Storage= 81 cf

Plug-Flow detention time= 35.8 min calculated for 1,039 cf (96% of inflow)
Center-of-Mass det. time= 13.0 min (827.3 - 814.4)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	81 cf	**surface storage (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	124	42.0	0	0	124
60.00	205	56.0	81	81	236

Device	Routing	Invert	Outlet Devices
#1	Primary	59.80'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.33 cfs @ 12.10 hrs HW=59.92' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.33 cfs @ 0.90 fps)

Summary for Pond IS1: infiltration 1

GW elevation from TP8

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 18,979 sf, 98.79% Impervious, Inflow Depth = 5.29" for 10-year event
Inflow = 2.33 cfs @ 12.09 hrs, Volume= 8,364 cf
Outflow = 1.02 cfs @ 12.27 hrs, Volume= 8,364 cf, Atten= 56%, Lag= 11.3 min
Discarded = 0.07 cfs @ 12.27 hrs, Volume= 5,058 cf
Primary = 0.95 cfs @ 12.27 hrs, Volume= 3,307 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.15' @ 12.27 hrs Surf.Area= 3,088 sf Storage= 2,919 cf
Flood Elev= 60.93' Surf.Area= 3,088 sf Storage= 3,939 cf

Plug-Flow detention time= 167.8 min calculated for 8,353 cf (100% of inflow)
Center-of-Mass det. time= 167.9 min (918.7 - 750.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.60'	2,174 cf	**41.50'W x 74.40'L x 2.33'H Field A** 7,204 cf Overall - 1,769 cf Embedded = 5,435 cf x 40.0% Voids
#2A	59.10'	1,769 cf	**ADS_StormTech SC-310 +Cap** x 120 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 12 Rows
		3,943 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	58.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 54.60' Phase-In= 0.01'
#2	Primary	59.50'	**8.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 59.50' / 57.25' S= 0.0703 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.07 cfs @ 12.27 hrs HW=60.14' (Free Discharge)
└**1=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=0.94 cfs @ 12.27 hrs HW=60.14' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.94 cfs @ 2.73 fps)

Summary for Pond IS2: infiltration 2

GW from TP5

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 32,183 sf, 98.22% Impervious, Inflow Depth = 5.28" for 10-year event
Inflow = 3.94 cfs @ 12.09 hrs, Volume= 14,173 cf
Outflow = 0.90 cfs @ 12.48 hrs, Volume= 14,173 cf, Atten= 77%, Lag= 23.9 min
Discarded = 0.14 cfs @ 12.48 hrs, Volume= 11,002 cf
Primary = 0.76 cfs @ 12.48 hrs, Volume= 3,172 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.36' @ 12.48 hrs Surf.Area= 6,032 sf Storage= 6,098 cf
Flood Elev= 60.03' Surf.Area= 6,032 sf Storage= 7,744 cf

Plug-Flow detention time= 274.0 min calculated for 14,154 cf (100% of inflow)
Center-of-Mass det. time= 274.3 min (1,025.2 - 751.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	57.70'	4,214 cf	**51.50'W x 117.12'L x 2.33'H Field A** 14,074 cf Overall - 3,538 cf Embedded = 10,536 cf x 40.0% Voids
#2A	58.20'	3,538 cf	**ADS_StormTech SC-310 +Cap** x 240 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 240 Chambers in 15 Rows
		7,752 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.70'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 53.70' Phase-In= 0.01'
#2	Primary	58.92'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 58.92' / 58.00' S= 0.0460 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.14 cfs @ 12.48 hrs HW=59.36' (Free Discharge)
└**1=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=0.75 cfs @ 12.48 hrs HW=59.36' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.75 cfs @ 2.26 fps)

Summary for Pond IS3: infiltration 3

GW from TP2

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 5.36" for 10-year event
Inflow = 0.70 cfs @ 12.09 hrs, Volume= 2,528 cf
Outflow = 0.04 cfs @ 13.80 hrs, Volume= 2,528 cf, Atten= 94%, Lag= 102.8 min
Discarded = 0.04 cfs @ 13.80 hrs, Volume= 2,528 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 1R : continuity reach

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.59' @ 13.80 hrs Surf.Area= 1,972 sf Storage= 1,112 cf
Flood Elev= 61.60' Surf.Area= 1,972 sf Storage= 2,057 cf

Plug-Flow detention time= 230.6 min calculated for 2,528 cf (100% of inflow)
Center-of-Mass det. time= 230.5 min (976.7 - 746.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.60'	1,257 cf	**20.75'W x 95.03'L x 2.00'H Field A** 3,944 cf Overall - 800 cf Embedded = 3,144 cf x 40.0% Voids
#2A	60.10'	800 cf	**ADS_StormTech SC-160LP +Cap** x 117 Inside #1 Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap 117 Chambers in 9 Rows
		2,057 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	61.60'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	59.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 55.60' Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 13.80 hrs HW=60.59' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=59.60' (Free Discharge)

Summary for Link SP1: Study Point

Inflow Area = 180,997 sf, 40.18% Impervious, Inflow Depth = 1.36" for 10-year event
Inflow = 4.19 cfs @ 12.24 hrs, Volume= 20,546 cf
Primary = 4.19 cfs @ 12.24 hrs, Volume= 20,546 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 9,321 sf, 0.00% Impervious, Inflow Depth = 1.74" for 10-year event
Inflow = 0.40 cfs @ 12.10 hrs, Volume= 1,354 cf
Primary = 0.40 cfs @ 12.10 hrs, Volume= 1,354 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 28,777 sf, 60.23% Impervious, Inflow Depth = 1.25" for 10-year event
Inflow = 1.04 cfs @ 12.12 hrs, Volume= 2,990 cf
Primary = 1.04 cfs @ 12.12 hrs, Volume= 2,990 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 5,412 sf, 0.00% Impervious, Inflow Depth = 1.74" for 10-year event
Inflow = 0.21 cfs @ 12.15 hrs, Volume= 786 cf
Primary = 0.21 cfs @ 12.15 hrs, Volume= 786 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1: Subcat P-1 Runoff Area=96,521 sf 0.06% Impervious Runoff Depth=2.48"
Flow Length=85' Tc=13.7 min CN=58 Runoff=4.79 cfs 19,927 cf

Subcatchment P-10: Subcat P-10 Runoff Area=7,046 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=1.10 cfs 4,029 cf

Subcatchment P-11: Subcat P-11 Runoff Area=2,310 sf 85.16% Impervious Runoff Depth=6.27"
Tc=6.0 min CN=93 Runoff=0.35 cfs 1,207 cf

Subcatchment P-12: Subcat P-12 Runoff Area=4,268 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=0.67 cfs 2,440 cf

Subcatchment P-13: Subcat P-13 Runoff Area=4,999 sf 98.84% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=0.78 cfs 2,858 cf

Subcatchment P-14: Subcat P-14 Runoff Area=24,922 sf 65.26% Impervious Runoff Depth=5.35"
Tc=6.0 min CN=85 Runoff=3.41 cfs 11,107 cf

Subcatchment P-15: Subcat P-15 Runoff Area=11,933 sf 98.07% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=97 Runoff=1.86 cfs 6,704 cf

Subcatchment P-16: Subcat P-16 Runoff Area=3,691 sf 53.10% Impervious Runoff Depth=4.90"
Tc=6.0 min CN=81 Runoff=0.47 cfs 1,507 cf

Subcatchment P-2: Subcat P-2 Runoff Area=9,321 sf 0.00% Impervious Runoff Depth=2.77"
Tc=6.0 min CN=61 Runoff=0.67 cfs 2,155 cf

Subcatchment P-3: Subcat P-3 Runoff Area=10,121 sf 28.87% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=72 Runoff=1.05 cfs 3,301 cf

Subcatchment P-4: Subcat E-4 Runoff Area=5,412 sf 0.00% Impervious Runoff Depth=2.77"
Flow Length=162' Tc=9.6 min CN=61 Runoff=0.34 cfs 1,251 cf

Subcatchment P-5: Subcat P-5 Runoff Area=21,307 sf 97.31% Impervious Runoff Depth=6.74"
Tc=6.0 min CN=97 Runoff=3.32 cfs 11,971 cf

Subcatchment P-6: Subcat P-6 Runoff Area=2,391 sf 88.45% Impervious Runoff Depth=6.39"
Tc=6.0 min CN=94 Runoff=0.37 cfs 1,273 cf

Subcatchment P-7: Subcat P-7 Runoff Area=8,731 sf 52.04% Impervious Runoff Depth=4.79"
Tc=6.0 min CN=80 Runoff=1.09 cfs 3,483 cf

Subcatchment P-8: Subcat P-8 Runoff Area=10,876 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=1.70 cfs 6,218 cf

Subcatchment P-9: Subcat P-9 Runoff Area=657 sf 100.00% Impervious Runoff Depth=6.86"
Tc=6.0 min CN=98 Runoff=0.10 cfs 376 cf

Reach 1R: continuity reach Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond B1: bioretention system 1 Peak Elev=60.45' Storage=1,997 cf Inflow=1.08 cfs 3,391 cf
Discarded=0.05 cfs 3,391 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 3,391 cf

Pond B2: bioretention system 2 Peak Elev=60.84' Storage=627 cf Inflow=0.67 cfs 2,390 cf
Discarded=0.02 cfs 1,230 cf Primary=0.55 cfs 1,160 cf Outflow=0.57 cfs 2,390 cf

Pond B3: bioretention system 3 Peak Elev=60.85' Storage=6,151 cf Inflow=3.75 cfs 10,909 cf
Discarded=0.11 cfs 9,059 cf Primary=0.17 cfs 1,128 cf Outflow=0.28 cfs 10,187 cf

Pond B4: bioretention system 4 Peak Elev=60.42' Storage=800 cf Inflow=0.47 cfs 1,463 cf
Discarded=0.03 cfs 1,463 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 1,463 cf

Pond FB1: sediment forebay Peak Elev=59.77' Storage=159 cf Inflow=1.09 cfs 3,483 cf
Outflow=1.08 cfs 3,391 cf

Pond FB2: sediment forebay Peak Elev=60.95' Storage=72 cf Inflow=0.67 cfs 2,440 cf
Outflow=0.67 cfs 2,390 cf

Pond FB3: sediment forebay Peak Elev=60.11' Storage=457 cf Inflow=3.41 cfs 11,107 cf
Outflow=3.75 cfs 10,909 cf

Pond FB4: sediment forebay Peak Elev=59.96' Storage=72 cf Inflow=0.47 cfs 1,507 cf
Outflow=0.47 cfs 1,463 cf

Pond IS1: infiltration 1 Peak Elev=60.55' Storage=3,472 cf Inflow=2.96 cfs 10,733 cf
Discarded=0.08 cfs 5,525 cf Primary=1.42 cfs 5,208 cf Outflow=1.50 cfs 10,733 cf

Pond IS2: infiltration 2 Peak Elev=59.68' Storage=6,910 cf Inflow=5.01 cfs 18,189 cf
Discarded=0.15 cfs 11,921 cf Primary=1.92 cfs 6,268 cf Outflow=2.07 cfs 18,189 cf

Pond IS3: infiltration 3 Peak Elev=60.97' Storage=1,549 cf Inflow=0.88 cfs 3,234 cf
Discarded=0.04 cfs 3,234 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 3,234 cf

Link SP1: Study Point Inflow=8.36 cfs 35,010 cf
Primary=8.36 cfs 35,010 cf

Link SP2: Study Point Inflow=0.67 cfs 2,155 cf
Primary=0.67 cfs 2,155 cf

Link SP3: Study Point Inflow=1.55 cfs 4,461 cf
Primary=1.55 cfs 4,461 cf

Link SP4: Study Point Inflow=0.34 cfs 1,251 cf
Primary=0.34 cfs 1,251 cf

Total Runoff Area = 224,507 sf Runoff Volume = 79,808 cf Average Runoff Depth = 4.27"
59.89% Pervious = 134,448 sf 40.11% Impervious = 90,059 sf

Summary for Subcatchment P-1: Subcat P-1

Runoff = 4.79 cfs @ 12.20 hrs, Volume= 19,927 cf, Depth= 2.48"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
33,219	61	>75% Grass cover, Good, HSG B
478	74	>75% Grass cover, Good, HSG C
57,731	55	Woods, Good, HSG B
5,030	70	Woods, Good, HSG C
63	98	Paved parking, HSG B
96,521	58	Weighted Average
96,458		99.94% Pervious Area
63		0.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.5	35	0.0060	0.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.7	85	Total			

Summary for Subcatchment P-10: Subcat P-10

Runoff = 1.10 cfs @ 12.09 hrs, Volume= 4,029 cf, Depth= 6.86"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
7,046	98	Roofs, HSG B
7,046		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-11: Subcat P-11

Runoff = 0.35 cfs @ 12.09 hrs, Volume= 1,207 cf, Depth= 6.27"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
35	98	Paved parking, HSG C
343	61	>75% Grass cover, Good, HSG B
1,933	98	Paved parking, HSG B
2,310	93	Weighted Average
343		14.84% Pervious Area
1,967		85.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-12: Subcat P-12

Runoff = 0.67 cfs @ 12.09 hrs, Volume= 2,440 cf, Depth= 6.86"
Routed to Pond FB2 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
4,268	98	Paved parking, HSG B
4,268		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-13: Subcat P-13

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 2,858 cf, Depth= 6.86"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
4,941	98	Paved parking, HSG B
58	61	>75% Grass cover, Good, HSG B
4,999	98	Weighted Average
58		1.16% Pervious Area
4,941		98.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-14: Subcat P-14

Runoff = 3.41 cfs @ 12.09 hrs, Volume= 11,107 cf, Depth= 5.35"
Routed to Pond FB3 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
8,658	61	>75% Grass cover, Good, HSG B
16,263	98	Paved parking, HSG B
24,922	85	Weighted Average
8,658		34.74% Pervious Area
16,263		65.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-15: Subcat P-15

Runoff = 1.86 cfs @ 12.09 hrs, Volume= 6,704 cf, Depth= 6.74"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
230	61	>75% Grass cover, Good, HSG B
11,703	98	Paved parking, HSG B
11,933	97	Weighted Average
230		1.93% Pervious Area
11,703		98.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-16: Subcat P-16

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 1,507 cf, Depth= 4.90"
Routed to Pond FB4 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
1,960	98	Paved parking, HSG B
1,731	61	>75% Grass cover, Good, HSG B
3,691	81	Weighted Average
1,731		46.90% Pervious Area
1,960		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.67 cfs @ 12.10 hrs, Volume= 2,155 cf, Depth= 2.77"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
9,321	61	>75% Grass cover, Good, HSG B
9,321		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 min**

Summary for Subcatchment P-3: Subcat P-3

Runoff = 1.05 cfs @ 12.09 hrs, Volume= 3,301 cf, Depth= 3.91"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
7,199	61	>75% Grass cover, Good, HSG B
2,922	98	Paved parking, HSG B
10,121	72	Weighted Average
7,199		71.13% Pervious Area
2,922		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.34 cfs @ 12.15 hrs, Volume= 1,251 cf, Depth= 2.77"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
5,412	61	>75% Grass cover, Good, HSG B
5,412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.28"
1.5	112	0.0310	1.23		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	162	Total			

Summary for Subcatchment P-5: Subcat P-5

Runoff = 3.32 cfs @ 12.09 hrs, Volume= 11,971 cf, Depth= 6.74"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
574	61	>75% Grass cover, Good, HSG B
20,733	98	Paved parking, HSG B
21,307	97	Weighted Average
574		2.69% Pervious Area
20,733		97.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-6: Subcat P-6

Runoff = 0.37 cfs @ 12.09 hrs, Volume= 1,273 cf, Depth= 6.39"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
276	61	>75% Grass cover, Good, HSG B
2,115	98	Paved parking, HSG B
2,391	94	Weighted Average
276		11.55% Pervious Area
2,115		88.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-7: Subcat P-7

Runoff = 1.09 cfs @ 12.09 hrs, Volume= 3,483 cf, Depth= 4.79"
Routed to Pond FB1 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
4,544	98	Paved parking, HSG B
4,188	61	>75% Grass cover, Good, HSG B
8,731	80	Weighted Average
4,188		47.96% Pervious Area
4,544		52.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-8: Subcat P-8

Runoff = 1.70 cfs @ 12.09 hrs, Volume= 6,218 cf, Depth= 6.86"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
10,876	98	Roofs, HSG B
10,876		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.10 cfs @ 12.09 hrs, Volume= 376 cf, Depth= 6.86"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=7.10"

Area (sf)	CN	Description
657	98	Roofs, HSG B
657		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Reach 1R: continuity reach

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

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 0.00" for 25-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Routed to Link SP3 : Study Point

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond B1: bioretention system 1

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB1 by 0.92' @ 15.25 hrs

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 4.66" for 25-year event
Inflow = 1.08 cfs @ 12.10 hrs, Volume= 3,391 cf
Outflow = 0.05 cfs @ 15.04 hrs, Volume= 3,391 cf, Atten= 95%, Lag= 175.9 min
Discarded = 0.05 cfs @ 15.04 hrs, Volume= 3,391 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.45' @ 15.04 hrs Surf.Area= 571 sf Storage= 1,997 cf
Flood Elev= 61.00' Surf.Area= 571 sf Storage= 3,054 cf

Plug-Flow detention time= 455.3 min calculated for 3,386 cf (100% of inflow)
Center-of-Mass det. time= 455.6 min (1,273.1 - 817.5)

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	2,712 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	56.50'	343 cf	**media storage (Irregular)**Listed below (Recalc) 1,142 cf Overall x 30.0% Voids
		3,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.50	365	133.0	0	0	365
59.00	571	142.0	232	232	574
60.00	1,101	180.0	822	1,054	1,561
61.00	2,286	255.0	1,658	2,712	4,166

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	571	142.0	0	0	571
58.50	571	142.0	1,142	1,142	855

Device	Routing	Invert	Outlet Devices
#1	Primary	60.70'	**4.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	56.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'

Discarded OutFlow Max=0.05 cfs @ 15.04 hrs HW=60.45' (Free Discharge)
└**2=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.50' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond B2: bioretention system 2

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[79] Warning: Submerged Pond FB2 Primary device # 1 by 0.09'

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 6.72" for 25-year event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 2,390 cf
Outflow = 0.57 cfs @ 12.15 hrs, Volume= 2,390 cf, Atten= 15%, Lag= 3.3 min
Discarded = 0.02 cfs @ 12.15 hrs, Volume= 1,230 cf
Primary = 0.55 cfs @ 12.15 hrs, Volume= 1,160 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.84' @ 12.15 hrs Surf.Area= 258 sf Storage= 627 cf
Flood Elev= 61.00' Surf.Area= 258 sf Storage= 743 cf

Plug-Flow detention time= 166.0 min calculated for 2,387 cf (100% of inflow)
Center-of-Mass det. time= 166.4 min (922.4 - 756.0)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	588 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	155 cf	**media storage (Irregular)**Listed below (Recalc) 516 cf Overall x 30.0% Voids
		743 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	98	88.0	0	0	98
60.00	258	114.0	86	86	519
61.00	796	185.0	502	588	2,215

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	258	114.0	0	0	258
59.50	258	114.0	516	516	486

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'
#2	Device 3	60.50'	**15.0" Vert. overflow orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**8.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 12.15 hrs HW=60.84' (Free Discharge)
└─**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.55 cfs @ 12.15 hrs HW=60.84' (Free Discharge)
└─**3=Culvert** (Passes 0.55 cfs of 1.76 cfs potential flow)
  └─**2=overflow orifice** (Orifice Controls 0.55 cfs @ 2.00 fps)

Summary for Pond B3: bioretention system 3

GW from TP1

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB3 by 1.25' @ 14.15 hrs

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 5.25" for 25-year event
Inflow = 3.75 cfs @ 12.10 hrs, Volume= 10,909 cf
Outflow = 0.28 cfs @ 13.15 hrs, Volume= 10,187 cf, Atten= 92%, Lag= 62.9 min
Discarded = 0.11 cfs @ 13.15 hrs, Volume= 9,059 cf
Primary = 0.17 cfs @ 13.15 hrs, Volume= 1,128 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.85' @ 13.15 hrs Surf.Area= 1,639 sf Storage= 6,151 cf
Flood Elev= 61.00' Surf.Area= 1,639 sf Storage= 6,870 cf

Plug-Flow detention time= 512.2 min calculated for 10,187 cf (93% of inflow)
Center-of-Mass det. time= 476.9 min (1,281.1 - 804.2)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	5,886 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.00'	983 cf	**media storage (Irregular)**Listed below (Recalc) 3,278 cf Overall x 30.0% Voids
		6,870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	1,639	184.0	0	0	1,639
60.00	2,580	217.0	2,092	2,092	2,711
61.00	5,156	323.0	3,794	5,886	7,274

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.00	1,639	184.0	0	0	1,639
59.00	1,639	184.0	3,278	3,278	2,007

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	58.40'	**8.0" Round Culvert** L= 77.0' Ke= 0.500 Inlet / Outlet Invert= 58.40' / 57.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Discarded	57.00'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.01'

Discarded OutFlow Max=0.11 cfs @ 13.15 hrs HW=60.85' (Free Discharge)
└─**3=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=0.16 cfs @ 13.15 hrs HW=60.85' (Free Discharge)
└─**2=Culvert** (Passes 0.16 cfs of 2.10 cfs potential flow)
└─**1=Orifice/Grate** (Weir Controls 0.16 cfs @ 0.76 fps)

Summary for Pond B4: bioretention system 4

GW assumed based on surrounding data. confirmatory TP to be performed.

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB4 by 0.60' @ 14.35 hrs

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 4.76" for 25-year event
Inflow = 0.47 cfs @ 12.10 hrs, Volume= 1,463 cf
Outflow = 0.03 cfs @ 14.25 hrs, Volume= 1,463 cf, Atten= 94%, Lag= 129.0 min
Discarded = 0.03 cfs @ 14.25 hrs, Volume= 1,463 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.42' @ 14.25 hrs Surf.Area= 516 sf Storage= 800 cf
Flood Elev= 61.00' Surf.Area= 516 sf Storage= 1,358 cf

Plug-Flow detention time= 343.6 min calculated for 1,461 cf (100% of inflow)
Center-of-Mass det. time= 343.7 min (1,159.8 - 816.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	1,049 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	310 cf	**media storage (Irregular)**Listed below (Recalc) 1,032 cf Overall x 30.0% Voids
		1,358 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	391	79.0	0	0	391
60.00	516	88.0	226	226	518
61.00	1,174	135.0	823	1,049	1,359

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	516	88.0	0	0	516
59.50	516	88.0	1,032	1,032	692

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.10'

Discarded OutFlow Max=0.03 cfs @ 14.25 hrs HW=60.42' (Free Discharge)
└─**2=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond FB1: sediment forebay

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 4.79" for 25-year event
Inflow = 1.09 cfs @ 12.09 hrs, Volume= 3,483 cf
Outflow = 1.08 cfs @ 12.10 hrs, Volume= 3,391 cf, Atten= 1%, Lag= 0.8 min
Primary = 1.08 cfs @ 12.10 hrs, Volume= 3,391 cf
Routed to Pond B1 : bioretention system 1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.77' @ 12.10 hrs Surf.Area= 273 sf Storage= 159 cf
Flood Elev= 61.00' Surf.Area= 489 sf Storage= 627 cf

Plug-Flow detention time= 25.4 min calculated for 3,387 cf (97% of inflow)
Center-of-Mass det. time= 10.1 min (817.5 - 807.4)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	627 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	146	45.0	0	0	146
60.00	318	66.0	226	226	340
61.00	489	84.0	400	627	567

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.07 cfs @ 12.10 hrs HW=59.77' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.07 cfs @ 1.33 fps)

Summary for Pond FB2: sediment forebay

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 6.86" for 25-year event
Inflow = 0.67 cfs @ 12.09 hrs, Volume= 2,440 cf
Outflow = 0.67 cfs @ 12.09 hrs, Volume= 2,390 cf, Atten= 0%, Lag= 0.5 min
Primary = 0.67 cfs @ 12.09 hrs, Volume= 2,390 cf
Routed to Pond B2 : bioretention system 2

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Peak Elev= 60.95' @ 12.09 hrs Surf.Area= 123 sf Storage= 72 cf
Flood Elev= 61.00' Surf.Area= 130 sf Storage= 78 cf

Plug-Flow detention time= 26.5 min calculated for 2,390 cf (98% of inflow)
Center-of-Mass det. time= 13.2 min (756.0 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	78 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	1	1.0	0	0	1
60.00	28	23.0	6	6	43
61.00	130	44.0	73	78	160

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.66 cfs @ 12.09 hrs HW=60.95' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.66 cfs @ 1.12 fps)

Summary for Pond FB3: sediment forebay

[93] Warning: Storage range exceeded by 0.11'
[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 5.35" for 25-year event
Inflow = 3.41 cfs @ 12.09 hrs, Volume= 11,107 cf
Outflow = 3.75 cfs @ 12.10 hrs, Volume= 10,909 cf, Atten= 0%, Lag= 0.5 min
Primary = 3.75 cfs @ 12.10 hrs, Volume= 10,909 cf
Routed to Pond B3 : bioretention system 3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.11' @ 12.10 hrs Surf.Area= 586 sf Storage= 457 cf
Flood Elev= 61.00' Surf.Area= 586 sf Storage= 457 cf

Plug-Flow detention time= 20.4 min calculated for 10,894 cf (98% of inflow)
Center-of-Mass det. time= 9.6 min (804.2 - 794.6)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	457 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	340	70.0	0	0	340
60.00	586	91.0	457	457	621

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=3.70 cfs @ 12.10 hrs HW=60.11' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 3.70 cfs @ 2.03 fps)

Summary for Pond FB4: sediment forebay

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 4.90" for 25-year event
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 1,507 cf
Outflow = 0.47 cfs @ 12.10 hrs, Volume= 1,463 cf, Atten= 1%, Lag= 0.8 min
Primary = 0.47 cfs @ 12.10 hrs, Volume= 1,463 cf
Routed to Pond B4 : bioretention system 4

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.96' @ 12.10 hrs Surf.Area= 197 sf Storage= 72 cf
Flood Elev= 60.00' Surf.Area= 205 sf Storage= 81 cf

Plug-Flow detention time= 28.2 min calculated for 1,463 cf (97% of inflow)
Center-of-Mass det. time= 11.1 min (816.1 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	81 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	124	42.0	0	0	124
60.00	205	56.0	81	81	236

Device	Routing	Invert	Outlet Devices
#1	Primary	59.80'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.46 cfs @ 12.10 hrs HW=59.95' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.46 cfs @ 1.00 fps)

Summary for Pond IS1: infiltration 1

GW elevation from TP8

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 18,979 sf, 98.79% Impervious, Inflow Depth = 6.79" for 25-year event
Inflow = 2.96 cfs @ 12.09 hrs, Volume= 10,733 cf
Outflow = 1.50 cfs @ 12.23 hrs, Volume= 10,733 cf, Atten= 49%, Lag= 8.8 min
Discarded = 0.08 cfs @ 12.23 hrs, Volume= 5,525 cf
Primary = 1.42 cfs @ 12.23 hrs, Volume= 5,208 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.55' @ 12.23 hrs Surf.Area= 3,088 sf Storage= 3,472 cf
Flood Elev= 60.93' Surf.Area= 3,088 sf Storage= 3,939 cf

Plug-Flow detention time= 151.5 min calculated for 10,733 cf (100% of inflow)
Center-of-Mass det. time= 151.3 min (898.1 - 746.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.60'	2,174 cf	**41.50'W x 74.40'L x 2.33'H Field A** 7,204 cf Overall - 1,769 cf Embedded = 5,435 cf x 40.0% Voids
#2A	59.10'	1,769 cf	**ADS_StormTech SC-310 +Cap** x 120 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 12 Rows
		3,943 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	58.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 54.60' Phase-In= 0.01'
#2	Primary	59.50'	**8.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 59.50' / 57.25' S= 0.0703 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.08 cfs @ 12.23 hrs HW=60.55' (Free Discharge)
└**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=1.42 cfs @ 12.23 hrs HW=60.55' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.42 cfs @ 4.07 fps)

Summary for Pond IS2: infiltration 2

GW from TP5

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 32,183 sf, 98.22% Impervious, Inflow Depth = 6.78" for 25-year event
Inflow = 5.01 cfs @ 12.09 hrs, Volume= 18,189 cf
Outflow = 2.07 cfs @ 12.30 hrs, Volume= 18,189 cf, Atten= 59%, Lag= 12.7 min
Discarded = 0.15 cfs @ 12.30 hrs, Volume= 11,921 cf
Primary = 1.92 cfs @ 12.30 hrs, Volume= 6,268 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.68' @ 12.30 hrs Surf.Area= 6,032 sf Storage= 6,910 cf
Flood Elev= 60.03' Surf.Area= 6,032 sf Storage= 7,744 cf

Plug-Flow detention time= 239.2 min calculated for 18,164 cf (100% of inflow)
Center-of-Mass det. time= 239.5 min (986.5 - 746.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	57.70'	4,214 cf	**51.50'W x 117.12'L x 2.33'H Field A** 14,074 cf Overall - 3,538 cf Embedded = 10,536 cf x 40.0% Voids
#2A	58.20'	3,538 cf	**ADS_StormTech SC-310 +Cap** x 240 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 240 Chambers in 15 Rows
		7,752 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.70'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 53.70' Phase-In= 0.01'
#2	Primary	58.92'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 58.92' / 58.00' S= 0.0460 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.15 cfs @ 12.30 hrs HW=59.68' (Free Discharge)
└**1=Exfiltration** (Controls 0.15 cfs)

Primary OutFlow Max=1.92 cfs @ 12.30 hrs HW=59.68' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.92 cfs @ 2.98 fps)

Summary for Pond IS3: infiltration 3

GW from TP2

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 6.86" for 25-year event
Inflow = 0.88 cfs @ 12.09 hrs, Volume= 3,234 cf
Outflow = 0.04 cfs @ 14.23 hrs, Volume= 3,234 cf, Atten= 95%, Lag= 128.3 min
Discarded = 0.04 cfs @ 14.23 hrs, Volume= 3,234 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 1R : continuity reach

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.97' @ 14.23 hrs Surf.Area= 1,972 sf Storage= 1,549 cf
Flood Elev= 61.60' Surf.Area= 1,972 sf Storage= 2,057 cf

Plug-Flow detention time= 314.5 min calculated for 3,229 cf (100% of inflow)
Center-of-Mass det. time= 314.5 min (1,057.2 - 742.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.60'	1,257 cf	**20.75'W x 95.03'L x 2.00'H Field A** 3,944 cf Overall - 800 cf Embedded = 3,144 cf x 40.0% Voids
#2A	60.10'	800 cf	**ADS_StormTech SC-160LP +Cap** x 117 Inside #1 Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap 117 Chambers in 9 Rows
		2,057 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	61.60'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	59.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 55.60' Phase-In= 0.01'

Discarded OutFlow Max=0.04 cfs @ 14.23 hrs HW=60.97' (Free Discharge)
└**1=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=59.60' (Free Discharge)

Summary for Link SP1: Study Point

Inflow Area = 180,997 sf, 40.18% Impervious, Inflow Depth = 2.32" for 25-year event
Inflow = 8.36 cfs @ 12.22 hrs, Volume= 35,010 cf
Primary = 8.36 cfs @ 12.22 hrs, Volume= 35,010 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 9,321 sf, 0.00% Impervious, Inflow Depth = 2.77" for 25-year event
Inflow = 0.67 cfs @ 12.10 hrs, Volume= 2,155 cf
Primary = 0.67 cfs @ 12.10 hrs, Volume= 2,155 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 28,777 sf, 60.23% Impervious, Inflow Depth = 1.86" for 25-year event
Inflow = 1.55 cfs @ 12.11 hrs, Volume= 4,461 cf
Primary = 1.55 cfs @ 12.11 hrs, Volume= 4,461 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 5,412 sf, 0.00% Impervious, Inflow Depth = 2.77" for 25-year event
Inflow = 0.34 cfs @ 12.15 hrs, Volume= 1,251 cf
Primary = 0.34 cfs @ 12.15 hrs, Volume= 1,251 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1: Subcat P-1 Runoff Area=96,521 sf 0.06% Impervious Runoff Depth=3.49"
Flow Length=85' Tc=13.7 min CN=58 Runoff=6.90 cfs 28,043 cf

Subcatchment P-10: Subcat P-10 Runoff Area=7,046 sf 100.00% Impervious Runoff Depth=8.27"
Tc=6.0 min CN=98 Runoff=1.32 cfs 4,856 cf

Subcatchment P-11: Subcat P-11 Runoff Area=2,310 sf 85.16% Impervious Runoff Depth=7.67"
Tc=6.0 min CN=93 Runoff=0.42 cfs 1,476 cf

Subcatchment P-12: Subcat P-12 Runoff Area=4,268 sf 100.00% Impervious Runoff Depth=8.27"
Tc=6.0 min CN=98 Runoff=0.80 cfs 2,942 cf

Subcatchment P-13: Subcat P-13 Runoff Area=4,999 sf 98.84% Impervious Runoff Depth=8.27"
Tc=6.0 min CN=98 Runoff=0.94 cfs 3,445 cf

Subcatchment P-14: Subcat P-14 Runoff Area=24,922 sf 65.26% Impervious Runoff Depth=6.71"
Tc=6.0 min CN=85 Runoff=4.22 cfs 13,928 cf

Subcatchment P-15: Subcat P-15 Runoff Area=11,933 sf 98.07% Impervious Runoff Depth=8.15"
Tc=6.0 min CN=97 Runoff=2.23 cfs 8,104 cf

Subcatchment P-16: Subcat P-16 Runoff Area=3,691 sf 53.10% Impervious Runoff Depth=6.22"
Tc=6.0 min CN=81 Runoff=0.59 cfs 1,915 cf

Subcatchment P-2: Subcat P-2 Runoff Area=9,321 sf 0.00% Impervious Runoff Depth=3.84"
Tc=6.0 min CN=61 Runoff=0.94 cfs 2,981 cf

Subcatchment P-3: Subcat P-3 Runoff Area=10,121 sf 28.87% Impervious Runoff Depth=5.14"
Tc=6.0 min CN=72 Runoff=1.37 cfs 4,339 cf

Subcatchment P-4: Subcat E-4 Runoff Area=5,412 sf 0.00% Impervious Runoff Depth=3.84"
Flow Length=162' Tc=9.6 min CN=61 Runoff=0.48 cfs 1,731 cf

Subcatchment P-5: Subcat P-5 Runoff Area=21,307 sf 97.31% Impervious Runoff Depth=8.15"
Tc=6.0 min CN=97 Runoff=3.98 cfs 14,471 cf

Subcatchment P-6: Subcat P-6 Runoff Area=2,391 sf 88.45% Impervious Runoff Depth=7.79"
Tc=6.0 min CN=94 Runoff=0.44 cfs 1,552 cf

Subcatchment P-7: Subcat P-7 Runoff Area=8,731 sf 52.04% Impervious Runoff Depth=6.10"
Tc=6.0 min CN=80 Runoff=1.38 cfs 4,442 cf

Subcatchment P-8: Subcat P-8 Runoff Area=10,876 sf 100.00% Impervious Runoff Depth=8.27"
Tc=6.0 min CN=98 Runoff=2.04 cfs 7,495 cf

Subcatchment P-9: Subcat P-9 Runoff Area=657 sf 100.00% Impervious Runoff Depth=8.27"
Tc=6.0 min CN=98 Runoff=0.12 cfs 453 cf

Reach 1R: continuity reach Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Pond B1: bioretention system 1 Peak Elev=60.73' Storage=2,484 cf Inflow=1.37 cfs 4,350 cf
Discarded=0.05 cfs 3,984 cf Primary=0.05 cfs 267 cf Outflow=0.10 cfs 4,251 cf

Pond B2: bioretention system 2 Peak Elev=60.88' Storage=655 cf Inflow=0.80 cfs 2,891 cf
Discarded=0.02 cfs 1,318 cf Primary=0.67 cfs 1,573 cf Outflow=0.69 cfs 2,891 cf

Pond B3: bioretention system 3 Peak Elev=60.97' Storage=6,723 cf Inflow=4.22 cfs 13,730 cf
Discarded=0.11 cfs 9,415 cf Primary=0.92 cfs 3,403 cf Outflow=1.03 cfs 12,818 cf

Pond B4: bioretention system 4 Peak Elev=60.74' Storage=1,082 cf Inflow=0.59 cfs 1,871 cf
Discarded=0.03 cfs 1,871 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 1,871 cf

Pond FB1: sediment forebay Peak Elev=59.82' Storage=171 cf Inflow=1.38 cfs 4,442 cf
Outflow=1.37 cfs 4,350 cf

Pond FB2: sediment forebay Peak Elev=60.97' Storage=75 cf Inflow=0.80 cfs 2,942 cf
Outflow=0.80 cfs 2,891 cf

Pond FB3: sediment forebay Peak Elev=60.16' Storage=457 cf Inflow=4.22 cfs 13,928 cf
Outflow=4.22 cfs 13,730 cf

Pond FB4: sediment forebay Peak Elev=59.98' Storage=78 cf Inflow=0.59 cfs 1,915 cf
Outflow=0.59 cfs 1,871 cf

Pond IS1: infiltration 1 Peak Elev=60.93' Storage=3,942 cf Inflow=3.55 cfs 12,960 cf
Discarded=0.08 cfs 5,893 cf Primary=1.76 cfs 7,067 cf Outflow=1.84 cfs 12,960 cf

Pond IS2: infiltration 2 Peak Elev=60.02' Storage=7,729 cf Inflow=6.02 cfs 21,966 cf
Discarded=0.16 cfs 12,650 cf Primary=2.94 cfs 9,315 cf Outflow=3.10 cfs 21,966 cf

Pond IS3: infiltration 3 Peak Elev=61.49' Storage=1,974 cf Inflow=1.06 cfs 3,898 cf
Discarded=0.05 cfs 3,898 cf Primary=0.00 cfs 0 cf Outflow=0.05 cfs 3,898 cf

Link SP1: Study Point Inflow=12.08 cfs 50,858 cf
Primary=12.08 cfs 50,858 cf

Link SP2: Study Point Inflow=0.94 cfs 2,981 cf
Primary=0.94 cfs 2,981 cf

Link SP3: Study Point Inflow=1.99 cfs 6,180 cf
Primary=1.99 cfs 6,180 cf

Link SP4: Study Point Inflow=0.48 cfs 1,731 cf
Primary=0.48 cfs 1,731 cf

Total Runoff Area = 224,507 sf Runoff Volume = 102,173 cf Average Runoff Depth = 5.46"
59.89% Pervious = 134,448 sf 40.11% Impervious = 90,059 sf

Summary for Subcatchment P-1: Subcat P-1

Runoff = 6.90 cfs @ 12.20 hrs, Volume= 28,043 cf, Depth= 3.49"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
33,219	61	>75% Grass cover, Good, HSG B
478	74	>75% Grass cover, Good, HSG C
57,731	55	Woods, Good, HSG B
5,030	70	Woods, Good, HSG C
63	98	Paved parking, HSG B
96,521	58	Weighted Average
96,458		99.94% Pervious Area
63		0.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	50	0.0200	0.07		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 3.28"
1.5	35	0.0060	0.39		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
13.7	85	Total			

Summary for Subcatchment P-10: Subcat P-10

Runoff = 1.32 cfs @ 12.09 hrs, Volume= 4,856 cf, Depth= 8.27"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
7,046	98	Roofs, HSG B
7,046		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-11: Subcat P-11

Runoff = 0.42 cfs @ 12.09 hrs, Volume= 1,476 cf, Depth= 7.67"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
35	98	Paved parking, HSG C
343	61	>75% Grass cover, Good, HSG B
1,933	98	Paved parking, HSG B
2,310	93	Weighted Average
343		14.84% Pervious Area
1,967		85.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-12: Subcat P-12

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 2,942 cf, Depth= 8.27"
Routed to Pond FB2 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
4,268	98	Paved parking, HSG B
4,268		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-13: Subcat P-13

Runoff = 0.94 cfs @ 12.09 hrs, Volume= 3,445 cf, Depth= 8.27"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
4,941	98	Paved parking, HSG B
58	61	>75% Grass cover, Good, HSG B
4,999	98	Weighted Average
58		1.16% Pervious Area
4,941		98.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-14: Subcat P-14

Runoff = 4.22 cfs @ 12.09 hrs, Volume= 13,928 cf, Depth= 6.71"
Routed to Pond FB3 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
8,658	61	>75% Grass cover, Good, HSG B
16,263	98	Paved parking, HSG B
24,922	85	Weighted Average
8,658		34.74% Pervious Area
16,263		65.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-15: Subcat P-15

Runoff = 2.23 cfs @ 12.09 hrs, Volume= 8,104 cf, Depth= 8.15"
Routed to Pond IS1 : infiltration 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
230	61	>75% Grass cover, Good, HSG B
11,703	98	Paved parking, HSG B
11,933	97	Weighted Average
230		1.93% Pervious Area
11,703		98.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-16: Subcat P-16

Runoff = 0.59 cfs @ 12.09 hrs, Volume= 1,915 cf, Depth= 6.22"
Routed to Pond FB4 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
1,960	98	Paved parking, HSG B
1,731	61	>75% Grass cover, Good, HSG B
3,691	81	Weighted Average
1,731		46.90% Pervious Area
1,960		53.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-2: Subcat P-2

Runoff = 0.94 cfs @ 12.10 hrs, Volume= 2,981 cf, Depth= 3.84"
Routed to Link SP2 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
9,321	61	>75% Grass cover, Good, HSG B
9,321		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 min**

Summary for Subcatchment P-3: Subcat P-3

Runoff = 1.37 cfs @ 12.09 hrs, Volume= 4,339 cf, Depth= 5.14"
Routed to Link SP3 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
7,199	61	>75% Grass cover, Good, HSG B
2,922	98	Paved parking, HSG B
10,121	72	Weighted Average
7,199		71.13% Pervious Area
2,922		28.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-4: Subcat E-4

Runoff = 0.48 cfs @ 12.14 hrs, Volume= 1,731 cf, Depth= 3.84"
Routed to Link SP4 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
5,412	61	>75% Grass cover, Good, HSG B
5,412		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	50	0.0200	0.10		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.28"
1.5	112	0.0310	1.23		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.6	162	Total			

Summary for Subcatchment P-5: Subcat P-5

Runoff = 3.98 cfs @ 12.09 hrs, Volume= 14,471 cf, Depth= 8.15"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
574	61	>75% Grass cover, Good, HSG B
20,733	98	Paved parking, HSG B
21,307	97	Weighted Average
574		2.69% Pervious Area
20,733		97.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-6: Subcat P-6

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 1,552 cf, Depth= 7.79"
Routed to Link SP1 : Study Point

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
276	61	>75% Grass cover, Good, HSG B
2,115	98	Paved parking, HSG B
2,391	94	Weighted Average
276		11.55% Pervious Area
2,115		88.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-7: Subcat P-7

Runoff = 1.38 cfs @ 12.09 hrs, Volume= 4,442 cf, Depth= 6.10"
Routed to Pond FB1 : sediment forebay

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
4,544	98	Paved parking, HSG B
4,188	61	>75% Grass cover, Good, HSG B
8,731	80	Weighted Average
4,188		47.96% Pervious Area
4,544		52.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-8: Subcat P-8

Runoff = 2.04 cfs @ 12.09 hrs, Volume= 7,495 cf, Depth= 8.27"
Routed to Pond IS2 : infiltration 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
10,876	98	Roofs, HSG B
10,876		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Subcatchment P-9: Subcat P-9

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 453 cf, Depth= 8.27"
Routed to Pond IS3 : infiltration 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 50-year Rainfall=8.51"

Area (sf)	CN	Description
657	98	Roofs, HSG B
657		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, TR-55 MIN**

Summary for Reach 1R: continuity reach

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

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 0.00" for 50-year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Routed to Link SP3 : Study Point

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Pond B1: bioretention system 1

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB1 by 1.18' @ 13.85 hrs

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 5.98" for 50-year event
Inflow = 1.37 cfs @ 12.10 hrs, Volume= 4,350 cf
Outflow = 0.10 cfs @ 13.53 hrs, Volume= 4,251 cf, Atten= 93%, Lag= 85.6 min
Discarded = 0.05 cfs @ 13.53 hrs, Volume= 3,984 cf
Primary = 0.05 cfs @ 13.53 hrs, Volume= 267 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.73' @ 13.53 hrs Surf.Area= 571 sf Storage= 2,484 cf
Flood Elev= 61.00' Surf.Area= 571 sf Storage= 3,054 cf

Plug-Flow detention time= 488.5 min calculated for 4,245 cf (98% of inflow)
Center-of-Mass det. time= 475.4 min (1,285.0 - 809.6)

Volume	Invert	Avail.Storage	Storage Description
#1	58.50'	2,712 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	56.50'	343 cf	**media storage (Irregular)**Listed below (Recalc) 1,142 cf Overall x 30.0% Voids
		3,054 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
58.50	365	133.0	0	0	365
59.00	571	142.0	232	232	574
60.00	1,101	180.0	822	1,054	1,561
61.00	2,286	255.0	1,658	2,712	4,166

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
56.50	571	142.0	0	0	571
58.50	571	142.0	1,142	1,142	855

Device	Routing	Invert	Outlet Devices
#1	Primary	60.70'	**4.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Discarded	56.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'

Discarded OutFlow Max=0.05 cfs @ 13.53 hrs HW=60.73' (Free Discharge)
└**2=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.05 cfs @ 13.53 hrs HW=60.73' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.05 cfs @ 0.40 fps)

Summary for Pond B2: bioretention system 2

GW from TP4

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[79] Warning: Submerged Pond FB2 Primary device # 1 by 0.13'

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 8.13" for 50-year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 2,891 cf
Outflow = 0.69 cfs @ 12.15 hrs, Volume= 2,891 cf, Atten= 14%, Lag= 3.1 min
Discarded = 0.02 cfs @ 12.15 hrs, Volume= 1,318 cf
Primary = 0.67 cfs @ 12.15 hrs, Volume= 1,573 cf
Routed to Link SP3 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.88' @ 12.15 hrs Surf.Area= 258 sf Storage= 655 cf
Flood Elev= 61.00' Surf.Area= 258 sf Storage= 743 cf

Plug-Flow detention time= 152.7 min calculated for 2,891 cf (100% of inflow)
Center-of-Mass det. time= 152.6 min (904.5 - 751.9)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	588 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	155 cf	**media storage (Irregular)**Listed below (Recalc) 516 cf Overall x 30.0% Voids
		743 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	98	88.0	0	0	98
60.00	258	114.0	86	86	519
61.00	796	185.0	502	588	2,215

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	258	114.0	0	0	258
59.50	258	114.0	516	516	486

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.20' Phase-In= 0.01'
#2	Device 3	60.50'	**15.0" Vert. overflow orifice** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**8.0" Round Culvert** L= 98.0' Ke= 0.500 Inlet / Outlet Invert= 58.00' / 57.50' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.02 cfs @ 12.15 hrs HW=60.88' (Free Discharge)
└─**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.67 cfs @ 12.15 hrs HW=60.88' (Free Discharge)
└─**3=Culvert** (Passes 0.67 cfs of 1.77 cfs potential flow)
└─**2=overflow orifice** (Orifice Controls 0.67 cfs @ 2.10 fps)

Summary for Pond B3: bioretention system 3

GW from TP1

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB3 by 1.27' @ 12.70 hrs

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 6.61" for 50-year event
Inflow = 4.22 cfs @ 12.09 hrs, Volume= 13,730 cf
Outflow = 1.03 cfs @ 12.50 hrs, Volume= 12,818 cf, Atten= 76%, Lag= 24.8 min
Discarded = 0.11 cfs @ 12.50 hrs, Volume= 9,415 cf
Primary = 0.92 cfs @ 12.50 hrs, Volume= 3,403 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.97' @ 12.50 hrs Surf.Area= 1,639 sf Storage= 6,723 cf
Flood Elev= 61.00' Surf.Area= 1,639 sf Storage= 6,870 cf

Plug-Flow detention time= 424.2 min calculated for 12,800 cf (93% of inflow)
Center-of-Mass det. time= 389.5 min (1,186.6 - 797.1)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	5,886 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.00'	983 cf	**media storage (Irregular)**Listed below (Recalc) 3,278 cf Overall x 30.0% Voids
		6,870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	1,639	184.0	0	0	1,639
60.00	2,580	217.0	2,092	2,092	2,711
61.00	5,156	323.0	3,794	5,886	7,274

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.00	1,639	184.0	0	0	1,639
59.00	1,639	184.0	3,278	3,278	2,007

Device	Routing	Invert	Outlet Devices
#1	Device 2	60.80'	**15.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	58.40'	**8.0" Round Culvert** L= 77.0' Ke= 0.500 Inlet / Outlet Invert= 58.40' / 57.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Discarded	57.00'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.01'

Discarded OutFlow Max=0.11 cfs @ 12.50 hrs HW=60.97' (Free Discharge)
└─**3=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=0.91 cfs @ 12.50 hrs HW=60.97' (Free Discharge)
└─**2=Culvert** (Passes 0.91 cfs of 2.14 cfs potential flow)
└─**1=Orifice/Grate** (Weir Controls 0.91 cfs @ 1.35 fps)

Summary for Pond B4: bioretention system 4

GW assumed based on surrounding data. confirmatory TP to be performed.

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

---

[81] Warning: Exceeded Pond FB4 by 0.92' @ 14.95 hrs

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 6.08" for 50-year event
Inflow = 0.59 cfs @ 12.10 hrs, Volume= 1,871 cf
Outflow = 0.03 cfs @ 14.81 hrs, Volume= 1,871 cf, Atten= 95%, Lag= 162.5 min
Discarded = 0.03 cfs @ 14.81 hrs, Volume= 1,871 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.74' @ 14.81 hrs Surf.Area= 516 sf Storage= 1,082 cf
Flood Elev= 61.00' Surf.Area= 516 sf Storage= 1,358 cf

Plug-Flow detention time= 429.4 min calculated for 1,868 cf (100% of inflow)
Center-of-Mass det. time= 429.6 min (1,237.8 - 808.2)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	1,049 cf	**surface storage (Irregular)**Listed below (Recalc) -Impervious
#2	57.50'	310 cf	**media storage (Irregular)**Listed below (Recalc) 1,032 cf Overall x 30.0% Voids
		1,358 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	391	79.0	0	0	391
60.00	516	88.0	226	226	518
61.00	1,174	135.0	823	1,049	1,359

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
57.50	516	88.0	0	0	516
59.50	516	88.0	1,032	1,032	692

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**5.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	57.50'	**0.720 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 55.50' Phase-In= 0.10'

Discarded OutFlow Max=0.03 cfs @ 14.81 hrs HW=60.74' (Free Discharge)
└─**2=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond FB1: sediment forebay

Inflow Area = 8,731 sf, 52.04% Impervious, Inflow Depth = 6.10" for 50-year event
Inflow = 1.38 cfs @ 12.09 hrs, Volume= 4,442 cf
Outflow = 1.37 cfs @ 12.10 hrs, Volume= 4,350 cf, Atten= 0%, Lag= 0.7 min
Primary = 1.37 cfs @ 12.10 hrs, Volume= 4,350 cf
Routed to Pond B1 : bioretention system 1

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.82' @ 12.10 hrs Surf.Area= 281 sf Storage= 171 cf
Flood Elev= 61.00' Surf.Area= 489 sf Storage= 627 cf

Plug-Flow detention time= 21.5 min calculated for 4,350 cf (98% of inflow)
Center-of-Mass det. time= 9.0 min (809.6 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	627 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	146	45.0	0	0	146
60.00	318	66.0	226	226	340
61.00	489	84.0	400	627	567

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=1.36 cfs @ 12.10 hrs HW=59.81' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.36 cfs @ 1.45 fps)

Summary for Pond FB2: sediment forebay

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 4,268 sf,100.00% Impervious, Inflow Depth = 8.27" for 50-year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 2,942 cf
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 2,891 cf, Atten= 0%, Lag= 0.5 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 2,891 cf
Routed to Pond B2 : bioretention system 2

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.97' @ 12.09 hrs Surf.Area= 126 sf Storage= 75 cf
Flood Elev= 61.00' Surf.Area= 130 sf Storage= 78 cf

Plug-Flow detention time= 22.7 min calculated for 2,891 cf (98% of inflow)
Center-of-Mass det. time= 11.5 min (751.9 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	78 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	1	1.0	0	0	1
60.00	28	23.0	6	6	43
61.00	130	44.0	73	78	160

Device	Routing	Invert	Outlet Devices
#1	Primary	60.75'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.79 cfs @ 12.09 hrs HW=60.97' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.79 cfs @ 1.19 fps)

Summary for Pond FB3: sediment forebay

[93] Warning: Storage range exceeded by 0.16'

Inflow Area = 24,922 sf, 65.26% Impervious, Inflow Depth = 6.71" for 50-year event
Inflow = 4.22 cfs @ 12.09 hrs, Volume= 13,928 cf
Outflow = 4.22 cfs @ 12.09 hrs, Volume= 13,730 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.22 cfs @ 12.09 hrs, Volume= 13,730 cf
Routed to Pond B3 : bioretention system 3

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.16' @ 12.09 hrs Surf.Area= 586 sf Storage= 457 cf
Flood Elev= 61.00' Surf.Area= 586 sf Storage= 457 cf

Plug-Flow detention time= 17.4 min calculated for 13,711 cf (98% of inflow)
Center-of-Mass det. time= 8.7 min (797.1 - 788.4)

Volume	Invert	Avail.Storage	Storage Description
#1	59.00'	457 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.00	340	70.0	0	0	340
60.00	586	91.0	457	457	621

Device	Routing	Invert	Outlet Devices
#1	Primary	59.50'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=4.12 cfs @ 12.09 hrs HW=60.15' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 4.12 cfs @ 2.11 fps)

Summary for Pond FB4: sediment forebay

Inflow Area = 3,691 sf, 53.10% Impervious, Inflow Depth = 6.22" for 50-year event
Inflow = 0.59 cfs @ 12.09 hrs, Volume= 1,915 cf
Outflow = 0.59 cfs @ 12.10 hrs, Volume= 1,871 cf, Atten= 0%, Lag= 0.7 min
Primary = 0.59 cfs @ 12.10 hrs, Volume= 1,871 cf
Routed to Pond B4 : bioretention system 4

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 59.98' @ 12.10 hrs Surf.Area= 202 sf Storage= 78 cf
Flood Elev= 60.00' Surf.Area= 205 sf Storage= 81 cf

Plug-Flow detention time= 23.5 min calculated for 1,868 cf (98% of inflow)
Center-of-Mass det. time= 9.9 min (808.2 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	59.50'	81 cf	**surface storage (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
59.50	124	42.0	0	0	124
60.00	205	56.0	81	81	236

Device	Routing	Invert	Outlet Devices
#1	Primary	59.80'	**3.0' long x 2.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.59 cfs @ 12.10 hrs HW=59.98' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.59 cfs @ 1.08 fps)

Summary for Pond IS1: infiltration 1

GW elevation from TP8

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 18,979 sf, 98.79% Impervious, Inflow Depth = 8.19" for 50-year event
Inflow = 3.55 cfs @ 12.09 hrs, Volume= 12,960 cf
Outflow = 1.84 cfs @ 12.23 hrs, Volume= 12,960 cf, Atten= 48%, Lag= 8.4 min
Discarded = 0.08 cfs @ 12.23 hrs, Volume= 5,893 cf
Primary = 1.76 cfs @ 12.23 hrs, Volume= 7,067 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.93' @ 12.23 hrs Surf.Area= 3,088 sf Storage= 3,942 cf
Flood Elev= 60.93' Surf.Area= 3,088 sf Storage= 3,939 cf

Plug-Flow detention time= 139.9 min calculated for 12,942 cf (100% of inflow)
Center-of-Mass det. time= 140.2 min (884.2 - 744.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	58.60'	2,174 cf	**41.50'W x 74.40'L x 2.33'H Field A** 7,204 cf Overall - 1,769 cf Embedded = 5,435 cf x 40.0% Voids
#2A	59.10'	1,769 cf	**ADS_StormTech SC-310 +Cap** x 120 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 120 Chambers in 12 Rows
		3,943 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	58.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 54.60' Phase-In= 0.01'
#2	Primary	59.50'	**8.0" Round Culvert** L= 32.0' Ke= 0.500 Inlet / Outlet Invert= 59.50' / 57.25' S= 0.0703 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.08 cfs @ 12.23 hrs HW=60.93' (Free Discharge)
└**1=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=1.76 cfs @ 12.23 hrs HW=60.93' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.76 cfs @ 5.03 fps)

Summary for Pond IS2: infiltration 2

GW from TP5

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 32,183 sf, 98.22% Impervious, Inflow Depth = 8.19" for 50-year event
Inflow = 6.02 cfs @ 12.09 hrs, Volume= 21,966 cf
Outflow = 3.10 cfs @ 12.23 hrs, Volume= 21,966 cf, Atten= 49%, Lag= 8.6 min
Discarded = 0.16 cfs @ 12.23 hrs, Volume= 12,650 cf
Primary = 2.94 cfs @ 12.23 hrs, Volume= 9,315 cf
Routed to Link SP1 : Study Point

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 60.02' @ 12.23 hrs Surf.Area= 6,032 sf Storage= 7,729 cf
Flood Elev= 60.03' Surf.Area= 6,032 sf Storage= 7,744 cf

Plug-Flow detention time= 216.5 min calculated for 21,935 cf (100% of inflow)
Center-of-Mass det. time= 216.9 min (961.1 - 744.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	57.70'	4,214 cf	**51.50'W x 117.12'L x 2.33'H Field A** 14,074 cf Overall - 3,538 cf Embedded = 10,536 cf x 40.0% Voids
#2A	58.20'	3,538 cf	**ADS_StormTech SC-310 +Cap** x 240 Inside #1 Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 240 Chambers in 15 Rows
		7,752 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	57.70'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 53.70' Phase-In= 0.01'
#2	Primary	58.92'	**12.0" Round Culvert** L= 20.0' Ke= 0.500 Inlet / Outlet Invert= 58.92' / 58.00' S= 0.0460 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.16 cfs @ 12.23 hrs HW=60.02' (Free Discharge)
└**1=Exfiltration** (Controls 0.16 cfs)

Primary OutFlow Max=2.93 cfs @ 12.23 hrs HW=60.02' (Free Discharge)
└**2=Culvert** (Inlet Controls 2.93 cfs @ 3.73 fps)

Summary for Pond IS3: infiltration 3

GW from TP2

NRCS Soil Report shows the site to be Urban Land soil type. No Ksat is provided. Assumed Ksat for adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes. 10.1993 micrometers per second = 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Inflow Area = 5,656 sf, 98.97% Impervious, Inflow Depth = 8.27" for 50-year event
Inflow = 1.06 cfs @ 12.09 hrs, Volume= 3,898 cf
Outflow = 0.05 cfs @ 14.57 hrs, Volume= 3,898 cf, Atten= 95%, Lag= 149.1 min
Discarded = 0.05 cfs @ 14.57 hrs, Volume= 3,898 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Reach 1R : continuity reach

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 61.49' @ 14.57 hrs Surf.Area= 1,972 sf Storage= 1,974 cf
Flood Elev= 61.60' Surf.Area= 1,972 sf Storage= 2,057 cf

Plug-Flow detention time= 382.6 min calculated for 3,893 cf (100% of inflow)
Center-of-Mass det. time= 382.7 min (1,123.2 - 740.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	59.60'	1,257 cf	**20.75'W x 95.03'L x 2.00'H Field A** 3,944 cf Overall - 800 cf Embedded = 3,144 cf x 40.0% Voids
#2A	60.10'	800 cf	**ADS_StormTech SC-160LP +Cap** x 117 Inside #1 Effective Size= 18.0"W x 12.0"H => 0.96 sf x 7.12'L = 6.8 cf Overall Size= 25.0"W x 12.0"H x 7.56'L with 0.44' Overlap 117 Chambers in 9 Rows
		2,057 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#0	Primary	61.60'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	59.60'	**0.720 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 55.60' Phase-In= 0.01'

Discarded OutFlow Max=0.05 cfs @ 14.57 hrs HW=61.49' (Free Discharge)
└**1=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=59.60' (Free Discharge)

Summary for Link SP1: Study Point

Inflow Area = 180,997 sf, 40.18% Impervious, Inflow Depth = 3.37" for 50-year event
Inflow = 12.08 cfs @ 12.20 hrs, Volume= 50,858 cf
Primary = 12.08 cfs @ 12.20 hrs, Volume= 50,858 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP2: Study Point

Inflow Area = 9,321 sf, 0.00% Impervious, Inflow Depth = 3.84" for 50-year event
Inflow = 0.94 cfs @ 12.10 hrs, Volume= 2,981 cf
Primary = 0.94 cfs @ 12.10 hrs, Volume= 2,981 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP3: Study Point

Inflow Area = 28,777 sf, 60.23% Impervious, Inflow Depth = 2.58" for 50-year event
Inflow = 1.99 cfs @ 12.10 hrs, Volume= 6,180 cf
Primary = 1.99 cfs @ 12.10 hrs, Volume= 6,180 cf, Atten= 0%, Lag= 0.0 min

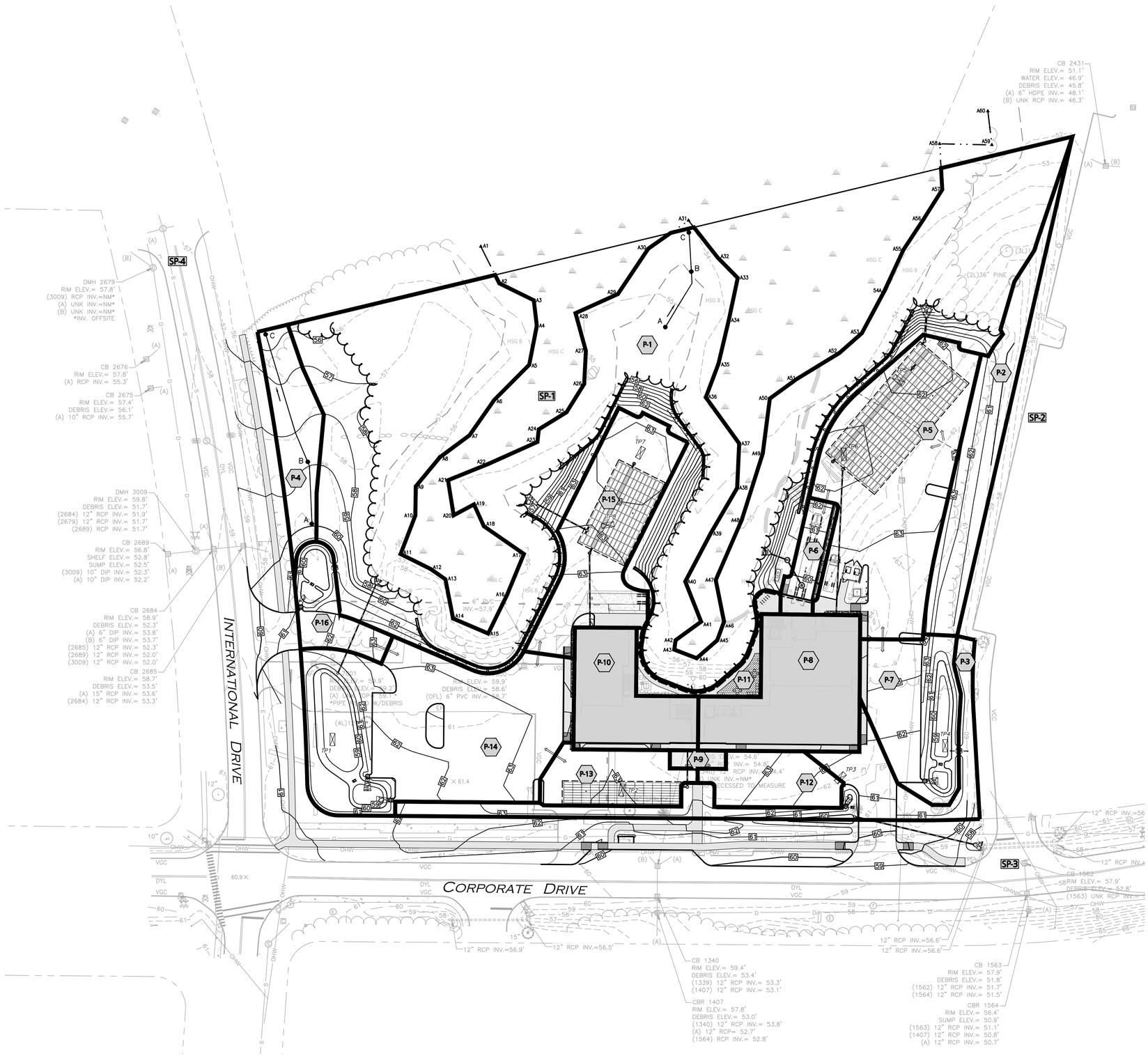
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Summary for Link SP4: Study Point

Inflow Area = 5,412 sf, 0.00% Impervious, Inflow Depth = 3.84" for 50-year event
Inflow = 0.48 cfs @ 12.14 hrs, Volume= 1,731 cf
Primary = 0.48 cfs @ 12.14 hrs, Volume= 1,731 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Proposed Watershed Plan



LEGEND

SUBCATCHMENT BOUNDARY	
SUBCATCHMENT LABEL	P-1
Tc FLOW PATH	A — B
SCS SOILS BOUNDARY	
FLOW DIRECTION	⟹

PLAN NOTES:

1. THE EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED TO ALLEN & MAJOR ASSOCIATES, INC. (A&M) BY THE APPLICANT AND ARE TAKEN FROM A DRAWING ENTITLED "EXISTING CONDITIONS PLAN FOR ATDG, LLC", PREPARED BY DOUCET SURVEY LLC, DATED APRIL 5, 2023.

2. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. IT'S INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 40'	DWG. NAME: C-3250-01.dwg	
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
PROPOSED WATERSHED PLAN

SHEET No.
PWS-1

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_WATERSHED-PROPOSED.DWG

SECTION 7.0 -
APPENDIX

AoT Application & AoT Permit

ALTERATION OF TERRAIN PERMIT APPLICATION

Water Division/ Alteration of Terrain Bureau/ Land Resources Management
Check the Status of your Application: www.des.nh.gov/onestop

RSA/ Rule: RSA 485-A:17, Env-Wq 1500

Administrative Use Only	Administrative Use Only	Administrative Use Only	File Number:
			Check No.
			Amount:
			Initials:

1. APPLICANT INFORMATION (INTENDED PERMIT HOLDER)		
Applicant Name: ATDG, LLC	Contact Name: Dr. Alex Slocum	
Email: ahslocum@gmail.com	Daytime Telephone: (603) 799-6787	
Mailing Address: 7 Sinclair Drive		
Town/City: Exeter	State: NH	Zip Code: 03833
2. APPLICANT'S AGENT INFORMATION If none, check here: ☐		
Business Name: Apex Design Build	Contact Name: Raquelle Kemnitz, Project Coordinator	
Email: raquellek@apexdesignbuild.net	Daytime Telephone: 708.610.5000	
Address: 9550 W. Higgins Road, Ste 170		
Town/City: Rosemont	State: IL	Zip Code: 60018
3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)		
Applicant Name: Pease Development Authority	Contact Name: Michael Mates	
Email: m.mates@peasedev.org	Daytime Telephone: (603) 433-6088	
Mailing Address: 55 International Drive		
Town/City: Portsmouth	State: NH	Zip Code: 03801
4. PROPERTY OWNER'S AGENT INFORMATION If none, check here: ☒		
Business Name:	Contact Name:	
Email:	Daytime Telephone:	
Address:		
Town/City:	State:	Zip Code:
5. CONSULTANT INFORMATION If none, check here: ☐		
Engineering Firm: Allen & Major Associates, Inc.	Contact Name: Brian D. Jones, PE	
Email: bjones@allenmajor.com	Daytime Telephone: (603) 627-5500	
Address: 400 Harvey Road, Suite D		
Town/City: Manchester	State: NH	Zip Code: 03103

6. PROJECT TYPE

☐ Excavation Only ☐ Residential ☒ Commercial ☐ Golf Course ☐ School ☐ Municipal
☐ Agricultural ☐ Land Conversion ☐ Other:

7. PROJECT LOCATION INFORMATION

Project Name: ASC / Medical Office

Street/Road Address: 360 Corporate Drive

Town/City: Portsmouth	County: Rockingham

Tax Map: 315	Block:	Lot Number: 5	Unit:

Location Coordinates: 43.073484, -70.80109 ☒ Latitude/Longitude ☐ UTM ☐ State Plane

Post-development, will the proposed project withdraw from or directly discharge to any of the following? If yes, identify the purpose.

1. Stream or Wetland Purpose: Treated, stormwater discharge	☒ Yes ☐ No	☐ Withdrawal	☒ Discharge
2. Man-made pond created by impounding a stream or wetland Purpose:	☐ Yes ☒ No	☐ Withdrawal	☐ Discharge
3. Unlined pond dug into the water table Purpose:	☐ Yes ☒ No	☐ Withdrawal	☐ Discharge

Post-development, will the proposed project discharge to:

- A surface water impaired for phosphorus and/or nitrogen? ☒ No ☐ **Yes - include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen**
- A Class A surface water or Outstanding Resource Water? ☐ No ☐ **Yes - include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen**
- A lake or pond not covered previously? ☒ No ☐ **Yes - include information to demonstrate that project will not cause net increase in phosphorus in the lake or pond**

Is the project a High Load area? ☐ Yes ☒ No
If yes, specify the type of high load land use or activity: _____

Is the project within a Water Supply Intake Protection Area (WSIPA)? ☐ Yes ☒ No
Is the project within a Groundwater Protection Area (GPA)? ☒ Yes ☐ No
Will the well setbacks identified in Env-Wq 1508.02 be met? ☒ Yes ☐ No

Note: Guidance document titled "*Using NHDES's OneStop WebGIS to Locate Protection Areas*" is available online. For more details on the restrictions in these areas, read Chapter 3.1 in Volume 2 of the NH Stormwater Manual.

Is any part of the property within the 100-year floodplain? ☐ Yes ☒ No
If yes: Cut volume: _____ cubic feet within the 100-year floodplain
Fill volume: _____ cubic feet within the 100-year floodplain

☐ Project **IS** within **¼ mile of a designated river** Name of River:
☒ Project is **NOT** within ¼ mile of a designated river

☒ Project **IS** within **a Coastal/Great Bay Region community - include info required by Env-Wq 1503.08(l) if applicable**
☐ Project is **NOT** within a Coastal/Great Bay Region community

8. BRIEF PROJECT DESCRIPTION (PLEASE DO NOT REPLY "SEE ATTACHED")

The project proposes to construct a 3-story surgical center with associated parking. The proposed building has a footprint of 16,700± square feet with a gross floor area of 52,400± square feet. The proposed sitework incorporates various walls to protect the existing wetland resources on site and utilize the developable area.

9. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT

N/A

10. ADDITIONAL REQUIRED INFORMATION

A. Date a copy of the application was sent to the municipality as required by Env-Wq 1503.05(e)[1]:08/ /2023.

(Attach proof of delivery)

B. Date a copy of the application was sent to the local river advisory committee if required by Env-Wq 1503.05(e)[2]: / / .

(Attach proof of delivery)

C. Type of plan required: ☐ Land Conversion ☒ Detailed Development ☐ Excavation, Grading & Reclamation ☐ Steep Slope

D. Additional plans required: ☒ Stormwater Drainage & Hydrologic Soil Groups ☐ Source Control ☐ Chloride Management

E. Total area of disturbance: 181,000 square feet

F. Additional impervious cover as a result of the project: 72,916 square feet (use the "-" symbol to indicate a net reduction in impervious coverage).

Total final impervious cover: 90,058 square feet

G. Total undisturbed cover: 116,074 square feet

H. Number of lots proposed: 0

I. Total length of roadway: 0 linear feet

J. Name(s) of receiving water(s): Wetland

K. Identify all other NHDES permits required for the project, and for each indicate whether an application has been filed and is pending, or if the required approval has been issued provide the permit number, registration date, or approval letter number, as applicable.

Type of Approval	Application Filed?	Status	
		Pending	If Issued:
1. Water Supply Approval	☐ Yes ☐ No ☒ N/A	☐	Permit number:
2. Wetlands Permit	☐ Yes ☐ No ☒ N/A	☐	Permit number:
3. Shoreland Permit	☐ Yes ☐ No ☒ N/A	☐	Permit number:
4. UIC Registration	☐ Yes ☐ No ☒ N/A	☐	Registration date:
5. Large/Small Community Well Approval	☐ Yes ☐ No ☒ N/A	☐	Approval letter date:
6. Large Groundwater Withdrawal Permit	☐ Yes ☐ No ☒ N/A	☐	Permit number:
7. Other:	☐ Yes ☐ No	☐	Permit number:

L. List all species identified by the Natural Heritage Bureau as threatened or endangered or of concern: N/A

M. Using NHDES's Web GIS OneStop program (www2.des.state.nh.us/gis/onestop/), with the Surface Water Impairment layer turned on, list the impairments identified for each receiving water. If no pollutants are listed, enter "N/A."

N/A

N. Did the applicant/applicant's agent have a pre-application meeting with AOT staff? ☐ Yes ☒ No

If yes, name of staff member: N/A

O. Will blasting of bedrock be required? ☐ Yes ☒ No If yes, estimated quantity of blast rock: _____ cubic yards

If yes, standard blasting BMP notes must be placed on the plans, available at:
http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf

NOTE: If greater than 5,000 cubic yards of blast rock will be generated, a groundwater monitoring program must be developed and submitted to NHDES. Contact AOT staff for additional detail.

[1] Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the governing body of each municipality in which the project is proposed.

[2] Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the Local River Advisory Committee, if the project is within ¼ mile of a designated river.

11. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY (SUBMIT WITH APPLICATION IN ORDER LISTED)

LOOSE:

- ☒ Signed application form: des.nh.gov/organization/divisions/water/aot/index.htm (with attached proof(s) of delivery)
- ☒ Check for the application fee: des.nh.gov/organization/divisions/water/aot/fees.htm
- ☒ Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale)
- ☒ If Applicant is not the property owner, proof that the applicant will have a legal right to undertake the project on the property if a permit is issued to the applicant.

BIND IN A REPORT IN THE FOLLOWING ORDER:

- ☒ Copy of the signed application form & application checklist (des.nh.gov/organization/divisions/water/aot/index.htm)
- ☒ Copy of the check
- ☒ Copy of the USGS map with the property boundaries outlined (1" = 2,000' scale)
- ☒ Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points
- ☒ Web GIS printout with the "Surface Water Impairments" layer turned on - http://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx
- ☒ Web GIS printouts with the AOT screening layers turned on - http://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx
- ☒ NHB letter using DataCheck Tool – www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/
- ☒ The Web Soil Survey Map with project's watershed outlined – websoilsurvey.nrcs.usda.gov
- ☒ Aerial photograph (1" = 2,000' scale with the site boundaries outlined)
- ☒ Photographs representative of the site
- ☒ Groundwater Recharge Volume calculations (one worksheet for each permit application): des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- ☒ BMP worksheets (one worksheet for each treatment system): des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- ☒ Drainage analysis, stamped by a professional engineer (see Application Checklist for details)
- ☒ Riprap apron or other energy dissipation or stability calculations
- ☒ Site Specific Soil Survey report, stamped and with a certification note prepared by the soil scientist that the survey was done in accordance with the Site Specific Soil Mapping standards, *Site-Specific Soil Mapping Standards for NH & VT, SSSNNE Special Publication No. 3*.
- ☒ Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)]
- ☒ Registration and Notification Form for Storm Water Infiltration to Groundwater (UIC Registration-for underground systems only, including drywells and trenches): (http://des.nh.gov/organization/divisions/water/dwgb/dwspp/gw_discharge)
- ☒ Inspection and maintenance manual with, if applicable, long term maintenance agreements [Env-Wq 1503.08(g)]
- ☒ Source control plan

PLANS:

- ☒ One set of design plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details)
- ☒ Pre & post-development color coded soil plans on 11" x 17" (see Application Checklist for details)
- ☒ Pre & post-development drainage area plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details)

100-YEAR FLOODPLAIN REPORT:

- ☐ All information required in Env-Wq 1503.09, submitted as a separate report.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- ☐ See Checklist for Details

☐ **REVIEW APPLICATION FOR COMPLETENESS & CONFIRM INFORMATION LISTED ON THE APPLICATION IS INCLUDED WITH SUBMITTAL.**

12. REQUIRED SIGNATURES

_____ By initialing here, I acknowledge that I am required by Env-Wq 1503.20(e) to submit a copy of all approved documents to the department in PDF format on a CD within one week after permit approval.

By signing below, I certify that:

- The information contained in or otherwise submitted with this application is true, complete, and not misleading to the best of my knowledge and belief;
- I understand that the submission of false, incomplete, or misleading information constitutes grounds for the department to deny the application, revoke any permit that is granted based on the information, and/or refer the matter to the board of professional engineers established by RSA 310-A:3 if I am a professional engineer; and
- I understand that I am subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641.

☐ **APPLICANT** ☒ **APPLICANT'S AGENT**:

Signature:_____ Date: _____

Name (print or type): Raquelle Kemnitz Title: Project Coordinator

☐ PROPERTY OWNER ☐ PROPERTY OWNER'S AGENT:

Signature:_____ Date: _____

Name (print or type): _____ Title: _____

ATTACHMENT A:
ALTERATION OF TERRAIN PERMIT APPLICATION CHECKLIST

Check the box to indicate the item has been provided or provide an explanation why the item does not apply.

DESIGN PLANS

☒ Plans printed on 34 - 36" by 22 - 24" white paper

☒ PE stamp

☒ Wetland delineation

☒ Temporary erosion control measures

☒ Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and non-residential roof runoff. Guidance on treatment BMPs can be found in Volume 2, Chapter 4 of the NH Stormwater Management Manual.

☒ Pre-existing 2-foot contours

☒ Proposed 2-foot contours

☐ Drainage easements protecting the drainage/treatment structures

☒ Compliance with the Wetlands Bureau, RSA 482- A http://des.nh.gov/organization/divisions/water/wetlands/index.htm. Note that artificial detention in wetlands is not allowed.

☐ Compliance with the Comprehensive Shoreland Protection Act, RSA 483-B. http://des.nh.gov/organization/divisions/water/wetlands/cspa

☐ Benches. Benching is needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope.

☒ Check to see if any proposed ponds need state Dam permits.
http://des.nh.gov/organization/divisions/water/dam/documents/damdef.pdf

DETAILS

☐ Typical roadway x-section

☐ Detention basin with inverts noted on the outlet structure

☐ Stone berm level spreader

☒ Outlet protection – riprap aprons

☒ A general installation detail for an erosion control blanket

☒ Silt fences or mulch berm

☒ Storm drain inlet protection. Note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement.

☐ Hay bale barriers

☒ Stone check dams

☒ Gravel construction exit

☒ Temporary sediment trap

☒ The treatment BMP's proposed

☒ Any innovative BMP's proposed

CONSTRUCTION SEQUENCE/EROSION CONTROL

☒ Note that the project is to be managed in a manner that meets the requirements and intent of RSA 430:53 and Chapter Agr 3800 relative to invasive species.

☒ Note that perimeter controls shall be installed prior to earth moving operations.

☒ Note that temporary water diversion (swales, basins, etc) must be used as necessary until areas are stabilized.

☒ Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site).

☒ Note that all ditches and swales shall be stabilized prior to directing runoff to them.

☒ Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.

☒ Note that all cut and fill slopes shall be seeded/loamed within 72 hours of achieving finished grade

☒ Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall.

☒ Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information.

Example note: The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized.

☒ Note the definition of the word "stable"

Example note: An area shall be considered stable if one of the following has occurred:

- Base course gravels have been installed in areas to be paved.
- A minimum of 85 percent vegetated growth has been established.
- A minimum of 3 inches of non-erosive material such stone or riprap has been installed.
- Or, erosion control blankets have been properly installed.

☒ Note the limit of time an area may be exposed
Example note: All areas shall be stabilized within 45 days of initial disturbance.

☒ Provide temporary and permanent seeding specifications. (Reed canary grass is listed in the Green Book; however, this is a problematic species according to the Wetlands Bureau and therefore should not be specified)

☒ Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
- All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
- After October 15, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.

☐ Note at the end of the construction sequence that "Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable." – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit.

DRAINAGE ANALYSES

Please double-side 8 ½" × 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

☒ PE stamp

☒ Rainfall amount obtained from the Northeast Regional Climate Center- http://precip.eas.cornell.edu/. Include extreme precipitation table as obtained from the above referenced website.

☒ Drainage analyses, in the following order:

- Pre-development analysis: Drainage diagram.
- Pre-development analysis: Area Listing and Soil Listing.
- Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year.
- Pre-development analysis: Full summary of the 10-year storm.
- Post-development analysis: Drainage diagram.
- Post-development analysis: Area Listing and Soil Listing.
- Post-development analysis: Node listing for the 2-year, 10-year and 50-year.
- Post-development analysis: Full summary of the 10-year storm.

☒ Review the Area Listing and Soil Listing reports

- Hydrologic soil groups (HSG) match the HSGs on the soil maps provided.
- There is the same or less HSG A soil area after development (check for each HSG).
- There is the same or less "woods" cover in the post-development.
- Undeveloped land was assumed to be in "good" condition.
- The amount of impervious cover in the analyses is correct.

Note: A good check is to subtract the total impervious area used in the pre analysis from the total impervious area used in the post-analysis. For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses/units proposed. Do these numbers make sense?

☒ Check the storage input used to model the ponds.

☒ Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped.

☒ Check the outlet structure proposed and make sure it matches that modeled.

☒ Check to see if the total areas in the pre and post analyses are same.

☒ Confirm the correct NRCS storm type was modeled (Coos, Carroll & Grafton counties are Type II, all others Type III).

.

PRE- AND POST-DEVELOPMENT DRAINAGE AREA PLANS

☒ Plans printed on 34 - 36" by 22 - 24" on white paper.

☒ Submit these plans separate from the soil plans.

☒ A north arrow.

☒ A scale.

☒ Labeled subcatchments, reaches and ponds.

☒ Tc lines.

☒ A clear delineation of the subcatchment boundaries.

☐ Roadway station numbers.

☐ Culverts and other conveyance structures.

PRE AND POST-DEVELOPMENT COLOR-CODED SOIL PLANS

☐ 11" × 17"sheets suitable, as long as it is readable.

☒ Submit these plans separate from the drainage area plans.

☒ A north arrow.

☒ A scale.

☒ Name of the soil scientist who performed the survey and date the soil survey took place.

☒ 2-foot contours (5-foot contours if application is for a gravel pit) as well as other surveyed features.

☒ Delineation of the soil boundaries and wetland boundaries.

☒ Delineation of the subcatchment boundaries.

☒ Soil series symbols (e.g., 26).

☒ A key or legend which identifies each soil series symbol and its associated soil series name (e.g., 26 = Windsor).

☒ The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, & Impervious = gray).

Please note that excavation projects (e.g., gravel pits) have similar requirements to that above, however the following are common exceptions/additions:

☐ Drainage report is not needed if site does not have off-site flow.

☐ 5 foot contours allowed rather than 2 foot.

☐ No PE stamp needed on the plans.

☐ Add a note to the plans that the applicant must submit to the Department of Environmental Services a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.

☐ Add reclamation notes.

See NRCS publication titled: *Vegetating New Hampshire Sand and Gravel Pits* for a good resource, it is posted online at: http://des.nh.gov/organization/divisions/water/aot/categories/publications.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

☐ If project will discharge stormwater to a surface water impaired for phosphorus and/or nitrogen, include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen.

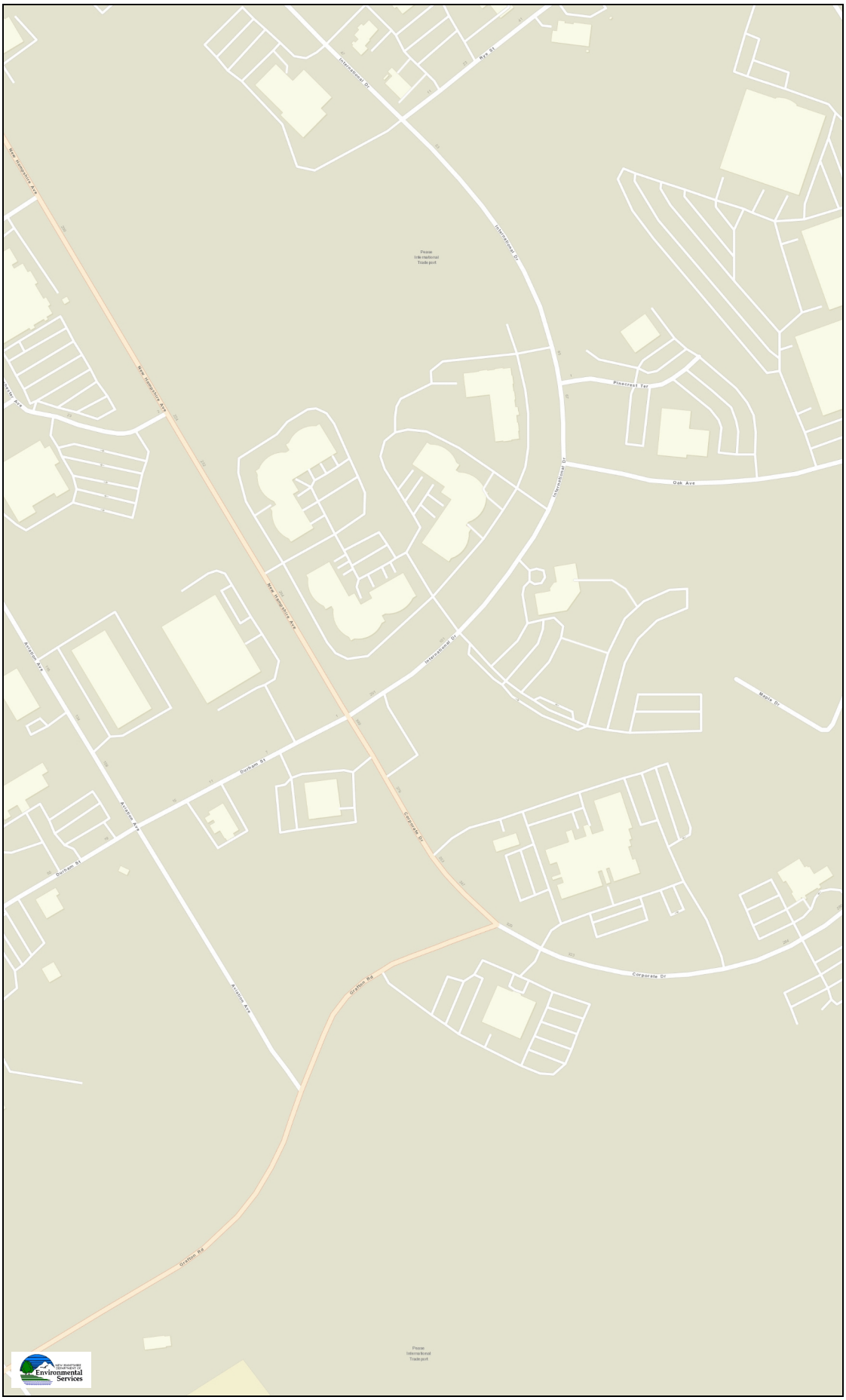
☐ If project will discharge stormwater to a Class A surface water or Outstanding Resource Water, include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen.

☐ If project will discharge stormwater to a lake or pond not covered previously, include information to demonstrate that project will not cause net increase in phosphorus in the lake or pond.

☐ If project is within a Coastal/Great Bay Region community, include info required by Env-Wq 1503.08(l) if applicable.

Surface Water Impairment Map

Surface Waters with Impairments Map



Legend

Surface Waters with Impairm
with Quarter Mile Buffer

Map Scale

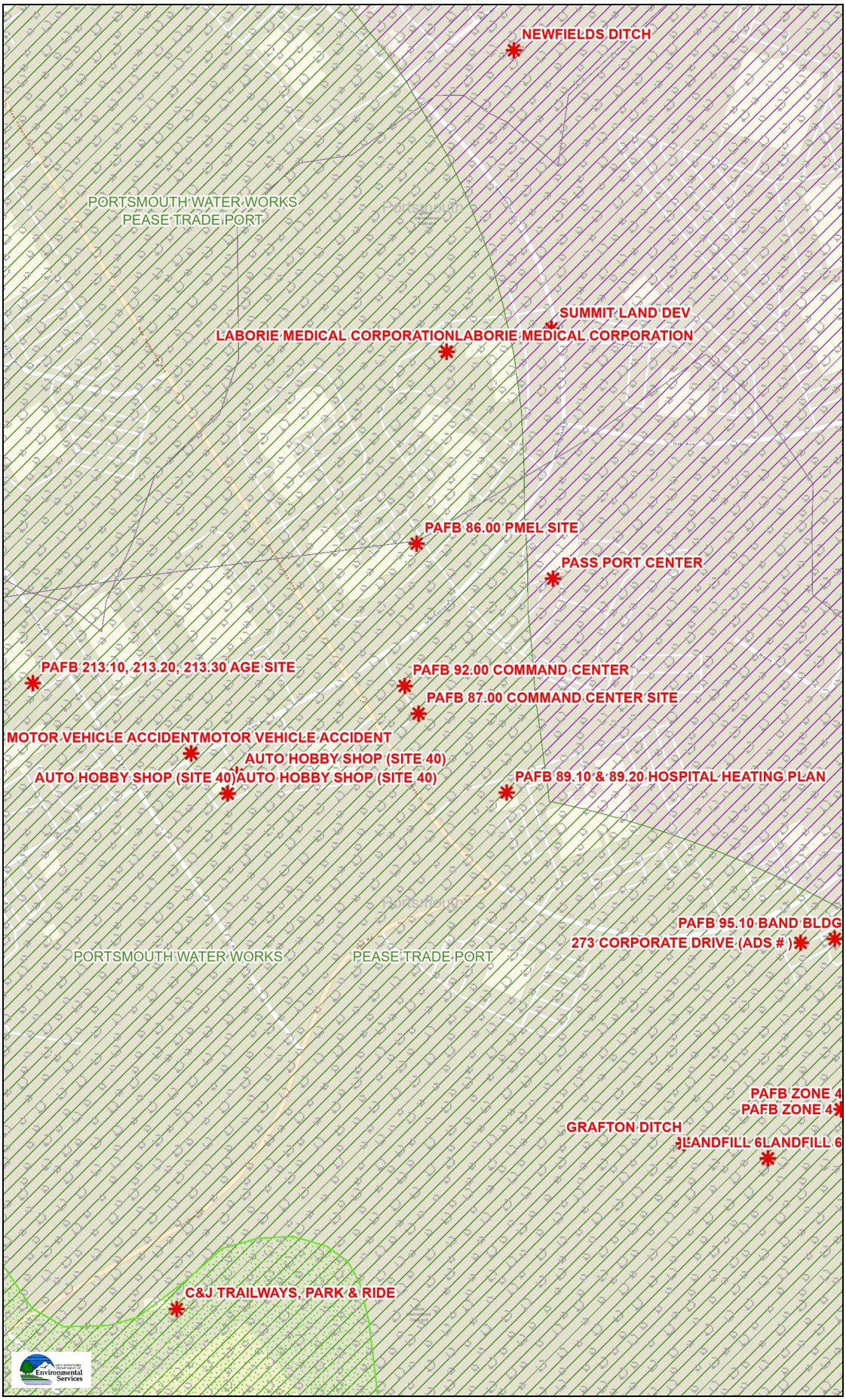
1: 6,494

Map Generated: 7/6/2023

Notes

AoT Screening Layers Map

AoT Screening Layers



Legend

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

Map Scale

1: 6,494

Map Generated: 7/6/2023

Notes

Natural Heritage Data Check

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: steven mayer
250 Commercial Street
Manchester, NH 03101

From: NH Natural Heritage Bureau

Date: 6/29/2023 (This letter is valid through 6/29/2024)

Re: Review by NH Natural Heritage Bureau of request dated 6/29/2023

Permit Types: Alteration of Terrain Permit
Sewer Connection Permit
Stormwater Pollution Prevention
Portsmouth

NHB ID: NHB23-1980

Applicant: steven mayer

Location: Portsmouth
Tax Map: 315, Tax Lot: 5
Address: 360 Corporate Drive

Proj. Description: The project includes the construction of a 3 story medical use building with a footprint of approximately 15,754 square feet. The project will construct approximately 125 parking spaces, required utilities, lighting, and stormwater infrastructure.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

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

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

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

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

MAP OF PROJECT BOUNDARIES FOR: NHB23-1980

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

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

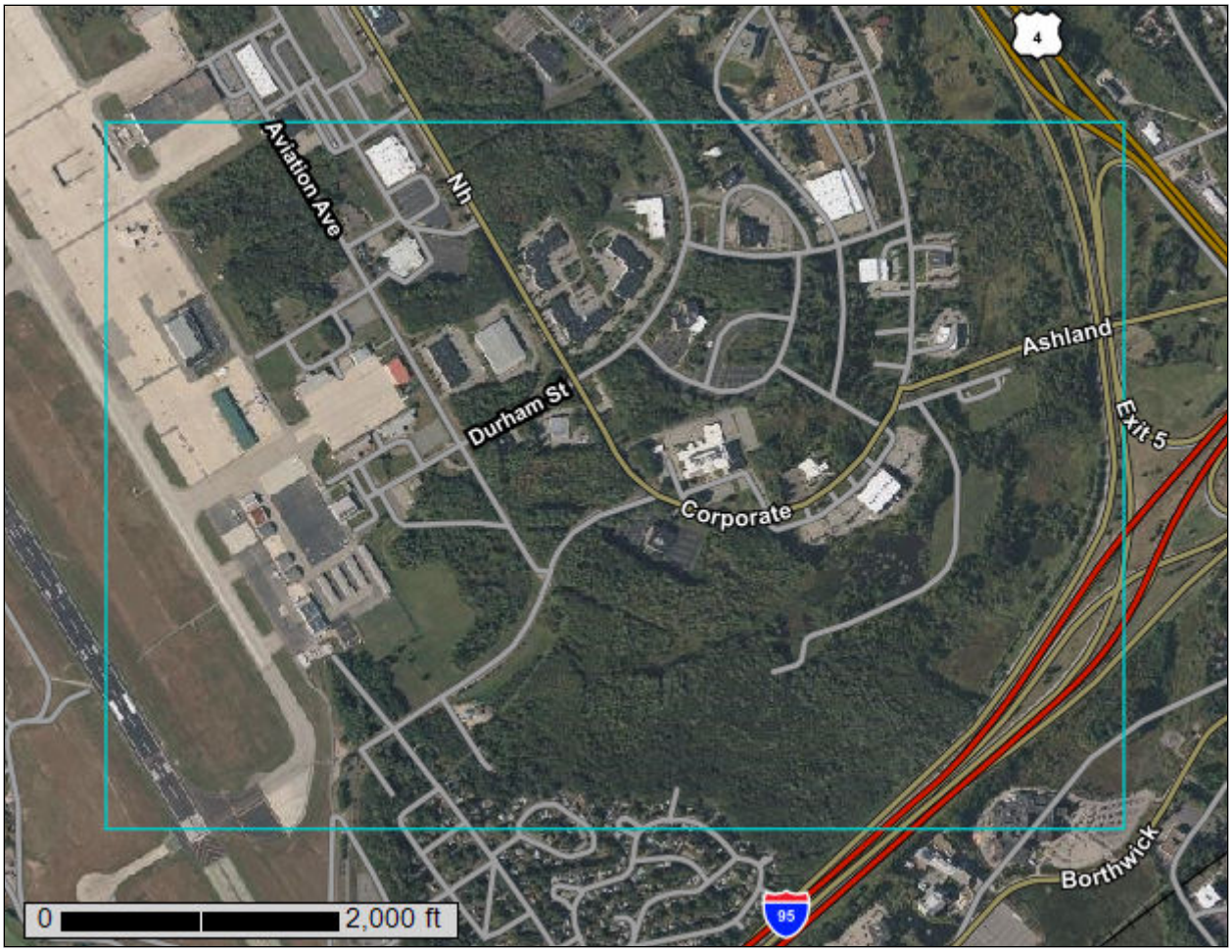
NRCS Web Soil Survey

United States Department of Agriculture

Natural Resources Conservation Service

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

Custom Soil Resource Report for Rockingham County, New Hampshire



July 3, 2023

Custom Soil Resource Report
Soil Map

Map Scale: 1:13,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 25, Sep 12, 2022

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
38A	Eldridge fine sandy loam, 0 to 3 percent slopes	15.2	1.8%
134	Maybid silt loam	27.2	3.2%
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	24.6	2.9%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	2.5	0.3%
299	Udorthents, smoothed	129.9	15.3%
314A	Pipestone sand, 0 to 5 percent slopes	36.8	4.3%
495	Natchaug mucky peat, 0 to 2 percent slopes	9.1	1.1%
538A	Squamscott fine sandy loam, 0 to 5 percent slopes	161.0	18.9%
599	Urban land-Hoosic complex, 3 to 15 percent slopes	26.6	3.1%
657B	Ridgebury fine sandy loam, 3 to 8 percent slopes, very stony	12.6	1.5%
699	Urban land	224.0	26.3%
799	Urban land-Canton complex, 3 to 15 percent slopes	182.2	21.4%
Totals for Area of Interest		**851.8**	**100.0%**

Map Unit Descriptions

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

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

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

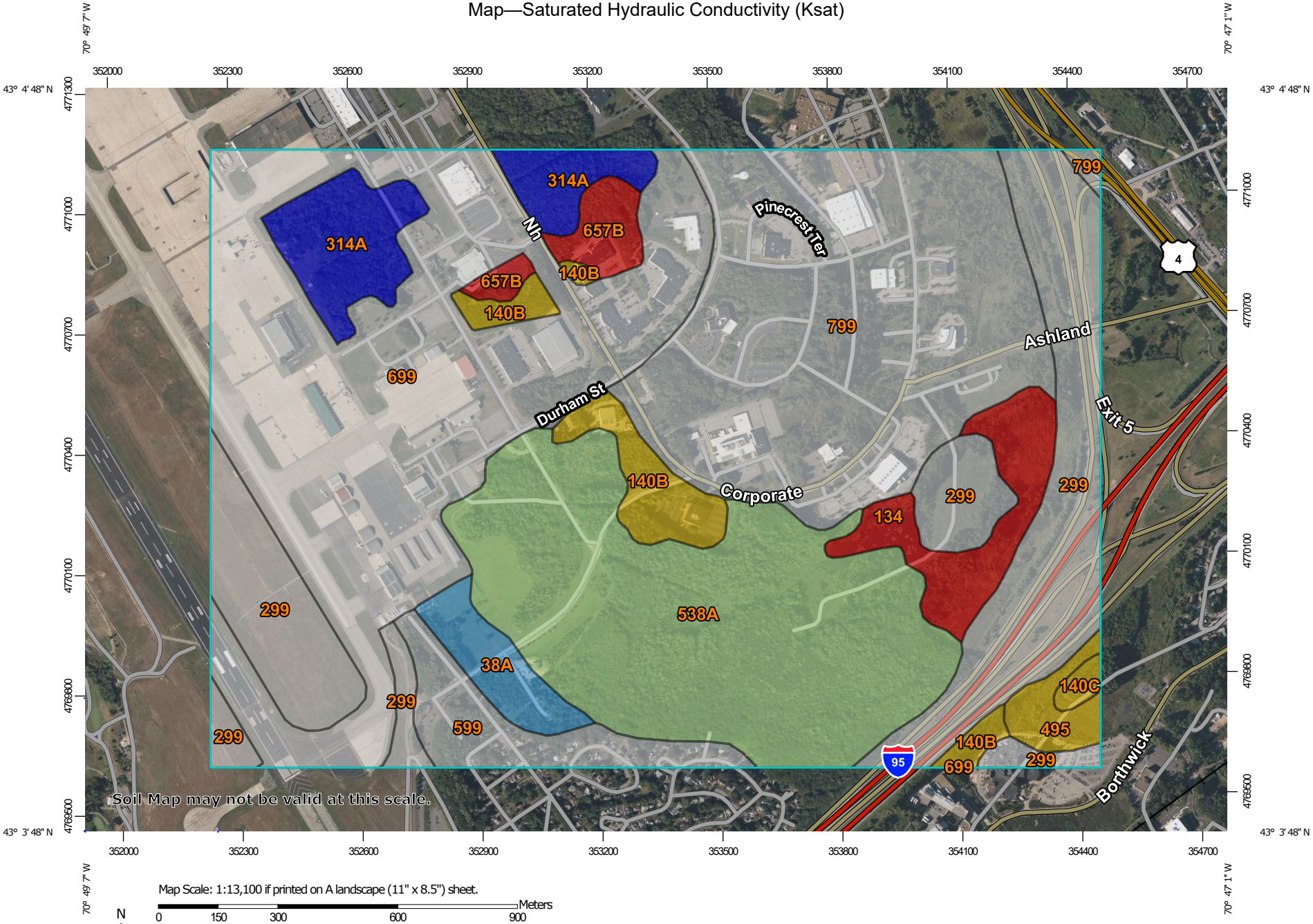
Saturated Hydraulic Conductivity (Ksat)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Custom Soil Resource Report
Map—Saturated Hydraulic Conductivity (Ksat)



Map Scale: 1:13,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

<= 4.5628

> 4.5628 and <= 10.1993

> 10.1993 and <= 28.6840

> 28.6840 and <= 35.3528

> 35.3528 and <= 91.7222

Not rated or not available

Soil Rating Lines

<= 4.5628

> 4.5628 and <= 10.1993

> 10.1993 and <= 28.6840

> 28.6840 and <= 35.3528

> 35.3528 and <= 91.7222

Not rated or not available

Soil Rating Points

<= 4.5628

> 4.5628 and <= 10.1993

> 10.1993 and <= 28.6840

> 28.6840 and <= 35.3528

> 35.3528 and <= 91.7222

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 25, Sep 12, 2022

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Table—Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
38A	Eldridge fine sandy loam, 0 to 3 percent slopes	35.3528	15.2	1.8%
134	Maybid silt loam	1.0099	27.2	3.2%
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	10.1993	24.6	2.9%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	10.1993	2.5	0.3%
299	Udorthents, smoothed		129.9	15.3%
314A	Pipestone sand, 0 to 5 percent slopes	91.7222	36.8	4.3%
495	Natchaug mucky peat, 0 to 2 percent slopes	7.3000	9.1	1.1%
538A	Squamscott fine sandy loam, 0 to 5 percent slopes	28.6840	161.0	18.9%
599	Urban land-Hoosic complex, 3 to 15 percent slopes		26.6	3.1%
657B	Ridgebury fine sandy loam, 3 to 8 percent slopes, very stony	4.5628	12.6	1.5%
699	Urban land		224.0	26.3%
799	Urban land-Canton complex, 3 to 15 percent slopes		182.2	21.4%
Totals for Area of Interest			**851.8**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 0

Bottom Depth: 100

Units of Measure: Inches

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

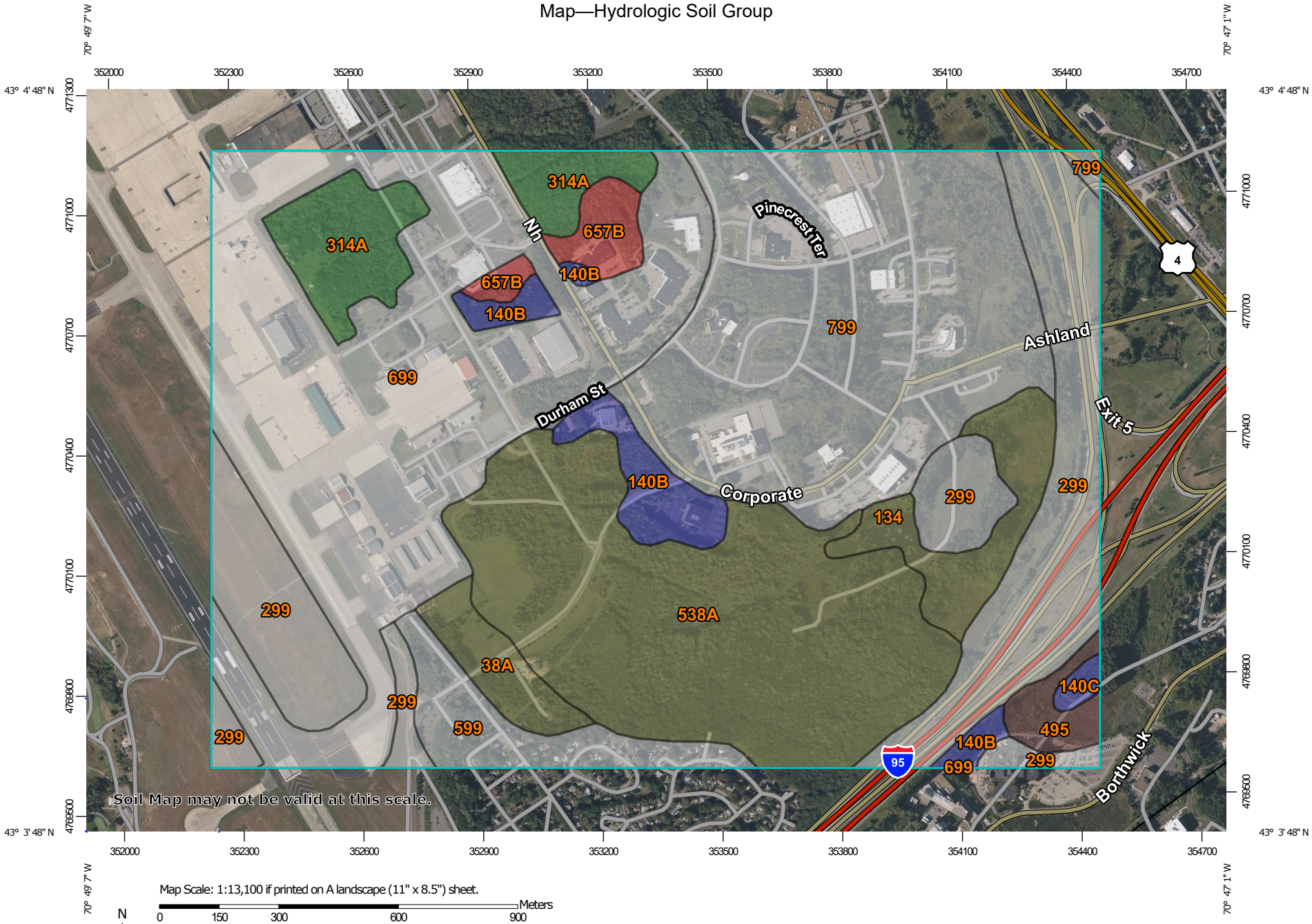
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group



Map Scale: 1:13,100 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

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

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 25, Sep 12, 2022

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

Date(s) aerial images were photographed: Jun 19, 2020—Sep 20, 2020

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
38A	Eldridge fine sandy loam, 0 to 3 percent slopes	C/D	15.2	1.8%
134	Maybid silt loam	C/D	27.2	3.2%
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	B	24.6	2.9%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	B	2.5	0.3%
299	Udorthents, smoothed		129.9	15.3%
314A	Pipestone sand, 0 to 5 percent slopes	A/D	36.8	4.3%
495	Natchaug mucky peat, 0 to 2 percent slopes	B/D	9.1	1.1%
538A	Squamscott fine sandy loam, 0 to 5 percent slopes	C/D	161.0	18.9%
599	Urban land-Hoosic complex, 3 to 15 percent slopes		26.6	3.1%
657B	Ridgebury fine sandy loam, 3 to 8 percent slopes, very stony	D	12.6	1.5%
699	Urban land		224.0	26.3%
799	Urban land-Canton complex, 3 to 15 percent slopes		182.2	21.4%
Totals for Area of Interest			**851.8**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Site Photographs

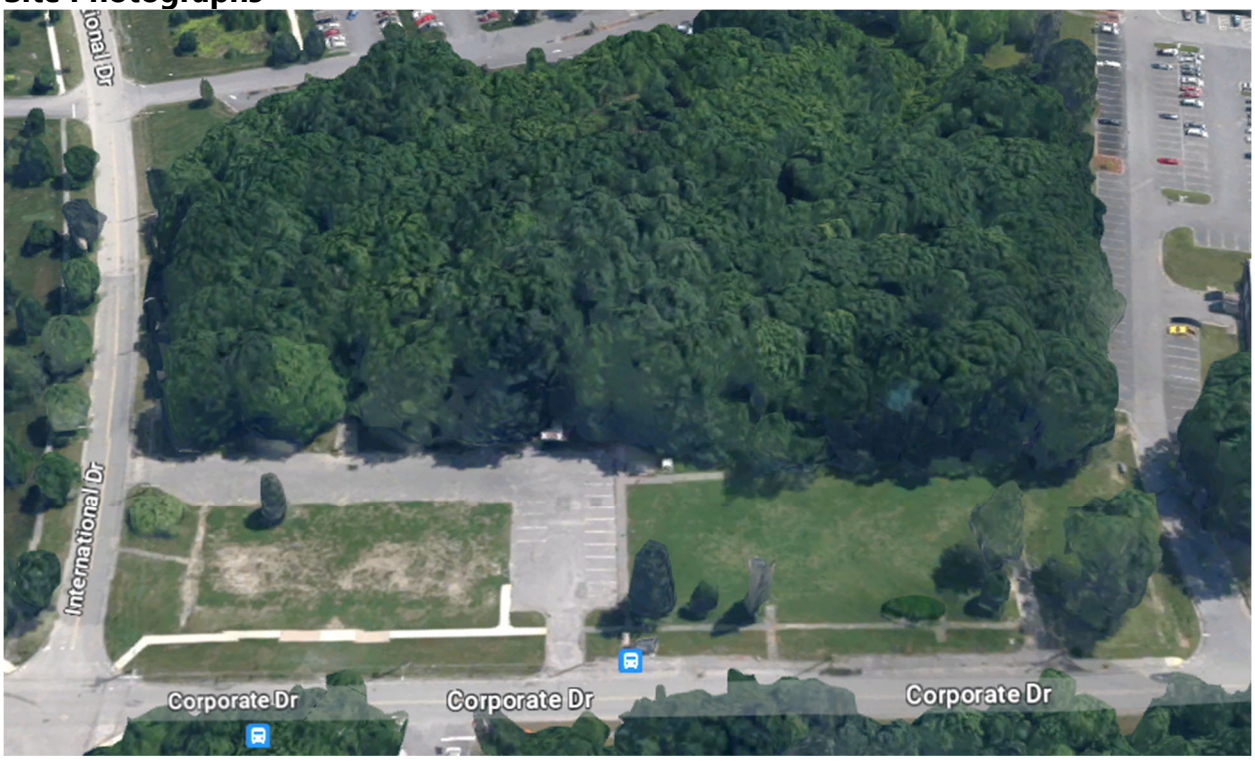


Image 1 - Aerial Image

Image 2 - View from Corporate & International Intersection

Image 3 - View from 320 Corporate Drive

NHDES Groundwater Recharge Volume Calculations

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

	ac	Area of HSG A soil that was replaced by impervious cover	0.40"
1.67	ac	Area of HSG B soil that was replaced by impervious cover	0.25"
0.00	ac	Area of HSG C soil that was replaced by impervious cover	0.10"
	ac	Area of HSG D soil or impervious cover that was replaced by impervious cover	0.0"
0.25	inches	Rd = Weighted groundwater recharge depth	
0.4184	ac-in	GRV = AI * Rd	
1,519	cf	GRV conversion (ac-in x 43,560 sf/ac x 1ft/12")	

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

Provided:

Bioretention System 1 = 2,429 cf

Bioretention System 2 = 425 cf

Bioretention System 3 = 5,898 cf

Bioretention System 4 = 1,089 cf

Infiltration System 1 = 1,582 cf

Infiltration System 2 = 4,514 cf

Infiltration System 3 = 2,057 cf

Total Provided = 17,994 cf > 1,519 cf required

see stage storage spreadsheets in following appendix section

NHDES BMP Worksheets

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Bioretention System 1**

Enter the node name in the drainage analysis if applicable.

0.20	ac	A = Area draining to the practice	
0.10	ac	A_I = Impervious area draining to the practice	
0.52	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.52	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.10	ac-in	WQV= 1" x Rv x A	
377	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
38	cf	10% x WQV (check calc for sediment forebay)	
94	cf	25% x WQV (check calc for water stored in saturated zone)	
Sediment Forebay		Method of Pretreatment	
92	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
2,429	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
343	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.01	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
58.60	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.03	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
6.98	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**≥ 24-hrs**
24.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
N/A		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
60.73	ft	Peak elevation of the 50-year storm event (E_{50})	
61.00	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

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

Designer's Notes:

Stage-Area-Storage for Pond FB1: sediment forebay

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.00	146	0
59.02	149	3
59.04	152	6
59.06	154	9
59.08	157	12
59.10	160	15
59.12	163	19
59.14	166	22
59.16	169	25
59.18	172	29
59.20	175	32
59.22	178	36
59.24	181	39
59.26	184	43
59.28	187	47
59.30	191	50
59.32	194	54
59.34	197	58
59.36	200	62
59.38	204	66
59.40	207	70
59.42	210	74
59.44	214	79
59.46	217	83
59.48	220	87
59.50	224	92
59.52	227	96
59.54	231	101
59.56	234	105
59.58	238	110
59.60	241	115
59.62	245	120
59.64	248	125
59.66	252	130
59.68	256	135
59.70	259	140
59.72	263	145
59.74	267	151
59.76	271	156
59.78	274	161
59.80	278	167
59.82	282	173
59.84	286	178
59.86	290	184
59.88	294	190
59.90	298	196
59.92	302	202
59.94	306	208
59.96	310	214
59.98	314	220
60.00	318	226
60.02	321	233
60.04	324	239
60.06	327	246
60.08	330	252
60.10	333	259
60.12	337	266
60.14	340	273
60.16	343	279
60.18	346	286
60.20	349	293
60.22	352	300
60.24	356	307
60.26	359	314
60.28	362	322
60.30	365	329
60.32	369	336
60.34	372	344
60.36	375	351
60.38	379	359
60.40	382	366
60.42	385	374
60.44	389	382
60.46	392	390
60.48	396	397
60.50	399	405
60.52	402	413
60.54	406	421
60.56	409	430
60.58	413	438
60.60	416	446
60.62	420	454
60.64	423	463
60.66	427	471
60.68	430	480
60.70	434	489
60.72	437	497
60.74	441	506
60.76	445	515
60.78	448	524
60.80	452	533
60.82	456	542
60.84	459	551
60.86	463	560
60.88	467	570
60.90	470	579
60.92	474	588
60.94	478	598
60.96	481	608
60.98	485	617
61.00	**489**	**627**

Stage-Area-Storage for Pond B1: bioretention system 1

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
56.50	571	0
56.55	578	9
56.60	585	17
56.65	592	26
56.70	599	34
56.75	607	43
56.80	614	51
56.85	621	60
56.90	628	69
56.95	635	77
57.00	642	86
57.05	649	94
57.10	656	103
57.15	663	111
57.20	670	120
57.25	678	128
57.30	685	137
57.35	692	146
57.40	699	154
57.45	706	163
57.50	713	171
57.55	720	180
57.60	727	188
57.65	734	197
57.70	741	206
57.75	749	214
57.80	756	223
57.85	763	231
57.90	770	240
57.95	777	248
58.00	784	257
58.05	791	266
58.10	798	274
58.15	805	283
58.20	812	291
58.25	820	300
58.30	827	308
58.35	834	317
58.40	841	325
58.45	848	334
58.50	**855**	343
58.55	855	361
58.60	855	381
58.65	855	402
58.70	855	423
58.75	855	446
58.80	855	469
58.85	855	494
58.90	855	520
58.95	855	547
59.00	855	575
59.05	855	604
59.10	855	634
59.15	855	665
59.20	855	698
59.25	855	732
59.30	855	767
59.35	855	803
59.40	855	840
59.45	855	879
59.50	855	919
59.55	855	961
59.60	855	1,003
59.65	855	1,047
59.70	855	1,093
59.75	855	1,140
59.80	855	1,188
59.85	855	1,238
59.90	855	1,289
59.95	855	1,342
60.00	855	1,396
60.05	855	1,453
60.10	855	1,511
60.15	855	1,573
60.20	855	1,637
60.25	855	1,703
60.30	855	1,772
60.35	855	1,844
60.40	855	1,919
60.45	855	1,997
60.50	855	2,077
60.55	855	2,161
60.60	855	2,247
60.65	855	2,337
60.70	855	2,429
60.75	855	2,525
60.80	855	2,624
60.85	855	2,727
60.90	855	2,832
60.95	855	2,942
61.00	855	**3,054**

Stage-Discharge for Pond B1: bioretention system 1

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
56.50	0.00	0.00	0.00
56.55	0.01	0.01	0.00
56.60	0.01	0.01	0.00
56.65	0.01	0.01	0.00
56.70	0.01	0.01	0.00
56.75	0.01	0.01	0.00
56.80	0.01	0.01	0.00
56.85	0.01	0.01	0.00
56.90	0.01	0.01	0.00
56.95	0.01	0.01	0.00
57.00	0.01	0.01	0.00
57.05	0.02	0.02	0.00
57.10	0.02	0.02	0.00
57.15	0.02	0.02	0.00
57.20	0.02	0.02	0.00
57.25	0.02	0.02	0.00
57.30	0.02	0.02	0.00
57.35	0.02	0.02	0.00
57.40	0.02	0.02	0.00
57.45	0.02	0.02	0.00
57.50	0.02	0.02	0.00
57.55	0.02	0.02	0.00
57.60	0.02	0.02	0.00
57.65	0.02	0.02	0.00
57.70	0.02	0.02	0.00
57.75	0.02	0.02	0.00
57.80	0.02	0.02	0.00
57.85	0.02	0.02	0.00
57.90	0.02	0.02	0.00
57.95	0.02	0.02	0.00
58.00	0.03	0.03	0.00
58.05	0.03	0.03	0.00
58.10	0.03	0.03	0.00
58.15	0.03	0.03	0.00
58.20	0.03	0.03	0.00
58.25	0.03	0.03	0.00
58.30	0.03	0.03	0.00
58.35	0.03	0.03	0.00
58.40	0.03	0.03	0.00
58.45	0.03	0.03	0.00
58.50	0.03	0.03	0.00
58.55	0.03	0.03	0.00
58.60	0.03	0.03	0.00
58.65	0.03	0.03	0.00
58.70	0.03	0.03	0.00
58.75	0.03	0.03	0.00
58.80	0.03	0.03	0.00
58.85	0.03	0.03	0.00
58.90	0.04	0.04	0.00
58.95	0.04	0.04	0.00
59.00	0.04	0.04	0.00
59.05	0.04	0.04	0.00
59.10	0.04	0.04	0.00
59.15	0.04	0.04	0.00
59.20	0.04	0.04	0.00
59.25	0.04	0.04	0.00
59.30	0.04	0.04	0.00
59.35	0.04	0.04	0.00
59.40	0.04	0.04	0.00
59.45	0.04	0.04	0.00
59.50	0.04	0.04	0.00
59.55	0.04	0.04	0.00
59.60	0.04	0.04	0.00
59.65	0.04	0.04	0.00
59.70	0.04	0.04	0.00
59.75	0.04	0.04	0.00
59.80	0.04	0.04	0.00
59.85	0.04	0.04	0.00
59.90	0.04	0.04	0.00
59.95	0.05	0.05	0.00
60.00	0.05	0.05	0.00
60.05	0.05	0.05	0.00
60.10	0.05	0.05	0.00
60.15	0.05	0.05	0.00
60.20	0.05	0.05	0.00
60.25	0.05	0.05	0.00
60.30	0.05	0.05	0.00
60.35	0.05	0.05	0.00
60.40	0.05	0.05	0.00
60.45	0.05	0.05	0.00
60.50	0.05	0.05	0.00
60.55	0.05	0.05	0.00
60.60	0.05	0.05	0.00
60.65	0.05	0.05	0.00
60.70	0.05	0.05	0.00
60.75	0.16	0.05	0.10
60.80	0.35	0.05	0.30
60.85	0.60	0.05	0.54
60.90	0.89	0.05	0.84
60.95	1.24	0.05	1.19
61.00	**1.65**	**0.06**	**1.59**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Bioretention System 2**

Enter the node name in the drainage analysis if applicable.

0.10	ac	A = Area draining to the practice	
0.10	ac	A_I = Impervious area draining to the practice	
1.00	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.09	ac-in	WQV= 1" x Rv x A	
338	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
34	cf	10% x WQV (check calc for sediment forebay)	
84	cf	25% x WQV (check calc for water stored in saturated zone)	
Sediment Forebay		Method of Pretreatment	
50	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
425	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
155	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.01	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
60.40	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.02	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
9.39	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**≥ 24-hrs**
24.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
N/A		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
60.88	ft	Peak elevation of the 50-year storm event (E_{50})	
61.00	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

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

Designer's Notes:

Stage-Area-Storage for Pond FB2: sediment forebay

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.50	1	0	60.03	30	7
59.51	1	0	60.04	31	7
59.52	1	0	60.05	31	7
59.53	2	0	60.06	32	8
59.54	2	0	60.07	33	8
59.55	2	0	60.08	33	8
59.56	2	0	60.09	34	9
59.57	3	0	60.10	35	9
59.58	3	0	60.11	36	9
59.59	3	0	60.12	36	10
59.60	3	0	60.13	37	10
59.61	4	0	60.14	38	10
59.62	4	0	60.15	39	11
59.63	4	0	60.16	39	11
59.64	5	0	60.17	40	11
59.65	5	0	60.18	41	12
59.66	6	0	60.19	42	12
59.67	6	1	60.20	42	13
59.68	6	1	60.21	43	13
59.69	7	1	60.22	44	14
59.70	7	1	60.23	45	14
59.71	8	1	60.24	46	14
59.72	8	1	60.25	46	15
59.73	9	1	60.26	47	15
59.74	9	1	60.27	48	16
59.75	10	1	60.28	49	16
59.76	10	1	60.29	50	17
59.77	11	1	60.30	51	17
59.78	12	1	60.31	52	18
59.79	12	2	60.32	53	18
59.80	13	2	60.33	53	19
59.81	13	2	60.34	54	19
59.82	14	2	60.35	55	20
59.83	15	2	60.36	56	21
59.84	15	2	60.37	57	21
59.85	16	2	60.38	58	22
59.86	17	3	60.39	59	22
59.87	17	3	60.40	60	23
59.88	18	3	60.41	61	23
59.89	19	3	60.42	62	24
59.90	20	3	60.43	63	25
59.91	20	4	60.44	64	25
59.92	21	4	60.45	65	26
59.93	22	4	60.46	66	27
59.94	23	4	60.47	67	27
59.95	24	4	60.48	68	28
59.96	24	5	60.49	69	29
59.97	25	5	60.50	70	29
59.98	26	5	60.51	71	30
59.99	27	5	60.52	72	31
60.00	28	6	60.53	73	31
60.01	29	6	60.54	74	32
60.02	29	6	60.55	75	33

Stage-Area-Storage for Pond FB2: sediment forebay (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
60.56	76	34
60.57	77	34
60.58	78	35
60.59	79	36
60.60	80	37
60.61	81	38
60.62	82	38
60.63	84	39
60.64	85	40
60.65	86	41
60.66	87	42
60.67	88	43
60.68	89	44
60.69	90	45
60.70	92	45
60.71	93	46
60.72	94	47
60.73	95	48
60.74	96	49
60.75	97	50
60.76	99	51
60.77	100	52
60.78	101	53
60.79	102	54
60.80	104	55
60.81	105	56
60.82	106	57
60.83	107	58
60.84	109	59
60.85	110	61
60.86	111	62
60.87	113	63
60.88	114	64
60.89	115	65
60.90	116	66
60.91	118	67
60.92	119	69
60.93	120	70
60.94	122	71
60.95	123	72
60.96	124	73
60.97	126	75
60.98	127	76
60.99	129	77
61.00	**130**	**78**

Stage-Area-Storage for Pond B2: bioretention system 2

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
57.50	258	0
57.55	264	4
57.60	269	8
57.65	275	12
57.70	281	15
57.75	287	19
57.80	292	23
57.85	298	27
57.90	304	31
57.95	309	35
58.00	315	39
58.05	321	43
58.10	326	46
58.15	332	50
58.20	338	54
58.25	344	58
58.30	349	62
58.35	355	66
58.40	361	70
58.45	366	74
58.50	372	77
58.55	378	81
58.60	383	85
58.65	389	89
58.70	395	93
58.75	401	97
58.80	406	101
58.85	412	104
58.90	418	108
58.95	423	112
59.00	429	116
59.05	435	120
59.10	440	124
59.15	446	128
59.20	452	132
59.25	458	135
59.30	463	139
59.35	469	143
59.40	475	147
59.45	480	151
59.50	**486**	155
59.55	486	160
59.60	486	166
59.65	486	172
59.70	486	180
59.75	486	188
59.80	486	197
59.85	486	206
59.90	486	217
59.95	486	228
60.00	486	241
60.05	486	254
60.10	486	268
60.15	486	284
60.20	486	300
60.25	486	318
60.30	486	337
60.35	486	357
60.40	486	378
60.45	486	401
60.50	486	425
60.55	486	450
60.60	486	476
60.65	486	504
60.70	486	534
60.75	486	565
60.80	486	597
60.85	486	631
60.90	486	667
60.95	486	704
61.00	486	**743**
61.05	486	743
61.10	486	743
61.15	486	743
61.20	486	743
61.25	486	743
61.30	486	743
61.35	486	743
61.40	486	743
61.45	486	743
61.50	486	743
61.55	486	743
61.60	486	743
61.65	486	743
61.70	486	743
61.75	486	743

Stage-Discharge for Pond B2: bioretention system 2

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
57.50	0.00	0.00	0.00
57.55	0.00	0.00	0.00
57.60	0.00	0.00	0.00
57.65	0.00	0.00	0.00
57.70	0.01	0.01	0.00
57.75	0.01	0.01	0.00
57.80	0.01	0.01	0.00
57.85	0.01	0.01	0.00
57.90	0.01	0.01	0.00
57.95	0.01	0.01	0.00
58.00	0.01	0.01	0.00
58.05	0.01	0.01	0.00
58.10	0.01	0.01	0.00
58.15	0.01	0.01	0.00
58.20	0.01	0.01	0.00
58.25	0.01	0.01	0.00
58.30	0.01	0.01	0.00
58.35	0.01	0.01	0.00
58.40	0.01	0.01	0.00
58.45	0.01	0.01	0.00
58.50	0.01	0.01	0.00
58.55	0.01	0.01	0.00
58.60	0.01	0.01	0.00
58.65	0.01	0.01	0.00
58.70	0.01	0.01	0.00
58.75	0.01	0.01	0.00
58.80	0.01	0.01	0.00
58.85	0.01	0.01	0.00
58.90	0.01	0.01	0.00
58.95	0.01	0.01	0.00
59.00	0.01	0.01	0.00
59.05	0.01	0.01	0.00
59.10	0.01	0.01	0.00
59.15	0.01	0.01	0.00
59.20	0.01	0.01	0.00
59.25	0.01	0.01	0.00
59.30	0.01	0.01	0.00
59.35	0.01	0.01	0.00
59.40	0.01	0.01	0.00
59.45	0.01	0.01	0.00
59.50	0.01	0.01	0.00
59.55	0.01	0.01	0.00
59.60	0.01	0.01	0.00
59.65	0.01	0.01	0.00
59.70	0.01	0.01	0.00
59.75	0.01	0.01	0.00
59.80	0.01	0.01	0.00
59.85	0.01	0.01	0.00
59.90	0.01	0.01	0.00
59.95	0.01	0.01	0.00
60.00	0.01	0.01	0.00
60.05	0.01	0.01	0.00
60.10	0.01	0.01	0.00
60.15	0.02	0.02	0.00
60.20	0.02	0.02	0.00
60.25	0.02	0.02	0.00
60.30	0.02	0.02	0.00
60.35	0.02	0.02	0.00
60.40	0.02	0.02	0.00
60.45	0.02	0.02	0.00
60.50	0.02	0.02	0.00
60.55	0.03	0.02	0.01
60.60	0.07	0.02	0.05
60.65	0.13	0.02	0.11
60.70	0.21	0.02	0.19
60.75	0.31	0.02	0.30
60.80	0.44	0.02	0.42
60.85	0.58	0.02	0.57
60.90	0.75	0.02	0.73
60.95	0.93	0.02	0.91
61.00	1.12	0.02	1.10
61.05	1.33	0.02	1.31
61.10	1.55	0.02	1.54
61.15	1.79	0.02	1.77
61.20	1.86	0.02	1.84
61.25	1.87	0.02	1.85
61.30	1.89	0.02	1.87
61.35	1.90	0.02	1.88
61.40	1.92	0.02	1.90
61.45	1.93	0.02	1.91
61.50	1.95	0.02	1.93
61.55	1.96	0.02	1.94
61.60	1.97	0.02	1.95
61.65	1.99	0.02	1.97
61.70	2.00	0.02	1.98
61.75	**2.02**	**0.02**	**2.00**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Bioretention System 3**

Enter the node name in the drainage analysis if applicable.

0.57	ac	A = Area draining to the practice	
0.37	ac	A_I = Impervious area draining to the practice	
0.65	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.64	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.36	ac-in	WQV= 1" x Rv x A	
1,324	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
132	cf	10% x WQV (check calc for sediment forebay)	
331	cf	25% x WQV (check calc for water stored in saturated zone)	
Sediment Forebay		Method of Pretreatment	
198	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
5,898	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
983	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.03	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
59.20	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.08	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
9.19	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**≥ 24-hrs**
24.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
N/A		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
60.97	ft	Peak elevation of the 50-year storm event (E_{50})	
61.00	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

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

Designer's Notes:

Stage-Area-Storage for Pond FB3: sediment forebay

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.00	340	0
59.02	344	7
59.04	349	14
59.06	353	21
59.08	357	28
59.10	362	35
59.12	366	42
59.14	370	50
59.16	375	57
59.18	379	65
59.20	384	72
59.22	388	80
59.24	393	88
59.26	398	96
59.28	402	104
59.30	407	112
59.32	411	120
59.34	416	128
59.36	421	137
59.38	426	145
59.40	430	154
59.42	435	162
59.44	440	171
59.46	445	180
59.48	450	189
59.50	455	198
59.52	460	207
59.54	465	216
59.56	470	226
59.58	475	235
59.60	480	245
59.62	485	254
59.64	490	264
59.66	495	274
59.68	500	284
59.70	505	294
59.72	510	304
59.74	516	314
59.76	521	325
59.78	526	335
59.80	531	346
59.82	537	356
59.84	542	367
59.86	548	378
59.88	553	389
59.90	558	400
59.92	564	411
59.94	569	423
59.96	575	434
59.98	580	446
60.00	**586**	**457**
60.02	586	457
60.04	586	457
60.06	586	457
60.08	586	457
60.10	586	457
60.12	586	457
60.14	586	457
60.16	586	457
60.18	586	457
60.20	586	457
60.22	586	457
60.24	586	457
60.26	586	457
60.28	586	457
60.30	586	457
60.32	586	457
60.34	586	457
60.36	586	457
60.38	586	457
60.40	586	457
60.42	586	457
60.44	586	457
60.46	586	457
60.48	586	457
60.50	586	457
60.52	586	457
60.54	586	457
60.56	586	457
60.58	586	457
60.60	586	457
60.62	586	457
60.64	586	457
60.66	586	457
60.68	586	457
60.70	586	457
60.72	586	457
60.74	586	457
60.76	586	457
60.78	586	457
60.80	586	457
60.82	586	457
60.84	586	457
60.86	586	457
60.88	586	457
60.90	586	457
60.92	586	457
60.94	586	457
60.96	586	457
60.98	586	457
61.00	586	457

Stage-Area-Storage for Pond B3: bioretention system 3

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
57.00	1,639	0
57.05	1,648	25
57.10	1,657	49
57.15	1,667	74
57.20	1,676	98
57.25	1,685	123
57.30	1,694	148
57.35	1,703	172
57.40	1,713	197
57.45	1,722	221
57.50	1,731	246
57.55	1,740	270
57.60	1,749	295
57.65	1,759	320
57.70	1,768	344
57.75	1,777	369
57.80	1,786	393
57.85	1,795	418
57.90	1,805	443
57.95	1,814	467
58.00	1,823	492
58.05	1,832	516
58.10	1,841	541
58.15	1,851	565
58.20	1,860	590
58.25	1,869	615
58.30	1,878	639
58.35	1,887	664
58.40	1,897	688
58.45	1,906	713
58.50	1,915	738
58.55	1,924	762
58.60	1,933	787
58.65	1,943	811
58.70	1,952	836
58.75	1,961	860
58.80	1,970	885
58.85	1,979	910
58.90	1,989	934
58.95	1,998	959
59.00	**2,007**	983
59.05	2,007	1,066
59.10	2,007	1,152
59.15	2,007	1,239
59.20	2,007	1,328
59.25	2,007	1,420
59.30	2,007	1,514
59.35	2,007	1,610
59.40	2,007	1,708
59.45	2,007	1,809
59.50	2,007	1,912
59.55	2,007	2,017
59.60	2,007	2,125
59.65	2,007	2,235
59.70	2,007	2,347
59.75	2,007	2,462
59.80	2,007	2,580
59.85	2,007	2,700
59.90	2,007	2,822
59.95	2,007	2,947
60.00	2,007	3,075
60.05	2,007	3,207
60.10	2,007	3,344
60.15	2,007	3,487
60.20	2,007	3,635
60.25	2,007	3,789
60.30	2,007	3,949
60.35	2,007	4,115
60.40	2,007	4,287
60.45	2,007	4,466
60.50	2,007	4,650
60.55	2,007	4,842
60.60	2,007	5,039
60.65	2,007	5,244
60.70	2,007	5,455
60.75	2,007	5,673
60.80	2,007	5,898
60.85	2,007	6,130
60.90	2,007	6,369
60.95	2,007	6,616
61.00	2,007	**6,870**

Stage-Discharge for Pond B3: bioretention system 3

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
57.00	0.00	0.00	0.00
57.05	0.03	0.03	0.00
57.10	0.03	0.03	0.00
57.15	0.03	0.03	0.00
57.20	0.03	0.03	0.00
57.25	0.03	0.03	0.00
57.30	0.03	0.03	0.00
57.35	0.03	0.03	0.00
57.40	0.04	0.04	0.00
57.45	0.04	0.04	0.00
57.50	0.04	0.04	0.00
57.55	0.04	0.04	0.00
57.60	0.04	0.04	0.00
57.65	0.04	0.04	0.00
57.70	0.04	0.04	0.00
57.75	0.04	0.04	0.00
57.80	0.04	0.04	0.00
57.85	0.05	0.05	0.00
57.90	0.05	0.05	0.00
57.95	0.05	0.05	0.00
58.00	0.05	0.05	0.00
58.05	0.05	0.05	0.00
58.10	0.05	0.05	0.00
58.15	0.05	0.05	0.00
58.20	0.05	0.05	0.00
58.25	0.06	0.06	0.00
58.30	0.06	0.06	0.00
58.35	0.06	0.06	0.00
58.40	0.06	0.06	0.00
58.45	0.06	0.06	0.00
58.50	0.06	0.06	0.00
58.55	0.06	0.06	0.00
58.60	0.06	0.06	0.00
58.65	0.06	0.06	0.00
58.70	0.07	0.07	0.00
58.75	0.07	0.07	0.00
58.80	0.07	0.07	0.00
58.85	0.07	0.07	0.00
58.90	0.07	0.07	0.00
58.95	0.07	0.07	0.00
59.00	0.07	0.07	0.00
59.05	0.07	0.07	0.00
59.10	0.07	0.07	0.00
59.15	0.08	0.08	0.00
59.20	0.08	0.08	0.00
59.25	0.08	0.08	0.00
59.30	0.08	0.08	0.00
59.35	0.08	0.08	0.00
59.40	0.08	0.08	0.00
59.45	0.08	0.08	0.00
59.50	0.08	0.08	0.00
59.55	0.08	0.08	0.00
59.60	0.09	0.09	0.00
59.65	0.09	0.09	0.00
59.70	0.09	0.09	0.00
59.75	0.09	0.09	0.00
59.80	0.09	0.09	0.00
59.85	0.09	0.09	0.00
59.90	0.09	0.09	0.00
59.95	0.09	0.09	0.00
60.00	0.09	0.09	0.00
60.05	0.09	0.09	0.00
60.10	0.10	0.10	0.00
60.15	0.10	0.10	0.00
60.20	0.10	0.10	0.00
60.25	0.10	0.10	0.00
60.30	0.10	0.10	0.00
60.35	0.10	0.10	0.00
60.40	0.10	0.10	0.00
60.45	0.10	0.10	0.00
60.50	0.10	0.10	0.00
60.55	0.11	0.11	0.00
60.60	0.11	0.11	0.00
60.65	0.11	0.11	0.00
60.70	0.11	0.11	0.00
60.75	0.11	0.11	0.00
60.80	0.11	0.11	0.00
60.85	0.25	0.11	0.14
60.90	0.52	0.11	0.41
60.95	0.86	0.11	0.75
61.00	**1.26**	**0.11**	**1.15**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR
(UNH Stormwater Center Specification)

Type/Node Name: **Bioretention System 4**

Enter the node name in the drainage analysis if applicable.

0.08	ac	A = Area draining to the practice	
0.04	ac	A_I = Impervious area draining to the practice	
0.53	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.53	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.04	ac-in	WQV= 1" x Rv x A	
162	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
16	cf	10% x WQV (check calc for sediment forebay)	
41	cf	25% x WQV (check calc for water stored in saturated zone)	
Sediment Forebay		Method of Pretreatment	
44	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
1,089	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
310	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.00	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
58.55	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.01	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
9.02	hours	T_{ED} = Drawdown time of extended detention = $2WQV/Q_{WQV}$	**≥ 24-hrs**
24.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
N/A		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
60.74	ft	Peak elevation of the 50-year storm event (E_{50})	
61.00	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

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

Designer's Notes:

Stage-Area-Storage for Pond FB4: sediment forebay

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.50	124	0
59.51	125	1
59.52	127	3
59.53	128	4
59.54	130	5
59.55	131	6
59.56	133	8
59.57	134	9
59.58	136	10
59.59	137	12
59.60	139	13
59.61	140	15
59.62	142	16
59.63	143	17
59.64	145	19
59.65	146	20
59.66	148	22
59.67	149	23
59.68	151	25
59.69	152	26
59.70	154	28
59.71	156	29
59.72	157	31
59.73	159	32
59.74	160	34
59.75	162	36
59.76	164	37
59.77	165	39
59.78	167	41
59.79	169	42
59.80	170	44
59.81	172	46
59.82	174	47
59.83	175	49
59.84	177	51
59.85	179	53
59.86	180	54
59.87	182	56
59.88	184	58
59.89	185	60
59.90	187	62
59.91	189	64
59.92	191	66
59.93	192	67
59.94	194	69
59.95	196	71
59.96	198	73
59.97	200	75
59.98	201	77
59.99	203	79
60.00	**205**	**81**

Stage-Area-Storage for Pond B4: bioretention system 4

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
57.50	516	0	58.03	563	82
57.51	517	2	58.04	564	84
57.52	518	3	58.05	564	85
57.53	519	5	58.06	565	87
57.54	520	6	58.07	566	88
57.55	520	8	58.08	567	90
57.56	521	9	58.09	568	91
57.57	522	11	58.10	569	93
57.58	523	12	58.11	570	94
57.59	524	14	58.12	571	96
57.60	525	15	58.13	571	98
57.61	526	17	58.14	572	99
57.62	527	19	58.15	573	101
57.63	527	20	58.16	574	102
57.64	528	22	58.17	575	104
57.65	529	23	58.18	576	105
57.66	530	25	58.19	577	107
57.67	531	26	58.20	578	108
57.68	532	28	58.21	578	110
57.69	533	29	58.22	579	111
57.70	534	31	58.23	580	113
57.71	534	33	58.24	581	115
57.72	535	34	58.25	582	116
57.73	536	36	58.26	583	118
57.74	537	37	58.27	584	119
57.75	538	39	58.28	585	121
57.76	539	40	58.29	586	122
57.77	540	42	58.30	586	124
57.78	541	43	58.31	587	125
57.79	542	45	58.32	588	127
57.80	542	46	58.33	589	128
57.81	543	48	58.34	590	130
57.82	544	50	58.35	591	132
57.83	545	51	58.36	592	133
57.84	546	53	58.37	593	135
57.85	547	54	58.38	593	136
57.86	548	56	58.39	594	138
57.87	549	57	58.40	595	139
57.88	549	59	58.41	596	141
57.89	550	60	58.42	597	142
57.90	551	62	58.43	598	144
57.91	552	63	58.44	599	146
57.92	553	65	58.45	600	147
57.93	554	67	58.46	600	149
57.94	555	68	58.47	601	150
57.95	556	70	58.48	602	152
57.96	556	71	58.49	603	153
57.97	557	73	58.50	604	155
57.98	558	74	58.51	605	156
57.99	559	76	58.52	606	158
58.00	560	77	58.53	607	159
58.01	561	79	58.54	608	161
58.02	562	80	58.55	608	163

Stage-Area-Storage for Pond B4: bioretention system 4 (continued)

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
58.56	609	164	59.09	656	246
58.57	610	166	59.10	657	248
58.58	611	167	59.11	658	249
58.59	612	169	59.12	659	251
58.60	613	170	59.13	659	252
58.61	614	172	59.14	660	254
58.62	615	173	59.15	661	255
58.63	615	175	59.16	662	257
58.64	616	176	59.17	663	259
58.65	617	178	59.18	664	260
58.66	618	180	59.19	665	262
58.67	619	181	59.20	666	263
58.68	620	183	59.21	666	265
58.69	621	184	59.22	667	266
58.70	622	186	59.23	668	268
58.71	622	187	59.24	669	269
58.72	623	189	59.25	670	271
58.73	624	190	59.26	671	272
58.74	625	192	59.27	672	274
58.75	626	194	59.28	673	276
58.76	627	195	59.29	674	277
58.77	628	197	59.30	674	279
58.78	629	198	59.31	675	280
58.79	630	200	59.32	676	282
58.80	630	201	59.33	677	283
58.81	631	203	59.34	678	285
58.82	632	204	59.35	679	286
58.83	633	206	59.36	680	288
58.84	634	207	59.37	681	289
58.85	635	209	59.38	681	291
58.86	636	211	59.39	682	293
58.87	637	212	59.40	683	294
58.88	637	214	59.41	684	296
58.89	638	215	59.42	685	297
58.90	639	217	59.43	686	299
58.91	640	218	59.44	687	300
58.92	641	220	59.45	688	302
58.93	642	221	59.46	688	303
58.94	643	223	59.47	689	305
58.95	644	224	59.48	690	307
58.96	644	226	59.49	691	308
58.97	645	228	59.50	**692**	310
58.98	646	229	59.51	692	314
58.99	647	231	59.52	692	317
59.00	648	232	59.53	692	321
59.01	649	234	59.54	692	325
59.02	650	235	59.55	692	329
59.03	651	237	59.56	692	333
59.04	652	238	59.57	692	338
59.05	652	240	59.58	692	342
59.06	653	241	59.59	692	346
59.07	654	243	59.60	692	350
59.08	655	245	59.61	692	354

Stage-Area-Storage for Pond B4: bioretention system 4 (continued)

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
59.62	692	358	60.15	692	619
59.63	692	362	60.16	692	625
59.64	692	367	60.17	692	631
59.65	692	371	60.18	692	637
59.66	692	375	60.19	692	643
59.67	692	379	60.20	692	650
59.68	692	384	60.21	692	656
59.69	692	388	60.22	692	662
59.70	692	393	60.23	692	669
59.71	692	397	60.24	692	675
59.72	692	401	60.25	692	682
59.73	692	406	60.26	692	688
59.74	692	410	60.27	692	695
59.75	692	415	60.28	692	702
59.76	692	419	60.29	692	708
59.77	692	424	60.30	692	715
59.78	692	428	60.31	692	722
59.79	692	433	60.32	692	729
59.80	692	438	60.33	692	736
59.81	692	442	60.34	692	743
59.82	692	447	60.35	692	750
59.83	692	452	60.36	692	757
59.84	692	456	60.37	692	765
59.85	692	461	60.38	692	772
59.86	692	466	60.39	692	779
59.87	692	471	60.40	692	787
59.88	692	476	60.41	692	794
59.89	692	480	60.42	692	802
59.90	692	485	60.43	692	810
59.91	692	490	60.44	692	817
59.92	692	495	60.45	692	825
59.93	692	500	60.46	692	833
59.94	692	505	60.47	692	841
59.95	692	510	60.48	692	849
59.96	692	515	60.49	692	857
59.97	692	520	60.50	692	865
59.98	692	525	60.51	692	873
59.99	692	530	60.52	692	881
60.00	692	536	60.53	692	889
60.01	692	541	60.54	692	898
60.02	692	546	60.55	692	906
60.03	692	551	60.56	692	915
60.04	692	557	60.57	692	923
60.05	692	562	60.58	692	932
60.06	692	568	60.59	692	941
60.07	692	573	60.60	692	949
60.08	692	579	60.61	692	958
60.09	692	584	60.62	692	967
60.10	692	590	60.63	692	976
60.11	692	596	60.64	692	985
60.12	692	601	60.65	692	994
60.13	692	607	60.66	692	1,003
60.14	692	613	60.67	692	1,012

Stage-Area-Storage for Pond B4: bioretention system 4 (continued)

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
60.68	692	1,022
60.69	692	1,031
60.70	692	1,041
60.71	692	1,050
60.72	692	1,060
60.73	692	1,069
60.74	692	1,079
60.75	692	1,089
60.76	692	1,099
60.77	692	1,109
60.78	692	1,119
60.79	692	1,129
60.80	692	1,139
60.81	692	1,149
60.82	692	1,160
60.83	692	1,170
60.84	692	1,181
60.85	692	1,191
60.86	692	1,202
60.87	692	1,212
60.88	692	1,223
60.89	692	1,234
60.90	692	1,245
60.91	692	1,256
60.92	692	1,267
60.93	692	1,278
60.94	692	1,289
60.95	692	1,301
60.96	692	1,312
60.97	692	1,324
60.98	692	1,335
60.99	692	1,347
61.00	692	**1,358**

Stage-Discharge for Pond B4: bioretention system 4

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
57.50	0.00	0.00	0.00	58.03	0.01	0.01	0.00
57.51	0.00	0.00	0.00	58.04	0.01	0.01	0.00
57.52	0.00	0.00	0.00	58.05	0.01	0.01	0.00
57.53	0.00	0.00	0.00	58.06	0.01	0.01	0.00
57.54	0.00	0.00	0.00	58.07	0.01	0.01	0.00
57.55	0.00	0.00	0.00	58.08	0.01	0.01	0.00
57.56	0.01	0.01	0.00	58.09	0.01	0.01	0.00
57.57	0.01	0.01	0.00	58.10	0.01	0.01	0.00
57.58	0.01	0.01	0.00	58.11	0.01	0.01	0.00
57.59	0.01	0.01	0.00	58.12	0.01	0.01	0.00
57.60	0.01	0.01	0.00	58.13	0.01	0.01	0.00
57.61	0.01	0.01	0.00	58.14	0.01	0.01	0.00
57.62	0.01	0.01	0.00	58.15	0.01	0.01	0.00
57.63	0.01	0.01	0.00	58.16	0.01	0.01	0.00
57.64	0.01	0.01	0.00	58.17	0.01	0.01	0.00
57.65	0.01	0.01	0.00	58.18	0.01	0.01	0.00
57.66	0.01	0.01	0.00	58.19	0.01	0.01	0.00
57.67	0.01	0.01	0.00	58.20	0.01	0.01	0.00
57.68	0.01	0.01	0.00	58.21	0.01	0.01	0.00
57.69	0.01	0.01	0.00	58.22	0.01	0.01	0.00
57.70	0.01	0.01	0.00	58.23	0.01	0.01	0.00
57.71	0.01	0.01	0.00	58.24	0.01	0.01	0.00
57.72	0.01	0.01	0.00	58.25	0.01	0.01	0.00
57.73	0.01	0.01	0.00	58.26	0.01	0.01	0.00
57.74	0.01	0.01	0.00	58.27	0.01	0.01	0.00
57.75	0.01	0.01	0.00	58.28	0.01	0.01	0.00
57.76	0.01	0.01	0.00	58.29	0.01	0.01	0.00
57.77	0.01	0.01	0.00	58.30	0.01	0.01	0.00
57.78	0.01	0.01	0.00	58.31	0.01	0.01	0.00
57.79	0.01	0.01	0.00	58.32	0.01	0.01	0.00
57.80	0.01	0.01	0.00	58.33	0.01	0.01	0.00
57.81	0.01	0.01	0.00	58.34	0.01	0.01	0.00
57.82	0.01	0.01	0.00	58.35	0.01	0.01	0.00
57.83	0.01	0.01	0.00	58.36	0.01	0.01	0.00
57.84	0.01	0.01	0.00	58.37	0.01	0.01	0.00
57.85	0.01	0.01	0.00	58.38	0.01	0.01	0.00
57.86	0.01	0.01	0.00	58.39	0.01	0.01	0.00
57.87	0.01	0.01	0.00	58.40	0.01	0.01	0.00
57.88	0.01	0.01	0.00	58.41	0.01	0.01	0.00
57.89	0.01	0.01	0.00	58.42	0.01	0.01	0.00
57.90	0.01	0.01	0.00	58.43	0.01	0.01	0.00
57.91	0.01	0.01	0.00	58.44	0.01	0.01	0.00
57.92	0.01	0.01	0.00	58.45	0.01	0.01	0.00
57.93	0.01	0.01	0.00	58.46	0.01	0.01	0.00
57.94	0.01	0.01	0.00	58.47	0.01	0.01	0.00
57.95	0.01	0.01	0.00	58.48	0.01	0.01	0.00
57.96	0.01	0.01	0.00	58.49	0.01	0.01	0.00
57.97	0.01	0.01	0.00	58.50	0.01	0.01	0.00
57.98	0.01	0.01	0.00	58.51	0.01	0.01	0.00
57.99	0.01	0.01	0.00	58.52	0.01	0.01	0.00
58.00	0.01	0.01	0.00	58.53	0.01	0.01	0.00
58.01	0.01	0.01	0.00	58.54	0.01	0.01	0.00
58.02	0.01	0.01	0.00	58.55	0.01	0.01	0.00

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration System 1**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.43	ac	A = Area draining to the practice	
0.43	ac	A_I = Impervious area draining to the practice	
0.99	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.41	ac-in	WQV= 1" x Rv x A	
1,471	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
368	cf	25% x WQV (check calc for sediment forebay volume)	
Isolator Row		Method of pretreatment? (not required for clean or roof runoff)	
*	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
1,582	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
3,088	sf	A_{SA} = Surface area of the bottom of the pond	
0.72	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
7.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**< 72-hrs**
58.60	feet	E_{BTM} = Elevation of the bottom of the basin	
54.60	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
51.60	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
7.0	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
N/A	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
yes	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
N/A		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
N/A	:1	If a basin is proposed, pond side slopes.	**≥3:1**
60.15	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
60.93	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
60.93	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes: *All pavement runoff is pretreated by the isolator row

Stage-Area-Storage for Pond IS1: infiltration 1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.60	**3,088**	0
58.65	3,088	62
58.70	3,088	124
58.75	3,088	185
58.80	3,088	247
58.85	3,088	309
58.90	3,088	371
58.95	3,088	432
59.00	3,088	494
59.05	3,088	556
59.10	3,088	618
59.15	3,088	741
59.20	3,088	864
59.25	3,088	986
59.30	3,088	1,108
59.35	3,088	1,228
59.40	3,088	1,347
59.45	3,088	1,465
59.50	3,088	1,582
59.55	3,088	1,697
59.60	3,088	1,811
59.65	3,088	1,923
59.70	3,088	2,034
59.75	3,088	2,143
59.80	3,088	2,250
59.85	3,088	2,355
59.90	3,088	2,457
59.95	3,088	2,557
60.00	3,088	2,654
60.05	3,088	2,749
60.10	3,088	2,839
60.15	3,088	2,925
60.20	3,088	3,005
60.25	3,088	3,080
60.30	3,088	3,151
60.35	3,088	3,219
60.40	3,088	3,284
60.45	3,088	3,346
60.50	3,088	3,408
60.55	3,088	3,470
60.60	3,088	3,532
60.65	3,088	3,593
60.70	3,088	3,655
60.75	3,088	3,717
60.80	3,088	3,779
60.85	3,088	3,840
60.90	3,088	**3,902**

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration System 2**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.74	ac	A = Area draining to the practice	
0.73	ac	A_I = Impervious area draining to the practice	
0.98	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.93	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.69	ac-in	WQV= 1" x Rv x A	
2,505	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
626	cf	25% x WQV (check calc for sediment forebay volume)	
Isolator Row		Method of pretreatment? (not required for clean or roof runoff)	
*	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
4,514	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
6,032	sf	A_{SA} = Surface area of the bottom of the pond	
0.72	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
6.9	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**< 72-hrs**
57.70	feet	E_{BTM} = Elevation of the bottom of the basin	
53.70	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
49.73	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
8.0	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
N/A	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
yes	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
N/A		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
N/A	:1	If a basin is proposed, pond side slopes.	**≥3:1**
59.36	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
60.02	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
60.03	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes: *All pavement runoff is pretreated by the isolator row

Stage-Area-Storage for Pond IS2: infiltration 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
57.70	**6,032**	0	58.23	6,032	1,353
57.71	6,032	24	58.24	6,032	1,402
57.72	6,032	48	58.25	6,032	1,450
57.73	6,032	72	58.26	6,032	1,499
57.74	6,032	97	58.27	6,032	1,548
57.75	6,032	121	58.28	6,032	1,596
57.76	6,032	145	58.29	6,032	1,645
57.77	6,032	169	58.30	6,032	1,693
57.78	6,032	193	58.31	6,032	1,742
57.79	6,032	217	58.32	6,032	1,790
57.80	6,032	241	58.33	6,032	1,839
57.81	6,032	265	58.34	6,032	1,887
57.82	6,032	290	58.35	6,032	1,935
57.83	6,032	314	58.36	6,032	1,983
57.84	6,032	338	58.37	6,032	2,031
57.85	6,032	362	58.38	6,032	2,079
57.86	6,032	386	58.39	6,032	2,127
57.87	6,032	410	58.40	6,032	2,175
57.88	6,032	434	58.41	6,032	2,223
57.89	6,032	458	58.42	6,032	2,270
57.90	6,032	483	58.43	6,032	2,318
57.91	6,032	507	58.44	6,032	2,365
57.92	6,032	531	58.45	6,032	2,413
57.93	6,032	555	58.46	6,032	2,460
57.94	6,032	579	58.47	6,032	2,507
57.95	6,032	603	58.48	6,032	2,555
57.96	6,032	627	58.49	6,032	2,602
57.97	6,032	651	58.50	6,032	2,649
57.98	6,032	676	58.51	6,032	2,695
57.99	6,032	700	58.52	6,032	2,742
58.00	6,032	724	58.53	6,032	2,789
58.01	6,032	748	58.54	6,032	2,835
58.02	6,032	772	58.55	6,032	2,882
58.03	6,032	796	58.56	6,032	2,928
58.04	6,032	820	58.57	6,032	2,974
58.05	6,032	844	58.58	6,032	3,021
58.06	6,032	869	58.59	6,032	3,067
58.07	6,032	893	58.60	6,032	3,112
58.08	6,032	917	58.61	6,032	3,158
58.09	6,032	941	58.62	6,032	3,204
58.10	6,032	965	58.63	6,032	3,249
58.11	6,032	989	58.64	6,032	3,295
58.12	6,032	1,013	58.65	6,032	3,340
58.13	6,032	1,037	58.66	6,032	3,385
58.14	6,032	1,062	58.67	6,032	3,430
58.15	6,032	1,086	58.68	6,032	3,475
58.16	6,032	1,110	58.69	6,032	3,520
58.17	6,032	1,134	58.70	6,032	3,565
58.18	6,032	1,158	58.71	6,032	3,609
58.19	6,032	1,182	58.72	6,032	3,654
58.20	6,032	1,206	58.73	6,032	3,698
58.21	6,032	1,255	58.74	6,032	3,742
58.22	6,032	1,304	58.75	6,032	3,786

Stage-Area-Storage for Pond IS2: infiltration 2 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
58.76	6,032	3,830	59.29	6,032	5,888
58.77	6,032	3,874	59.30	6,032	5,919
58.78	6,032	3,918	59.31	6,032	5,949
58.79	6,032	3,961	59.32	6,032	5,979
58.80	6,032	4,005	59.33	6,032	6,008
58.81	6,032	4,048	59.34	6,032	6,037
58.82	6,032	4,091	59.35	6,032	6,066
58.83	6,032	4,134	59.36	6,032	6,094
58.84	6,032	4,177	59.37	6,032	6,122
58.85	6,032	4,220	59.38	6,032	6,150
58.86	6,032	4,262	59.39	6,032	6,177
58.87	6,032	4,305	59.40	6,032	6,204
58.88	6,032	4,347	59.41	6,032	6,231
58.89	6,032	4,389	59.42	6,032	6,258
58.90	6,032	4,431	59.43	6,032	6,284
58.91	6,032	4,472	59.44	6,032	6,311
58.92	6,032	4,514	59.45	6,032	6,337
58.93	6,032	4,555	59.46	6,032	6,363
58.94	6,032	4,597	59.47	6,032	6,388
58.95	6,032	4,638	59.48	6,032	6,414
58.96	6,032	4,678	59.49	6,032	6,439
58.97	6,032	4,719	59.50	6,032	6,464
58.98	6,032	4,759	59.51	6,032	6,489
58.99	6,032	4,800	59.52	6,032	6,514
59.00	6,032	4,840	59.53	6,032	6,538
59.01	6,032	4,880	59.54	6,032	6,562
59.02	6,032	4,919	59.55	6,032	6,586
59.03	6,032	4,959	59.56	6,032	6,610
59.04	6,032	4,998	59.57	6,032	6,635
59.05	6,032	5,037	59.58	6,032	6,659
59.06	6,032	5,076	59.59	6,032	6,683
59.07	6,032	5,114	59.60	6,032	6,707
59.08	6,032	5,152	59.61	6,032	6,731
59.09	6,032	5,190	59.62	6,032	6,755
59.10	6,032	5,228	59.63	6,032	6,779
59.11	6,032	5,266	59.64	6,032	6,803
59.12	6,032	5,303	59.65	6,032	6,828
59.13	6,032	5,340	59.66	6,032	6,852
59.14	6,032	5,377	59.67	6,032	6,876
59.15	6,032	5,414	59.68	6,032	6,900
59.16	6,032	5,450	59.69	6,032	6,924
59.17	6,032	5,486	59.70	6,032	6,948
59.18	6,032	5,522	59.71	6,032	6,972
59.19	6,032	5,557	59.72	6,032	6,996
59.20	6,032	5,592	59.73	6,032	7,021
59.21	6,032	5,627	59.74	6,032	7,045
59.22	6,032	5,661	59.75	6,032	7,069
59.23	6,032	5,695	59.76	6,032	7,093
59.24	6,032	5,728	59.77	6,032	7,117
59.25	6,032	5,761	59.78	6,032	7,141
59.26	6,032	5,794	59.79	6,032	7,165
59.27	6,032	5,826	59.80	6,032	7,189
59.28	6,032	5,857	59.81	6,032	7,214

Stage-Area-Storage for Pond IS2: infiltration 2 (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.82	6,032	7,238
59.83	6,032	7,262
59.84	6,032	7,286
59.85	6,032	7,310
59.86	6,032	7,334
59.87	6,032	7,358
59.88	6,032	7,382
59.89	6,032	7,407
59.90	6,032	7,431
59.91	6,032	7,455
59.92	6,032	7,479
59.93	6,032	7,503
59.94	6,032	7,527
59.95	6,032	7,551
59.96	6,032	7,575
59.97	6,032	7,600
59.98	6,032	7,624
59.99	6,032	7,648
60.00	6,032	7,672
60.01	6,032	7,696
60.02	6,032	7,720
60.03	6,032	**7,744**

INFILTRATION PRACTICE CRITERIA
(Env-Wq 1508.06)

Type/Node Name: **Infiltration System 3**

Enter the type of infiltration practice (e.g., basin, trench) and the node name in the drainage analysis, if applicable.

yes		Have you reviewed Env-Wq 1508.06(a) to ensure that infiltration is allowed?	**← yes**
0.13	ac	A = Area draining to the practice	
0.13	ac	A_I = Impervious area draining to the practice	
0.99	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.12	ac-in	WQV= 1" x Rv x A	
443	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
111	cf	25% x WQV (check calc for sediment forebay volume)	
Isolator Row		Method of pretreatment? (not required for clean or roof runoff)	
*	cf	V_{SED} = Sediment forebay volume, if used for pretreatment	**≥ 25%WQV**
2,057	cf	V = Volume[1] (attach a stage-storage table)	**≥ WQV**
1,972	sf	A_{SA} = Surface area of the bottom of the pond	
0.72	iph	$Ksat_{DESIGN}$ = Design infiltration rate[2]	
3.7	hours	T_{DRAIN} = Drain time = V / (A_{SA} * I_{DESIGN})	**< 72-hrs**
59.60	feet	E_{BTM} = Elevation of the bottom of the basin	
55.60	feet	E_{SHWT} = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
53.40	feet	E_{ROCK} = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
4.00	feet	D_{SHWT} = Separation from SHWT	**≥ *** [3]
6.2	feet	D_{ROCK} = Separation from bedrock	**≥ *** [3]
N/A	ft	D_{amend} = Depth of amended soil, if applicable due high infiltation rate	**≥ 24"**
N/A	ft	D_T = Depth of trench, if trench proposed	**4 - 10 ft**
yes	Yes/No	If a trench or underground system is proposed, has observation well been provided?	**←yes**
N/A		If a trench is proposed, does materialmeet Env-Wq 1508.06(k)(2) requirements.[4]	**← yes**
N/A	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	**← yes**
N/A	:1	If a basin is proposed, pond side slopes.	**≥3:1**
60.59	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
61.49	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
61.60	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench?[5]	**← yes**
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	**← yes**

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. $Ksat_{DESIGN}$ includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

Designer's Notes: *All pavement runoff is pretreated by the isolator row

Stage-Area-Storage for Pond IS3: infiltration 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
59.60	**1,972**	0
59.62	1,972	16
59.64	1,972	32
59.66	1,972	47
59.68	1,972	63
59.70	1,972	79
59.72	1,972	95
59.74	1,972	110
59.76	1,972	126
59.78	1,972	142
59.80	1,972	158
59.82	1,972	174
59.84	1,972	189
59.86	1,972	205
59.88	1,972	221
59.90	1,972	237
59.92	1,972	252
59.94	1,972	268
59.96	1,972	284
59.98	1,972	300
60.00	1,972	315
60.02	1,972	331
60.04	1,972	347
60.06	1,972	363
60.08	1,972	379
60.10	1,972	394
60.12	1,972	425
60.14	1,972	456
60.16	1,972	486
60.18	1,972	517
60.20	1,972	548
60.22	1,972	578
60.24	1,972	608
60.26	1,972	638
60.28	1,972	668
60.30	1,972	698
60.32	1,972	728
60.34	1,972	757
60.36	1,972	786
60.38	1,972	816
60.40	1,972	845
60.42	1,972	873
60.44	1,972	902
60.46	1,972	930
60.48	1,972	959
60.50	1,972	987
60.52	1,972	1,015
60.54	1,972	1,042
60.56	1,972	1,069
60.58	1,972	1,097
60.60	1,972	1,123
60.62	1,972	1,150
60.64	1,972	1,176
60.66	1,972	1,202
60.68	1,972	1,228
60.70	1,972	1,254
60.72	1,972	1,279
60.74	1,972	1,303
60.76	1,972	1,328
60.78	1,972	1,352
60.80	1,972	1,375
60.82	1,972	1,398
60.84	1,972	1,421
60.86	1,972	1,443
60.88	1,972	1,464
60.90	1,972	1,485
60.92	1,972	1,505
60.94	1,972	1,524
60.96	1,972	1,543
60.98	1,972	1,561
61.00	1,972	1,579
61.02	1,972	1,597
61.04	1,972	1,614
61.06	1,972	1,630
61.08	1,972	1,647
61.10	1,972	1,663
61.12	1,972	1,679
61.14	1,972	1,695
61.16	1,972	1,710
61.18	1,972	1,726
61.20	1,972	1,742
61.22	1,972	1,758
61.24	1,972	1,773
61.26	1,972	1,789
61.28	1,972	1,805
61.30	1,972	1,821
61.32	1,972	1,837
61.34	1,972	1,852
61.36	1,972	1,868
61.38	1,972	1,884
61.40	1,972	1,900
61.42	1,972	1,915
61.44	1,972	1,931
61.46	1,972	1,947
61.48	1,972	1,963
61.50	1,972	1,979
61.52	1,972	1,994
61.54	1,972	2,010
61.56	1,972	2,026
61.58	1,972	2,042
61.60	1,972	**2,057**

GENERAL CALCULATIONS - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP **that does not fit into one of the specific worksheets already provided** (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.05	ac	A = Area draining to the practice
0.05	ac	A_I = Impervious area draining to the practice
0.88	decimal	I = Percent impervious area draining to the practice, in decimal form
0.85	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.05	ac-in	WQV= 1" x Rv x A
169	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

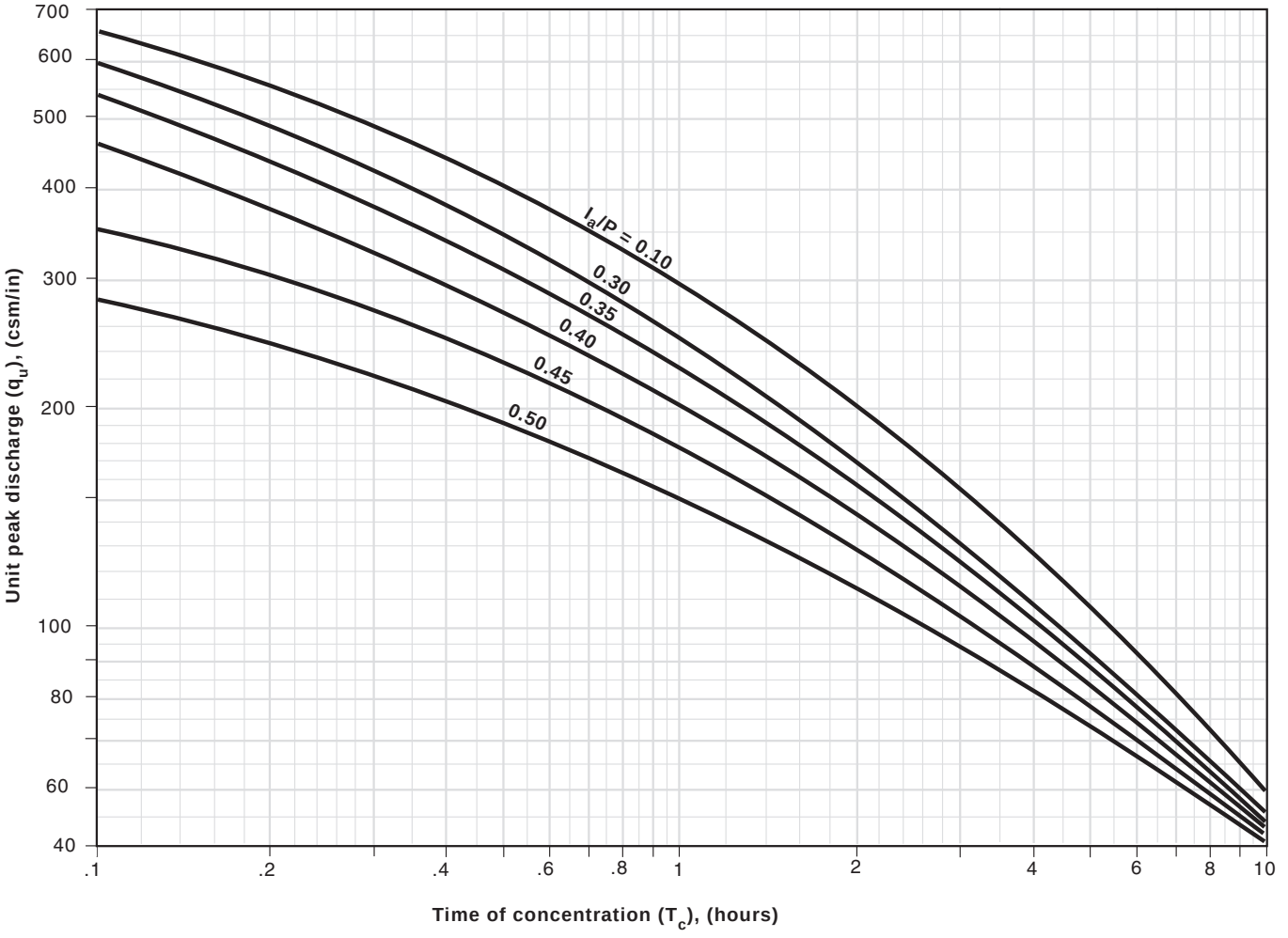
Water Quality Flow (WQF)

1	inches	P = Amount of rainfall. For WQF in NH, P = 1".
0.85	inches	Q = Water quality depth. Q = WQV/A
99	unitless	CN = Unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.1	inches	S = Potential maximum retention. S = (1000/CN) - 10
0.029	inches	Ia = Initial abstraction. Ia = 0.2S
6.0	minutes	T_c = Time of Concentration
700.0	cfs/mi^2/in	q_u is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III.
0.051	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac.

Designer's Notes: Calculations for WQ-01

The Jellyfish JF4 with 15" cartridges has a treatment capacity of 0.05 cfs

Exhibit 4-III Unit peal discharge (q_u) for NRCS (SCS) type III rainfall distribution



Rip-Rap Apron / Energy Dissipation / Stability Calculations

Outlet # FES-01 (from HydroCAD IS1)

Q10 = 0.95 cfs T_w = 0.33 feet

D_o = 8 inches

Design Criteria

Apron Dimensions

The dimensions of the apron at the outlet of the pipe shall be determined as follows:

1.) The width of the apron at the outlet of the pipe or channel shall be 3 times the diameter of the pipe of width of the channel.

W= **2** feet

2.) The length of the apron shall be determined from the following formula when the tailwater depth at the outlet of the pipe or channel is less than one-half the diameter of the pipe or one-half the width of the channel:

La=1.8*Q/ Do^3/2+ 7Do

La= **7.81** feet

Where:

La is the length of the apron

Q is the discharge from the pipe or channel

D_o is the diameter of pipe of width of channel

3.) When the depth of the tailwater at the outlet of the pipe or channel is equal to or greater than one-half the diameter of the pipe or the width of the channel. Then the following formula applies:

La=3.0*Qo/ Do^1.5 +7D_o

USE THIS ONE La= **9.90** feet

4.) Where there is no well defined channel downstream of the outlet, the width of the downstream end of the apron shall be determined as follows:

a. For minimum tailwater conditions where the tailwater depth is less than the elevation of the center of the pipe:

W=3*Do+La

USE THIS ONE W= **9.81** feet

b. For maximum tailwater conditions where the tailwater depth is greater than the elevation of the center of the pipe:

W=3*Do+0.4*La

W= **5.96** feet

5.) Where there is a stable well-defined channel downstream of the apron, the bottom of the apron shall be equal to the width of the channel.

6.) The side of the apron in a well-defined channel shall be 2:1 (horizontal to vertical) or flatter. The height of the structural lining along the channel sides shall begin at the elevation equal to the top of conduit and taper down to the channel bottom through the length of the apron.

7.) The bottom grade of the apron shall be level (0% grade). No overfall is allowable at the end of the apron.

8.) The apron shall be located so that there are no bends in the horizontal alignment of the apron.

Rock Riprap

The following criteria shall be used to determine the dimensions of the rock riprap used for the apron:

1.) The median stone diameter shall be determined using the formula:

d_{50}=0.02*Q^4/3/(Tw*D_o)

d_{50}= **1.02** inches **USE 3** inches

d_{50} minimum 3 inches

Where:

d_{50} is the median stone diameter in feet

Tw is the tailwater depth above the invert of the pipe channel in feet

Q is the discharge from the pipe or channel in cubic feet per second

D_o is the diameter of the pipe or width of the channel in feet

2.) Fifty percent by weight of the riprap mixture shall be smaller the than median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size.

3.) The quality and gradation of the rock, the thickness of the riprap lining, filter material and the quality of the stone shall meet the requirements in the Rock Riprap BMP. The minimum depth shall be 6 inches or 1.5 times the largest stone size in the mixture whichever is larger (d).

Thickness of the riprap

d = 1.5*(1.5*d_{50}(largest stone size))

d = **7** inches*

* must use a minimum of 6"

Rock Rip Rap Gradation

% of weight smaller than the given size	size of stone in inches		
100	**4.5**	to	**6.0**
85	**3.9**	to	**5.4**
50	**3.0**	to	**4.5**
15	**0.9**	to	**1.5**

Formulas Used (Reference NHDES Handbook, Pages 7-114, 7-115)

Outlet # FES-02 (from HydroCAD IS2)

Q10 = 0.76 cfs T_w = 0.5 feet

D_o = 12 inches

Design Criteria

Apron Dimensions

The dimensions of the apron at the outlet of the pipe shall be determined as follows:

1.) The width of the apron at the outlet of the pipe or channel shall be 3 times the diameter of the pipe of width of the channel.

W= **3** feet

2.) The length of the apron shall be determined from the following formula when the tailwater depth at the outlet of the pipe or channel is less than one-half the diameter of the pipe or one-half the width of the channel:

La=1.8*Q/ Do^3/2+ 7Do

La= **8.37** feet

Where:

La is the length of the apron

Q is the discharge from the pipe or channel

D_o is the diameter of pipe of width of channel

3.) When the depth of the tailwater at the outlet of the pipe or channel is equal to or greater than one-half the diameter of the pipe or the width of the channel. Then the following formula applies:

La=3.0*Qo/ Do^1.5 +7D_o

USE THIS ONE La= **9.28** feet

4.) Where there is no well defined channel downstream of the outlet, the width of the downstream end of the apron shall be determined as follows:

a. For minimum tailwater conditions where the tailwater depth is less than the elevation of the center of the pipe:

W=3*Do+La

USE THIS ONE W= **11.37** feet

b. For maximum tailwater conditions where the tailwater depth is greater than the elevation of the center of the pipe:

W=3*Do+0.4*La

W= **6.71** feet

5.) Where there is a stable well-defined channel downstream of the apron, the bottom of the apron shall be equal to the width of the channel.

6.) The side of the apron in a well-defined channel shall be 2:1 (horizontal to vertical) or flatter. The height of the structural lining along the channel sides shall begin at the elevation equal to the top of conduit and taper down to the channel bottom through the length of the apron.

7.) The bottom grade of the apron shall be level (0% grade). No overfall is allowable at the end of the apron.

8.) The apron shall be located so that there are no bends in the horizontal alignment of the apron.

Rock Riprap

The following criteria shall be used to determine the dimensions of the rock riprap used for the apron:

1.) The median stone diameter shall be determined using the formula:

d_{50}=0.02*Q^4/3/(Tw*D_o)

d_{50}= **0.33** inches **USE 3** inches

d_{50} minimum 3 inches

Where:

d_{50} is the median stone diameter in feet

Tw is the tailwater depth above the invert of the pipe channel in feet

Q is the discharge from the pipe or channel in cubic feet per second

D_o is the diameter of the pipe or width of the channel in feet

2.) Fifty percent by weight of the riprap mixture shall be smaller the than median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size.

3.) The quality and gradation of the rock, the thickness of the riprap lining, filter material and the quality of the stone shall meet the requirements in the Rock Riprap BMP. The minimum depth shall be 6 inches or 1.5 times the largest stone size in the mixture whichever is larger (d).

Thickness of the riprap

d = 1.5*(1.5*d_{50}(largest stone size))

d = **7** inches*

* must use a minimum of 6"

Rock Rip Rap Gradation

% of weight smaller than the given size	size of stone in inches		
100	**4.5**	to	**6.0**
85	**3.9**	to	**5.4**
50	**3.0**	to	**4.5**
15	**0.9**	to	**1.5**

Formulas Used (Reference NHDES Handbook, Pages 7-114, 7-115)

Outlet # FES-03 (from HydroCAD P-6)

Q10 = 0.28 cfs T_w = 0.33 feet

D_o = 8 inches

Design Criteria

Apron Dimensions

The dimensions of the apron at the outlet of the pipe shall be determined as follows:

1.) The width of the apron at the outlet of the pipe or channel shall be 3 times the diameter of the pipe of width of the channel.

W= **2** feet

2.) The length of the apron shall be determined from the following formula when the tailwater depth at the outlet of the pipe or channel is less than one-half the diameter of the pipe or one-half the width of the channel:

La=1.8*Q/ Do^3/2+ 7Do

La= **5.59** feet

Where:

La is the length of the apron

Q is the discharge from the pipe or channel

D_o is the diameter of pipe of width of channel

3.) When the depth of the tailwater at the outlet of the pipe or channel is equal to or greater than one-half the diameter of the pipe or the width of the channel. Then the following formula applies:

La=3.0*Qo/ Do^1.5 +7D_o

USE THIS ONE La= **6.21** feet

4.) Where there is no well defined channel downstream of the outlet, the width of the downstream end of the apron shall be determined as follows:

a. For minimum tailwater conditions where the tailwater depth is less than the elevation of the center of the pipe:

W=3*Do+La

USE THIS ONE W= **7.59** feet

b. For maximum tailwater conditions where the tailwater depth is greater than the elevation of the center of the pipe:

W=3*Do+0.4*La

W= **4.48** feet

5.) Where there is a stable well-defined channel downstream of the apron, the bottom of the apron shall be equal to the width of the channel.

6.) The side of the apron in a well-defined channel shall be 2:1 (horizontal to vertical) or flatter. The height of the structural lining along the channel sides shall begin at the elevation equal to the top of conduit and taper down to the channel bottom through the length of the apron.

7.) The bottom grade of the apron shall be level (0% grade). No overfall is allowable at the end of the apron.

8.) The apron shall be located so that there are no bends in the horizontal alignment of the apron.

Rock Riprap

The following criteria shall be used to determine the dimensions of the rock riprap used for the apron:

1.) The median stone diameter shall be determined using the formula:

d_{50}=0.02*Q^4/3/(Tw*D_o)

d_{50}= **0.20** inches **USE 3** inches

d_{50} minimum 3 inches

Where:

d_{50} is the median stone diameter in feet

Tw is the tailwater depth above the invert of the pipe channel in feet

Q is the discharge from the pipe or channel in cubic feet per second

D_o is the diameter of the pipe or width of the channel in feet

2.) Fifty percent by weight of the riprap mixture shall be smaller the than median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size.

3.) The quality and gradation of the rock, the thickness of the riprap lining, filter material and the quality of the stone shall meet the requirements in the Rock Riprap BMP. The minimum depth shall be 6 inches or 1.5 times the largest stone size in the mixture whichever is larger (d).

Thickness of the riprap

d = 1.5*(1.5*d_{50}(largest stone size))

d = **7** inches*

* must use a minimum of 6"

Rock Rip Rap Gradation

% of weight smaller than the given size	size of stone in inches		
100	**4.5**	to	**6.0**
85	**3.9**	to	**5.4**
50	**3.0**	to	**4.5**
15	**0.9**	to	**1.5**

Formulas Used (Reference NHDES Handbook, Pages 7-114, 7-115)

Outlet # FES-04 (from HydroCAD B2)

Q10 = 0.39 cfs T_w = 0.33 feet

D_o = 8 inches

Design Criteria

Apron Dimensions

The dimensions of the apron at the outlet of the pipe shall be determined as follows:

1.) The width of the apron at the outlet of the pipe or channel shall be 3 times the diameter of the pipe of width of the channel.

W= **2** feet

2.) The length of the apron shall be determined from the following formula when the tailwater depth at the outlet of the pipe or channel is less than one-half the diameter of the pipe or one-half the width of the channel:

La=1.8*Q/ Do^3/2+ 7Do

La= **5.96** feet

Where:

La is the length of the apron

Q is the discharge from the pipe or channel

D_o is the diameter of pipe of width of channel

3.) When the depth of the tailwater at the outlet of the pipe or channel is equal to or greater than one-half the diameter of the pipe or the width of the channel. Then the following formula applies:

La=3.0*Qo/ Do^1.5 +7D_o

USE THIS ONE La= **6.82** feet

4.) Where there is no well defined channel downstream of the outlet, the width of the downstream end of the apron shall be determined as follows:

a. For minimum tailwater conditions where the tailwater depth is less than the elevation of the center of the pipe:

W=3*Do+La

USE THIS ONE W= **7.96** feet

b. For maximum tailwater conditions where the tailwater depth is greater than the elevation of the center of the pipe:

W=3*Do+0.4*La

W= **4.73** feet

5.) Where there is a stable well-defined channel downstream of the apron, the bottom of the apron shall be equal to the width of the channel.

6.) The side of the apron in a well-defined channel shall be 2:1 (horizontal to vertical) or flatter. The height of the structural lining along the channel sides shall begin at the elevation equal to the top of conduit and taper down to the channel bottom through the length of the apron.

7.) The bottom grade of the apron shall be level (0% grade). No overfall is allowable at the end of the apron.

8.) The apron shall be located so that there are no bends in the horizontal alignment of the apron.

Rock Riprap

The following criteria shall be used to determine the dimensions of the rock riprap used for the apron:

1.) The median stone diameter shall be determined using the formula:

d_{50}=0.02*Q^4/3/(Tw*D_o)

d_{50}= **0.31** inches **USE 3** inches

d_{50} minimum 3 inches

Where:

d_{50} is the median stone diameter in feet

Tw is the tailwater depth above the invert of the pipe channel in feet

Q is the discharge from the pipe or channel in cubic feet per second

D_o is the diameter of the pipe or width of the channel in feet

2.) Fifty percent by weight of the riprap mixture shall be smaller the than median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size.

3.) The quality and gradation of the rock, the thickness of the riprap lining, filter material and the quality of the stone shall meet the requirements in the Rock Riprap BMP. The minimum depth shall be 6 inches or 1.5 times the largest stone size in the mixture whichever is larger (d).

Thickness of the riprap

d = 1.5*(1.5*d_{50}(largest stone size))

d = **7** inches*

* must use a minimum of 6"

Rock Rip Rap Gradation

% of weight smaller than the given size	size of stone in inches		
100	**4.5**	to	**6.0**
85	**3.9**	to	**5.4**
50	**3.0**	to	**4.5**
15	**0.9**	to	**1.5**

Formulas Used (Reference NHDES Handbook, Pages 7-114, 7-115)

Outlet # FES-05 (from HydroCAD B3)

Q10 = 0.00 cfs T_w = 0.00 feet

D_o = 8 inches

Design Criteria

Apron Dimensions

The dimensions of the apron at the outlet of the pipe shall be determined as follows:

1.) The width of the apron at the outlet of the pipe or channel shall be 3 times the diameter of the pipe of width of the channel.

W= **2** feet

2.) The length of the apron shall be determined from the following formula when the tailwater depth at the outlet of the pipe or channel is less than one-half the diameter of the pipe or one-half the width of the channel:

La=1.8*Q/ Do^3/2+ 7Do

La= **4.67** feet

Where:

La is the length of the apron

Q is the discharge from the pipe or channel

D_o is the diameter of pipe of width of channel

3.) When the depth of the tailwater at the outlet of the pipe or channel is equal to or greater than one-half the diameter of the pipe or the width of the channel. Then the following formula applies:

La=3.0*Qo/ Do^1.5 +7D_o

USE THIS ONE La= **4.67** feet

4.) Where there is no well defined channel downstream of the outlet, the width of the downstream end of the apron shall be determined as follows:

a. For minimum tailwater conditions where the tailwater depth is less than the elevation of the center of the pipe:

W=3*Do+La

USE THIS ONE W= **6.67** feet

b. For maximum tailwater conditions where the tailwater depth is greater than the elevation of the center of the pipe:

W=3*Do+0.4*La

W= **3.87** feet

5.) Where there is a stable well-defined channel downstream of the apron, the bottom of the apron shall be equal to the width of the channel.

6.) The side of the apron in a well-defined channel shall be 2:1 (horizontal to vertical) or flatter. The height of the structural lining along the channel sides shall begin at the elevation equal to the top of conduit and taper down to the channel bottom through the length of the apron.

7.) The bottom grade of the apron shall be level (0% grade). No overfall is allowable at the end of the apron.

8.) The apron shall be located so that there are no bends in the horizontal alignment of the apron.

Rock Riprap

The following criteria shall be used to determine the dimensions of the rock riprap used for the apron:

1.) The median stone diameter shall be determined using the formula:

d_{50}=0.02*Q^4/3/(Tw*D_o)

d_{50}= **0.00** inches **USE 3** inches

d_{50} minimum 3 inches

Where:

d_{50} is the median stone diameter in feet

Tw is the tailwater depth above the invert of the pipe channel in feet

Q is the discharge from the pipe or channel in cubic feet per second

D_o is the diameter of the pipe or width of the channel in feet

2.) Fifty percent by weight of the riprap mixture shall be smaller the than median size stone designated as d_{50}. The largest stone size in the mixture shall be 1.5 times the d_{50} size.

3.) The quality and gradation of the rock, the thickness of the riprap lining, filter material and the quality of the stone shall meet the requirements in the Rock Riprap BMP. The minimum depth shall be 6 inches or 1.5 times the largest stone size in the mixture whichever is larger (d).

Thickness of the riprap

d = 1.5*(1.5*d_{50}(largest stone size))

d = **7** inches*

* must use a minimum of 6"

Rock Rip Rap Gradation

% of weight smaller than the given size	size of stone in inches		
100	**4.5**	to	**6.0**
85	**3.9**	to	**5.4**
50	**3.0**	to	**4.5**
15	**0.9**	to	**1.5**

Formulas Used (Reference NHDES Handbook, Pages 7-114, 7-115)

Site Specific Soil Survey Report

TES ENVIRONMENTAL CONSULTANTS, L.L.C.

Environmental Planning and Permitting
Soil and Wetlands Investigation

SITE-SPECIFIC SOIL SURVEY REPORT

performed at

ATDG, LLC
Tax Map 315, Lot 5
360 Corporate Drive
Portsmouth, New Hampshire

prepared for

Allen & Major Associates, Inc.
250 Commercial Street
Manchester, New Hampshire

TES Project # 23-0031

1494 Route 3A, Unit 1
Bow, NH 03304
(603) 856-8925

tom@tesenviro.comcastbiz.net

STATE OF NEW HAMPSHIRE
THOMAS E. SOKOLOSKI
No. 063
8/9/2023
CERTIFIED SOIL SCIENTIST

August 9, 2023

Mr. Brian D. Jones, P.E.
Allen & Major Associates, Inc.
400 Harvey Road
Manchester, New Hampshire 03103

RE: Site Specific Soil Map for ATDG, LLC
Tax Map 315, Lot 5; 360 Corporate Drive, Portsmouth, New Hampshire

Dear Mr. Jones:

On August 9, 2023 I performed field work on the above-referenced property for a Site Specific Soil Survey as you requested. This parcel was depicted on an Existing Conditions Plan and surveyed boundary map printed at a scale of 1" = 40', with a 1-foot contour interval, which served as the field base map for the soil survey. Ample ground control for the soil survey was provided by the flagged wetland boundaries, tree lines, a stone wall, trails, individual trees and boulders and development features on and adjacent to the site including edge of pavement, a shed, utility poles, storm drains, concrete piers and property boundary markers.

This Site Specific Soil Survey was completed utilizing SSSNNE Special Publication No. 3; Site Specific Soil Mapping Standards for New Hampshire and Vermont, Version 7.0, March 2021. The soil legend used for this soil map conforms to the New Hampshire State-Wide Numerical Soils Legend, Issue #10, January 2011 established and maintained by the Natural Resources Conservation Service.

The purpose of this soil survey was to provide information for an Alteration of Terrain permit application related to planned site development. Field work for this survey included the examination of numerous soil profiles via hand dug spade pits and soil auger borings taken at intervals sufficient to delineate the boundaries between soil map units. The NRCS Soil Survey of Rockingham County, New Hampshire was reviewed to determine the soils that have been mapped on and in the vicinity of the site, which were entirely Urban Land-Canton complex (799). As would be expected, Site Specific Soil mapping observations revealed discrepancies with the broad-scaled NRCS mapping. Altered soils are present, mainly in the western portion of the mapping area, moderately well drained soils exist adjacent to and between site wetlands, and poorly drained soils are present within wetlands in the central portion of the site. All New Hampshire-jurisdictional wetlands on the parcel were previously delineated by others, and I concurred with the delineation.

The following report includes a Site Specific Soil Map Key with accompanying Hydrologic Soil Groups and High Intensity Soil Survey codes, as well as soil map unit descriptions. The general soil conditions on the site consist of nearly level to moderately sloping lands having soils formed in loamy glacial till deposits. As noted in the above paragraph, altered soils are found along the lot frontage along Corporate Drive, consisting of regraded land extending approximately 140-160 feet east from Corporate Drive. Most of this area is lawn, although an asphalt-paved parking

lot exists in the northwest corner of the site. The remainder of the site is forested, with two wetland drainageways originating at the rear of the regraded portion of the site to the eastern property boundary. Site soils were mostly found to be derived from loamy, loose glacial till deposits, with the poorly drained soils in the wetlands having a loam to silt loam substratum likely derived from glaciomarine deposits

.

If you have any questions regarding the soils on this site and the accompanying report, please contact our office.

Very truly yours,

Thomas E. Sokoloski

Thomas E. Sokoloski
New Hampshire Certified Soil Scientist No. 63

STATE OF NEW HAMPSHIRE
THOMAS
E
SOKOLOSKI
No. 063
8/9/2023
CERTIFIED SOIL SCIENTIST

SITE SPECIFIC SOIL MAP UNIT KEY

Symbol*	Map Unit	Slope Class	Drainage Class	HISS Symbol	Hydrologic Soil Group
42B	Canton fine sandy loam	0-8%	Well	221BH	B
42C	Canton fine sandy loam	8-15%	Well	221CH	B
444B	Newfields fine sandy loam	0-8%	Moderately well	321BH	B
444C	Newfields fine sandy loam	8-15%	Moderately well	321CH	B
500B/ccabb	Udorthents, loamy	0-8%	Well	261BH	B
500C/ccabb	Udorthents, loamy	8-15%	Well	261CH	B
500D/ccabb	Udorthents, loamy	15-25%	Well	261DH	B
500E/ccabb	Udorthents, loamy	25% +	Well	261EH	B
500B/hchbb	Udorthents, loamy	0-8%	Undeterminable	761BH**	B**
538B	Squamscott fine sandy loam	0-8%	Poorly	551BH	C
921B	Newfields Variant (SPD)	0-8%	Somewhat poorly	421BH	C

* Refer to accompanying report for 5-unit supplemental symbol explanation.

** Assumed based upon adjacent soils without impervious surfaces.

This detailed Site-Specific Soil Map, prepared on August 9, 2023 by Thomas E. Sokoloski, Certified Soil Scientist #063 of TES Environmental Consultants, L.L.C. in Bow, New Hampshire, conforms to the standards of SSSNNE Publication No. 3, Version 7.0, "Site-Specific Soil Mapping Standards for New Hampshire and Vermont", March 2021. This map has been prepared to comply with soil mapping requirements of RSA 485 A: 17 and NHDES Env-Wq 1500, Alteration of Terrain. See accompanying report for methodology, map symbol legend, and interpretations. Use of the map symbol denominators for disturbed or altered soils, where given, is at the discretion of the Certified Soil Scientist.

This map product is within the technical standards of the National Cooperative Soil Survey. It is a special purpose product, intended for use in support of a New Hampshire Alteration Terrain permit application. It was produced by a certified Soil Scientist, and is not a product of the USDA Natural Resources Conservation Service. There is a narrative report that accompanies this map.

Supplemental Symbols

The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

Symbol 1: Drainage Class
a-Excessively Well Drained
b-Somewhat Excessively Drained
c-Well Drained
d-Moderately Well Drained
e-Somewhat Poorly Drained
f-Poorly Drained
g-Very Poorly Drained
h-Not Determined

Symbol 2 -: Parent Material (of naturally formed soil only, if present)
a-No natural soil within 60"
b-Glaciofluvial Deposits (outwash/terraces of sand or sand and gravel)
c-Glacial Till Material (active ice)
d-Glaciolacustrine very fine sand and silt deposits (glacial lakes)
e-Loamy/sandy over silt/clay deposits
f-Marine Silt and clay deposits (ocean waters)
g-Alluvial Deposits (floodplains)
h-Organic Materials-Fresh water Bogs, etc
i- Organic Materials-Tidal Marsh

Symbol 3: Restrictive/Impervious Layers
a-None
b-Bouldery surface with more than 15% of the surface covered with boulders
c-Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as hardpan, platy structure or clayey texture with consistence of at least firm, i.e. more than 20 newtons. For other examples of soil characteristics that qualify for restrictive layer, see "Soil Manual for Site evaluations in NH" 2nd Ed., page 3-17, figure 2-14
d-Bedrock in the soil profile 0-20 inches
e-Bedrock in the soil profile 20-60 inches
f-Areas where depth to bedrock is so variable that a single soil type cannot be applied, will be mapped as a complex of soil types
g-Subject to Flooding
h –man-made impervious surface including pavement, concrete, or built-up surfaces (i.e. buildings) with no morphological restrictive layer within control section

Symbol 4 Estimated Ksat* (most restrictive layer excluding symbol 3h above).
a- High
b-Moderate
c-Low
d-Not determined
*See "Guidelines for Ksat Class Placement" in Chapter 3 of the Soil Survey Manual, USDA

Symbol 5: Hydrologic Soil Group*
a-Group A
b-Group B
c-Group C
d-Group D
e-Not determined

*excluding man-made impervious/restrictive layers

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 42

Map Unit Name: Canton fine sandy loam

Landscape Settings: Upland slopes and crests, forests or fields

Surface Features: None

Drainage Class: Well

Parent Material: Loamy glacial till material with no mineral restrictive features (hardpan)

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes: Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-2"	Oe	10YR 2/2	--	--	--	--	Forest duff
2-10"	Ap	10YR 2/2	Sandy loam	Granular	Very friable	None	
10-28"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	None	
28-40"+	C	2.5Y 6/4	Loamy sand	Single grain	Loose	None within 40"	

Groundwater not encountered. SHWT below 40".

Southern portion of Tax Map 315, Lot 5.

Thomas E. Sokoloski August 9, 2023

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 444

Map Unit Name: Newfields fine sandy loam

Landscape Settings: Lower slopes of glacial till uplands, forests or fields

Surface Features: None

Drainage Class: Moderately well

Parent Material: Loamy glacial till material with no mineral restrictive features (hardpan)

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

Small inclusions of somewhat poorly drained soils along wetland boundaries, mostly in northern and eastern portions of site, less than 5% of map unit.

Additional Notes: Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-2"	Oe	10YR 2/2	--	--	--	--	Forest duff
2-8"	A	10YR 2/2	Sandy loam	Granular	Very friable	None	
10-22"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	None	
22-40"+	C	2.5Y 5/3	Loamy sand	Single grain	Loose	10YR 5/6	

Groundwater not encountered. SHWT 15-40".

Across most of forested uplands adjacent to site wetlands on Tax Map 315, Lot 5.

Thomas E. Sokoloski August 9, 2023

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 500BE/ccabb

Map Unit Name: Udorthents, loamy

Landscape Settings: Regraded or filled land surfaces

Surface Features: Fill material

Drainage Class: Well

Parent Material: Filled or regraded glacial till material with no mineral restrictive features

Complex: Yes ( ) No (X)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes: Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-8"	Af	10YR 3/3	Sandy loam	Granular	Very friable	None	Fill
8-18"	Bw	10YR 5/6	Sandy loam	Blocky	Friable	None	
18-40"+	C	2.5Y 6/4	Loamy sand	Single grain	Loose	None within 40"	

Groundwater not encountered. SHWT below 40".

Western and southern portions of Tax Map 315, Lot 5.

Thomas E. Sokoloski August 9, 2023

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 500B/hchbb

Map Unit Name: Udorthents, loamy

Landscape Settings: Developed, impervious land surfaces (buildings, pavement)

Surface Features: Buildings and pavement

Drainage Class: Undeterminable (assumed to be well drained as are adjacent soils)

Parent Material: Filled or regraded glacial till material with no mineral restrictive features (hardpan)

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes: Typical observed soil profile description:

Soil not observed due to impervious surface.

Western portion of Tax Map 315, Lot 5.

Thomas E. Sokoloski August 9, 2023

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 538

Map Unit Name: Squamscott fine sandy loam

Landscape Settings: Low-lying portions of forests or fields; wetlands

Surface Features: None

Drainage Class: Poorly

Parent Material: Loamy glacial till material with silty substrata (glaciomarine deposits)

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

None.

Additional Notes: Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-1"	Oa	10YR 2/1	--	--	--	--	Muck
1-6"	A	10YR 2/1	Sandy loam	Granular	Very friable	None	
6-15" +	Bg	10YR 5/2	Sandy loam	Blocky	Friable	10YR 5/6	
15-30"+	Cg	2.5Y 5/2	Loam/silt loam	Massive	Friable	10YR 5/6	

Groundwater at 14". SHWT above surface.

Central portion of Tax Map 315, Lot 5.

Thomas E. Sokoloski August 9, 2023

SITE SPECIFIC SOIL MAP UNIT DESCRIPTIONS

Map Unit Symbol: 921

Map Unit Name: Newfields Variant (Somewhat Poorly Drained)

Landscape Settings: Low-lying portions of forests or fields; adjacent to wetlands

Surface Features: None

Drainage Class: Somewhat poorly

Parent Material: Loamy glacial till material with no mineral restrictive features (hardpan)

Complex: Yes ( ) No (**X**)

Nature of Dissimilar Inclusions, Locations and Estimated Percent:

Additional Notes: Typical observed soil profile description:

Depth	Horizon	Color	Texture	Structure	Consistency	Redox	Notes
0-2"	Oe	10YR 2/2	--	--	--	--	Forest duff
2-10"	A	10YR 2/2	Sandy loam	Granular	Very friable	None	
10-20"	Bw	10YR 5/4	Sandy loam	Blocky	Friable	10YR 5/6	
20-28"+	C1	2.5Y 6/3	Loamy sand	Single grain	Loose	10YR 5/6 & 2.5Y 5/2	
28-40"	C2	2.5Y 5/2	Silt loam	Massive	Friable	10YR 5/8	

Groundwater at 25". SHWT between 12-15".

Southern portion of Tax Map 315, Lot 5.

Thomas E. Sokoloski August 9, 2023

Infiltration Feasibility Report

Infiltration Feasibility Report

The project proposes seven systems that require infiltration to function properly. These systems are identified on the plans as Infiltration System 1, 2, and 3, as well as a bioretention system 1, 2, 3, and 4.

Infiltration System 1

1. Location of the practice

Infiltration System 1 – This system is located in the center of the site, behind the proposed building, below the proposed parking lot.

2. Existing topography at the location of the practice

The existing topography within the area of Infiltration System 1 is relatively flat. Existing elevations where the system is proposed range from 57 to 58.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of the bottom of Infiltration System 1 is 3,087± S.F. and 2 test pits were dug in the vicinity of the proposed practice. These pits are identified on the plans as TP7 and TP8.

4. Seasonal high-water table (SHWT) and bedrock elevations

The seasonal high-water table was observed in TP7 at 40" below grade, or elevation 54.5. Bedrock/refusal was not encountered in TP7, which was advanced to a depth of 72" below grade.
The seasonal high-water table was observed in TP8 at 36" below grade, or elevation 54.6. Bedrock/refusal was not encountered in TP8, which was advanced to a depth of 72" below grade.

5. Profile Description

Test pits were completed on 07-17-2023 and observed by Allen & Major Associates.

Test Pit 7 (TP7) Existing Ground Elevation: 57.8 Date: 07-17-2023	
Depth	Description
0-3"	Leaf litter
3-8"	Sandy loam, massive friable, dry
8-14"	Sandy loam, massive friable, dry
14-72"	Sandy loam, massive friable, dry to moist
ESHWT: 40" (Elevation 54.5) Weep: None Bedrock/Refusal: None	

Test Pit 8 (TP8) Existing Ground Elevation: 57.6 Date: 07-17-2023	
Depth	Description
0-3"	Leaf litter
3-6"	Sandy loam, massive friable, dry
6-12"	Sandy loam, massive friable, dry
12-72"	Sandy loam, massive friable, dry to moist
ESHWT: 36" (Elevation 54.6) Weep: None Bedrock/Refusal: None	

6. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Infiltration System 2

1. Location of the practice

Infiltration System 2 – This system is located on the southeast side of the site, behind the proposed building and below the proposed parking lot.

2. Existing topography at the location of the practice

The existing topography within the area of Infiltration System 2 is moderately sloped. Existing elevations where the system is proposed range from 55 to 61.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of the bottom of Infiltration System 2 is 6,031± S.F. and 2 test pits were dug in the vicinity of the proposed practice. These pits are identified on the plans as TP5 and TP6.

4. Seasonal high-water table (SHWT) and bedrock elevations

The seasonal high-water table was observed in TP5 at 36" below grade, or elevation 53.7. Bedrock/refusal was not encountered in TP5, which was advanced to a depth of 72" below grade.
The seasonal high-water table was observed in TP6 at 34" below grade, or elevation 53.6. Bedrock/refusal was not encountered in TP6, which was advanced to a depth of 80" below grade.

5. Profile Description

Test pits were completed on 07-17-2023 and observed by Allen & Major Associates.

Test Pit 5 (TP5) Existing Ground Elevation: 56.7 Date: 07-17-2023	
Depth	Description
0-3"	Leaf litter
3-9"	Sandy loam, massive friable, dry
9-14"	Sandy loam, massive friable, dry
14-72"	Sandy loam, massive friable, dry to moist
ESHWT: 36" (Elevation 53.7) Weep: None Bedrock/Refusal: None	

Test Pit 6 (TP6) Existing Ground Elevation: 56.4 Date: 07-17-2023	
Depth	Description
0-3"	Leaf litter
3-10"	Sandy loam, massive friable, dry
10-16"	Sandy loam, massive friable, dry
16-80"	Sandy loam, massive friable, dry to moist
ESHWT: 34" (Elevation 53.6) Weep: None Bedrock/Refusal: None	

6. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Infiltration System 3

1. Location of the practice

Infiltration System 3 – This system is located on the west side of the site, between the proposed building and Corporate Drive, below the proposed parking lot.

2. Existing topography at the location of the practice

The existing topography within the area of Infiltration System 3 is relatively flat. Existing elevations where the system is proposed range from 61 to 62.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of the bottom of Infiltration System 3 is 1,971± S.F. and 1 test pit was dug in the vicinity of the proposed practice. This pit is identified on the plans as TP2.

4. Seasonal high-water table (SHWT) and bedrock elevations

The seasonal high-water table was observed in TP2 at 70" below grade, or elevation 55.6. Bedrock/refusal was not encountered in TP2, which was advanced to a depth of 96" below grade.

5. Profile Description

Test pits were completed on 07-17-2023 and observed by Allen & Major Associates.

Test Pit 2 (TP2) Existing Ground Elevation: 61.4 Date: 07-17-2023	
Depth	Description
0-80"	Loamy sand (fill), dry to moist
80-82"	Buried organics
82-96"	Fine sandy loam, massive, firm, moist
ESHWT: 70" (Elevation 55.6) Weep: None Bedrock/Refusal: None	

6. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Bioretention System 1

1. Location of the practice

Bioretention System 1 – This system is located on the south side of the site, between the parking lot and the southerly property line.

2. Existing topography at the location of the practice

The existing topography within the area of Bioretention System 1 is relatively flat. Existing elevations where the system is proposed range from 60 to 61.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of Bioretention System 1 is 571± S.F. and 1 test pit was dug in the vicinity of the proposed practice. The pit is identified on the plans as TP4.

4. Seasonal high-water table (SHWT) and bedrock elevations

The seasonal high-water table was observed in TP4 at 67" below grade, or elevation 55.2. Bedrock/refusal was not encountered in TP4, which was advanced to a depth of 96" below grade.

5. Profile Description

Test pits were completed on 07-17-2023 and observed by Allen & Major Associates.

Test Pit 4 (TP4) Existing Ground Elevation: 60.8 Date: 07-17-2023	
Depth	Description
0-18"	Loamy sand (fill), dry
18-24"	Sandy loam, massive friable, dry
24-32"	Sandy loam, massive friable, dry
32-48"	Sandy loam, massive friable, dry
48-96"	Sandy loam, massive firm, dry to moist
ESHWT: 67" (Elevation 55.2) Weep: None Bedrock/Refusal: None	

6. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Bioretention System 2

1. Location of the practice

Bioretention System 2 – This system is located on the west side of the site, between the parking lot and Corporate Drive.

2. Existing topography at the location of the practice

The existing topography within the area of Bioretention System 2 is relatively flat. Existing elevations where the system is proposed range from 61 to 61.5.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of the system which uses infiltration is 258± S.F. and 1 test pit was dug in the vicinity of the proposed practice. The pit is identified on the plans as TP3.

4. Seasonal high-water table (SHWT) and bedrock elevations

The seasonal high-water table was observed in TP3 at 76" below grade, or elevation 55.9. Bedrock/refusal was not encountered in TP3, which was advanced to a depth of 94" below grade.

5. Profile Description

Test pits were completed on 07-17-2023 and observed by Allen & Major Associates.

Test Pit 3 (TP3) Existing Ground Elevation: 62.2 Date: 07-17-2023	
Depth	Description
0-60"	Loamy sand (fill), dry, some construction debris
60-94"	Sandy loam, massive, firm, dry to moist
ESHWT: 76" (Elevation 55.9) Weep: None Bedrock/Refusal: None	

6. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Bioretention System 3

1. Location of the practice

Bioretention System 3 – This system is located in the northwest corner of the site, near the intersection of Corporate Drive and International Drive.

2. Existing topography at the location of the practice

The existing topography within the area of Bioretention System 3 is relatively flat. Existing elevations where the system is proposed range from 60 to 61.5.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of the system which uses infiltration is 1,639± S.F. and 1 test pit was dug in the vicinity of the proposed practice. The pit is identified on the plans as TP1.

4. Seasonal high-water table (SHWT) and bedrock elevations

The seasonal high-water table was observed in TP1 at 72" below grade, or elevation 55.5. Bedrock/refusal was not encountered in TP1, which was advanced to a depth of 96" below grade.

7. Profile Description

Test pits were completed on 07-17-2023 and observed by Allen & Major Associates.

Test Pit 1 (TP1) Existing Ground Elevation: 61.5 Date: 07-17-2023	
Depth	Description
0-48"	Loamy sand (fill), dry, some construction debris
48-96"	Sandy loam, massive, firm, dry to moist
ESHWT: 72" (Elevation 55.5) Weep: None Bedrock/Refusal: None	

5. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Bioretention System 4

1. Location of the practice

Bioretention System 4 – This system is located on the north side of the site, near the proposed driveway entrance to International Drive.

2. Existing topography at the location of the practice

The existing topography within the area of Bioretention System 4 is relatively flat. Existing elevations where the system is proposed range from 58.5 to 59.

3. Test pit location

In accordance with Env-Wq 1504.13, NHDES requires that a minimum number of test pits be dug in the location of each system, depending on the size of the proposed system.

The footprint of the system that uses infiltration is 516± S.F. At this time no test pits have been performed in the vicinity of this practice. With that said, soils and depths to SHWT on site are consistent throughout and so it is reasonable to expect this system to function properly as designed. It has been noted on the plan that one confirmatory test pit shall be performed within the footprint of the practice prior to construction.

4. Summary of field-testing data used to determine the infiltration rate

The NRCS Soil Report shows the site to be Urban Land soil type, for which no Ksat value is provided. Given the test pit results, it was assumed that the Ksat value for the adjacent Chatfield-Hollis-Canton Complex, 0-8% slopes would be applicable. The Ksat value provided in the Soil Report for this soil type is 10.1993 micrometers per second which equals 1.445 inches per hour. A 2x safety factor was applied and 0.72 inches per hour was used for the design exfiltration rate.

Registration and Notification Form for Storm Water Infiltration to Groundwater

NHDES-W-03-135

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

REGISTRATION AND NOTIFICATION FORM FOR STORMWATER INFILTRATION TO GROUNDWATER (5H1)

Groundwater Discharge Program

RSA/Rule: RSA 485-A:6, VII; 485:3, X; Env-Wq 402

Applicant Information

Name: ATDG, LLC	Daytime Phone: 603-799-6787	
Mailing Address: 1 Merrill Crossing		
City: Bow	State: NH	ZIP: 03304
Contact Person Name: Alexander Slocum	Email: ahslocum@gmail.com	
Contact Person Phone Number: 603-777-6506	Fax Number:	

Facility Information

Name: ASC / Medical Office		
Address: 360 Corporate Drive		
City: Portsmouth	State: NH	ZIP: 03801
Property Tax Map: 315	Lot Number: 5	
Latitude & Longitude of discharge point(s): 43.073484, -70.801090		

Facility Owner Information (complete only if different than applicant)

Owner Name: same as applicant	Daytime Phone:	
Mailing Address:		
City/Town:	State:	ZIP:
Contact Person Name:	Email:	
Contact Person Phone Number:	Fax Number:	

Property Owner (complete only if different then Applicant)

Name: Pease Development Authority	Daytime Phone:	
Mailing Address: 360 Corporate Drive		
City: Portsmouth	State: NH	ZIP: 03801
Contact Person Name:	Email:	
Contact Person Phone Number:	Fax Number:	

Facility Operator's Information (complete only if different than applicant)

Facility Operator Name: same as applicant	Daytime Phone:	
Mailing Address:		
City:	State:	ZIP:

Complete this form if you are using a drywell or other subsurface infiltration structures to recharge stormwater to the ground or groundwater. If a completed Underground Injection Control (UIC) registration form was submitted to the Alteration of Terrain Bureau for this project, then one is not required to be sent directly to the Drinking Water and Groundwater Bureau (DWGB).

REGISTRATION AND NOTIFICATION FORM FOR STORMWATER INFILTRATION TO GROUNDWATER (attach additional sheets, as necessary, for responses to questions below)

Please provide a complete description of the facility including historic uses, any former contamination and/or ongoing remedial action at the site.
The site was used as an officer's quarters on Pease Air Base when the base was operational. The AoT screening layers show two remedial actions on the site, "PAFB 92.00 Command Center", and "PAFB 87.00 Command Center Site". There is no known ongoing remedial action being performed on the site.

Please provide information concerning the location of the infiltration activity, include Locus map (i.e. USGS map).
Infiltration systems 1-3 are located on the east and west sides of the site, below the proposed parking lot. Bioretention Systems 1-4 are located around the perimeter of the site, adjacent to the proposed parking lot.

Please describe the pretreatment system, if any, and capacity of the system.
All runoff directed to the four infiltration systems enters through an isolator row lined with fabric, which prevents migration of sediment to the rest of the system. Runoff directed to the four bioretention systems will be pretreated by one of four sediment forebays.

Please describe the materials and products used for the subsurface infiltration structure (i.e., pipe and stone leachfield, plastic chamber units, concrete drywell, etc.).
The four infiltration systems are designed as ADS Stormtech SC-310 and SC-160 chambers. As mentioned above, the inlet (isolator) rows are lined with filter fabric for pretreatment. The systems are backfilled with coarse stone which provides additional storage volume. The bioretention systems include 24" of filter media, per Env-Wq 1508.07(k)(4), and underlaid with coarse gravel and pea gravel, per NH Stormwater Manual, Chapter 4.3c.

Please describe the disposal method and location. Include a site plan showing: the infiltration structure, any other on-site infiltration structures, dimensions, depth to groundwater (if known), adjacent septic system(s), and drinking water source(s).
Stormwater runoff will be infiltrated using the systems described above. There are no known existing septic systems, and the project will connect to the existing municipal sewer system. Drinking water will be provided by a municipal connection. Site plans are provided which show locations of the various systems, as well as test pit data that was used in the design.

Please provide information concerning methods and schedule for periodic inspection and/or maintenance.
A complete Operation & Maintenance Plan is included with the AoT submittal which outlines the methods and schedule of inspections.

Applicant/Owner Certification Statement and Signature

By signing this application, the signer certifies that the information contained in or otherwise submitted with this application is true, complete and not misleading to the best of the signer's knowledge and belief.

By signing this application, the signer understands that submission of false, incomplete or misleading information is grounds for:

- **Denying the application;**
- **Revoking any application that is granted based on the information; and**
- **If the signer is acting as or on behalf of a listed engineer as defined in Env-C 502.10, debarring the listed engineer from the roster.**

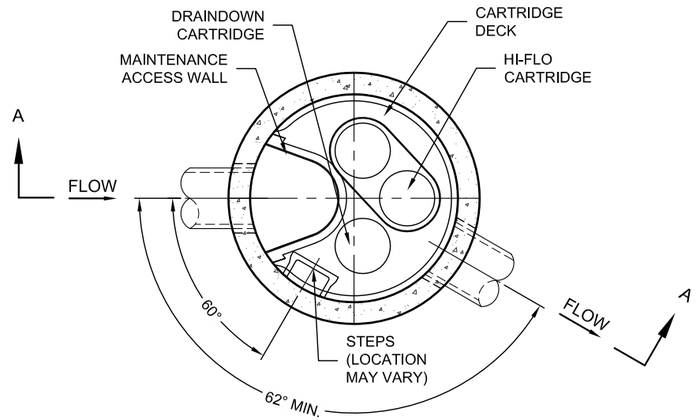
By signing the application, the signer and applicant agree to comply with all applicable rules and conditions of this permit and to not discharge to the holding tank(s) until written permission from the department has been received.

DocuSigned by:
Alexander H Slocum Jr
3D12526EBF66412

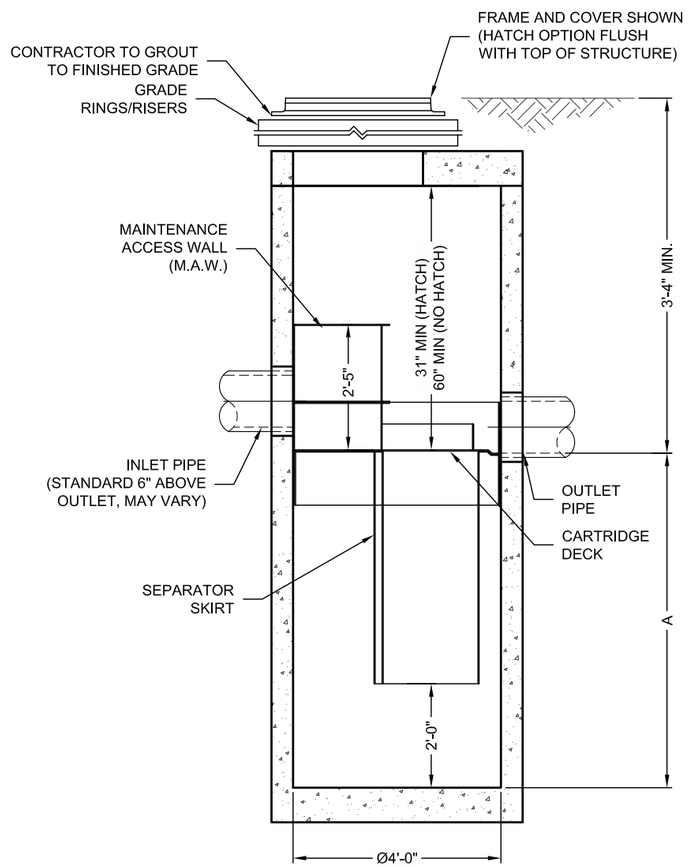
8/16/2023 | 1:59:46 PM CDT

Signature of Facility Owner or Contact **Date**

Jellyfish Standard Detail Treatment Capacity



PLAN VIEW



SECTION A-A

Jellyfish® Filter

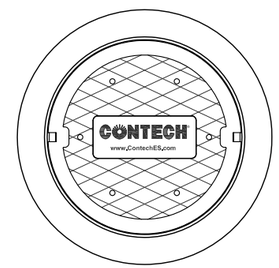
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENT NO. 8,287,726, 8,221,618 & US 8,123,935; OTHER INTERNATIONAL PATENTS PENDING

JELLYFISH DESIGN NOTES

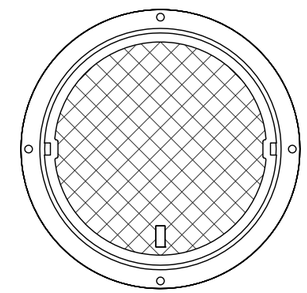
JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN. Ø48" MANHOLE JELLYFISH PEAK TREATMENT CAPACITY IS 0.45 CFS. IF THE SITE CONDITIONS EXCEED 0.45 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE DEPTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-5"	5'-3"	4'-2"	3'-2"
FLOW RATE HIGH-FLO / DRAINDOWN (cfs) (per cart)	0.18 / 0.09	0.13 / 0.065	0.09 / 0.045	0.05 / 0.025
MAX. CARTS HIGH-FLO / DRAINDOWN	2 / 1			



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.



HATCH
(Ø36" CAST INTO SLAB)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	* / *
CARTRIDGE SIZE	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES:

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.

CONTECH®
ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

JELLYFISH JF4
STANDARD DETAIL
OFFLINE CONFIGURATION

TSS and Nitrogen Worksheets

ALLEN & MAJOR ASSOCIATES, INC.

Project No.	3250-01	**Sheet**	1 of 4
Project Description	Surgical Center		
Calculated By	SM	**Date**	8/10/2023
Checked By	BDJ	**Date**	8/10/2023

TSS REMOVAL CALULATIONS

The calculations provide the TSS removal rate for the treatment train with Infiltration systems

Stormwater Management BMP	TSS Removal rate
Street Sweeping	5 %
Deep Sump Catch Basins	15 %
Infiltration System	90 %

Average Annual Load	=	100%	
Street Sweeping	=	5.0	% Removal Rate
		95.0	% TSS Load Remains
TSS Load Remaining	=	95.0	%
Deep Sump Catch Basins	=	15.0	% Removal Rate
		80.8	% TSS Load Remains
TSS Load Remaining	=	80.8	%
Infiltration System	=	90.0	% Removal Rate
		8.1	% TSS Load Remains

Initial TSS Load - Percentage of TSS Remaining = Final TSS Removal Rate

100 - 8.1 = 91.9 %

ALLEN & MAJOR ASSOCIATES, INC.

Project No.	3250-01	**Sheet**	2 of 4
Project Description	Surgical Center		
Calculated By	SM	**Date**	8/10/2023
Checked By	BDJ	**Date**	8/10/2023

TSS REMOVAL CALULATIONS

The calculations provide the TSS removal rate for the treatment train with Bioretention systems

Stormwater Management BMP	TSS Removal rate
Street Sweeping	5 %
Bioretention	90 %

Average Annual Load	=	100%	
Street Sweeping	=	5.0	% Removal Rate
		95.0	% TSS Load Remains
TSS Load Remaining	=	95.0	%
Bioretention	=	90.0	% Removal Rate
		9.5	% TSS Load Remains

Initial TSS Load - Percentage of TSS Remaining = Final TSS Removal Rate

100 - 9.5 = 90.5 %

ALLEN & MAJOR ASSOCIATES, INC.

Project No.	3250-01	**Sheet**	3 of 4
Project Description	Surgical Center		
Calculated By	SM	**Date**	8/10/2023
Checked By	BDJ	**Date**	8/10/2023

Nitrogen REMOVAL CALULATIONS

The calculations provide the Nitrogen removal rate for the treatment train with Infiltration systems

Stormwater Management BMP	Nitrogen Removal rate
Deep Sump Catch Basins	5 %
Infiltration System	60 %

Average Annual Load	=	100.0	%
Deep Sump Catch Basins	=	5.0	% Removal Rate
		95.0	% Nitrogen Load Remains
Nitrogen Load Remaining	=	95.0	%
Infiltration System	=	60.0	% Removal Rate
		38.0	% Nitrogen Load Remains

Initial Nitrogen Load - Percentage of Nitrogen Remaining = Final Removal Rate

100 - 38.0 = 62.0 %

ALLEN & MAJOR ASSOCIATES, INC.

Project No.	3250-01	**Sheet**	4 of 4
Project Description	Surgical Center		
Calculated By	SM	**Date**	8/10/2023
Checked By	BDJ	**Date**	8/10/2023

Nitrogen REMOVAL CALULATIONS

The calculations provide the Nitrogen removal rate for the treatment train with Bioretention systems

Stormwater Management BMP	Nitrogen Removal rate
Bioretention	65 %

Nitrogen Load Remaining	=	100.0	%
Bioretention	=	65.0	% Removal Rate
		35.0	% Nitrogen Load Remains

Initial Nitrogen Load - Percentage of Nitrogen Remaining = Final Removal Rate

100 - 35.0 = 65.0 %

Pipe Sizing Calculations

Surgical Center
360 Corporate Drive, Portsmouth, NH
Allen & Major Associates, Inc.
A&M Project Number: 3250-01

ALLEN & MAJOR ASSOCIATES, INC.

Drainage Pipe Design Analysis

Date: 10-Aug-23
Created By: SM
Checked By: BDJ
Approved By: BDJ

Manning's Formula

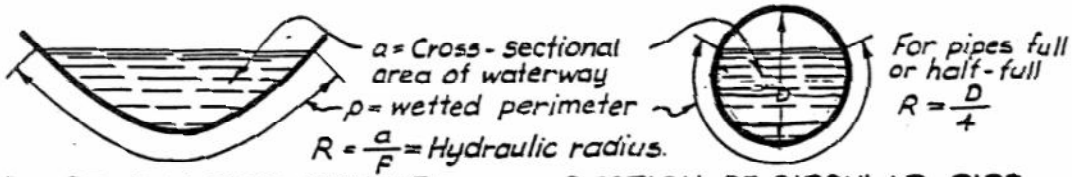
*V=1.486/n*R^ 2/3 *S^ 1/2*
*Q = V*A*
(25-Year storm)

Where: V is the velocity in Ft/sec.
n is Manning's coefficient of friction
R is the Hydraulic Radius
S is the slope of the pipe

R = Area/Wetted Perimeter

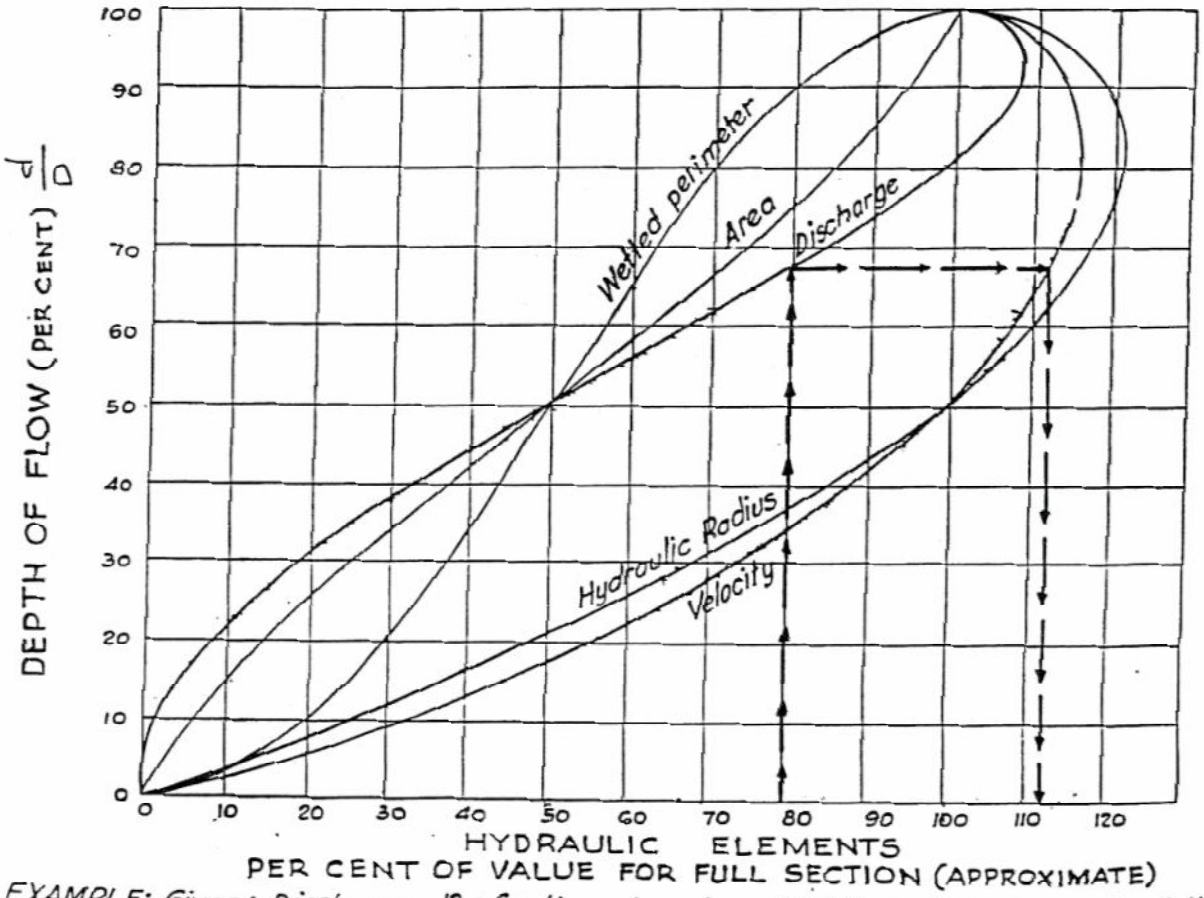
Where: Area = Pi(R/12)2*
*Wetted Perimeter = 2*Pi*R/12*

PIPE	Q_{design} (cfs)	n	Diameter (inches)	A (ft^2)	Wp (ft)	R (ft)	S (feet/foot)	Q_{full} (cfs)	Q_{full} ³ Q_{design}	V_{full} (ft/s)	Q_d/Q_f	Results Fig. 4-4A	V_{design} (ft/s)	V_{design} ≤ 12 ft/s
DMH-01	1.42	0.013	8	0.35	2.09	0.17	0.0142	1.44	OK	4.13	0.99	1.15	4.74	OK
DMH-03	1.92	0.013	12	0.79	3.14	0.25	0.0484	7.84	OK	9.98	0.24	0.80	7.98	OK
OCS-01	0.55	0.013	8	0.35	2.09	0.17	0.0050	0.85	OK	2.45	0.64	1.06	2.59	OK
OCS-02	0.17	0.013	8	0.35	2.09	0.17	0.0181	1.63	OK	4.66	0.10	0.59	2.75	OK
RD-01	1.10	0.013	8	0.35	2.09	0.17	0.0145	1.46	OK	4.17	0.76	1.10	4.59	OK
RD-02	1.70	0.013	8	0.35	2.09	0.17	0.0208	1.74	OK	4.99	0.98	1.15	5.74	OK
RD-03	0.10	0.013	8	0.35	2.09	0.17	0.0113	1.28	OK	3.68	0.08	0.55	2.02	OK
WQ-01	0.37	0.013	8	0.35	2.09	0.17	0.0052	0.87	OK	2.50	0.42	0.94	2.35	OK



V = Average or mean velocity in feet per second.
Q = a V = Discharge of pipe or channel in cubic feet per second (c.f.s.).
n = Coefficient of roughness of pipe or channel surface, see Table A-Pg.18-68.
S = Slope of Hydraulic Gradient (water surface in open channels or pipes not under pressure, same as slope of channel or pipe invert only when flow is uniform in constant section.

HYDRAULIC ELEMENTS OF CHANNEL SECTIONS.



EXAMPLE: Given: Discharge = 12 c.f.s. through a pipe which has capacity flowing full of 15 c.f.s. at a velocity of 7.0 ft. per sec. Required to find V for Q = 12 c.f.s. ∴ Percentage of full discharge = 12/15 = 80%. Enter chart at 80% of value for full section of Hydraulic Elements, find V = 112.5% × 7 = 7.9 ft. per sec.

VALUES OF HYDRAULIC ELEMENTS OF CIRCULAR SECTION FOR VARIOUS DEPTHS OF FLOW.

Figure 4-4A

Extreme Precipitation Tables

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point

Smoothing	Yes
State	
Location	
Latitude	43.073 degrees North
Longitude	70.802 degrees West
Elevation	10 feet
Date/Time	Mon Jul 03 2023 09:22:30 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day
1yr	0.26	0.40	0.50	0.65	0.82	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.66	2.92	**1yr**	2.35	2.81	3.21
2yr	0.32	0.50	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.49	3.21	3.57	**2yr**	2.84	3.43	3.93
5yr	0.37	0.58	0.73	0.97	1.24	1.60	**5yr**	1.07	1.46	1.88	2.43	3.14	4.07	4.57	**5yr**	3.60	4.40	5.03
10yr	0.41	0.64	0.81	1.11	1.44	1.88	**10yr**	1.25	1.72	2.22	2.88	3.74	4.87	5.53	**10yr**	4.31	5.31	6.07
25yr	0.47	0.75	0.96	1.33	1.76	2.32	**25yr**	1.52	2.13	2.76	3.62	4.73	6.17	7.10	**25yr**	5.46	6.82	7.78
50yr	0.53	0.85	1.09	1.52	2.05	2.74	**50yr**	1.77	2.51	3.27	4.30	5.65	7.40	8.58	**50yr**	6.55	8.25	9.40
100yr	0.60	0.97	1.25	1.76	2.39	3.22	**100yr**	2.06	2.96	3.86	5.11	6.74	8.86	10.38	**100yr**	7.84	9.98	11.35
200yr	0.67	1.09	1.41	2.02	2.79	3.80	**200yr**	2.41	3.49	4.58	6.09	8.06	10.62	12.55	**200yr**	9.40	12.07	13.71
500yr	0.79	1.30	1.69	2.45	3.43	4.71	**500yr**	2.96	4.34	5.71	7.66	10.19	13.50	16.15	**500yr**	11.95	15.53	17.61

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day
1yr	0.23	0.36	0.44	0.59	0.73	0.89	**1yr**	0.63	0.87	0.92	1.32	1.66	2.23	2.53	**1yr**	1.97	2.43	2.85
2yr	0.32	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.34	3.05	3.46	**2yr**	2.70	3.32	3.82
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.13	2.74	3.80	4.21	**5yr**	3.36	4.05	4.71
10yr	0.39	0.59	0.73	1.03	1.32	1.60	**10yr**	1.14	1.56	1.81	2.40	3.07	4.38	4.89	**10yr**	3.88	4.70	5.46

Hydrologic Soil Maps

SITE SPECIFIC SOIL MAP UNIT LEGEND

SYMBOL*	MAP UNIT	SLOPE CLASS	DRAINAGE CLASS	HISS SYMBOL	HYDROLOGIC SOIL GROUP
42B	CANTON FINE SANDY LOAM	0–8%	WELL	221BH	B
42C	CANTON FINE SANDY LOAM	8–15%	WELL	221CH	B
444B	NEWFIELDS FINE SANDY LOAM	0–8%	MODERATELY WELL	321BH	B
444C	NEWFIELDS FINE SANDY LOAM	8–15%	MODERATELY WELL	321CH	B
500B/CCABB	UDORTHENTS, LOAMY	0–8%	WELL	261BH	B
500C/CCABB	UDORTHENTS, LOAMY	8–15%	WELL	261CH	B
500D/CCABB	UDORTHENTS, LOAMY	15–25%	WELL	261DH	B
500E/CCABB	UDORTHENTS, LOAMY	25% +	WELL	261EH	B
500B/HCHBB	UDORTHENTS, LOAMY	0–8%	UNDETERMINABLE	761BH**	B**
538B	SQUAMSCOTT FINE SANDY LOAM	0–8%	POORLY	551BH	C
921B	NEWFIELDS VARIANT (SPD)	0–8%	SOMEWHAT POORLY	421BH	C

* REFER TO ACCOMPANYING REPORT FOR 5–UNIT SUPPLEMENTAL SYMBOL EXPLANATION.
** ASSUMED BASED UPON ADJACENT SOILS WITHOUT IMPERVIOUS SURFACES.

LEGEND

- EX. PROPERTY LINE
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB
- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP A
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- EXISTING WETLANDS
- OPEN WATER
- IMPERVIOUS COVER

SOIL MAPPING NOTES:

1. THIS DETAILED SITE–SPECIFIC SOIL MAP, PREPARED ON AUGUST 9, 2023 BY THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063 OF TES ENVIRONMENTAL CONSULTANTS, L.L.C. IN BOW, NEW HAMPSHIRE, CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, VERSION 7.0, "SITE–SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT", MARCH 2021.
2. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A: 17 AND NHDES ENV–WQ 1500, ALTERATION OF TERRAIN. SEE ACCOMPANYING REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS. USE OF THE MAP SYMBOL DENOMINATORS FOR DISTURBED OR ALTERED SOILS, WHERE GIVEN, IS AT THE DISCRETION OF THE CERTIFIED SOIL SCIENTIST.
3. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR USE IN SUPPORT OF A NEW HAMPSHIRE ALTERATION TERRAIN PERMIT APPLICATION. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME: C-3250-01.dwg	
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
PRE-CONSTRUCTION
HYDROLOGIC SOIL PLAN

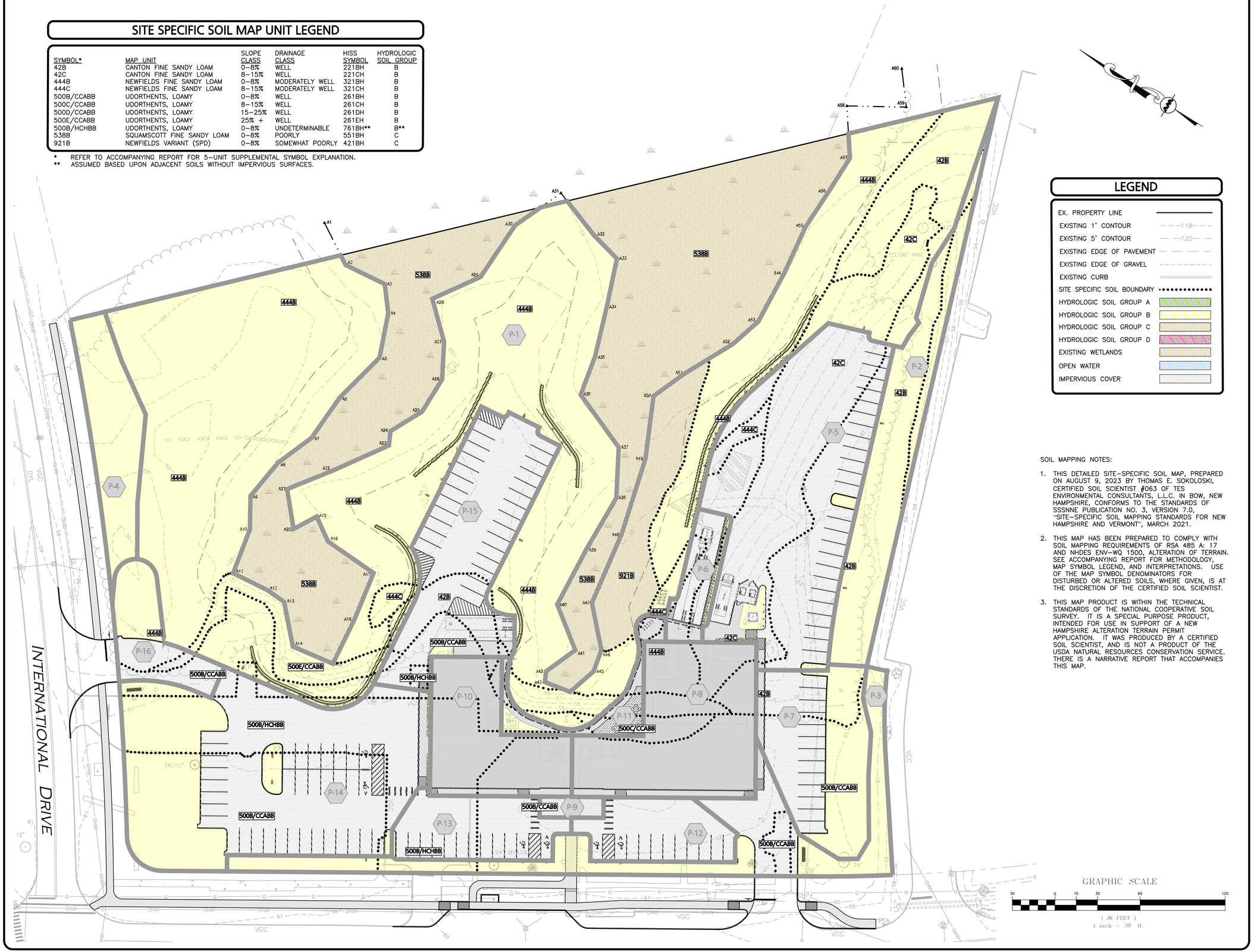
SHEET No.
HSP-1

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_HYDROLOGIC SOIL MAPPING.DWG

SITE SPECIFIC SOIL MAP UNIT LEGEND

SYMBOL*	MAP UNIT	SLOPE CLASS	DRAINAGE CLASS	HISS SYMBOL	HYDROLOGIC SOIL GROUP
42B	CANTON FINE SANDY LOAM	0–8%	WELL	221BH	B
42C	CANTON FINE SANDY LOAM	8–15%	WELL	221CH	B
444B	NEWFIELDS FINE SANDY LOAM	0–8%	MODERATELY WELL	321BH	B
444C	NEWFIELDS FINE SANDY LOAM	8–15%	MODERATELY WELL	321CH	B
500B/CCABB	UDORTHENTS, LOAMY	0–8%	WELL	261BH	B
500C/CCABB	UDORTHENTS, LOAMY	8–15%	WELL	261CH	B
500D/CCABB	UDORTHENTS, LOAMY	15–25%	WELL	261DH	B
500E/CCABB	UDORTHENTS, LOAMY	25% +	WELL	261EH	B
500B/HCHBB	UDORTHENTS, LOAMY	0–8%	UNDETERMINABLE	761BH**	B**
538B	SQUAMSCOTT FINE SANDY LOAM	0–8%	POORLY	551BH	C
921B	NEWFIELDS VARIANT (SPD)	0–8%	SOMEWHAT POORLY	421BH	C

* REFER TO ACCOMPANYING REPORT FOR 5–UNIT SUPPLEMENTAL SYMBOL EXPLANATION.
** ASSUMED BASED UPON ADJACENT SOILS WITHOUT IMPERVIOUS SURFACES.



LEGEND

- EX. PROPERTY LINE
- EXISTING 1' CONTOUR
- EXISTING 5' CONTOUR
- EXISTING EDGE OF PAVEMENT
- EXISTING EDGE OF GRAVEL
- EXISTING CURB
- SITE SPECIFIC SOIL BOUNDARY
- HYDROLOGIC SOIL GROUP A
- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C
- HYDROLOGIC SOIL GROUP D
- EXISTING WETLANDS
- OPEN WATER
- IMPERVIOUS COVER

SOIL MAPPING NOTES:

1. THIS DETAILED SITE–SPECIFIC SOIL MAP, PREPARED ON AUGUST 9, 2023 BY THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063 OF TES ENVIRONMENTAL CONSULTANTS, L.L.C. IN BOW, NEW HAMPSHIRE, CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, VERSION 7.0, "SITE–SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT", MARCH 2021.

2. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A: 17 AND NHDES ENV–WQ 1500, ALTERATION OF TERRAIN. SEE ACCOMPANYING REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS. USE OF THE MAP SYMBOL DENOMINATORS FOR DISTURBED OR ALTERED SOILS, WHERE GIVEN, IS AT THE DISCRETION OF THE CERTIFIED SOIL SCIENTIST.

3. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR USE IN SUPPORT OF A NEW HAMPSHIRE ALTERATION TERRAIN PERMIT APPLICATION. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME: C-3250-01.dwg	
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE:
POST-CONSTRUCTION HYDROLOGIC SOIL PLAN

SHEET No.
HSP-2

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_HYDROLOGIC SOIL MAPPING.DWG

400 Harvey Road, Manchester, NH 03103 | T (603) 627-5500 | F (603) 627-5501
allenmajor.com

ALLEN & MAJOR ASSOCIATES, INC.

August 21, 2023

To: Michael Mates, PE
Pease Development Authority
55 International Drive
Portsmouth, NH 03801

A&M Project #: 3250-01

Re: ASC / Medical Office
360 Corporate Drive
Portsmouth, NH
PDA Response Letter

Copy: August Consulting, PLLC

Dear Mr. Mates

Allen & Major Associates, Inc. is in receipt of your comments, provided via email on August 16, 2023. Please find A&M's responses to these comments below. The initial comments are provided along with A&M's responses in **bold**.

1. On the cover sheet PDA is listed as the owner. The term owner is used numerous times throughout the documents. In most cases it means ATDG not PDA. Please change the tile for PDA from "Owner" to "Lessor" and the title for ATG to "Applicant/Lessee". In addition, please revise PDA's address to 55 International Drive.

The information above has been revised as requested.

2. Provide a copy of the wetland report.

This has been provided by Apex/Fraggle Rock.

3. Provide Photometrics Plan.

The Photometrics Plan is now included in the Civil Site Development plan set.

4. The Existing Conditions Plan was not included in the drawing set. This needs to be included and it should show the Airport District (not the Airport Zone) for tax purposes. In addition, this plan should show existing monuments and call out any monuments to be set per section 502.03b2 of the PDA Land Use Controls as well as meets and bounds of the property.

The Existing Conditions Plan is now included in the Civil Site Development plan set.

5. On C-101 the numbering under Alteration of Terrain Notes is off.

The numbering has been fixed.

6. On C-101 note 10 specifies erosion control inspections after every 0.5" of rain. The NPDES CGP requires this after a 0.25" rain event. Please revise.

The note has been revised as requested.

7. Replace snow fence at the wetland buffers with chain link fence. We want to make absolutely sure no one mistakenly enters the wetland or buffer during construction. That would require an after the fact wetland and/or conditional use permit. This has happened before and we do not want it to happen again. The chain link is much more effective for preventing encroachment than snow fence.

The plan has been revised to indicate chain link fence, in lieu of snow fence, as requested.

8. Drawing C-101 is difficult to follow; where does the fencing stop (it runs into the notes on the top of the page)? What is the dashed line running adjacent to the property line on International

Dr? It's difficult to discern the hatch for clear and grub. It would help to have a line type that identifies the limit of disturbance on the plan the area of disturbance in a note.

The plan viewport has been expanded to show the extent of temporary fence. The dashed line shows the limit of tree clearing. The clear and grub hatch has been made more discernable. Tubular barriers indicate the limit of disturbance. The area of disturbance has been noted on the plan, see C-101.

9. In notes 7 on C-102 and 5 on C-103, please add that these designs shall be submitted to PDA for review. Please note that a building permit is required for any walls over 4' high.

These notes have been revised as requested.

10. On C-102, revise "Brick Sidewalk" to "Brick Patio" in the legend.

The legend has been revised as requested.

11. Add a note to the plans stating: The contractor shall clean the entire stormwater system of all sediment and debris, within the limit of work upon completion of construction.

The note has been added as requested, see note #7 on sheet C-103.

12. Add a note to the plans stating: Upon completion of construction and prior to the issuance of Certificate of Occupancy or release of bond, the applicant shall submit a letter to the Pease Development Authority, signed and stamped by a professional engineer, stating construction has been completed in conformance with the approved plans.

The note has been added as requested, see note #9 on sheet C-102.

13. Add a note to the plans stating: The contractor shall acquire a PDA Dig Permit before any disturbance can take place. Allow 7 calendar days for processing.

See General Sequence of Construction note #2, C-101.

14. Add a note to the plans stating: Contractor to obtain a NPDES Construction General Permit prior to construction. PDA shall be provided with a copy of the SWPPP and NOI.

See General Sequence of Construction note #3, C-101.

15. Add a note to the plans stating: Submission of multiple 7460-1's to the FAA will be required for the construction of the building and temporary use of a crane. Allow a minimum of 45 days for processing.

The note has been added as requested, see note #10 on C-102.

16. Add a note to the plans stating: Before ***ANY*** dewatering is performed, the contractor shall file and obtain a Temporary Groundwater Discharge Permit from NHDES. Coordination between the applicant, PDA, NHDES and the Air Force is necessary prior to filing this application. Update note 5 on detail 4 on sheet C-505 accordingly.

The notes have been added/revised as requested. See Erosion Control and Sediment Control note #8, C-101. Note #5 on detail 4 on sheet C-505 was revised.

17. Add a note to the plans stating: The applicant shall coordinate with the City of Portsmouth to confirm adequacy of radio signal strength for emergency services. Amplifiers may be required to boost signal strength, which, if necessary, shall be provided and installed by the applicant.

The note was added as requested, see note #11 on sheet C-102.

18. Add a note to the plans stating: The applicant shall submit as-built plans on reproducible mylar and in digital format (AutoCAD .dwg format) on CD to PDA upon completion of the project. As-builts shall be prepared and certified by a registered New Hampshire land surveyor or professional engineer. An electronic file of the site layout shall be submitted to the City of Portsmouth's GIS department.

The note was added as requested, see note #12 on sheet C-102.

19. It's understood that fill will need to be brought onto the site and excess is not expected, however, there may be unsuitable soils that cannot be incorporated in to the site and need to be stockpiled. Please designate an excess soil disposal area with its capacity. In addition, please provide cut and fill calculations for the project.

See Note #8 on C-103 for the net amount of fill anticipated for the projec.t A note has been added to the plan view indicating the capacity available in the excess spoil area in the northern corner of the property.

20. Add a note to the plans stating: All excess excavated soil material shall remain on site and shall be placed in the excess soil berm as shown on the Site Plans. No existing soils shall be removed from the project site.

The note has been added as requested, see note #9 on C-103.

21. Please add back the sidewalk adjacent to International Drive. I realize someone at the TAC workshop mentioned it could be deleted but it needs to remain because it's required by the PDA Land Use Controls section 405.02j2.

The sidewalk has been added back to the plans.

22. Please provide square foot areas of the two onsite wetlands.

The wetland area has been noted on sheet C-102.

23. Snow storage does not seem adequate and conflicts with landscaping in some areas. If there is not sufficient area, please add a note stating that snow will be removed and disposed of legally off site.

Snow storage conflicts with landscaping have been resolved. Also, see note #13 on sheet C-102.

24. Identify the type of curbing surrounding the building.

Curbing type has been identified, see C-102.

25. Label curve radii.

Curb radii have been labeled on C-102.

26. Additional spot grades will be helpful on C-103.

Additional spot grades have been added to C-103.

27. Please take a look at the grading and drainage at the south corner of the site in the vicinity of the driveway off of Corporate Drive. There is a section of proposed drive that runs offsite and is not treated. Please capture this and send it to treatment. In addition, the overflow for Bioretention System #1 is directed to the driveway of the abutter. This is not ideal and could cause icing issues if the flow enters the offsite drive. Please consider other options. Confirm that there is no increase in flow to the double culvert that passes beneath the colleges driveway.

The pavement runoff which flows to the Corporate Drive roadway is de minimis. The stormwater management design for the project exceeds treatment requirements and therefore, in aggregate, the project is an improvement over the existing conditions. The overflow from Bioretention System 1 overflows toward an existing swale that flows to the culvert that passes beneath the college's driveway. The flow to Corporate Drive is reduced by using infiltration. See Study Point #3 in the drainage report.

28. The outlet pipe for Bioretention System # 2 seems like it may conflict with the utility duct bank.

The utility duct bank can vary in elevation in the event of a conflict.

29. Show proposed tree lines on appropriate drawings.

The tree line has been added as requested.

30. Specify all sidewalks to be PCC per PDA requirements.

The sidewalk detail has been revised to reflect this request. See Note #5 on the concrete sidewalk detail, C-501.

31. Will salt be stored on site?

The applicant has indicated that salt will not be stored on site.

32. Remove crosswalk from driveway on corporate.

The crosswalk has been removed as requested.

33. The wetlands and buffers are screened on some drawings. These need to be in a bold line type on all drawings. Furthermore, there should be notes on the drawings that state there is no wetland or wetland buffer disturbance associated with this project but wetlands and buffers are present on site. Take extreme care not to impact these resources.

The wetlands have been darkened on the plans. Also, see note #9 on C-101.

34. The site feature labeled miscellaneous threaded rod near bus stop is the remnants of an old fire hydrant. Coordinate with DPW to determine if it should be removed or if a new hydrant should be installed.

This has been noted, see sheet C-101.

35. Add truck turning exhibits for right turns into the site and left turns out of the site.

The truck turning plan has been revised as requested.

36. Update sewer and drain manhole details to include a formed invert at the bottom of the structures.

The sewer manhole detail shows a formed invert at the bottom of the structure. The drain manhole does not, which is typical for drain manholes because pipes come in at differing elevations.

37. Add note to C101 indicating the transformer may still hold PCB's which need to be handled and disposed of per applicable rules and regulations.

The potential for PCB's has been noted as requested.

38. Add tapers on Corporate Drive into and out of the bus stop.

Tapers have been added as requested.

39. There are two concrete sidewalk details on C-501. One is labeled offsite and the other onsite and the only difference is the welded wire fabric vs. the fiber. Only the fiber reinforcement should be used and the onsite and offsite sidewalks should match.

The onsite detail has been removed. The offsite detail is now the only sidewalk detail.

40. Detail 8 on C-501 indicates certain dimensions vary and references "PLAN". Add dimensions or indicate what plan is being referred to.

The detail has been revised as requested.

41. Add bike rack detail.

A bike rack detail has been added, see detail 3 on sheet C-503.

42. It's noted that monument signage is being shown on the plans. This type of signage does not get approved until just before the building is occupied. Any approval you receive from site review does not include the signage.

Understood. Signage is shown for coordination purposes.

43. The sign on Corporate Drive looks like its connected to primary electric. Please clarify.

The electrical conduit for the sign in question has been revised to show it coming from the building.

44. There are two connection shown to existing electric, one on the abutting property. Has Eversource asked for this? Please explain the intent.

Apex has coordinated with Eversource and this was shown at their request.

45. A check dam detail has been provided but not called out on the plans.

The detail is included in case it is directed by the design engineer during construction to address field conditions.

46. In the O&M Plan, please make the following revisions:
    a. There are numerous mentions of coordination/notification with/to the City of Portsmouth for a variety reasons. Please add that PDA should also be part of any coordination/notifications.

These have been revised as requested to include PDA in any notifications/coordination.

    b. As in item 6 above the plan also mentions the 0.5" threshold. Please revise to match CGP requirements.

The note has been revised as requested.

    c. Revise Note 6 on page 18 to require installation of silt sacks in CB's adjacent to the site, not only if it appears to be happening.

The note has been revised as requested.

    d. Please add to the vehicle washing section on page 19 that vehicle washing is not an allowable stormwater discharge under PDA's NPDES Permit with EPA.

The note has been added as requested, see page 20 of the O&M.

    e. In regards to the section on snow, add that: The snow and ice management operators must be Green SnowPro certified by the UNH Technology Transfer Center and also be a New Hampshire certified salt applicator.

The note has been added as requested, see page 22 of the O&M.

Very Truly Yours,

ALLEN & MAJOR ASSOCIATES, INC.

Brian D. Jones, P.E.
Senior Project Manager

Attachments:

1. ASC / Medical Office Site Development Plans, Revision 1, dated August 17, 2023
2. ASC / Medical Office Drainage Report, Revision 1, dated August 17, 2023

City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. The checklist is required to be completed and uploaded to the Site Plan application in the City's online permitting system. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. 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 Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Applicant: ATDG, LLC (Contact: Dr. Alexander Slocum) Date Submitted: 08 / 21 / 2023

Application # (in City's online permitting): _____

Site Address: 360 Corporate Dr, Portsmouth, NH 03801 Map: 0315-0000 Lot: 0005-0005

Application Requirements			
☑	**Required Items for Submittal**	**Item Location (e.g. Page or Plan Sheet/Note #)**	**Waiver Requested**
☐	Complete application form submitted via the City's web-based permitting program (2.5.2.1**(2.5.2.3A)**	Application form to be submitted online.	N/A
☐	All application documents, plans, supporting documentation and other materials uploaded to the application form in viewpoint in digital Portable Document Format (PDF). One hard copy of all plans and materials shall be submitted to the Planning Department by the published deadline. **(2.5.2.8)**	Application documents to be submitted online.	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Statement that lists and describes "green" building components and systems. **(2.5.3.1B)**	See seperate attachment	
☐	Existing and proposed gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. **(2.5.3.1C)**	Sheet G0-0	N/A
☐	Tax map and lot number, and current zoning of all parcels under Site Plan Review. **(2.5.3.1D)**	Refer to Civil Sheets	N/A

Site Plan Review Application Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. **(2.5.3.1E)**	Sheet G0-0	N/A
☐	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. **(2.5.3.1F)**	To be provided by Pease Development Authority	N/A
☐	Names, addresses and telephone numbers of all professionals involved in the site plan design. **(2.5.3.1G)**	Sheet G0-0	N/A
☐	List of reference plans. **(2.5.3.1H)**	Refer to Civil Sheets	N/A
☐	List of names and contact information of all public or private utilities servicing the site. **(2.5.3.1I)**	Sheet G0-0	N/A

Site Plan Specifications			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director.. **(2.5.4.1A)**	24 inches by 36 inches	Y
☐	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. **(2.5.4.1B)**	Noted	N/A
☐	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. **(2.5.4.1C)**	Refer to Civil Sheets	N/A
☐	Plans shall be drawn to scale and stamped by a NH licensed civil engineer. **(2.5.4.1D)**	Refer to Civil Sheets	N/A
☐	Wetlands shall be delineated by a NH certified wetlands scientist and so stamped. **(2.5.4.1E)**	See all applicable sheets	N/A
☐	Title (name of development project), north point, scale, legend. **(2.5.4.2A)**	Sheet G0-0	N/A
☐	Date plans first submitted, date and explanation of revisions. **(2.5.4.2B)**	See revision schedule on all sheet	N/A
☐	Individual plan sheet title that clearly describes the information that is displayed. **(2.5.4.2C)**	Noted	N/A
☐	Source and date of data displayed on the plan. **(2.5.4.2D)**	Refer to Civil Sheets	N/A

Site Plan Specifications – Required Exhibits and Data			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	**1. Existing Conditions: (2.5.4.3A)** • Surveyed plan of site showing existing natural and built features; • Existing building footprints and gross floor area; • Existing parking areas and number of parking spaces provided; • Zoning district boundaries; • Existing, required, and proposed dimensional zoning requirements including building and open space coverage, yards and/or setbacks, and dwelling units per acre; • Existing impervious and disturbed areas; • Limits and type of existing vegetation; • Wetland delineation, wetland function and value assessment (including vernal pools); • SFHA, 100-year flood elevation line and BFE data, as required.	Refer to Civil Sheets	
☐	**2. Buildings and Structures: (2.5.4.3B)** • Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation; • Elevations: Height, massing, placement, materials, lighting, façade treatments; • Total Floor Area; • Number of Usable Floors; • Gross floor area by floor and use.	See A-Sheets	
☐	**3. Access and Circulation: (2.5.4.3C)** • Location/width of access ways within site; • Location of curbing, right of ways, edge of pavement and sidewalks; • Location, type, size and design of traffic signing (pavement markings); • Names/layout of existing abutting streets; • Driveway curb cuts for abutting prop. and public roads; • If subdivision; Names of all roads, right of way lines and easements noted; • AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	Refer to Civil Sheets	
☐	**4. Parking and Loading: (2.5.4.3D)** • Location of off street parking/loading areas, landscaped areas/buffers; • Parking Calculations (# required and the # provided).	Refer to Civil Sheets	
☐	**5. Water Infrastructure: (2.5.4.3E)** • Size, type and location of water mains, shut-offs, hydrants & Engineering data; • Location of wells and monitoring wells (include protective radii).	Refer to Civil Sheets	
☐	**6. Sewer Infrastructure: (2.5.4.3F)** • Size, type and location of sanitary sewage facilities & Engineering data, including any onsite temporary facilities during construction period.	Refer to Civil Sheets	

☐	**7. Utilities: (2.5.4.3G)** • The size, type and location of all above & below ground utilities; • Size type and location of generator pads, transformers and other fixtures.	Refer to Civil Sheets	
☐	**8. Solid Waste Facilities: (2.5.4.3H)**	N/A	
	• The size, type and location of solid waste facilities.	N/A	
☐	**9. Storm water Management: (2.5.4.3I)** • The location, elevation and layout of all storm-water drainage. • The location of onsite snow storage areas and/or proposed off-site snow removal provisions. • Location and containment measures for any salt storage facilities • Location of proposed temporary and permanent material storage locations and distance from wetlands, water bodies, and stormwater structures.	Refer to Civil Sheets	
☐	**10. Outdoor Lighting: (2.5.4.3J)** • Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and photometric plan.	See Photometric Plan	
☐	**11.** Indicate where dark sky friendly lighting measures have been implemented. **(10.1)**	See Photometric Plan	
☐	**12. Landscaping: (2.5.4.3K)** • Identify all undisturbed area, existing vegetation and that which is to be retained; • Location of any irrigation system and water source.	Refer to Lanscaping Plans	
☐	**13. Contours and Elevation: (2.5.4.3L)** • Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Refer to Civil Sheets	
☐	**14. Open Space: (2.5.4.3M)** • Type, extent and location of all existing/proposed open space.	Refer to Civil Sheets	
☐	**15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)**	Refer to Civil Sheets	
☐	**16. Character/Civic District (All following information shall be included): (2.5.4.3P)** • Applicable Building Height (10.5A21.20 & 10.5A43.30); • Applicable Special Requirements (10.5A21.30); • Proposed building form/type (10.5A43); • Proposed community space (10.5A46).	Refer to Civil Sheets	
☐	**17. Special Flood Hazard Areas (2.5.4.3Q)** • The proposed development is consistent with the need to minimize flood damage; • All public utilities and facilities are located and construction to minimize or eliminate flood damage; • Adequate drainage is provided so as to reduce exposure to flood hazards.	Refer to Civil Sheets	

Other Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	Traffic Impact Study or Trip Generation Report, as required. **(3.2.1-2)**	See separate attachment	
☐	Indicate where Low Impact Development Design practices have been incorporated. **(7.1)**	Refer to Civil Sheets	
☐	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. **(7.3.1)**	N/A	
☐	Stormwater Management and Erosion Control Plan. **(7.4)**	Refer to Civil Sheets	
☐	Inspection and Maintenance Plan **(7.6.5)**	Refer to Civil Sheets	

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	All local approvals, permits, easements and licenses required, including but not limited to: • Waivers; • Driveway permits; • Special exceptions; • Variances granted; • Easements; • Licenses. **(2.5.3.2A)**		
☐	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: • Calculations relating to stormwater runoff; • Information on composition and quantity of water demand and wastewater generated; • Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; • Estimates of traffic generation and counts pre- and post-construction; • Estimates of noise generation; • A Stormwater Management and Erosion Control Plan; • Endangered species and archaeological / historical studies; • Wetland and water body (coastal and inland) delineations; • Environmental impact studies. **(2.5.3.2B)**		
☐	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. **(2.5.3.2D)**		

Final Site Plan Approval Required Information			
☑	**Required Items for Submittal**	**Item Location (e.g. Page/line or Plan Sheet/Note #)**	**Waiver Requested**
☐	A list of any required state and federal permit applications required for the project and the status of same. **(2.5.3.2E)**		
☐	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." **(2.5.4.2E)**	Refer to Civil Sheets	N/A
☐	For site plans that involve land designated as "Special Flood Hazard Areas" (SFHA) by the National Flood Insurance Program (NFIP) confirmation that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334. **(2.5.4.2F)**	N/A	
☐	Plan sheets submitted for recording shall include the following notes: a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." **(2.13.3)**		N/A

Applicant's Signature: DocuSigned by: Alexander H Sloum Jr 3D12526FBF68412 **Date:** 8/18/2023 | 9:49:26 AM CDT

ADTG, LLC

DR. ALEX SLOCUM

360 CORPORATE DR.
PORTSMOUTH , NH 03801

PROPERTY OWNER & APPLICANT INFO

APPLICANT/ LESSEE:
DR. ALEXANDER SLOCUM - ATDG, LLC
1 MERRILL CROSSING, BOW, NH 03304
603-777-6506

LESSOR:
PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DR,
PORTSMOUTH, NH 03801
603-433-6088

INFO OF PROFESSIONALS INVOLVED IN THE SITE PLAN DESIGN

DESIGN, ARCHITECTURE, AND CONSTRUCTION FIRM:
JEFF KILBURG, PROJECT DIRECTOR
APEX DESIGN BUILD
9550 W HIGGINS RD STE 170,
ROSEMONT, IL 60018
847-288-0100

CIVIL ENGINEER:
BRIAN JONES, SENIOR PROJECT MANAGER, PE
ALLEN & MAJOR ASSOCIATES, INC
400 HARVEY ROAD
MANCHESTER, NH 03103
603-627-5500

SURVEYOR:
DOUCET SURVEY LLC
102 KENT PLACE
NEWMARKET, NH 03857

UTILITY PROVIDERS

WATER SERVICE:
CITY OF PORTSMOUTH
680 PEVERLY HILL RD, PORTSMOUTH, NH 03801

SEWER SERVICE:
CITY OF PORTSMOUTH
680 PEVERLY HILL RD, PORTSMOUTH, NH 03801

GAS SERVICES:
UNITIL
325 WEST RD, PORTSMOUTH, NH 03801
888-301-7700

ELECTRIC SERVICES:
EVERSOURCE
800-662-7764
PO BOX 330, MANCHESTER, NH 03105-0330

FLOOR ARE OF PROJECT

PROPOSED GROSS FLOOR AREA

- **OVERALL GROSS AREA: 52,401 SF**

- FIRST FLOOR
IMAGING SUITE AREA: 2,437 SF
TENANT SUITE 1 AREA: 2,754 SF
TENANT SUITE 2 AREA: 4,577 SF
TENANT SUITE 3 AREA: 2,661 SF
PUBLIC AREA: 4,294SF
OVERALL FIRST FLOOR GROSS AREA: 16,723 SF

- SECOND FLOOR
TENANT SUITE 4 AREA: 2,385 SF
TENANT SUITE 5 AREA: 2,660 SF
ASC AREA: 9,566 SF
PUBLIC AREA: 3,228 SF
OVERALL SECOND FLOOR GROSS AREA: 17,839 SF

-THIRD FLOOR:
TENANT SUITE 6 AREA: 4,163 SF
TENANT SUITE 7 AREA: 3,668 SF
MEDICAL CLINIC & MED SPA: 7,112 SF
PUBLIC AREA: 2,896 SF
OVERALL THIRD FLOOR GROSS AREA: 17,839 SF

SCOPE OF WORK

1. ARCHITECTURAL SCOPE - 3-STORY TYPE II-B SLAB ON GRADE MEDICAL OFFICE BUILDING WITH NEW SITE WORK AND LANDSCAPING TO ACCOMMODATE NEW BUILDING

ACCESSIBILITY NOTES

1. ALL FIXTURES AND ACCESSORIES SHALL BE MOUNTED IN ACCORDANCE WITH ALL CITY / VILLAGE ADOPTED ACCESSIBILITY REGULATIONS.
2. ALL THRESHOLDS MUST COMPLY WITH CITY/VILLAGE ADOPTED ACCESSIBILITY REGULATIONS.

APPLICABLE BUILDING CODES

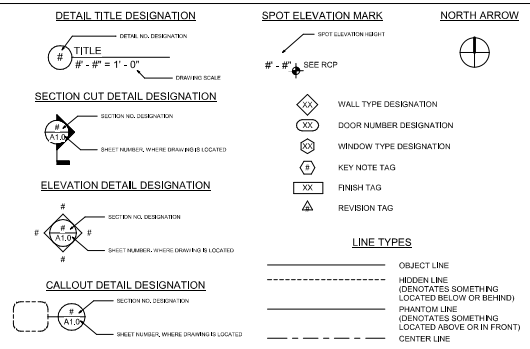
APPLICABLE BUILDING CODES
INTERNATIONAL BUILDING CODE 2018 (IBC)
INTERNATIONAL ENERGY CONSERVATION CODE 2018 (IECC)
INTERNATIONAL MECHANICAL CODE 2018 (IMC)
INTERNATIONAL PLUMBING CODE 2018 (IPC)
INTERNATIONAL RESIDENTIAL CODE 2018 (IRC)
NFPA 70™ – NATIONAL ELECTRICAL CODE® 2020 AMENDMENTS

"STATE FIRE CODE" AS DEFINED IN NH RSA 153:1 VI-A, WHICH INCLUDES THE ADOPTION BY REFERENCE OF THE LIFE SAFETY CODE NFPA 101, 2018 AND THE UNIFORM FIRE CODE NFPA 1, 2018 EDITIONS.

1. FIRE PROTECTION SYSTEM
CONTRACTOR SHALL PROVIDE A COMPLETE FIRE SUPPRESSION SYSTEM FROM THE 4" MAIN TO BE THROUGHOUT THE TENANT SPACE. ALL SPRINKLER LINES TO BE IN COMPLIANCE WITH NFPA LOAD FIRE CODES. ALL SPRINKLERS TO HAVE CONCEALED COVER PLATE HEADS FLUSH WITH CEILING TILE. SPRINKLER CONTRACTOR TO SUBMIT COMPLETE SHOP DRAWINGS UNDER SEPARATE SUBMITTAL TO BUILDING AND FIRE DEPT. FOR APPROVAL BY FIRE SUPPRESSION CONTRACTOR. PRIORITY- LTS, DIFFUSERS, RETURNS, EXH., THEN SPRINKLER HEADS. FOR POSITION IN CEILING.
2. FIRE ALARM SYSTEM
AN AUTOMATIC AND MANUAL FIRE ALARM SYSTEM IS EXISTING WITHIN THE BUILDING AND SEPARATE PLANS AND SPECIFICATIONS WILL BE PROVIDED FOR PERMITTING OUTSIDE OF THESE DRAWINGS. AN AUTOMATIC SYSTEM SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE PROVISIONS OF THE INTERNATIONAL BUILDING CODE AND NFPA 72 IN ALL BUILDINGS OF GROUPS A, B, E, F, H, I, M, R, S AND U. (AMENDS SEC. 907.2, INTERNATIONAL BUILDING CODE). A MANUAL FIRE ALARM SYSTEM WILL BE INSTALLED AND MAINTAINED IN THE FOLLOWING OCCUPANCIES REGARDLESS OF THE OCCUPANT LOAD: A, B, E, F, H, I-1, I-2, I-3, M, R-1, R-2, AND S. (AMENDS SECTION 907. INTERNATIONAL FIRE CODE). FA SUB WILL ALSO PROVIDE ALL REQUIRED SMOKE AND CARBON MONOXIDE DETECTOR LOCATIONS.

DRAWING INDEX

DRAFTING SYMBOLS



LOCATION MAP

PROJECT RENDERING

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

COVER PAGE

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
G0-0	
Scale	12" = 1'-0"

8/17/2023 2:27:08 PM

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR RENDERINGS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

GA0-1.0

Scale

8/17/2023 2:27:10 PM

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR RENDERINGS

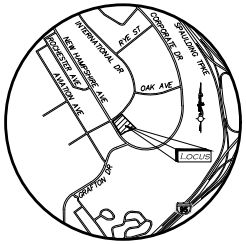
Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

GA0-1.1

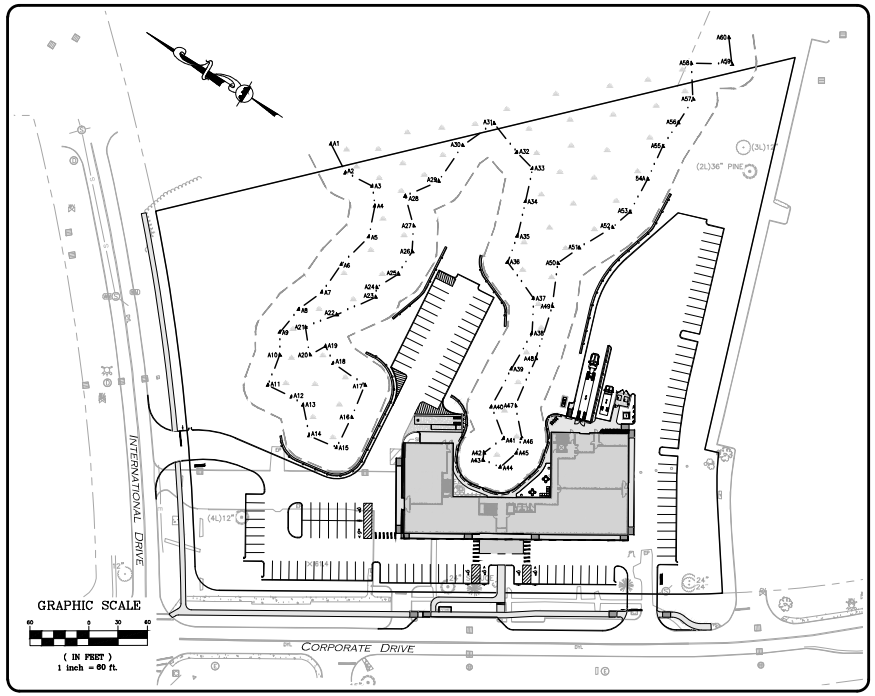
Scale

8/17/2023 2:27:10 PM

SITE DEVELOPMENT PLANS FOR
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801



LOCUS MAP
SCALE: 1" = 2,000'



APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

LESSOR:
PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801

ARCHITECT:
APEX DESIGN BUILD
9550 W. HIGGINS ROAD. SUITE 170
ROSEMONT, IL 60018

CIVIL ENGINEER / LANDSCAPE ARCHITECT
ALLEN & MAJOR ASSOCIATES, INC.
400 HARVEY ROAD
MANCHESTER, NH 03103
(603) 627-5500

SURVEYOR:
DOUCET SURVEY LLC
102 KENT PLACE
NEWMARKET, NH 03857

UTILITY PROVIDERS:
NATURAL GAS: UNITIL CORP.
ELECTRIC: EVERSOURCE
TELEPHONE: CONSOLIDATED COMMUNICATIONS

LIST OF DRAWINGS

DRAWING TITLE	SHEET NO.	ISSUED	REV 1
EXISTING CONDITIONS PLAN	1 OF 1	08-14-23	08-17-23
SITE SPECIFIC SOIL MAPPING	C-100	08-14-23	08-17-23
SITE PREPARATION PLAN	C-101	08-14-23	08-17-23
LAYOUT & MATERIALS PLAN	C-102	08-14-23	08-17-23
GRADING & DRAINAGE PLAN	C-103	08-14-23	08-17-23
UTILITIES PLAN & SEWER PROFILE	C-104	08-14-23	08-17-23
TRUCK TURNING PLAN	C-105	08-14-23	08-17-23
DETAILS	C-501	08-14-23	08-17-23
DETAILS	C-502	08-14-23	08-17-23
DETAILS	C-503	08-14-23	08-17-23
DETAILS	C-504	08-14-23	08-17-23
DETAILS	C-505	08-14-23	08-17-23
DETAILS	C-506	08-14-23	08-17-23
DETAILS	C-507	08-14-23	08-17-23
DETAILS	C-508	08-14-23	08-17-23
LANDSCAPE PLAN	L-101	08-14-23	08-17-23
LANDSCAPE NOTES	L-102	08-14-23	08-17-23
LANDSCAPE DETAILS	L-501	08-14-23	08-17-23

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13808
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

FOR MORE INFORMATION ABOUT THIS PLAN SET, CONTACT:
BRIAN D. JONES AT ALLEN & MAJOR ASSC., INC. 603-627-5500

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil & structural engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

ISSUED FOR SITE PLAN REVIEW: AUGUST 14, 2023
REVISED PER PDA COMMENTS: AUGUST 17, 2023

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_COVER.DWG

CURVE TABLE					
CURVE	ARC LENGTH	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD LENGTH
C1	366.29'	2155.00'	9°44'19"	N51°42'46"E	365.85'
C2	38.44'	25.00'	88°05'22"	S12°32'15"W	34.76'
C3	55.78'	1030.00'	3°06'09"	N33°03'31"W	55.77'
C4	55.43'	350.00'	9°04'25"	S59°13'06"W	55.37'

REFERENCE PLAN:

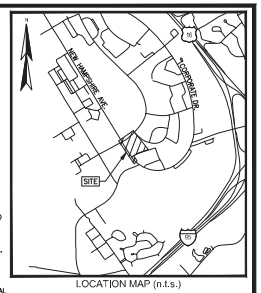
1. "LOT LINE REVISION PLAN FOR PEASE DEVELOPMENT AUTHORITY AND NEW HAMPSHIRE DEPT. OF REGIONAL COMMUNITY-TECHNICAL COLLEGES (TAC MAP 315, LOTS 4 & 5) CORPORATE & INTERNATIONAL DRIVE PORTSMOUTH, NEW HAMPSHIRE" DATED APRIL 9, 2009 BY DOUCET SURVEY INC. R.C.R.D. PLAN D-36858.

NOTES:

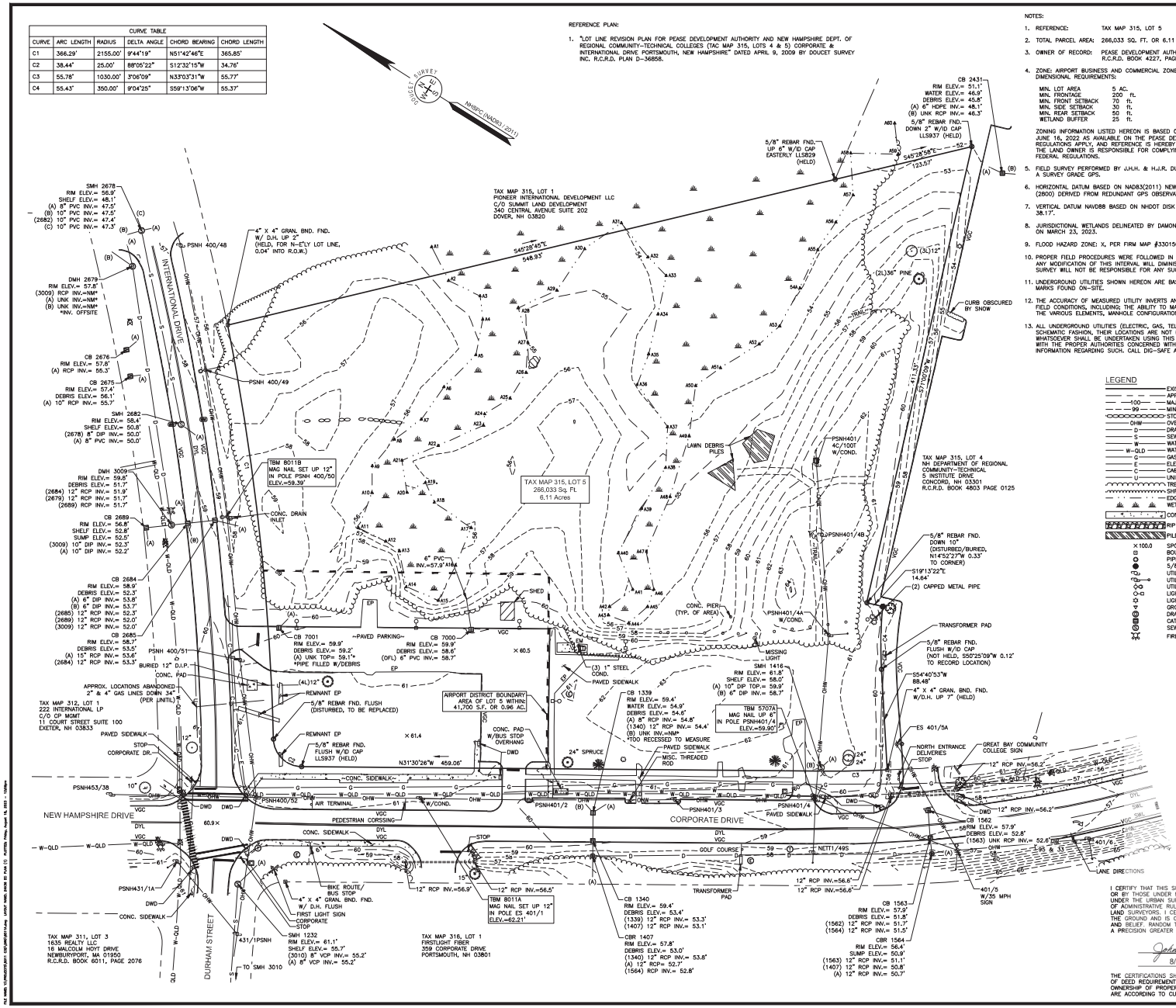
1. REFERENCE: TAX MAP 315, LOT 5
2. TOTAL PARCEL AREA: 266,033 SQ. FT. OR 6.11 AC.
3. OWNER OF RECORD: PEASE DEVELOPMENT AUTHORITY R.C.R.D. BOOK 4227, PAGE 001
4. ZONE: AIRPORT BUSINESS AND COMMERCIAL ZONE
   DIMENSIONAL REQUIREMENTS:

MIN. LOT AREA	5 AC.
MIN. FRONTAGE	200 ft.
MIN. FRONT SETBACK	70 ft.
MIN. SIDE SETBACK	30 ft.
MIN. REAR SETBACK	50 ft.
WETLAND BUFFER	25 ft.

   ZONING INFORMATION LISTED HEREON IS BASED ON THE PDA LAND USE CONTROLS REVISED TO JUNE 16, 2022 AS AVAILABLE ON THE PEASE DEVELOPMENT WEBSITE ON 4/5/2023. ADDITIONAL REGULATIONS APPLY, AND REFERENCE IS HEREBY MADE TO THE EFFECTIVE ZONING ORDINANCE. THE LAND OWNER IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE MUNICIPAL, STATE AND FEDERAL REGULATIONS.
5. FIELD SURVEY PERFORMED BY J.H.H. & H.J.R. DURING MARCH 2023 USING A TOTAL STATION AND A SURVEY GRADE GPS.
6. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2800) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
7. VERTICAL DATUM NAVD88 BASED ON NHDOT DISK 379-0740 HAVING A PUBLISHED ELEVATION OF 38.17'.
8. JURISDICTIONAL WETLANDS DELINEATED BY DAMON BURT, C.W.S. OF FRAGGLE ROCK ENVIRONMENTAL ON MARCH 23, 2023.
9. FLOOD HAZARD ZONE: X, PER FIRM MAP #33015C0260F, DATED 1/29/2021.
10. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 1' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION.
11. UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON OBSERVED PHYSICAL EVIDENCE AND PAINT MARKS FOUND ON-SITE.
12. THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING: THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.
13. ALL UNDERGROUND UTILITIES (ELECTRIC, GAS, TEL. WATER, SEWER DRAIN SERVICES) ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE AT 1-888-DIG-SAFE.



LOCATION MAP (n.t.s.)



LEGEND

	EXISTING LOT LINE
	APPROXIMATE ABUTTERS LINE
100	MAJOR CONTOUR LINE
99	MINOR CONTOUR LINE
	STONE WALL
OHW	OVERHEAD WIRE
D	DRAIN LINE
S	SEWER LINE
W	WATER LINE (PER SITE MARKINGS)
W-QLD	WATER LINE (PER CITY GIS)
G	GAS LINE
E	ELECTRIC LINE
C	CABLE/INTERNET LINE
U	UNIDENTIFIED UNDERGROUND UTILITY
	TREE LINE
	SHRUB LINE
	EDGE OF DELINEATED WETLAND
	WETLAND AREA
	CONCRETE
	RIP RAP
	PILE
×100.0	SPOT GRADE
	BOUND FOUND (BND. FND.)
	PIPE/ROD FOUND
	5/8" REBAR W/LLS 937 CAP TO BE SET
	UTILITY POLE
	UTILITY POLE & GUY WIRE
	UTILITY POLE W/LIGHT
	LIGHT POLE W/ARM
	LIGHT POST
	GROUND LIGHT
	DRAIN MANHOLE
	CATCH BASIN
	SEWER MANHOLE
	FIRE HYDRANT
	WATER GATE VALVE
	WATER METER
	GAS GATE VALVE
	ELECTRIC MANHOLE
EM	PAD MOUNTED TRANSFORMER
	ELECTRIC METER
	TELEPHONE MANHOLE
	TELEPHONE BOX
	CABLE BOX
	SIGN
	SIGN (TWO POSTS)
	ROCK/BOULDER
	CONIFEROUS TREE
	DECIDUOUS TREE
	BUSH
	JERSEY BARRIER
CONC.	CONCRETE
COND.	CONDUIT
D.H.	DRILL HOLE
DIP	DUCTILE IRON PIPE
DYL	DOUBLE YELLOW LINE
DWD	DETECTABLE WARNING DEVICE
EP	EDGE OF PAVEMENT
GRAN.	GRANITE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
OFL	OUTFALL
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
SWL	SINGLE WHITE LINE
SYL	SINGLE YELLOW LINE
TYP.	TYPICAL
UNK	UNKNOWN
VCC	VERTICAL CONCRETE CURB
VCP	VITREOUS CLAY PIPE
VGC	VERTICAL GRANITE CURB
(X)	INVERT I.D. CONNECTION UNKNOWN

40 0 40 80
SCALE: 1 INCH = 40 FT.

STATE OF NEW HAMPSHIRE
DAMON E. BURT
No. 163
CERTIFIED WETLAND SCIENTIST

STATE OF NEW HAMPSHIRE
No. 937
JOHN J. KAISER
LICENSED LAND SURVEYOR
SIGNATURE

I CERTIFY THAT THIS SURVEY AND PLAN WERE PREPARED BY ME OR BY THOSE UNDER MY DIRECT SUPERVISION AND FALLS UNDER THE URBAN SURVEY CLASSIFICATION OF THE NH CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS. I CERTIFY THAT THIS SURVEY WAS MADE ON THE GROUND AND IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. RANDOM TRAVERSE SURVEY BY TOTAL STATION, WITH A PRECISION GREATER THAN 1:15,000.

John Kaiser L.L.S. #937
8/18/23 DATE

THE CERTIFICATIONS SHOWN HEREON ARE INTENDED TO MEET REGISTRY OF DEED REQUIREMENTS AND ARE NOT A CERTIFICATION TO TITLE OR OWNERSHIP OF PROPERTY SHOWN. OWNERS OF ADJOINING PROPERTIES ARE ACCORDING TO CURRENT TOWN ASSESSORS RECORDS.

EXISTING CONDITIONS PLAN

FOR

ATDG, LLC

OWNED BY: PEASE DEVELOPMENT AUTHORITY

TAX MAP 315, LOT 5

360 CORPORATE DRIVE

PORTSMOUTH, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY
2	08/18/23	ADD GIS WATER LINE	J.R.P.
1	07/27/23	ADD LOCATED UTILITY MARKINGS	J.R.P.

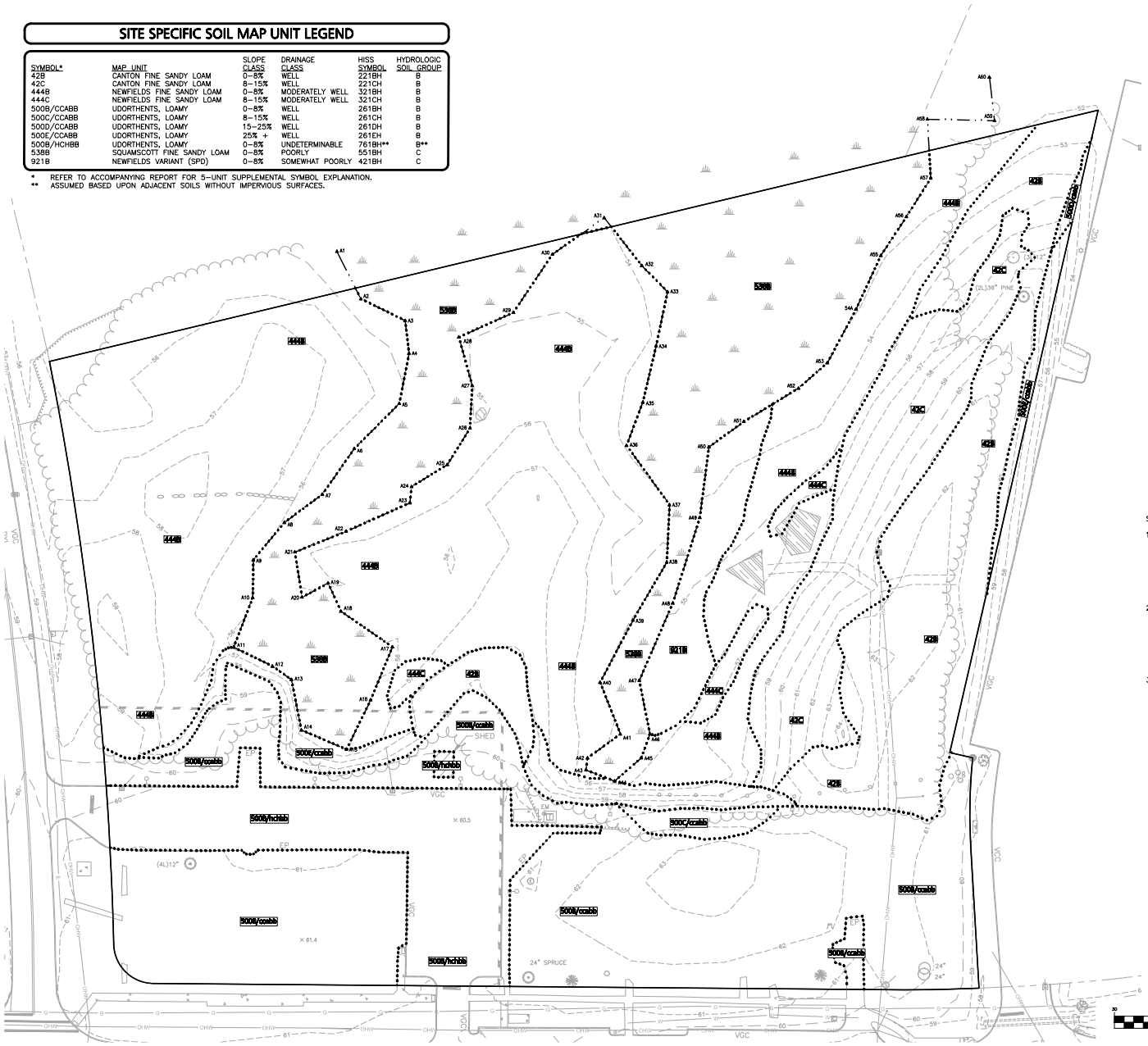
DRAWN BY:	J.R.P.	DATE:	APRIL 5, 2023
CHECKED BY:	J.F.K.	DRAWING NO.	8011A
JOB NO.	8011	SHEET 1 OF 1	

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-5560
Offices in Bedford & Keene, NH and Kennebunk, ME
http://www.doucetsurvey.com

SITE SPECIFIC SOIL MAP UNIT LEGEND

SYMBOL*	MAP UNIT	SLOPE CLASS	DRAINAGE CLASS	HISS SYMBOL	HYDROLOGIC SOIL GROUP
42B	CANTON FINE SANDY LOAM	0–8%	WELL	221BH	B
42C	CANTON FINE SANDY LOAM	8–15%	WELL	221CH	B
444B	NEWFIELDS FINE SANDY LOAM	0–8%	MODERATELY WELL	321BH	B
444C	NEWFIELDS FINE SANDY LOAM	8–15%	MODERATELY WELL	321CH	B
500B/CCABB	UDORTHENTS, LOAMY	0–8%	WELL	261BH	B
500C/CCABB	UDORTHENTS, LOAMY	8–15%	WELL	261CH	B
500D/CCABB	UDORTHENTS, LOAMY	15–25%	WELL	261DH	B
500E/CCABB	UDORTHENTS, LOAMY	25% +	WELL	261EH	B
500B/HCHBB	UDORTHENTS, LOAMY	0–8%	UNDETERMINABLE	761BH**	B**
538B	SQUAMSCOTT FINE SANDY LOAM	0–8%	POORLY	551BH	C
921B	NEWFIELDS VARIANT (SPD)	0–8%	SOMEWHAT POORLY	421BH	C

* REFER TO ACCOMPANYING REPORT FOR 5–UNIT SUPPLEMENTAL SYMBOL EXPLANATION.
** ASSUMED BASED UPON ADJACENT SOILS WITHOUT IMPERVIOUS SURFACES.



SITE SPECIFIC SOIL SURVEY PERFORMED BY:

TES ENVIRONMENTAL CONSULTANTS, LLC
1494 ROUTE 3A, UNIT 1
BOW, NH 03304

SOIL MAPPING NOTES:

1. THIS DETAILED SITE–SPECIFIC SOIL MAP, PREPARED ON AUGUST 9, 2023 BY THOMAS E. SOKOLOSKI, CERTIFIED SOIL SCIENTIST #063 OF TES ENVIRONMENTAL CONSULTANTS, L.L.C. IN BOW, NEW HAMPSHIRE, CONFORMS TO THE STANDARDS OF SSSNNE PUBLICATION NO. 3, VERSION 7.0, "SITE–SPECIFIC SOIL MAPPING STANDARDS FOR NEW HAMPSHIRE AND VERMONT", MARCH 2021.
2. THIS MAP HAS BEEN PREPARED TO COMPLY WITH SOIL MAPPING REQUIREMENTS OF RSA 485 A: 17 AND NHDES ENV–WQ 1500, ALTERATION OF TERRAIN. SEE ACCOMPANYING REPORT FOR METHODOLOGY, MAP SYMBOL LEGEND, AND INTERPRETATIONS. USE OF THE MAP SYMBOL DENOMINATORS FOR DISTURBED OR ALTERED SOILS, WHERE GIVEN, IS AT THE DISCRETION OF THE CERTIFIED SOIL SCIENTIST.
3. THIS MAP PRODUCT IS WITHIN THE TECHNICAL STANDARDS OF THE NATIONAL COOPERATIVE SOIL SURVEY. IT IS A SPECIAL PURPOSE PRODUCT, INTENDED FOR USE IN SUPPORT OF A NEW HAMPSHIRE ALTERATION TERRAIN PERMIT APPLICATION. IT WAS PRODUCED BY A CERTIFIED SOIL SCIENTIST, AND IS NOT A PRODUCT OF THE USDA NATURAL RESOURCES CONSERVATION SERVICE. THERE IS A NARRATIVE REPORT THAT ACCOMPANIES THIS MAP.

STATE OF NEW HAMPSHIRE BRIAN D. JONES No. 13805 LICENSED PROFESSIONAL ENGINEER
08-17-23
PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO. 3250-01	DATE: 08-14-23
SCALE: 1" = 30'	DWG. NAME: C-3250-01.dwg
DESIGNED BY: BDJ	CHECKED BY: RPC

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: SITE SPECIFIC SOIL MAPPING PLAN

SHEET No. C-100

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_SOIL MAPPING.DWG

ALTERATION OF TERRAIN NOTES:

1. ARTIFICIAL DETENTION IN WETLANDS IS NOT ALLOWED.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.
3. PERIMETER CONTROLS MUST BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.
4. TEMPORARY WATER DIVERSION (SWALES, BASINS, ETC.) MUST BE USED AS NECESSARY UNTIL AREAS ARE STABILIZED.
5. PONDS AND SWALES SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE.
6. RUNOFF MUST BE DIRECTED TO TEMPORARY PRACTICES UNTIL STORMWATER BMPS ARE STABILIZED.
7. BASINS, DITCHES AND SWALES MUST BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. ROADWAYS AND PARKING AREAS MUST BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
9. CUT AND FILL SLOPES MUST BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
10. EROSION CONTROL PRACTICES MUST BE INSPECTED AT LEAST WEEKLY AND AFTER EVERY RAIN EVENT OF 0.25 INCH OR MORE.
11. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION AND SHALL NOT EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. IF THE PROJECT RESULTS IN A DISTURBANCE OF GREATER THAN 5 ACRES AT ANY ONE TIME, THE FOLLOWING IS REQUIRED BEFOREHAND TO COMPLY WITH ENV WQ 1505.02(B):
   A. CONSTRUCTION SEQUENCE PLAN DEVELOPED BY A QUALIFIED ENGINEER OR CERTIFIED PROFESSIONAL EROSION AND SEDIMENT CONTROL SPECIALIST (CPESC SPECIALIST)
   B. EMPLOY AN ENVIRONMENTAL MONITOR DURING CONSTRUCTION TO PERFORM DUTIES IN ACCORDANCE WITH ENV WQ 1505.02(C) OR THE NOTES HEREON, WHICHEVER IS MORE STRINGENT.
12. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
   A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED.
   B. A MINIMUM OF 85 PERCENT VEGETATED GROWTH HAS BEEN ESTABLISHED.
   C. A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP RAP HAS BEEN INSTALLED, OR.
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
13. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
14. IN AREAS THAT WILL NOT BE PAVED, "STABLE" MEANS THAT:
   A. A MINIMUM OF 85% VEGETATIVE COVER HAS BEEN ESTABLISHED;
   B. A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR
   C. EROSION CONTROL BLANKETS HAVE BEEN INSTALLED IN ACCORDANCE WITH ENV-WQ 1506.03.

COLD WEATHER SITE STABILIZATION NOTES:

A. TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE ADDITIONAL STABILIZATION TECHNIQUES SPECIFIED IN THIS SECTION SHALL BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15 THROUGH MAY 1.

B. SUBJECT TO (C), BELOW, THE AREA OF EXPOSED, UNSTABILIZED SOIL SHALL BE:

1. LIMITED TO ONE ACRE; AND
2. PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT.

C. THE ALLOWABLE AREA OF EXPOSED SOIL MAY BE INCREASED IF A WINTER CONSTRUCTION PLAN IS DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST AND SUBMITTED TO THE DEPARTMENT FOR APPROVAL AS A REQUEST TO WAIVE THE ONE-ACRE LIMIT.

D. SUBJECT TO (F) AND (G), BELOW, ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF LESS THAN 15% THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH 3 TO 4 TONS OF HAY OR STRAW MULCH PER ACRE SECURED WITH ANCHORED NETTING OR TACKIFIER OR WITH AT LEAST 2 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(B).

E. SUBJECT TO (F) AND (G), BELOW, ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF 15% OR GREATER THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH A PROPERLY INSTALLED AND ANCHORED EROSION CONTROL BLANKET OR WITH AT LEAST 4 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(B).

F. ANCHORED HAY MULCH OR EROSION CONTROL MIX THAT MEETS THE CRITERIA OF ENV-WQ 1506.05(B) SHALL NOT BE INSTALLED OVER SNOW GREATER THAN ONE INCH IN DEPTH.

G. EROSION CONTROL BLANKETS SHALL NOT BE INSTALLED OVER SNOW GREATER THAN ONE INCH IN DEPTH OR ON FROZEN GROUND.

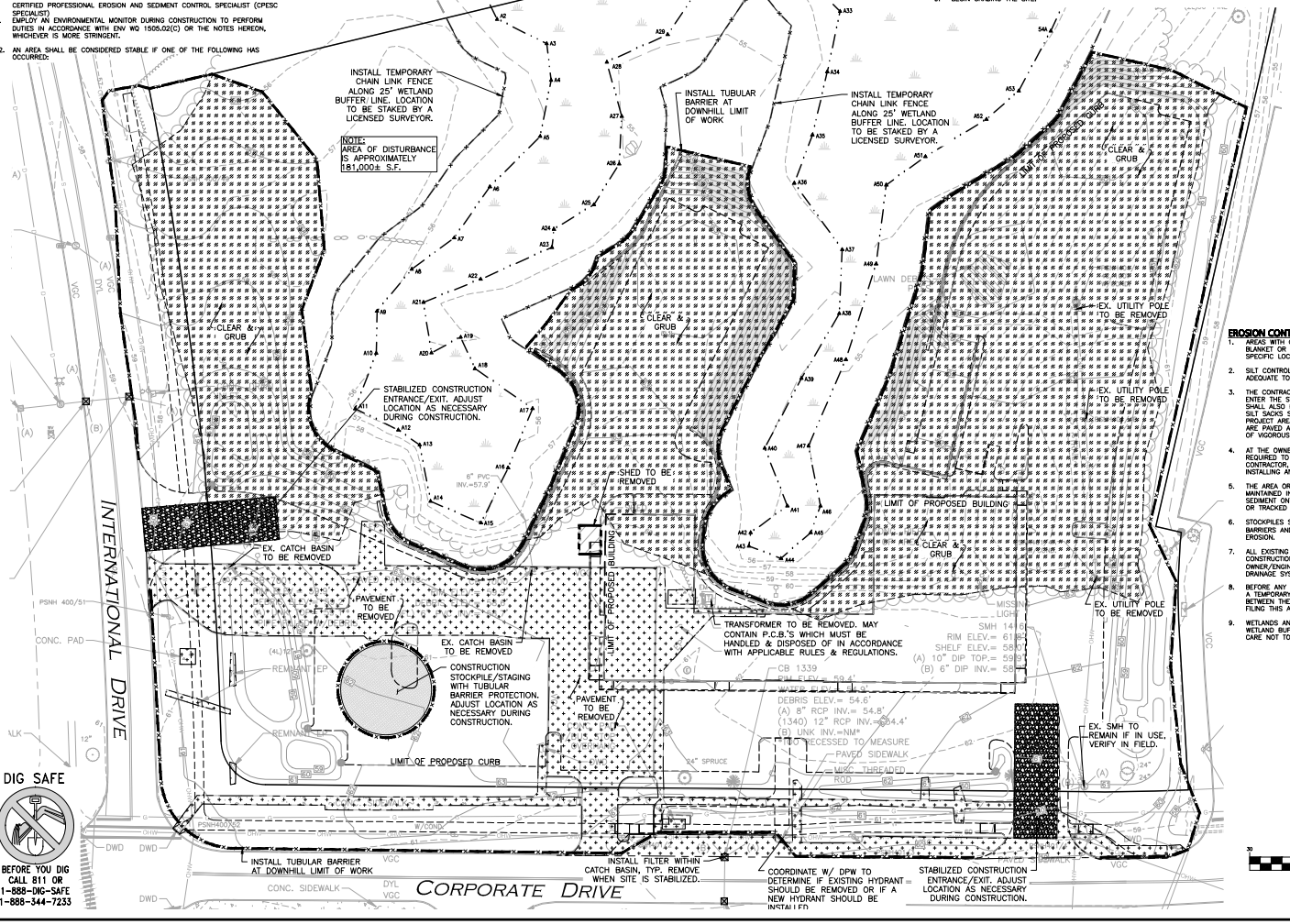
H. ALL PROPOSED STABILIZATION IN ACCORDANCE WITH (D) OR (E), ABOVE, SHALL BE COMPLETED WITHIN A DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS.

I. ALL DITCHES OR SWALES THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, AS DETERMINED BY THE OWNER'S ENGINEERING CONSULTANT.

J. AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING AREAS WHERE ACTIVE CONSTRUCTION OF THE ROAD OR PARKING AREA HAS STOPPED FOR THE WINTER SEASON SHALL BE PROTECTED WITH A MINIMUM 12-INCH LAYER OF BASE COURSE GRAVELS MEETING THE GRADATION REQUIREMENTS OF NHDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2016, TABLE 304-1, ITEM NO. 304.1, 304.2, OR 304.3, AVAILABLE AS NOTED IN APPENDIX B.

GENERAL SEQUENCE OF CONSTRUCTION:

1. CONTACT THE CITY OF PORTSMOUTH AT LEAST TWO (2) WEEKS PRIOR TO START OF CONSTRUCTION.
2. THE CONTRACTOR SHALL ACQUIRE A PDA DIG PERMIT BEFORE ANY DISTURBANCE CAN TAKE PLACE. ALLOW 7 CALENDAR DAYS FOR PROCESSING.
3. CONTRACTOR TO OBTAIN A NPDES CONSTRUCTION GENERAL PERMIT PRIOR TO CONSTRUCTION. PDA SHALL BE PROVIDED WITH A COPY OF THE SWPPP AND NOI.
4. INSTALL STABILIZED CONSTRUCTION ENTRANCES. SITE ACCESS SHALL BE ACHIEVED ONLY FROM THE DESIGNATED CONSTRUCTION ENTRANCE.
5. PREPARE TEMPORARY PARKING AND STORAGE AREA. UPON IMPLEMENTATION AND INSTALLATION OF THE FOLLOWING AREAS: TRAILER, PARKING, LAY DOWN, WHEEL WASH, CONCRETE WASHOUT, MASONS AREA, FUEL AND MATERIAL STORAGE CONTAINERS, SOLID WASTE CONTAINERS, ETC., DENOTE THEM ON THE SITE MAPS IMMEDIATELY AND NOTE ANY CHANGES IN THE LOCATIONS AS THEY OCCUR THROUGHOUT THE CONSTRUCTION PROCESS.
6. INSTALL THE FILTREXX SILTSOXX AND SILT SACK – CATCH BASIN INLET PROTECTION AS SHOWN HEREON.
7. BEGIN SITE CLEARING AND GRUBBING THE SITE
8. CONSTRUCT TEMPORARY SEDIMENTATION AND SEDIMENT TRAP BASINS AS NECESSARY.
9. BEGIN GRADING THE SITE.
10. CONSTRUCT STORMWATER MEASURES. SITE SHALL BE STABILIZED PRIOR TO STORMWATER MEASURES RECEIVING RUNOFF.
11. START CONSTRUCTION OF BUILDING PAD AND STRUCTURES. TEMPORARILY SEED DENUDED AREAS. ALL CUT AND FILL SLOPES SHALL BE SEEDED / LOAMED WITHIN 72 HOURS OF ACHIEVING FINISH GRADE, EXCEPT WHERE RIP RAP IS APPLIED.
12. INSTALL BUILDING, UTILITIES, STORM SEWERS, CURBS AND GUTTERS.
13. INSTALL INLET PROTECTION DEVICES AROUND ALL STORM DRAIN STRUCTURES.
14. INSTALL RIP RAP AROUND OUTLET STRUCTURES.
15. FINALIZE GRADING, AND PREPARE SITE FOR PAVING. NOTE, ALL PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.
16. PAVE SITE. COMPLETE FINISH GRADING AND INSTALL PERMANENT SEEDING AND PLANTING.
17. ONCE SITE IS STABILIZED, REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES.
18. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED WEEKLY AND AFTER ALL RAINFALL EVENTS GREATER THAN 0.25", AND SHALL BE MAINTAINED, REPAIRED OR REPLACED AS REQUIRED OR AT THE DIRECTION OF THE OWNER'S ENGINEER, OR THE TOWN ENGINEER.
19. SEDIMENT ACCUMULATION UP-GRADIENT OF THE TUBULAR BARRIERS GREATER THAN 6" IN DEPTH SHALL BE REMOVED AND DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
20. SILT SACKS SHALL BE INSTALLED IN ALL CATCH BASINS ADJACENT TO THE SITE. SEDIMENT ACCUMULATION ON ALL ADJACENT CATCH BASIN INLETS SHALL BE REMOVED AND THE SILT SACK REPLACED IF TORN OR DAMAGED.
21. THE CONTRACTOR SHALL COMPLY WITH THE GENERAL AND EROSION NOTES AS SHOWN ON THE SITE DEVELOPMENT PLANS.



LEGEND

LIMIT OF 'CLEAR AND GRUB'	
BUILDING TO BE REMOVED	
PAVEMENT TO BE REMOVED	
UTILITY CUT AND CAP	E
TEMPORARY FENCE	—x—x—
TUBULAR BARRIER	
EROSION CONTROL FABRIC	
CATCH BASIN FILTER	⊠
STABILIZED ENTRANCE	
STOCKPILE/STAGING AREA	

EROSION CONTROL AND SEDIMENT CONTROL NOTES:

1. AREAS WITH OVER 3:1 SLOPES SHALL BE PROTECTED WITH AN EROSION CONTROL BLANKET OR JUTE MESH. SEE THE GRADING & DRAINAGE PLAN, SHEET C-103 FOR SPECIFIC LOCATIONS.
2. SILT CONTROLS SHALL BE INSTALLED PRIOR TO CONSTRUCTION AND SHALL BE ADEQUATE TO MAINTAIN SEDIMENT ON SITE.
3. THE CONTRACTOR SHALL USE EXTREME CAUTION TO AVOID ALLOWING SEDIMENTS TO ENTER THE STORM DRAIN SYSTEM DURING CONSTRUCTION. CATCH BASIN INLETS SHALL ALSO BE PROTECTED DURING CONSTRUCTION BY THE USE OF SILT SACKS; SILT SACKS SHOULD BE INSTALLED IN ALL EXISTING CATCH BASINS WITHIN THE PROJECT AREA. INLET PROTECTION MAY BE REMOVED ONLY AFTER FINISHED AREAS ARE PAVED AND THE VEGETATED SLOPES ARE ESTABLISHED WITH AT LEAST 85–90% OF VIGOROUS PERENNIAL GROWTH.
4. AT THE OWNER'S DISCRETION ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED TO MAINTAIN STABILITY OF EARTHWORKS AND FINISHED GRADED AREAS. THE CONTRACTOR, AT HIS EXPENSE, WILL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ANY ADDITIONAL MEASURES AS SPECIFIED BY THE OWNER.
5. THE AREA OR AREAS OF ENTRANCE AND EXIT TO AND FROM THE SITE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO WEST PARK DRIVE MUST BE REMOVED IMMEDIATELY.
6. STOCKPILES SHALL BE SURROUNDED ON THEIR PERIMETERS WITH STAKED TUBULAR BARRIERS AND/OR SILTATION FENCES TO PREVENT AND/OR CONTROL SILTATION AND EROSION.
7. ALL EXISTING & PROPOSED CATCH BASINS SUBJECT TO STORMWATER RUNOFF DURING CONSTRUCTION SHALL HAVE SILT SACKS INSTALLED AS DIRECTED BY THE OWNER/ENGINEER. NO SEDIMENTATION SHALL ENTER THE ON–SITE OR OFF–SITE DRAINAGE SYSTEMS AT ANY TIME.
8. BEFORE ANY DEWATERING IS PERFORMED, THE CONTRACTOR SHALL FILE AND OBTAIN A TEMPORARY GROUNDWATER DISCHARGE PERMIT FROM NHDES. COORDINATION BETWEEN THE APPLICANT, PDA, NHDES AND THE AIR FORCE IS NECESSARY PRIOR TO FILING THIS APPLICATION.
9. WETLANDS AND BUFFERS ARE PRESENT ON SITE. THERE ARE NO WETLAND OR WETLAND BUFFER DISTURBANCES ASSOCIATED WITH THIS PROJECT. TAKE EXTREME CARE NOT TO IMPACT THESE RESOURCE AREAS.

SEEDINGS FOR TEMPORARY COVER

SPECIES	SEEDING RATE (LB/UNIT AREA)		RECOMMENDED SEEDING DATES
	1,000 S.F.	ACRE	
ANNUAL RYEGRASS	1	40	APRIL 1 – JUNE 1 AUG. 15 – SEPT. 15
FOXTAIL MILLET	0.7	30	MAY 1 – JUNE 30
OATS	2	80	APRIL 1 – JULY 1 AUG. 15 – SEPT. 15
WINTER RYE	3	120	AUG. 15 – OCT. 15

"HYDRO–SEEDING" APPLICATIONS WITH APPROPRIATE SEED–MULCH–FERTILIZER MIXTURES MAY ALSO BE USED.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

STATE OF NEW HAMPSHIRE BRIAN D. JONES No. 13805 LICENSED PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:

ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:

ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME: C3250-01.dwg	
DESIGNED BY:	BDJ	CHECKED BY:	BPC

PREPARED BY:

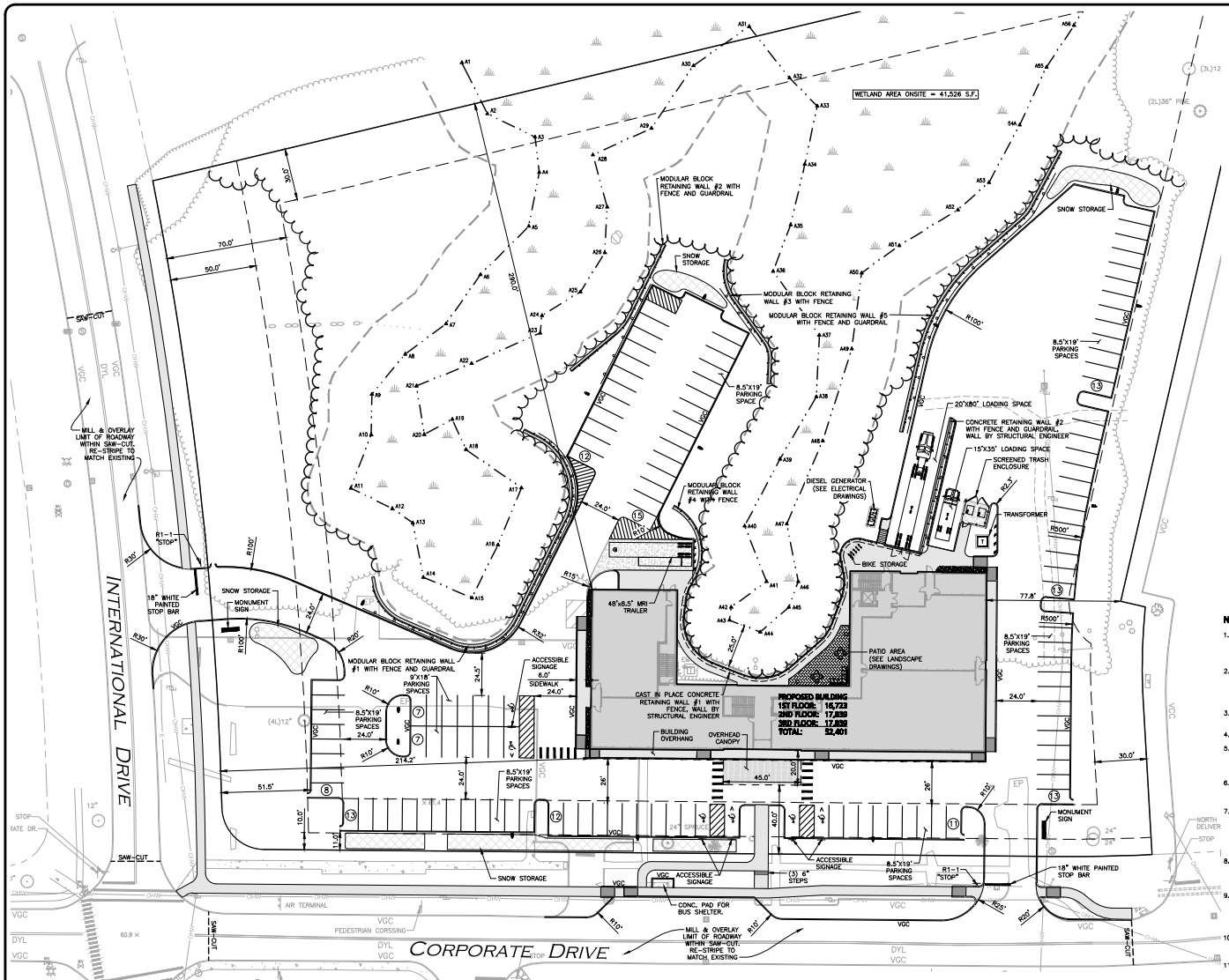
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: SITE PREPARATION PLAN

SHEET No. C-101

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_SITE-PREP.DWG



LEGEND

PROPERTY LINE	
SIGN	
BOLLARD	
BUILDING	
BUILDING ABOVE	
BUILDING ARCHITECTURE	
CURB	
RETAINING WALL	
PARKING STRIPING	
TRAFFIC ARROWS	
HEAVY DUTY CONCRETE	
SIDEWALK	
BRICK PATIO	
ADA ACCESSIBLE RAMP	
SNOW STORAGE	
SETBACK LINE	
SAW-CUT LINE	
PARKING COUNT	18
STEEL GUARDRAIL	
DECORATIVE FENCE	
SITE LIGHT	
TREE LINE	
VERTICAL GRANITE CURB	VGC

NOTES:

1. THE EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED TO ALLEN & MAJOR ASSOCIATES, INC. (A&M) BY THE APPLICANT AND ARE TAKEN FROM A DRAWING ENTITLED "EXISTING CONDITIONS PLAN FOR ATDG, LLC", PREPARED BY DOUCET SURVEY LLC, DATED APRIL 5, 2023.
2. WRITTEN DIMENSIONS ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS OR CONDITIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR.
3. ALL DIMENSIONS AND RADII ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
4. CURB RADII SHALL BE 3' UNLESS OTHERWISE SHOWN.
5. SIDEWALK CROSS SLOPE TO BE 1.5% MAX. LONGITUDINAL RUNNING SLOPE TO BE 4.5% MAX. ANY SIDEWALK WITH A RUNNING SLOPE BETWEEN 5% AND 8.3% REQUIRES HAND RAILS ON BOTH SIDES IN ACCORDANCE WITH ADA REQUIREMENTS, EXCEPT CURB TRANSITIONS.
6. SIDEWALK AND HARDSCAPE AREAS AT ACCESSIBLE ENTRY DOORS SHALL HAVE A MAXIMUM OF 1.5% SLOPE/CROSS SLOPE IN ALL DIRECTIONS AT THE DOOR MANEUVERING CLEARANCE.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ANY STRUCTURAL RETAINING WALLS (WALLS WITH AN EXPOSED FACE OF GREATER THAN 4'). DESIGN SHALL BE BY A REGISTERED STRUCTURAL ENGINEER AND SHALL BE STAMPED ACCORDINGLY. STRUCTURAL RETAINING WALL DESIGNS SHALL BE SUBMITTED TO PEASE DEVELOPMENT AUTHORITY FOR REVIEW. A BUILDING PERMIT IS REQUIRED FOR ANY WALLS OVER 4' IN HEIGHT.
8. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
9. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO THE ISSUANCE OF CERTIFICATE OF OCCUPANCY OR RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE PEASE DEVELOPMENT AUTHORITY, SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
10. SUBMISSION OF MULTIPLE 7460-1'S TO THE FAA WILL BE REQUIRED FOR THE CONSTRUCTION OF THE BUILDING AND TEMPORARY USE OF A CRANE. ALLOW A MINIMUM OF 45 DAYS FOR PROCESSING.
11. THE APPLICANT SHALL COORDINATE WITH THE CITY OF PORTSMOUTH TO CONFIRM ADEQUACY OF RADIO SIGNAL STRENGTH FOR EMERGENCY SERVICES. AMPLIFIERS MAY BE REQUIRED TO BOOST SIGNAL STRENGTH, WHICH, IF NECESSARY, SHALL BE PROVIDED AND INSTALLED BY THE APPLICANT.
12. THE APPLICANT SHALL SUBMIT AS-BUILT PLANS ON REPRODUCIBLE MYLAR AND IN DIGITAL FORMAT (AUTOCAD .DWG FORMAT) ON CD TO PDA UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A REGISTERED NEW HAMPSHIRE LAND SURVEYOR OR PROFESSIONAL ENGINEER. AN ELECTRONIC FILE OF THE SITE LAYOUT SHALL BE SUBMITTED TO THE CITY OF PORTSMOUTH'S GIS DEPARTMENT.
13. SNOW SHALL BE TAKEN OFFSITE ONCE SNOW STORAGE AREAS ONSITE BECOME INADEQUATE, AND BEGINS TO BLOCK ACCESS TO AND FROM THE SITE OR BLOCKS THE USE OF ONSITE PARKING. ANY EXCESS WILL BE BE TRUCKED OFFSITE & DISPOSED OF IN ACCORDANCE WITH LOCAL AND NHDES GUIDELINES.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

AIRPORT BUSINESS COMMERCIAL (ABC) ZONING DISTRICT

LOT	REQUIRED/ALLOWED	EXISTING/PROPOSED
MINIMUM LOT SIZE	5.00 ACRES	6.12 ACRES
MINIMUM FRONTAGE	200 FEET	366± FEET (INTERNATIONAL DRIVE)
FRONT SETBACK	70 FEET	214.2 FEET
SIDE SETBACK	30 FEET	40.0 FEET
REAR SETBACK	50 FEET	77.8 FEET
MAXIMUM BUILDING HEIGHT	FAA CRITERIA	3 STORY
MINIMUM OPEN SPACE	25% (UPLAND)	50%

OFF-STREET PARKING SUMMARY

USE	CALCULATION	PROVIDED
PROFESSIONAL OFFICES: 3 SPACES PER PROFESSIONAL + 1 PER OTHER EMPLOYEE	(20 PROFESSIONALS)x3 =60 (50 OFFICE STAFF)x1 + 50 SPACES REQUIRED =110	114 SPACES
HOSPITAL: 1 PER BED	(9 HOSPITAL BEDS) x1 = 9	10 SPACES
TOTAL	119 SPACES REQUIRED	124 SPACES

DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME: C-3250-01.dwg	
DESIGNED BY:	BDJ	CHECKED BY:	RPC

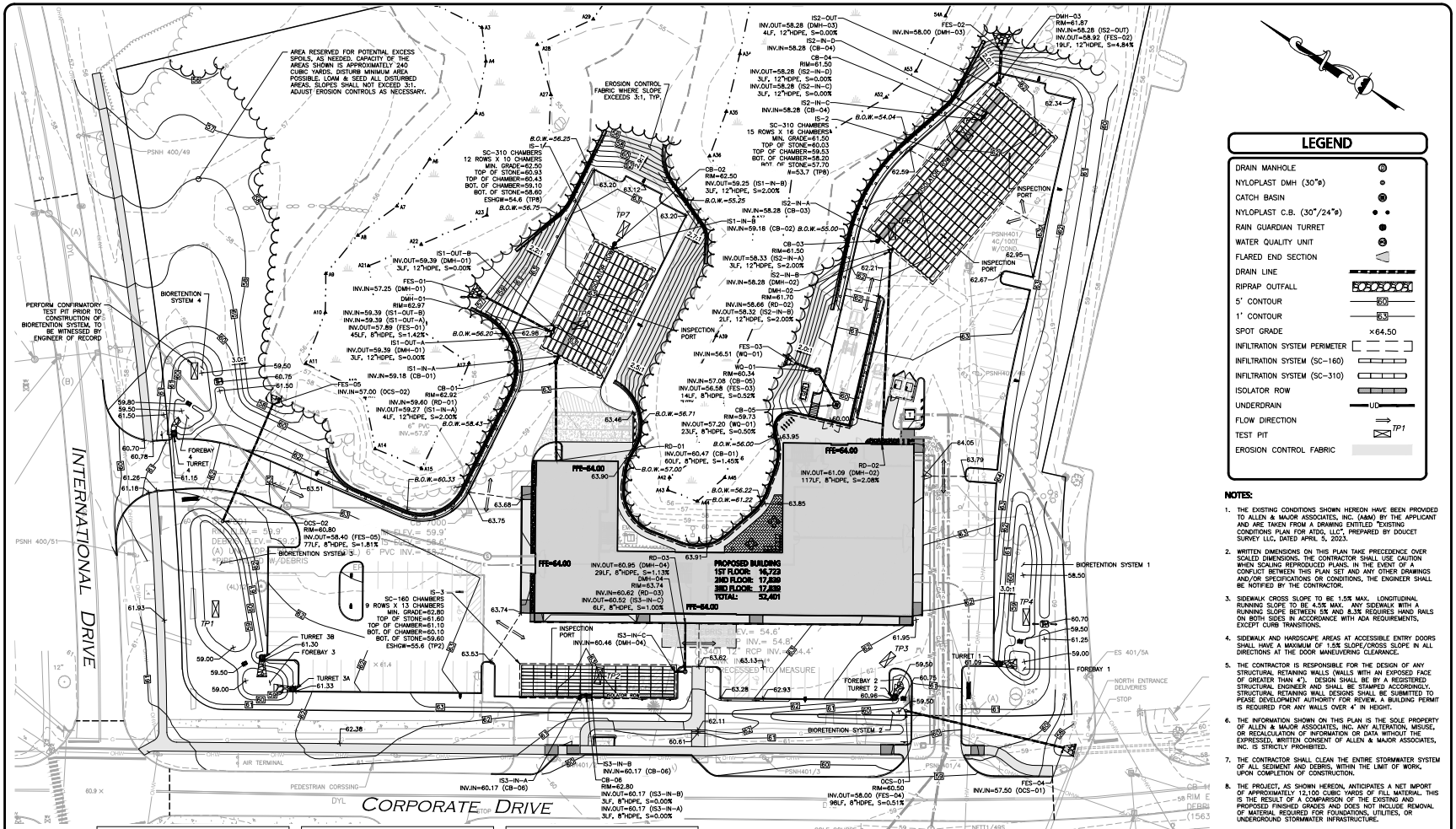
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: LAYOUT & MATERIALS PLAN

SHEET No. C-102

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_LAYOUT & MATERIALS.DWG



LEGEND

- DRAIN MANHOLE
- NYLOPLAST DMH (30"ø)
- CATCH BASIN
- NYLOPLAST C.B. (30"/24"ø)
- RAIN GUARDIAN TURRET
- WATER QUALITY UNIT
- FLARED END SECTION
- DRAIN LINE
- RIPRAP OUTFALL
- 5' CONTOUR
- 1' CONTOUR
- SPOT GRADE ×64.50
- INFILTRATION SYSTEM PERIMETER
- INFILTRATION SYSTEM (SC-160)
- INFILTRATION SYSTEM (SC-310)
- ISOLATOR ROW
- UNDERDRAIN
- FLOW DIRECTION
- TEST PIT
- EROSION CONTROL FABRIC

NOTES:

1. THE EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED TO ALLEN & MAJOR ASSOCIATES, INC. (A&M) BY THE APPLICANT AND ARE TAKEN FROM A DRAWING ENTITLED "EXISTING CONDITIONS PLAN FOR ATDG, LLC", PREPARED BY DOUCET SURVEY LLC, DATED APRIL 5, 2023.
2. WRITTEN DIMENSIONS ON THIS PLAN TAKE PRECEDENCE OVER SCALED DIMENSIONS. THE CONTRACTOR SHALL USE CAUTION WHEN SCALING REPRODUCED PLANS. IN THE EVENT OF A CONFLICT BETWEEN THIS PLAN SET AND ANY OTHER DRAWINGS AND/OR SPECIFICATIONS OR CONDITIONS, THE ENGINEER SHALL BE NOTIFIED BY THE CONTRACTOR.
3. SIDEWALK CROSS SLOPE TO BE 1.5% MAX. LONGITUDINAL RUNNING SLOPE TO BE 4.5% MAX. ANY SIDEWALK WITH A RUNNING SLOPE BETWEEN 5% AND 8.3% REQUIRES HAND RAILS ON BOTH SIDES IN ACCORDANCE WITH ADA REQUIREMENTS, EXCEPT CURB TRANSITIONS.
4. SIDEWALK AND HARDSCAPE AREAS AT ACCESSIBLE ENTRY DOORS SHALL HAVE A MAXIMUM OF 1.5% SLOPE/CROSS SLOPE IN ALL DIRECTIONS AT THE DOOR MANEUVERING CLEARANCE.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ANY STRUCTURAL RETAINING WALLS (WALLS WITH AN EXPOSED FACE OF GREATER THAN 4'). DESIGN SHALL BE BY A REGISTERED STRUCTURAL ENGINEER AND SHALL BE STAMPED ACCORDINGLY. STRUCTURAL RETAINING WALL DESIGNS SHALL BE SUBMITTED TO PEASE DEVELOPMENT AUTHORITY FOR REVIEW. A BUILDING PERMIT IS REQUIRED FOR ANY WALLS OVER 4' IN HEIGHT.
6. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
7. THE CONTRACTOR SHALL CLEAN THE ENTIRE STORMWATER SYSTEM OF ALL SEDIMENT AND DEBRIS, WITHIN THE LIMIT OF WORK, UPON COMPLETION OF CONSTRUCTION.
8. THE PROJECT, AS SHOWN HEREON, ANTICIPATES A NET IMPORT OF APPROXIMATELY 12,100 CUBIC YARDS OF FILL MATERIAL. THIS IS THE RESULT OF A COMPARISON OF THE EXISTING AND PROPOSED FINISHED GRADES AND DOES NOT INCLUDE REMOVAL OF MATERIAL REQUIRED FOR FOUNDATIONS, UTILITIES, OR UNDERGROUND STORMWATER INFRASTRUCTURE.
9. ALL EXCESS EXCAVATED SOIL MATERIAL SHALL REMAIN ON SITE AND SHALL BE PLACED IN THE EXCESS SOIL BERM AS SHOWN HEREON. NO EXISTING SOILS SHALL BE REMOVED FROM THE PROJECT SITE.

TEST PIT #6 (TP6)
EXISTING GROUND ELEVATION: 56.4
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
O	0-3"	N.A.	N.A.	N.A.	LEAF LITTER
A	3-10"	SANDY LOAM	7.5YR 3/2	MASSIVE FRIABLE	DRY
Bw	10-16"	SANDY LOAM	10YR 5/4	MASSIVE FRIABLE	DRY
C	16-80"	SANDY LOAM	2.5Y 5/4	MASSIVE, FRIABLE	DRY TO MOIST

ESHWT: 34" (ELEVATION=53.6)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #7 (TP7)
EXISTING GROUND ELEVATION: 57.8
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
O	0-3"	N.A.	N.A.	N.A.	LEAF LITTER
A	3-8"	SANDY LOAM	7.5YR 3/2	MASSIVE FRIABLE	DRY
Bw	8-14"	SANDY LOAM	10YR 5/4	MASSIVE FRIABLE	DRY
C	14-72"	SANDY LOAM	2.5Y 5/4	MASSIVE, FRIABLE	DRY TO MOIST

ESHWT: 40" (ELEVATION=54.5)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #8 (TP8)
EXISTING GROUND ELEVATION: 57.6
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
O	0-3"	N.A.	N.A.	N.A.	LEAF LITTER
A	3-6"	SANDY LOAM	7.5YR 3/2	MASSIVE FRIABLE	DRY
Bw	6-12"	SANDY LOAM	10YR 5/4	MASSIVE FRIABLE	DRY
C	12-72"	SANDY LOAM	2.5Y 5/4	MASSIVE, FRIABLE	DRY TO MOIST

ESHWT: 36" (ELEVATION=54.6)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #1 (TP1)
EXISTING GROUND ELEVATION: 61.5
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
HTM (FILL)	0-48"	GENERALLY LOAMY SAND	N.A.	N.A.	DRY, SOME CONST. DEBRIS
C	48-96"	SANDY LOAM	2.5Y 5/4	MASSIVE, FIRM	DRY TO MOIST

ESHWT: 72" (ELEVATION=55.5)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #2 (TP2)
EXISTING GROUND ELEVATION: 61.4
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
HTM (FILL)	0-80"	GENERALLY LOAMY SAND	N.A.	N.A.	DRY TO MOIST
O	80-82"	N.A.	GLEY1 N	N.A.	BURIED "O" HORIZON
C	82-96"	FINE SANDY LOAM	GLEY2 4/10G	MASSIVE, FIRM	MOIST

ESHWT: 70" (ELEVATION=55.6)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #3 (TP3)
EXISTING GROUND ELEVATION: 62.2
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
HTM (FILL)	0-60"	GENERALLY LOAMY SAND	N.A.	N.A.	DRY, SOME CONSTR. DEBRIS
C	60-94"	SANDY LOAM	2.5Y 5/4	MASSIVE, FIRM	DRY TO MOIST

ESHWT: 76" (ELEVATION=55.9)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #4 (TP4)
EXISTING GROUND ELEVATION: 60.8
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
HTM (FILL)	0-18"	GENERALLY LOAMY SAND	N.A.	N.A.	DRY
Ab	18-24"	SANDY LOAM	2.5Y 4/2	MASSIVE FRIABLE	DRY
Bw	24-32"	SANDY LOAM	7.5YR 4/6	MASSIVE FRIABLE	DRY
C_1	32-48"	SANDY LOAM	2.5Y 5/4	MASSIVE, FRIABLE	DRY
C_2	48-96"	SANDY LOAM	2.5Y 7/2	MASSIVE FIRM	DRY TO MOIST

ESHWT: 67" (ELEVATION=55.2)
WEEP: NONE
BEDROCK/REFUSAL: NONE

TEST PIT #5 (TP5)
EXISTING GROUND ELEVATION: 56.7
PERFORMED BY: BRIAN D. JONES, PE
DATE: 07-17-2023

HORIZON	DEPTH	TEXTURE	COLOR	STRUCTURE	NOTES
O	0-3"	N.A.	N.A.	N.A.	LEAF LITTER
A	3-9"	SANDY LOAM	7.5YR 3/2	MASSIVE FRIABLE	DRY
Bw	9-14"	SANDY LOAM	10YR 5/4	MASSIVE FRIABLE	DRY
C	14-72"	SANDY LOAM	2.5Y 5/4	MASSIVE, FRIABLE	DRY TO MOIST

ESHWT: 36" (ELEVATION=53.7)
WEEP: NONE
BEDROCK/REFUSAL: NONE

DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

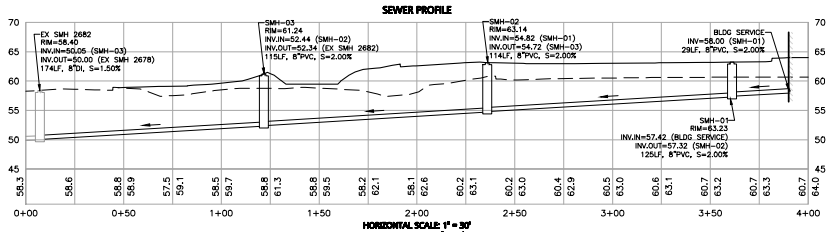
DRAWING TITLE:
GRADING & DRAINAGE PLAN

SHEET No.
C-103

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_GRADING & DRAINAGE.DWG

UTILITY NOTES:

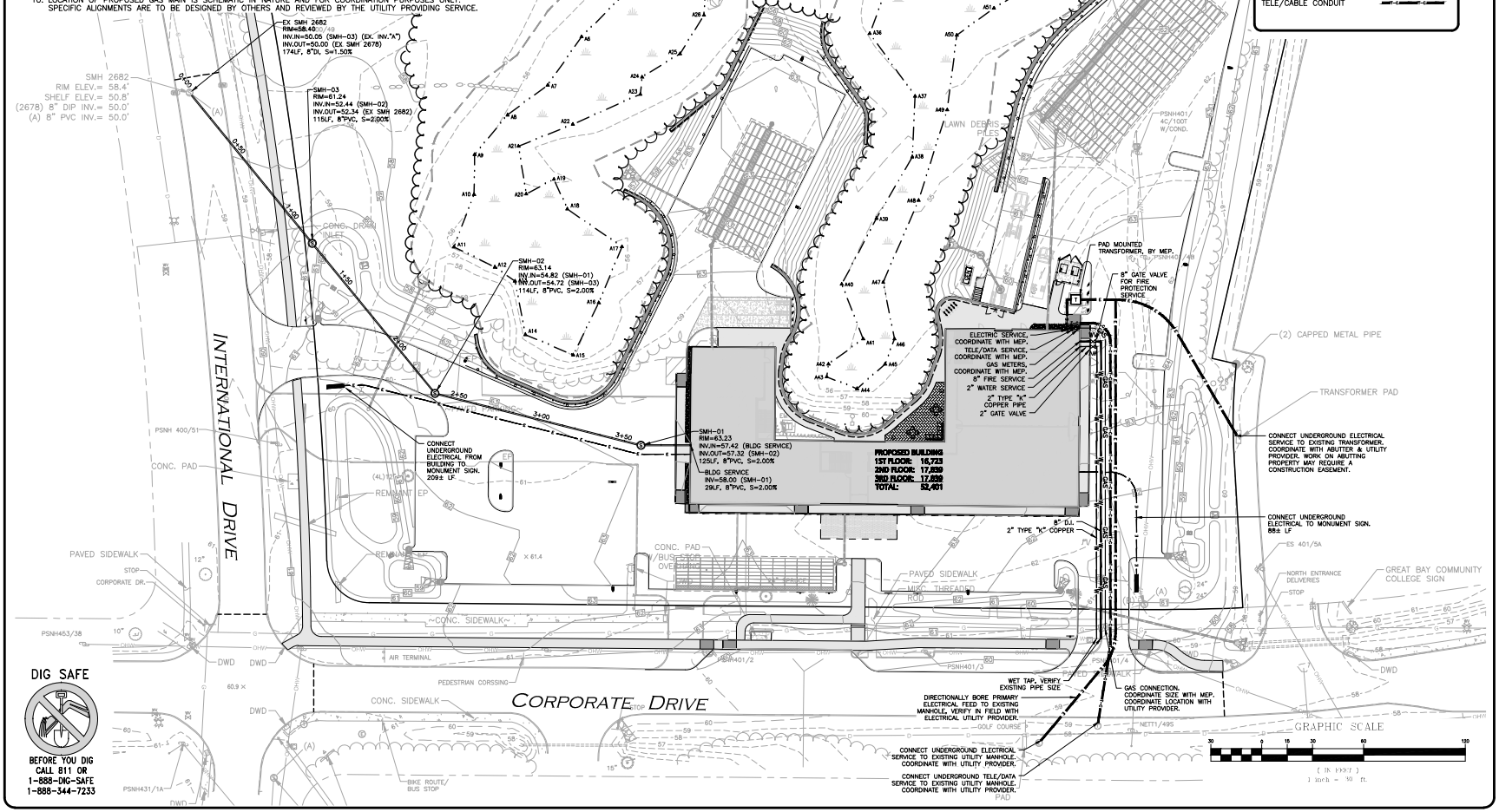
1. A MINIMUM OF 10 FEET CLEAR HORIZONTALLY SHALL BE MAINTAINED BETWEEN WATER MAINS AND SANITARY SEWER MAINS AND/OR STORM DRAINS. WHENEVER CONDITIONS PREVENT A LATERAL SEPARATION OF 10 FEET TO A WATER MAIN, THE WATER MAIN SHALL BE LAID IN A SEPARATE TRENCH AND THE DIFFERENCE IN ELEVATION BETWEEN THE WATER MAIN AND THE SEWER MAIN SHALL BE AT LEAST 18 INCHES.
2. IN THE CASE THAT WATER MAINS CROSS SANITARY SEWER MAINS AND/OR STORM DRAINS AND ARE SEPARATED BY LESS THAT 18" OF VERTICAL CLEARANCE, THE CROSSING PIPES SHALL BE ENCASED IN CONCRETE OR SLEEVED IN A LARGER DIAMETER PIPE FOR A DISTANCE OF 10 FEET ON EITHER SIDE OF THE CROSSING.
3. THE CONTRACTOR SHALL REFER TO ARCHITECT'S PLANS AND SPECIFICATIONS FOR ACTUAL LOCATION OF ALL ROOF DRAIN LATERALS AND UTILITY ENTRANCES TO INCLUDE SANITARY SEWER LATERALS, DOMESTIC AND FIRE PROTECTION WATER SERVICE, ELECTRIC, TELEPHONE, AND GAS SERVICE. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES IN SUCH A MANNER AS TO AVOID CONFLICTS AND COORDINATE WITH THE PROPER AGENCY THE LOCATION AND SCHEDULING OF CONNECTIONS WITH THEIR FACILITIES.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION.
5. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENTS OF NATURAL GAS, ELECTRIC, TELEPHONE AND ANY OTHER UTILITY BY THE UTILITY OWNER.
6. ALL WATER MAINS SHALL BE INSTALLED WITH A MINIMUM OF 4.5 FEET OF COVER AND A MAXIMUM OF 8 FEET OF COVER EXCEPT AS NOTED OR DETAILED OTHERWISE.
7. DOMESTIC WATER SERVICES SHALL BE INSTALLED WITH APPROPRIATELY SIZED GATE, BOX AND TEE FITTINGS.
8. GENERALLY, WATER MAIN FITTINGS, AND VALVES SHOWN ON THIS DRAWING ARE FOR INSTALLATION LOCATION PURPOSES. THE CONTRACTOR SHALL NOTE THAT NOT ALL FITTINGS AND VALVES ARE NOTED, SHOWN OR INDICATED.
9. LOCATION OF PROPOSED ELECTRICAL/COMMUNICATION SERVICE IS SCHEMATIC IN NATURE AND FOR COORDINATION PURPOSES ONLY. SPECIFIC ALIGNMENTS ARE TO BE DESIGNED BY OTHERS AND REVIEWED BY THE UTILITY PROVIDING SERVICE.
10. LOCATION OF PROPOSED GAS MAIN IS SCHEMATIC IN NATURE AND FOR COORDINATION PURPOSES ONLY. SPECIFIC ALIGNMENTS ARE TO BE DESIGNED BY OTHERS AND REVIEWED BY THE UTILITY PROVIDING SERVICE.



HORIZONTAL SCALE: 1" = 30'
VERTICAL SCALE: 1" = 10'

LEGEND

SEWER MANHOLE	S
SEWER LINE	
WATER LINE	W
WATER VALVE	WV
GAS LINE	GAS
ELECTRICAL CONDUIT	E
TELE/CABLE CONDUIT	T-C



DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	BPC

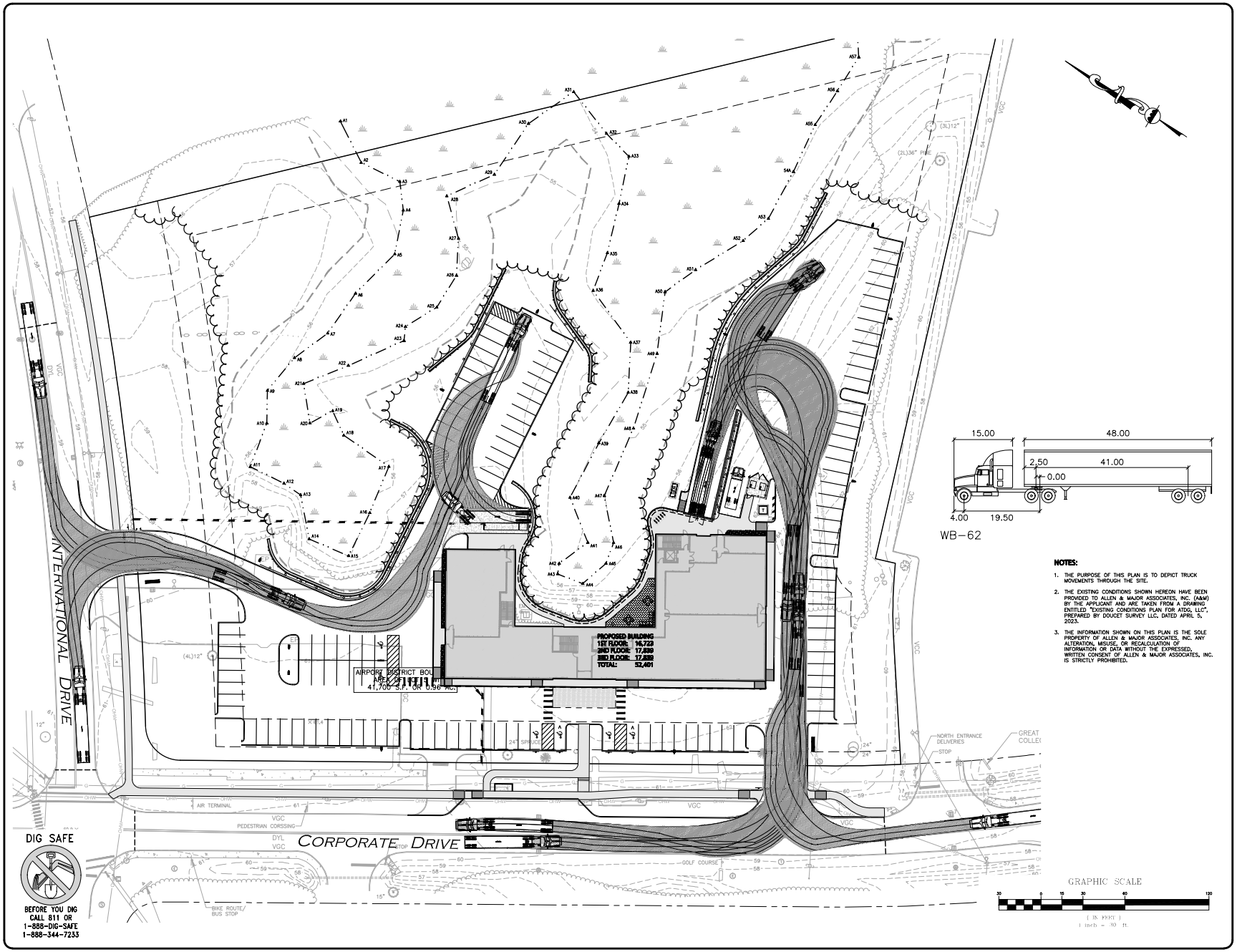
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: UTILITIES PLAN

SHEET No. C-104

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_UTILITIES.DWG



DIG SAFE

BEFORE YOU DIG
CALL 811 OR
1-888-DIG-SAFE
1-888-344-7233

NOTES:

1. THE PURPOSE OF THIS PLAN IS TO DEPICT TRUCK MOVEMENTS THROUGH THE SITE.
2. THE EXISTING CONDITIONS SHOWN HEREON HAVE BEEN PROVIDED TO ALLEN & MAJOR ASSOCIATES, INC. (A&M) BY THE APPLICANT AND ARE TAKEN FROM A DRAWING ENTITLED "EXISTING CONDITIONS PLAN FOR ATDG, LLC", PREPARED BY DOUCET SURVEY LLC, DATED APRIL 5, 2023.
3. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:

ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:

ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	1" = 30'	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

THE PLANS BY:

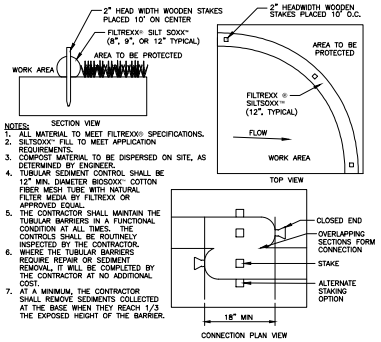
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: TRUCK TURNING PLAN

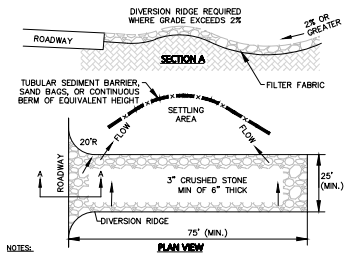
SHEET No. C-105

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_TRUCK TURNING.DWG



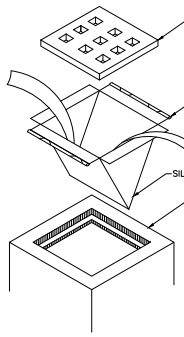
NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. SILTSOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.
4. TUBULAR SEDIMENT CONTROL SHALL BE 12" MIN. DIAMETER BIOSOXX™ COTTON FIBER MESH TUBE WITH NATURAL FILTER MEDIA BY FILTREXX OR APPROVED EQUAL.
5. THE CONTRACTOR SHALL MAINTAIN THE TUBULAR BARRIERS IN A FUNCTIONAL CONDITION AT ALL TIMES. THE CONTROLS SHALL BE ROUTINELY INSPECTED BY THE CONTRACTOR.
6. WHERE THE TUBULAR BARRIERS REQUIRE REPAIR OR SEDIMENT REMOVAL, IT WILL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST.
7. AT A MINIMUM, THE CONTRACTOR SHALL REMOVE SEDIMENTS COLLECTED AT THE BASE WHEN THEY REACH 1/3 THE EXPOSED HEIGHT OF THE BARRIER.

FILTREXX SILTSOXX DETAIL (1)
NOT TO SCALE



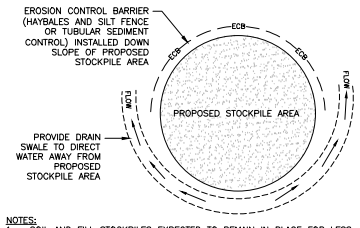
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTERING THE PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

STABILIZED CONSTRUCTION ENTRANCE (2)
NOT TO SCALE



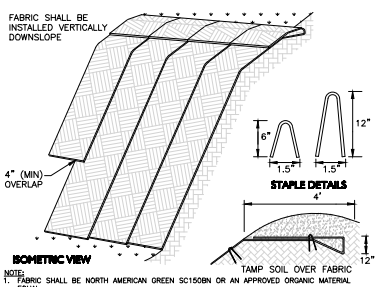
NOTES:
1. INSTALL SILTSACK PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EMPTY OR REMOVE SEDIMENT FROM SILTSACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE. CLEAN, RINSE, AND REPLACE AS NEEDED.
2. SILT SACKS TO BE INSTALLED DURING CONSTRUCTION OPERATIONS WHEN THE POTENTIAL FOR SEDIMENT TO ENTER EXISTING & PROPOSED BASINS EXISTS.

CATCH BASIN INLET PROTECTION (3)
NOT TO SCALE



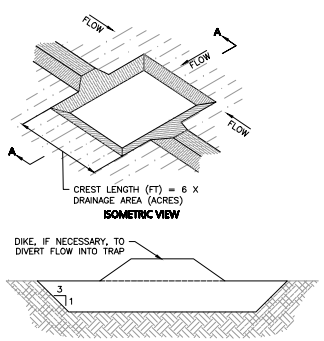
NOTES:
1. SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR LESS THAN 90 DAYS SHALL BE COVERED WITH HAY AND MULCH (AT 100LBS/1,000 SF), OR WITH AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.
2. SOIL AND FILL STOCKPILES EXPECTED TO REMAIN IN PLACE FOR 90 DAYS OR MORE SHALL BE SEEDED WITH WINTER RYE (FOR FALL SEEDING AT 3LB/1,000 SF) OR OATS (FOR SUMMER SEEDING AT 2LB/1,000 SF) AND THEN COVERED WITH HAY MULCH (AT 100LB/1,000 SF) OR AN ANCHORED TARP WITHIN 7 DAYS OR PRIOR TO ANY RAINFALL.

STOCKPILE PROTECTION (4)
NOT TO SCALE



NOTE:
1. FABRIC SHALL BE NORTH AMERICAN GREEN SC150BN OR AN APPROVED ORGANIC MATERIAL EQUAL.
2. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS.
3. APPLY PERMANENT SEEDING BEFORE PLACING FABRIC.
4. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
5. THERE SHALL BE NO PLASTIC, OR MULTI-FILAMENT OR MONOFILAMENT POLYPROPYLENE NETTING OR MESH WITH AN OPENING SIZE OF GREATER THAN 1/8 INCHES MATERIAL UTILIZED.

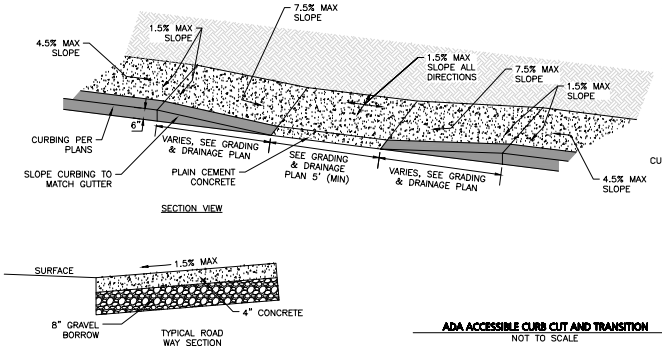
EROSION CONTROL FABRIC (5)
NOT TO SCALE

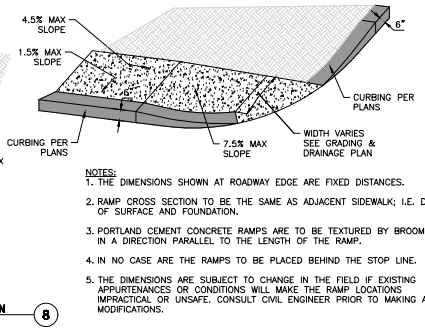


NOTES:
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA OR SOURCE OF SEDIMENT AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. THE SIDE SLOPES OF THE TRAP SHALL BE 3:1 OR FLATTER, AND SHALL BE STABILIZED IMMEDIATELY AFTER THEIR CONSTRUCTION.
5. THE OUTLET OF THE TRAP SHALL BE A MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP AND SHALL DISCHARGE TO A STABILIZED AREA.
6. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED.
7. THE MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AN STABILIZED.

TEMPORARY EARTH OUTLET SEDIMENT TRAP (6)
NOT TO SCALE

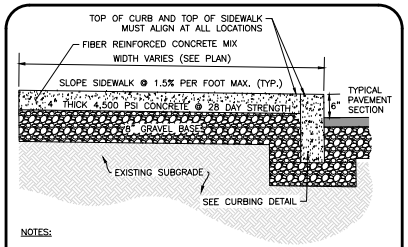
NOT USED (7)
NOT TO SCALE





NOTES:
1. THE DIMENSIONS SHOWN AT ROADWAY EDGE ARE FIXED DISTANCES.
2. RAMP CROSS SECTION TO BE THE SAME AS ADJACENT SIDEWALK; I.E. DEPTH OF SURFACE AND FOUNDATION.
3. PORTLAND CEMENT CONCRETE RAMPS ARE TO BE TEXTURED BY BROOMING IN A DIRECTION PARALLEL TO THE LENGTH OF THE RAMP.
4. IN NO CASE ARE THE RAMPS TO BE PLACED BEHIND THE STOP LINE.
5. THE DIMENSIONS ARE SUBJECT TO CHANGE IN THE FIELD IF EXISTING APPURTENANCES OR CONDITIONS WILL MAKE THE RAMP LOCATIONS IMPRACTICAL OR UNSAFE. CONSULT CIVIL ENGINEER PRIOR TO MAKING ANY MODIFICATIONS.

ADA ACCESSIBLE CURB CUT AND TRANSITION (8)
NOT TO SCALE



NOTES:
1. SIDEWALK TO HAVE TOOLED JOINTS IN A 5' x 5' (TYP.) GRID WITH EXPANSION JOINTS 15' ON CENTER AND PREMOLDED FILLER
2. TOOLED JOINT 6" FROM FACE OF CURB
3. SEE PLAN FOR ELEVATIONS AT CURB
4. SIDEWALK CROSS SLOPE TO BE 1.5% MAX & SIDEWALK LONGITUDINAL SLOPE TO BE 4.5% MAX, TYP.
5. ALL SIDEWALKS SHALL BE PORTLAND CEMENT CONCRETE, PER PDA REQUIREMENTS.

CONCRETE SIDEWALK WITH CURB (9)
NOT TO SCALE

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

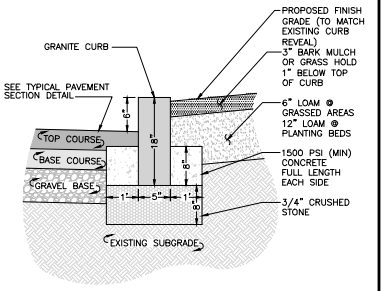
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

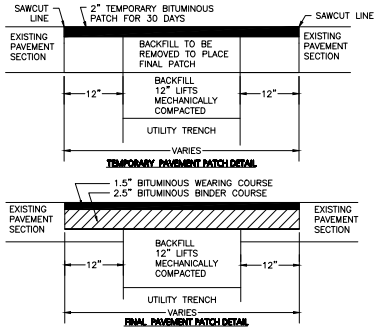
DRAWING TITLE: DETAILS

SHEET No. C-501

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG



VERTICAL GRANITE CURB
NOT TO SCALE
1



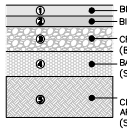
PAVEMENT TRENCH PATCH
NOT TO SCALE
2

STANDARD DUTY FLEXIBLE PAVEMENT DESIGN SECTION

LAYER NUMBER	LAYER DESCRIPTION	LAYER THICKNESS (INCHES)
1	BITUMINOUS WEARING COURSE (9" AGGREGATE – NHDOT PRE–APPROVED MIX DESIGN)	1.5"
2	BITUMINOUS BINDER COURSE (9" AGGREGATE – NHDOT PRE–APPROVED MIX DESIGN)	1.5"
3	CRUSHED GRAVEL (BASE COURSE) (NHDOT ITEM 304.3)	6.0"
4	GRAVEL BORROW (SUBBASE COURSE) (NHDOT ITEM 304.2)	12"
5	CLEAN GRANULAR FILL MATERIAL OR APPROVED ON–SITE MATERIALS (SUBGRADE)	AS NECESSARY

NHDOT GRADATION SPECIFICATION

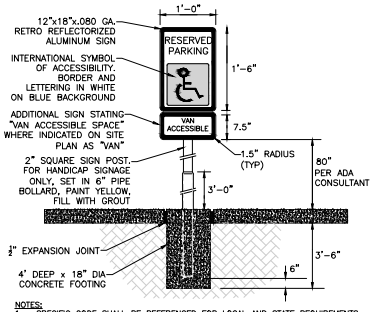
SIEVE SIZE	PERCENT PASSING BY WEIGHT		
	CLEAN GRANULAR FILL	BASE COURSE	SELECT GRANULAR FILL
8"	100	100	100
3"	70–100	100	70–100
3/4"	40–100	40–80	40–90
No. 4	25–100	30–70	25–80
No. 10	15–95	20–60	15–70
No. 40	10–70	10–30	5–40
No. 200	0–15	3–10	0–12



NOTES:
IF A GEOTECHNICAL REPORT IS PREPARED THE RECOMMENDATIONS WITHIN THAT REPORT SHALL SUPERCEDE RECOMMENDATIONS HEREIN. THE CONTRACTOR SHALL HAVE AND REVIEW A COPY OF THE GEOTECHNICAL REPORT AND COMPLY WITH THE RECOMMENDATIONS THEREIN.

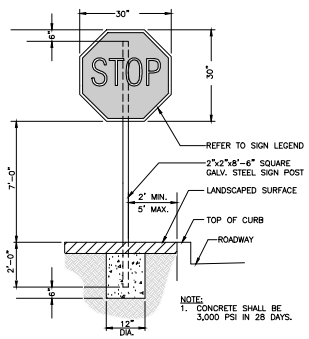
1. TOPSOIL SHALL BE REMOVED BENEATH ALL PAVEMENT AREAS TO EXPOSE THE NATURALLY–OCCURRING SOILS OR ACCEPTABLE ON–SITE FILL MATERIALS.
2. THE SUBGRADE SHOULD BE PROOFROLLED UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER USING AT LEAST 4 PASSES OF A 10–TON VIBRATORY ROLLER. AREAS OF THE SUBGRADE THAT 'WEAVE' OR 'ROLL' EXCESSIVELY SHOULD BE OVEREXCAVATED AND REPLACED WITH DRIER CLEAN GRANULAR FILL MATERIAL.
3. THE PAVEMENT SUBGRADE CONSISTING OF THE SPECIFIED CLEAN GRANULAR FILL SHALL BE PLACED IN 12" MAXIMUM LIFTS AND COMPACTED TO A DRY DENSITY OF AT LEAST 95 PERCENT OF THE MATERIALS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM DESIGNATION D–1557.
4. PAVEMENT AND GRAVEL SPECIFICATIONS WITHIN THE CITY RIGHT–OF–WAY ARE TO BE DESIGNATED BY THE CITY'S DESIGN CONSULTANT FOR THE ROUNDABOUT PROJECT.

PAVEMENT SECTIONS
NOT TO SCALE
3



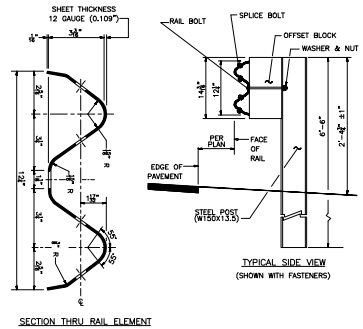
NOTES:
1. SPECIFIC CODE SHALL BE REFERENCED FOR LOCAL AND STATE REQUIREMENTS.
2. PROVIDE (1) SIGN PER HANDICAP SPACE. SEE SITE PLAN FOR EXACT LOCATION.
3. EXPANSION JOINT MATERIAL NOT REQUIRED WITH FLEXIBLE PAVEMENT.

ACCESSIBLE PARKING SIGN POST
NOT TO SCALE
4

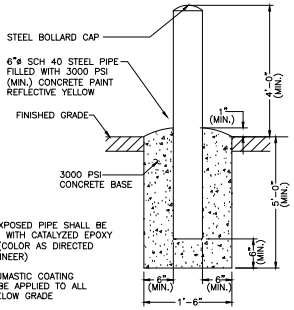


NOTE:
1. CONCRETE SHALL BE 3,000 PSI IN 28 DAYS.

STOP SIGN POST
NOT TO SCALE
5



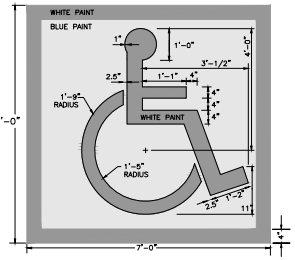
STEEL GUARDRAIL
NOT TO SCALE
6



NOTES:
–ALL EXPOSED PIPE SHALL BE PAINTED WITH CATALYZED EPOXY PAINT. (COLOR AS DIRECTED BY ENGINEER)
–A BITUMASTIC COATING SHALL BE APPLIED TO ALL PIPE BELOW GRADE

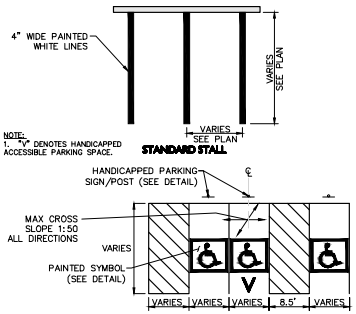
FIXED PIPE BOLLARD
NOT TO SCALE
7

NOT USED
NOT TO SCALE
8



SYMBOL TO BE CENTERED ON WIDTH OF PARKING STALL. SYMBOL IS REQUIRED TO CONTRAST WITH BACKGROUND. USE WHITE ON BLUE (COLOR #105090 IN FEDERAL STANDARD 5952) DOUBLE COAT.

ACCESSIBLE PARKING STALL PAVEMENT MARKING
NOT TO SCALE
9

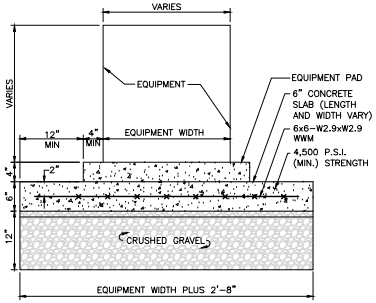


NOTE:
1. "V" DENOTES HANDICAPPED ACCESSIBLE PARKING SPACE.

STANDARD STALL

STANDARD AND VAN ACCESSIBLE HANDICAPPED PARKING SPACE

HANDICAP & STANDARD PARKING STRIPING
NOT TO SCALE
10



NOTE:
REFERENCE MECHANICAL ENGINEER'S PLANS FOR ANY PIPE, CONDUIT AND GROUND WIRE LOCATIONS

TYPICAL UTILITY PAD
NOT TO SCALE
11

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

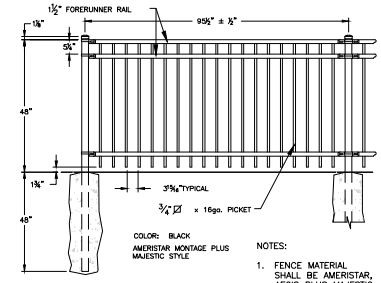
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: DETAILS

SHEET No. C-502

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG



COLOR: BLACK

AMERISTAR MONTAGE PLUS MAJESTIC STYLE

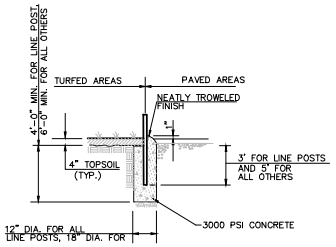
AMERISTAR®

1555 N. Mingo
Tulsa, OK 74116
1-888-333-3422

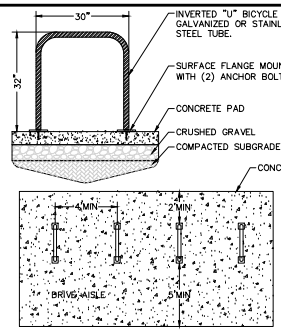
NOTES:

1. FENCE MATERIAL SHALL BE AMERISTAR, AEGIS PLUS MAJESTIC, COLOR BLACK.
2. POST SIZE SHALL BE PER AEGIS PLUS SIZING CHART

48" HIGH DECORATIVE STEEL FENCE
NOT TO SCALE
1

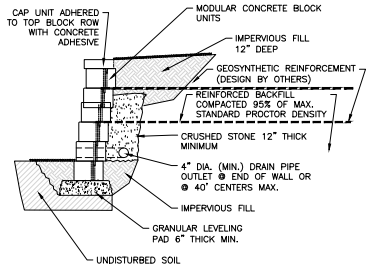


POST SETTING DETAIL
NOT TO SCALE
2



NOTE: BIKE RACKS TO BE FROM GROUND CONTROL SYSTEMS: HOOP RUNNER™ –INVERTED U SURFACE MOUNTED BIKE PARKING RACKS. SURFACE MOUNT PER MANUFACTURER'S RECOMMENDATIONS. FINISH SELECTED BY OWNER. PROVIDE SHOP DRAWINGS FOR APPROVAL PRIOR TO ORDERING.

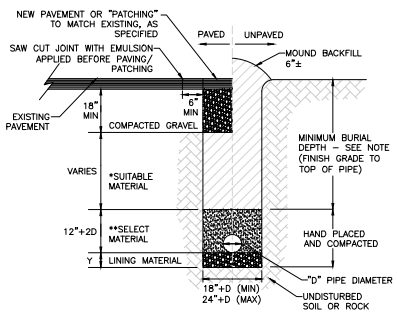
BICYCLE RACK DETAIL
NOT TO SCALE
3



NOTES:

1. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE STRUCTURAL DESIGN OF THE MODULAR BLOCK RETAINING WALLS.
2. WALLS THREE FEET OR GREATER IN HEIGHT SHALL BE DESIGNED BY A NEW HAMPSHIRE REGISTERED PROFESSIONAL STRUCTURAL ENGINEER.
3. WALL DESIGNS AND CALCULATIONS SHALL BE PROVIDED TO THE PROJECT GEOTECHNICAL ENGINEER TO CONFIRM THAT GEOTECHNICAL RECOMENDATIONS HAVE BEEN PROPERLY INCLUDED.
4. WALL DESIGNS AND CALCULATIONS SHALL BE PROVIDED TO THE PROJECT CIVIL ENGINEER TO CONFIRM ELEVATIONS AND ALIGNMENT HAVE BEEN PROPERLY INCLUDED.
5. SMALL BLOCK UNITS SHALL BE THE SQUARE FOOT PRODUCT BY VERSA-LOK OR APPROVED EQUAL.
6. WALL HEIGHT WITHOUT REINFORCEMENT SHALL BE LIMITED TO 3' EXPOSED FACE.
7. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

TYPICAL "SMALL BLOCK" RETAINING WALL
NOT TO SCALE
5



CONDITION & PIPE	**SELECT MATERIAL	LINING MATERIAL	Y-DIMENSION
DUCTILE IRON "ORDINARY SOIL"	TYPE I, II, OR III	SAND OR TYPE III	3"
RCP "ORDINARY SOIL"	TYPE II OR III	SAND OR TYPE III	3"
ALL PIPE OVER BEDROCK OR LEDGE	TYPE II OR III	SAND OR TYPE III	8"
DUCTILE IRON IN CLAY OR MUCK	TYPE II OR III	SAND	4"
RCP IN CLAY	TYPE II OR III	SAND	8"
ALL PLASTICS	TYPE III	SAND OR TYPE III	6"

NOTES:

1. MINIMUM BURIAL DEPTH (FINISH GRADE TO TOP OF PIPE)
   GRAVITY PIPE – SEE PLAN OR PROFILE
   PRESSURE PIPE UNDER PAVING – 4'
   PRESSURE PIPE BENEATH UNPAVED – 3'
2. WHERE BACKFILL IS DESIGNATED AS COMPACTED, THIS MEANS 90 TO 95% STANDARD PROCTOR. AASHTO T-99. ALL FILL PLACED BELOW PIPES AND STRUCTURES MUST MEET THIS REQUIREMENT.
3. FOR ALL TRENCHES WITH A GRADE GREATER THAN 4% AND/OR WHERE GROUNDWATER IS APPARENT, INSTALL CLAY DAMS AROUND THE PIPE AT 100' INTERVALS.
4. BACKFILL AS PER DCED-R100 AND REFERENCED AS STANDARD DRAWING.

* SUITABLE MATERIAL SHALL CONTAIN NO STONE GREATER THAN 4" IN DIAMETER, NO FROZEN LUMPS, AND ONLY MINOR AMOUNTS OF CLAY OR ORGANIC MATERIAL. ALL MATERIAL TO BE PLACED IN MAX 6" LIFTS AND COMPACTED BEFORE PLACING NEXT LIFT.
**TYPE I MATERIAL SHALL BE EITHER GRAVEL OR EXCAVATED MATERIAL CONTAINING NO STONES GREATER THAN 1.5" DIAMETER, NO FROZEN LUMPS, CLAY OR ORGANIC MATERIAL.
**TYPE II MATERIAL SHALL BE CLEAN, HARD, CRUSHED OR NATURAL STONE WITH A GRADATION BY WEIGHT OF 100% PASSING A 1.5" SQUARE OPENING, NOT MORE THAN 25% PASSING A ¾" OPENING, AND NOT MORE THAN 5% PASSING A ¼" SQUARE OPENING.
**TYPE III MATERIAL SHALL BE CLEAN, HARD, CRUSHED STONE FREE FROM COATINGS AND THOROUGHLY WASHED WITH A GRADATION BY WEIGHT OF 100% PASSING A 1" SQUARE OPENING, AND 0 TO 5% PASSING A ¼" SQUARE OPENING.

TRENCH DETAIL
NOT TO SCALE
4

NOT USED
NOT TO SCALE
6

NOT USED
NOT TO SCALE
7

NOT USED
NOT TO SCALE
8

NOT USED
NOT TO SCALE
9

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME: C-3250-01.dwg	
DESIGNED BY:	BDJ	CHECKED BY:	RPC

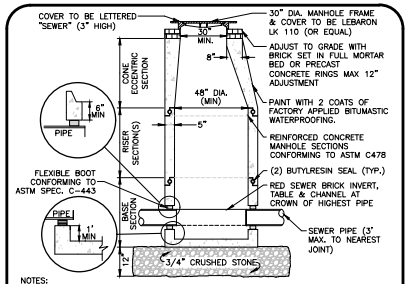
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: DETAILS

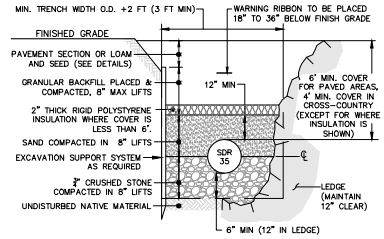
SHEET No. C-503

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG



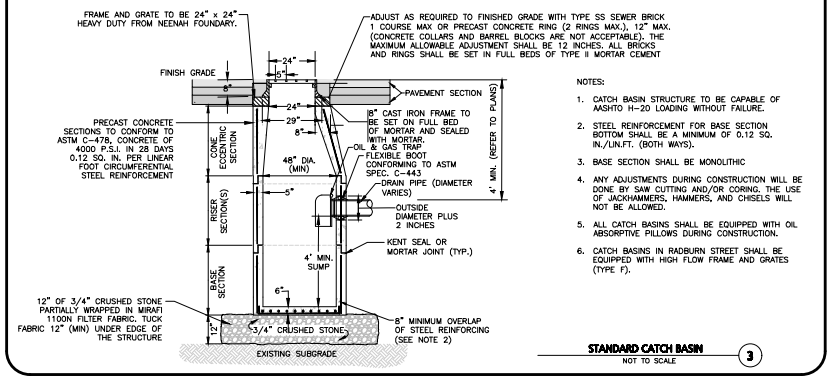
NOTES:
1. ALL PIPES SHALL HAVE MORTAR WITHIN THE FLEXIBLE BOOT.
2. TWO (2) BUTYL SEALS ARE REQUIRED AT JOINTS.
3. ALL MANHOLES SHALL BE PRESSURE TESTED PER NHDOT REGULATIONS.
4. THE MANHOLE, INCLUDING ALL COMPONENT PARTS, SHALL HAVE ADEQUATE SPACE, STRENGTH AND LEAK PROOF QUALITIES CONSIDERED NECESSARY FOR THE INTENDED SERVICE. SPACE REQUIREMENT AND CONFIGURATIONS SHALL BE AS SHOWN ON THE DRAWING. THE COMPLETE STRUCTURE SHALL BE OF SUCH MATERIAL AND QUALITY AS TO WITHSTAND (H-20 LOADING) OR WITHOUT FAILURE AND PREVENT LEAKAGE IN EXCESS OF ONE GALLON PER DAY PER VERTICAL FOOT OF MANHOLE.

SEWER MANHOLE (1)
NOT TO SCALE



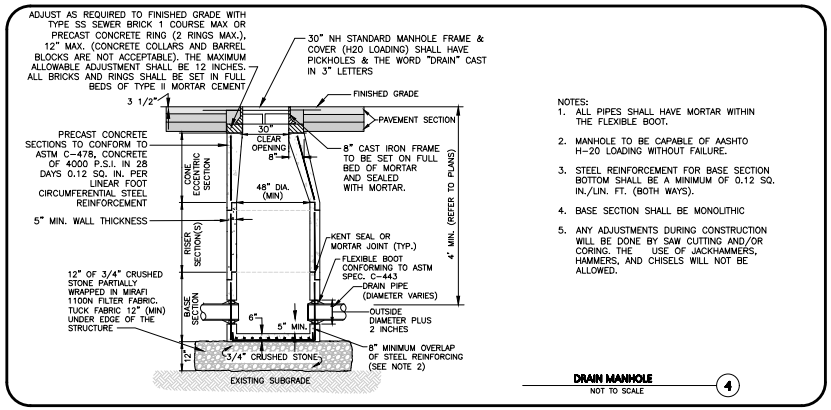
NOTES:
1. WHERE BACKFILL IS DESIGNATED AS COMPACTED, THIS MEANS 90 TO 95% STANDARD PROCTOR. AASHTO T-99. ALL FILL PLACED BELOW PIPES AND STRUCTURES MUST MEET THIS REQUIREMENT.
2. FOR ALL TRENCHES WITH A GRADE GREATER THAN 4% AND/OR WHERE GROUNDWATER IS APPARENT, INSTALL CLAY DAMS AROUND THE PIPE AT 100' INTERVALS.
3. CRUSHED STONE SHALL BE CLEAN, HARD, FREE FROM COATINGS AND THOROUGHLY WASHED WITH A GRADATION BY WEIGHT OF 100% PASSING A 1" SQUARE OPENING, AND 0 TO 5% PASSING A ¾" SQUARE OPENING.

SEWER TRENCH DETAIL (2)
NOT TO SCALE



NOTES:
1. CATCH BASIN STRUCTURE TO BE CAPABLE OF AASHTO H-20 LOADING WITHOUT FAILURE.
2. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN.FT. (BOTH WAYS).
3. BASE SECTION SHALL BE MONOLITHIC
4. ANY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW CUTTING AND/OR CORING. THE USE OF JACKHAMMERS, HAMMERS, AND CHISELS WILL NOT BE ALLOWED.
5. ALL CATCH BASINS SHALL BE EQUIPPED WITH OIL ABSORPTIVE PILLOWS DURING CONSTRUCTION.
6. CATCH BASINS IN RADBURN STREET SHALL BE EQUIPPED WITH HIGH FLOW FRAME AND GRATES (TYPE F).

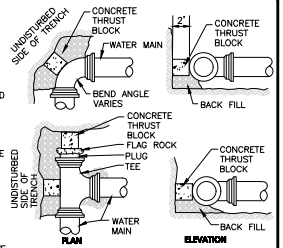
STANDARD CATCH BASIN (3)
NOT TO SCALE



NOTES:
1. ALL PIPES SHALL HAVE MORTAR WITHIN THE FLEXIBLE BOOT.
2. MANHOLE TO BE CAPABLE OF AASHTO H-20 LOADING WITHOUT FAILURE.
3. STEEL REINFORCEMENT FOR BASE SECTION BOTTOM SHALL BE A MINIMUM OF 0.12 SQ. IN./LIN. FT. (BOTH WAYS).
4. BASE SECTION SHALL BE MONOLITHIC
5. ANY ADJUSTMENTS DURING CONSTRUCTION WILL BE DONE BY SAW CUTTING AND/OR CORING. THE USE OF JACKHAMMERS, HAMMERS, AND CHISELS WILL NOT BE ALLOWED.

DRAIN MANHOLE (4)
NOT TO SCALE

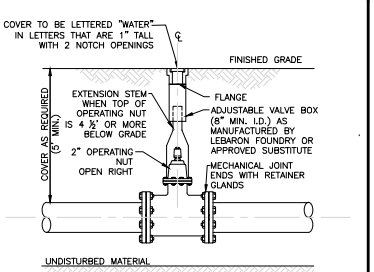
NOTES:
1. ALL THRUST BLOCKS SHALL BE PRECAST CONCRETE.
2. ALL WATER MAIN FITTINGS, BENDS, TEES, PLUGS ETC. SHALL BE RESTRAINED W/ THRUST BLOCKS EXCEPT WHERE NOTED.
3. ALL THRUST BLOCKS & COLLARS SHALL BE INSTALLED SO THAT THEY BEAR AGAINST UNDISTURBED EARTH.
4. SIZE OF CONCRETE THRUST BLOCKS SHALL BE AS NOTED BELOW.
5. MINIMUM COMPRESSIVE STRENGTH OF THRUST BLOCK CONCRETE SHALL BE 3,000 P.S.I.
6. KEEP CONCRETE CLEAR OF MECHANICAL JOINTS.



MINIMUM THRUST BLOCK BEARING AREAS

PIPE ø	90° BEND (SQ. FT.)	45° BEND (SQ. FT.)	22.5° BEND (SQ. FT.)	TEES, PLUGS, CAPS & HYD. (SQ.FT.)
6"	5	3	3	4
8"	9	6	3	9
10"	13	7	4	12
12"	20	10	5	16

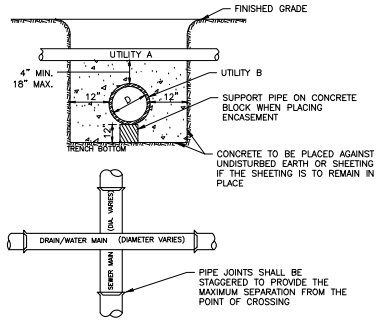
THRUST BLOCK DETAILS (5)
NOT TO SCALE



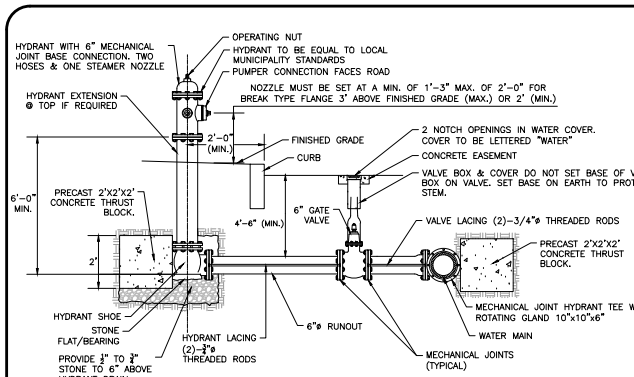
NOTES:
1. CONTRACTOR MAY USE ANCHOR TEES AT HIS OPTION.
2. HYDRANTS AND VALVES SHALL BE LEFT TURN OPEN (OPEN LEFT).
3. ALL VALVES MUST SAY "OPEN LEFT" ON GATE BOXES.

GATE VALVE (6)
NOT TO SCALE

NOTES:
1. WHENEVER CONDITIONS PREVENT A LATERAL SEPARATION OF 10 FEET BETWEEN A SEWER MAIN AND A WATER/DRAIN MAIN:
2. THE WATER/DRAIN MAIN SHALL BE LAID IN A SEPARATE TRENCH AND THE DIFFERENCE IN ELEVATION BETWEEN THE WATER/DRAIN MAIN AND THE SEWER MAIN SHALL BE AT LEAST 18 INCHES.
3. THE PIPE CROSSING SHALL OCCUR AS CLOSE TO 90° AS PRACTICABLE.
4. THE PIPE JOINTS SHALL BE STAGGERED TO PROVIDE THE MAXIMUM SEPARATION FROM THE POINT OF CROSSING, 6' OF SEPARATION MINIMUM.
5. THE CROSSING SHALL BE ENCASED IN CONCRETE FOR THE ENTIRE WIDTH OF THE TRENCH AND FOR A DISTANCE OF 10 LINEAR FEET CENTERED ON THE CROSSING.
6. UTILITIES A AND B CAN BE EITHER NEW OR EXISTING.
7. WHEN ONE UTILITY IS A SANITARY SEWER. IT IS PREFERABLE TO BE POSITIONED AS SHOWN FOR UTILITY B.
8. ENCASEMENT EXTENDS 10'-0" ON EACH SIDE OF THE CENTERLINE OF UTILITY A.
9. PIPE MUST BE BRACED VERTICALLY AND HORIZONTALLY TO PREVENT FLOATATION DURING PLACEMENT OF CONCRETE.



SEWER, WATER/DRAIN CROSSING DETAIL (7)
NOT TO SCALE



NOTES:
1. ALL HYDRANTS, VALVES AND LOCAL CONNECTIONS SHALL COMPLY WITH THE SPECIFICATIONS OF THE LOCAL MUNICIPALITY.
2. PIPING TO BE RESTRAINED WITH RODDING OR RETAINING GLANDS.
3. GATE VALVE INSTALLATION IS TYPICAL FOR ALL GATES SHOWN ON THE DRAWINGS.
4. HYDRANTS AND VALVES SHALL BE LEFT TURN OPEN (OPEN LEFT).
5. ALL VALVES MUST SAY "OPEN LEFT" ON GATE BOXES.

FIRE HYDRANT CONNECTION WITH MECHANICAL JOINT (8)
NOT TO SCALE

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

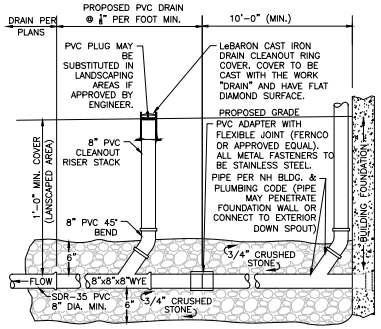
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

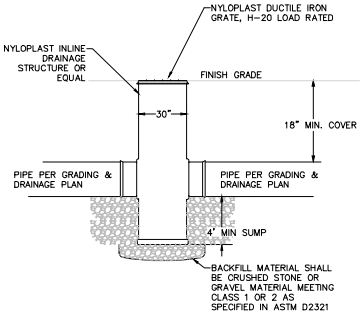
DRAWING TITLE: DETAILS

SHEET No. C-504

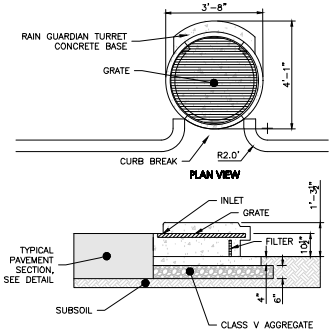
R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG



ROOF DRAIN
NOT TO SCALE
1



NYLOPLAST DRAIN STRUCTURE
NOT TO SCALE
2



NOTES:

1. STEEL REINFORCED, COLD JOINT SECURED MONOLITHIC CONCRETE STRUCTURE (1,030 LBS).
2. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. CONCRETE AIR ENTRAINED (4% TO 8% BY VOLUME).
3. MANUFACTURED AND DESIGNED TO ASTM C858.
4. THREE-POINT PICK USING RECESSED LIFTING POCKETS WITH A STANDARD HOOK.
5. SOIL UNDER BASE TO BE COMPACTED TO 95% STANDARD PROCTOR.
6. TWO-PIECE LIGHT DUTY GALVANIZED GRATE (34.5 LBS/PIECE) FOR 541 LB CONCENTRATED LOAD OR 309 LB/SQ FT UNIFORM LOAD.
7. TWO-PIECE HEAVY DUTY GALVANIZED GRATE (77.5 LBS/PIECE) FOR 2,456 LB CONCENTRATED LOAD OR 1,404 LB/SQ FT UNIFORM LOAD.
8. USE EXPANSION JOINT MATERIAL BETWEEN TURRET AND BIORETENTION INLET.

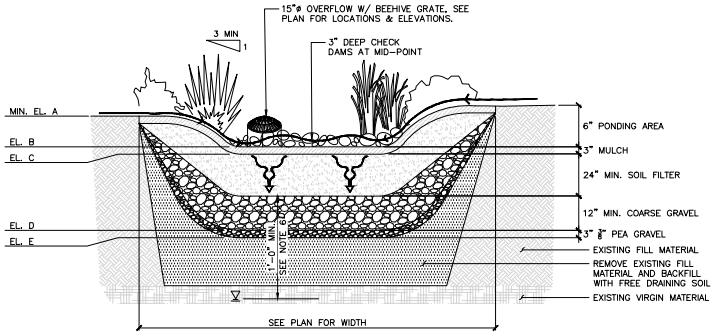
RAIN GUARDIAN - TURRET TYPICAL DETAIL
NOT TO SCALE
3

BIORETENTION FILTER MEDIA

COMPONENT MATERIAL	PERCENT OF MIXTURE BY VOLUME	GRADATION OF MATERIAL: SIEVE NO.	GRADATION OF MATERIAL: PERCENT BY WEIGHT PASSING STANDARD SIEVE
FILTER MEDIA OPTION A			
ASTM C-22 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

BIORETENTION ELEVATION TABLE

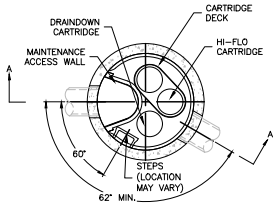
ELEV. ID	BR #1	BR #2	BR #3	BR #4
A	61.25	61.25	61.00	61.50
B	58.75	59.75	59.25	59.75
C	58.50	59.50	59.00	59.50
D	55.50	56.50	56.00	56.50
E	55.25	56.25	55.75	56.25



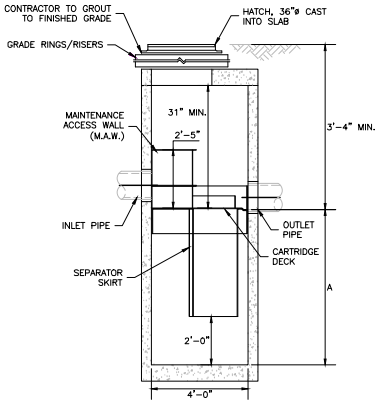
NOTES:

1. SEE LANDSCAPE PLAN FOR PLANT TYPES.
2. GRADING, AND PLANTING OF BIORETENTION SHALL BE COMPLETED IN EARLY PHASES OF CONSTRUCTION. PLANTS AND SEED ON SLOPES AND BOTTOM OF BASIN MUST BE ESTABLISHED PRIOR TO CONNECTING STORM DRAINAGE SYSTEM OUTLETS TO BIORETENTION AREA. PLANTS AND SEED MIX SHALL HAVE A MINIMUM OF 6 MONTHS GROWING, BE ESTABLISHED AND APPROVED BY LANDSCAPE ARCHITECT PRIOR TO CONNECTING STORM DRAINAGE SYSTEM OUTLETS TO BIORETENTION AREA.
3. EROSION CONTROL MEASURES AS SHOWN ON THE EROSION CONTROL PLAN, SHALL BE IN PLACE PRIOR TO ANY REGRADING ACTIVITY.
4. EXCAVATION, FILLING AND PLANTING SHALL OCCUR IN THE DRY. WATER LEVELS MUST BE LOWERED IN THE BIORETENTION AREA BY RELYING ON DRY SEASON AND OR DRY SPELLS; OR MAY BE ACCOMPLISHED THROUGH THE USE OF DEWATERING METHODS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ANY DEWATERING METHODS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
5. WATER FROM ANY DEWATERING OPERATION SHALL BE TREATED TO REDUCE TOTAL SUSPENDED SOLIDS AND BE IN COMPLIANCE WITH STATE AND FEDERAL STANDARDS. BEFORE ANY DEWATERING IS PERFORMED, THE CONTRACTOR SHALL FILE AND OBTAIN A TEMPORARY GROUNDWATER DISCHARGE PERMIT FROM NHDES. COORDINATION BETWEEN THE APPLICANT, PDA, NHDES AND THE AIR FORCE IS NECESSARY PRIOR TO FILING THIS APPLICATION.
6. A MINIMUM OF 1 FOOT SEPARATION BETWEEN THE BOTTOM OF THE PRACTICE AND SEASONAL HIGH WATER TABLE SHALL BE PROVIDED, VERIFY IN FIELD. IF SEPARATION CAN NOT BE ACHIEVED, SET UNDERDRAIN AT BOTTOM OF COARSE GRAVEL LAYER, OMIT PEA GRAVEL LAYER, AND PROVIDE IMPERMEABLE LINER AT BOTTOM OF PRACTICE,.

BIORETENTION SYSTEM DETAIL
NOT TO SCALE
4



PLAN VIEW



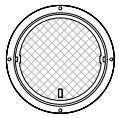
SECTION A-A

GENERAL NOTES:

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES:

1. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED).
2. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
3. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
4. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.



36" DIA. HATCH

WQ-01 - JELLYFISH (JF4) STANDARD DETAIL
NOT TO SCALE
5

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO. 3250-01	DATE: 08-14-23
SCALE: AS SHOWN	DWG. NAME: C-3250-01.dwg
DESIGNED BY: BDJ	CHECKED BY: RPC

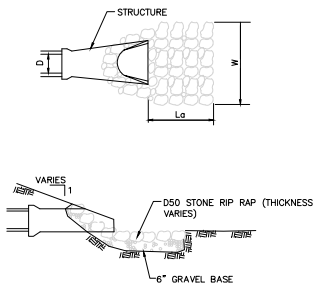
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: DETAILS

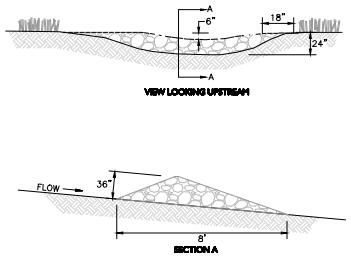
SHEET No. C-505

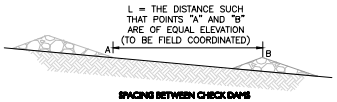
R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG



RIP-RAP SIZING CHART					
STRUCTURE	D	La	W	D50	THICKNESS
FES-01	8"	10'	10'	3"	7"
FES-02	12"	10'	12'	3"	7"
FES-03	8"	6.5'	8'	3"	7"
FES-04	8"	7'	8'	3"	7"
FES-05	8"	5'	7'	3"	7"

RIP-RAP OUTFALL APRON
NOT TO SCALE
1





NOTES:
1. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE DAM SHALL BE LESS THAN ONE ACRE.
2. THE MAXIMUM HEIGHT OF THE DAM SHALL BE 2 FEET.
3. THE CENTER OF THE DAM SHALL BE AT LEAST 6 INCHES LOWER THAN THE OUTER EDGES.
4. THE MAXIMUM SPACING BETWEEN THE DAMS SHALL BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE OVERFLOW ELEVATION OF THE DOWNSTREAM DAM.
5. THE DAMS SHALL BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.
6. CHECK DAMS SHALL BE CONSTRUCTED OF A WELL-GRADED ANGULAR 2-INCH TO 3-INCH STONE.

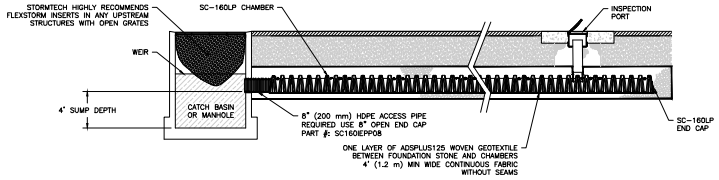
TEMPORARY CHECK DAM
NOT TO SCALE
2

ACCEPTABLE FILL MATERIALS: STORMTECH SC-160LP CHAMBER SYSTEMS

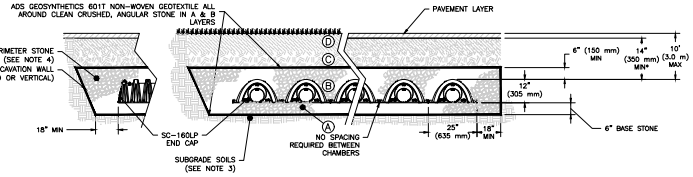
MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	GENERAL BACKFILL. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	SEE FULL DEPTH PAVEMENT SECTION DETAIL
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 14" (355 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

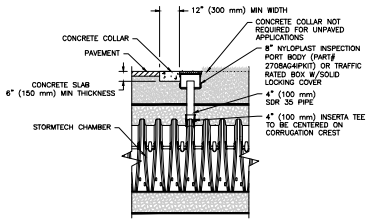
PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN Pplaced AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER "C" IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

ADS
Advanced Drainage Systems, Inc.



SC-160LP ISOLATOR ROW PLUS DETAIL
NOT TO SCALE





NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

INSPECTION PORT DETAIL
NOT TO SCALE

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

SC-160LP STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-160LP.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 1.5".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

STORMTECH SC-160LP INFILTRATION SYSTEM
NOT TO SCALE
3

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER
08-17-23
PROFESSIONAL ENGINEER FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: DETAILS

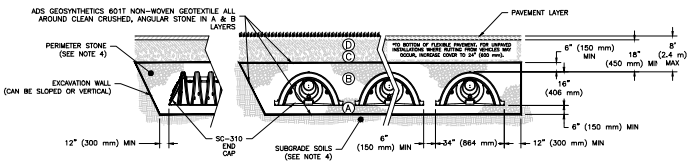
SHEET No. C-506

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145' A-1, A-2-4, A-3 OR AASHTO M43' 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ("A" LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43' 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43' 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[1,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

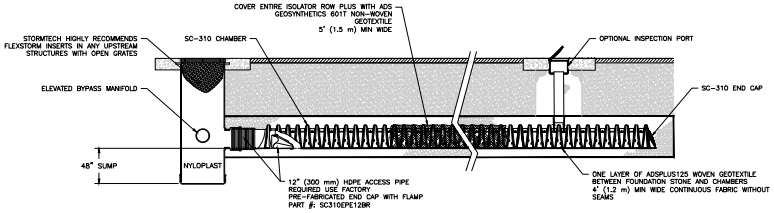


SC-310 - CROSS SECTION DETAIL

NOT TO SCALE

NOTES:

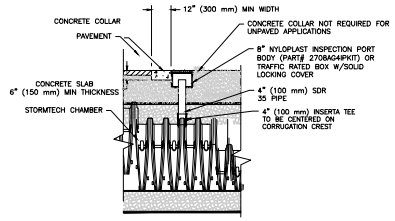
1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. COORDINATE WITH THE PROJECT GEOTECHNICAL ENGINEER FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



SC-310 - ISOLATOR ROW PLUS DETAIL

NOT TO SCALE

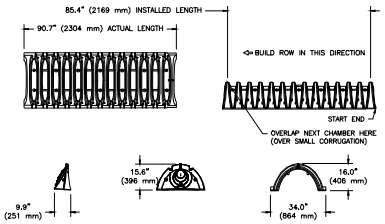
ADS
Advanced Drainage Systems, Inc.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4" PVC INSPECTION PORT

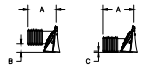
NOT TO SCALE



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH) mm)	34.0" X 16.0" X 85.4" (864 mm X 406 mm X 2169	
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m^3)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m^3)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310EPE12B	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)
SC310EPE12BR	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310EPE12B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310EPE12B THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

TECHNICAL SPECIFICATIONS

NOT TO SCALE

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C). CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

STORMTECH SC-310 CHAMBER INFILTRATION SYSTEM (1)

NOT TO SCALE

STATE OF NEW HAMPSHIRE
BRIAN D. JONES
No. 13805
LICENSED
PROFESSIONAL ENGINEER

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: DETAILS

SHEET No. C-507

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG

SECTION 33 36 00 - SANITARY SEWER SYSTEMS

PART 1 GENERAL

1.01 PRODUCTS

A. GENERAL: MATERIALS SHALL BE AS SPECIFIED HEREIN, EXCEPT THAT CONSIDERATION SHALL BE GIVEN TO OTHER PRODUCTS THAT MEET OR EXCEED THOSE SPECIFIED IF REQUESTED TEN (10) DAYS PRIOR TO DATE OF BID OPENING, IN ACCORDANCE WITH THE GENERAL CONDITIONS.

1.02 DESCRIPTION:

A. THE WORK UNDER THIS SECTION SHALL INCLUDE THE FURNISHING OF ALL MATERIAL, LABOR, EQUIPMENT AND SUPPLIES AND THE PERFORMANCE OF ALL OPERATIONS TO PROVIDE A COMPLETE WORKING SYSTEM AS REQUIRED BY THE DRAWINGS AND DETAILS AND AS SPECIFIED HEREIN, IN GENERAL, TO INCLUDE THE FOLLOWING ITEMS:

1. SANITARY SEWER SYSTEM FROM 5 FEET OUTSIDE THE BUILDING TO POINT OF TERMINATION AS SHOWN ON THE DRAWINGS.

2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE LOCAL DEPARTMENT OF PUBLIC WORKS AND NHDES.

1.03 RELATED WORK:

A. SECTION 31 23 00 – EARTHWORK.

B. SECTION 15401 – PLUMBING.

1.04 RELATED DOCUMENTS:

A. ALL WORK SHALL CONFORM TO THE APPLICABLE REGULATIONS AND STANDARDS OF THE MUNICIPALITY.

B. ALL WORK FOR ITEMS NOT OTHERWISE COVERED BY 1.03.A ABOVE SHALL CONFORM TO THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS AND BRIDGE CONSTRUCTION (LATEST EDITION).

C. ALL WORK SHALL CONFORM TO THE PERMITS ISSUED BY THE STATE OF NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES.

1.05 PROJECT CONDITIONS:

A. KNOWN UNDERGROUND AND SURFACE UTILITY LINES ARE INDICATED ON THE DRAWINGS. INFORMATION ON THE DRAWINGS RELATING TO EXISTING UTILITY LINES AND SERVICES IS FROM THE BEST SOURCE PRESENTLY AVAILABLE. ALL SUCH INFORMATION IS FURNISHED ONLY FOR INFORMATION AND IS NOT GUARANTEED. COORDINATE WITH UTILITY COMPANIES, DIG SAFE AND THEIR CONTRACTORS, AND EXCAVATE TEST PITS AS REQUIRED TO DETERMINE EXACT LOCATIONS OF EXISTING UTILITIES.

B. TEST BORINGS HAVE BEEN PERFORMED BY OWNER'S SEPARATE CONTRACTOR. LOCATIONS OF TEST BORINGS ARE SHOWN ON THE DRAWINGS. NEITHER THE OWNER NOR THE ENGINEERS MAKE WARRANTY, EITHER EXPRESSED OR IMPLIED, OF ACCURACY OF BORING DATA AS A REPRESENTATION OF TYPICAL CONDITIONS. THE CONTRACTOR SHALL MAKE HIS/HER OWN INVESTIGATION OF SUBSURFACE CONDITIONS AND SATISFY HER/HIMSELF AS TO CONDITION THEREOF AND SHALL BASE HIS/HER BID IN SOLE RELIANCE THEREON. SUCH INVESTIGATION MAY INCLUDE, BUT IS NOT NECESSARILY LIMITED TO: ADDITIONAL TEST PITS, BORINGS. NO ALLOWANCE WILL BE MADE FOR THE CONTRACTOR'S FAILURE TO PERFORM INVESTIGATION NECESSARY TO FULLY IDENTIFY AND SATISFY HIM/HERSELF AS TO SUBSURFACE CONDITIONS WHICH COULD AFFECT THE WORK.

C. PROTECT EXCAVATIONS BY SHORING, BRACING, SHEETING, UNDERPINNING, OR OTHER METHODS, AS REQUIRED TO PREVENT CAVE-INS OR LOOSE DIRT FROM ENTERING EXCAVATIONS. BARRICADE OPEN EXCAVATIONS AND POST WARNING LIGHTS AT WORK ADJACENT TO PUBLIC STREETS AND WALKS.

D. UNDERPIN ADJACENT STRUCTURE(S), INCLUDING UTILITY SERVICE LINES, WHICH MAY BE DAMAGED BY EXCAVATION OPERATIONS.

E. PROMPTLY REPAIR DAMAGE TO ADJACENT FACILITIES CAUSED BY SITE SEWER AND DRAINAGE OPERATIONS.

F. PROMPTLY NOTIFY THE OWNER OF UNEXPECTED SUB-SURFACE CONDITION

1.06 QUALITY ASSURANCE:

A. STANDARDS: COMPLY WITH STANDARDS SPECIFIED IN THIS SECTION. PROVIDE SHOP DRAWINGS TO THE OWNER OR OWNER'S REPRESENTATIVE.

B. QUALIFICATIONS OF INSTALLERS: USE ADEQUATE NUMBERS OF SKILLED WORKERS WHO ARE THOROUGHLY TRAINED AND EXPERIENCED IN THE NECESSARY CRAFTS AND WHO ARE COMPLETELY FAMILIAR WITH THE SPECIFIED REQUIREMENTS AND METHODS FOR PROPER PERFORMANCE OF THE WORK OF THIS SECTION.

C. OBTAIN OWNER OR OWNER'S REPRESENTATIVE'S ACCEPTANCE OF INSTALLED AND TESTED SITE DRAINAGE SYSTEM PRIOR TO BACKFILLING.

1.07 SUBMITTALS:

A. PRODUCT DATA:

1. COMPLETE MATERIALS LIST OF ALL ITEMS PROPOSED TO BE FURNISHED AND INSTALLED UNDER THIS SECTION.

2. MANUFACTURER'S SPECIFICATIONS AND OTHER DATA REQUIRED TO DEMONSTRATE COMPLIANCE WITH THE SPECIFIED REQUIREMENTS.

3. MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.

B. TESTING AND INSPECTION REPORTS.

C. PROVIDE SITE SEWER AND DRAINAGE RECORD DRAWINGS:

1. LEGIBLY MARK DRAWINGS TO RECORD ACTUAL CONSTRUCTION.

2. INDICATE HORIZONTAL AND VERTICAL LOCATIONS REFERENCED TO PERMANENT SURFACE IMPROVEMENTS.

3. IDENTIFY FIELD CHANGES OF DIMENSIONS AND DETAILS AND CHANGES MADE BY CHANGE ORDER.

1.08 COOPERATION AND COORDINATION WITH OTHER TRADES:

A. THE WORK SHALL BE SO PERFORMED THAT THE PROGRESS OF THE ENTIRE PROJECT CONSTRUCTION, INCLUDING ALL OTHER TRADES, SHALL NOT BE DELAYED AND NOT INTERFERED WITH. MATERIALS AND APPARATUS SHALL BE INSTALLED AS FAST AS CONDITIONS WILL PERMIT AND MUST BE INSTALLED PROMPTLY WHEN AND AS DIRECTED.

B. ALL WORK SHALL BE COORDINATED WITH OTHERS TRADES. THE WORK IN THIS SECTION SHALL AT NO TIME INTERRUPT THE NORMAL OPERATIONS OF EXISTING BUILDINGS.

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE PIPE (PVC):

A. PVC PIPE SHALL BE MADE FROM VIRGIN PLASTIC AND SHALL CONFORM TO ASTM D1784. SOLID PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM D3034 SDR 35. PERFORATED PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM D2729 SDR 35.

B. STANDARD NOMINAL LENGTHS OF PIPE SHALL BE A MINIMUM OF 10 FEET.

C. THE PIPE FITTINGS SHALL BE AS UNIFORM AS COMMERCIALLY PRACTICAL IN COLOR, OPACITY, DENSITY AND OTHER PHYSICAL PROPERTIES.

D. PIPE SHALL BE TESTED IN ACCORDANCE WITH SECTION 10 OF ASTM D2412 STANDARD METHOD OF "TEST FOR EXTERNAL LOADING PROPERTIES OF PLASTIC PIPE BY PARALLEL-PLATE LOADING". THE MINIMUM VALUE OF PIPE STIFFNESS AT 5% DEFLECTION COMPUTED FROM DATA OBTAINED FROM THE ABOVE TESTING PROCEDURE SHALL BE IN ACCORDANCE WITH ASTM D2412.

E. EACH PIPE AND ALL COUPLINGS AND FITTINGS SHALL BE CLEARLY MARKED ON THE OUTSIDE SURFACE WITH THE NAME OF THE MANUFACTURER, ASTM DESIGNATION WITH TYPE AND GRADE, AND NOMINAL DIAMETER.

2.02 DUCTILE IRON (D.I.) SEWER PIPE:

A. ANSI/AWWA C151/ A21.51 CLASS 52 WITH CEMENT LINING CONFORMING TO ANSI A21.4. PRESSURE CLASS SHALL BE ANSI PRESSURE CLASS 350. PROTECTIVE COATING ON EXTERIOR SHALL BE APPROVED BITUMASTIC OR COAL TAR ENAMEL CONFORMING TO ANSI A21.4 AND A21.10

B. FITTINGS FOR DUCTILE IRON PIPE SHALL BE DUCTILE IRON SHORT BODY FITTINGS CONFORMING TO ANSI A21.1 WITH CEMENT LINING CONFORMING TO ANSI A21.4. THICKNESS CLASS SHALL BE ANSI PRESSURE CLASS 350.

C. LENGTH AND JOINTS – DUCTILE IRON PIPE LENGTHS SHALL GENERALLY BE AS LONG AS POSSIBLE BUT SHALL HAVE A BELL-AND-SPIGOT OR SHALL HAVE FURNISHED WITH IT A SEPARATE JOINTING SLEEVE OR COUPLING WITH RUBBER RINGS COMPRESSED INTO PLACE TO MAKE A WATERTIGHT CLOSURE. JOINTS SHALL BE SEALED WITH A RUBBER RING GASKET AND SHALL BE OF A COMPOSITION AND TEXTURE WHICH WILL ENDURE PERMANENTLY UNDER THE CONDITIONS LIKELY TO BE IMPOSED BY THIS USE, AND SHALL CONFORM TO ASTM SPECIFICATIONS C-361 AMENDED TO DATE. JOINTS SHALL BE "PUSH-ON" TYPE COMPLYING WITH ANSI A21.1.

2.03 HIGH DENSITY POLYETHYLENE (HDPE)

A. FORCE MAINS AND LOW PRESSURE SEWERS SHALL BE TREATED AS GRAVITY SEWERS FOR PURPOSES OF FOUNDATION BEDDING AND BACKFILL REQUIREMENTS.

B. HDPE PIPE USED FOR FORCE MAINS AND LOW PRESSURE SEWERS SHALL CONFORM TO ASTM D3035-03A.

2.04 CAST IRON SOIL PIPE:

A. CAST IRON SOIL PIPE SHALL BE ASTM A 74, EXTRA HEAVY TYPE, INSIDE NOMINAL DIAMETER AS SPECIFIED ON CONSTRUCTION DRAWINGS, BELL AND SPIGOT END. JOINTS SHALL BE IN CONFORMANCE WITH AWWA C111, RUBBER GASKET JOINT DEVICES.

2.05 PIPE JOINTS AND FITTINGS:

A. DUCTILE IRON FITTINGS SHALL BE MECHANICAL JOINTS. ALL FITTINGS SHALL BE RESTRAINED OR RODDED.

B. DUCTILE IRON FITTINGS SHALL CONFORM TO ANSI 21.10 AND 21.11 (AWWA C110 AND AWWA C111).

C. HDPE AND PVC FITTINGS SHALL BE WATERTIGHT. STRUCTURAL INTEGRITY AND JOINT CONFIGURATION SHALL BE IDENTICAL TO THAT OF PIPE.

2.06 SEWER MANHOLES:

A. PRECAST CONCRETE MANHOLE, CATCH BASIN, LEACHING CATCH BASIN BASE, AND LEACHING PIT SECTIONS, RISER SECTIONS AND CONE SECTIONS SHALL BE CONSTRUCTED OF A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, AIR ENTRAINED CONCRETE WITH HOOP REINFORCING AND LIFTING HOLES. SECTIONS SHALL BE FURNISHED WITH "O" RING RUBBER GASKETS. LIFTING HOLES IN ALL SECTIONS SHALL BE FILLED WITH NONSHRINK MORTAR AFTER SECTIONS ARE IN PLACE.

B. CLASS "A" CONCRETE: ASTM C94. ALL CONCRETE SHALL BE CLASS A UNLESS STATED OTHERWISE.

1. STRENGTH : 3000 PSI @ 28 DAYS
2. CEMENT CONTENT : TYPE II, 6.5 SACKS/CY (MIN)
3. W/C RATIO : 0.464 (MAX)
4. FINE AGGREGATE : ASTM C33
5. COARSE AGGREGATE : ASTM C33 SIZE #67

C. CLASS "B" CONCRETE:

1. STRENGTH : 3000 PSI @ 28 DAYS
2. CEMENT CONTENT : TYPE II, 6.0 SACKS/CY (MIN)
3. W/C RATIO : 0.488 (MAX)
4. FINE AGGREGATE : ASTM C33
5. COARSE AGGREGATE : ASTM C33 SIZE #67

D. REINFORCING STEEL: ASTM A615, A616, OR A185.

E. PRECAST CONCRETE: ASTM C478 EXCEPT AS SPECIFIED OTHERWISE.

F. TABLES AND INVERTS SHALL BE CONSTRUCTED OF BRICK, SHALL HAVE THE SAME SHAPE OF THE PIPE THAT ARE CONNECTED AND ANY CHANGE IN SIZE OR DIRECTION SHALL BE GRADUAL AND EVEN.

G. PRECAST STRUCTURES SHALL BE ABLE TO WITHSTAND H-20 LOADING.

H. HORIZONTAL JOINTS BETWEEN SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE OF AN OVERLAPPING TYPE, SEALED FOR WATER-TIGHTNESS USING A DOUBLE ROW OF AN ELASTOMERIC OR MASTIC-LIKE SEALANT.

I. PIPE TO MANHOLE JOINTS SHALL BE AS FOLLOWS:

1. ELASTOMERIC, RUBBER SLEEVE WITH WATERTIGHT JOINTS AT THE MANHOLE OPENING AND PIPE SURFACES;

2. CAST INTO THE WALL OR SECURED WITH STAINLESS STEEL CLAMPS;\

3. ELASTOMERIC SEALING RING CAST IN THE MANHOLE OPENING WITH SEAL FORMED ON THE SURFACE OF THE PIPE BY COMPRESSION OF THE RING.

4. PIPE TO MANHOLE JOINTS SHALL BE ONE OF THE FOLLOWING OR APPROVED EQUAL:

a. KOR – N – SEAL
b. LOCK JOINT
c. PRESS WEDGE II

2.07 BRICK MASONRY:

A. CEMENT SHALL BE TYPE II PORTLAND CEMENT CONFORMING TO ASTM C 150-05, TYPE H.

B. HYDRATED LIME SHALL BE TYPE S CONFORMING TO THE ASTM C207-06 "STANDARD SPECIFICATIONS FOR HYDRATED LIME FOR MASONRY PURPOSES".

C. SAND SHALL BE CLEAN, HARD, DURABLE PARTICLES AND WITH NOT MORE THAN 5% IN VOLUME OF MICA, CLAY AND OTHER DELETERIOUS MATERIALS. THE SAND SHALL BE GRADED FROM FINE TO COURSE SO THAT WHEN TESTED DRY, IT WILL CONFORM TO THE LIMITS OF ASTM C33-03 "STANDARD SPECIFICATIONS FOR CONCRETE, FINE AGGREGATES".

D. MORTAR SHALL BE COMPOSED OF PORTLAND CEMENT AND SAND WITH OR WITHOUT HYDRATED LIME ADDITION;

1. PROPORTIONS IN MORTAR OF PARTS BY VOLUMES SHALL BE:

a. 4.5 PARTS SAND AND 1.5 PARTS CEMENT; OR
b. 4.5 PARTS SAND, ONE PART CEMENT AND 0.5 PART HYDRATED LIME

E. WATER SHALL BE FREE FROM OILS, ACIDS, ALKALIS OR ORGANIC MATTER, AND SHALL BE CLEAN AND FRESH.

F. BRICK SHALL BE SOUND, HARD AND UNIFORMLY BURNED, REGULAR AND UNIFORM IN SHAPE AND SIZE, OF COMPACT TEXTURE AND SATISFACTORY TO THE OWNER OR OWNER'S REPRESENTATIVE. BRICKS SHALL COMPLY WITH ASTM C32, GRADE SS. ONLY WHOLE BRICK SHALL BE USED UNLESS OTHERWISE PERMITTED.

2.08 MANHOLE STEPS: (NOT USED)

2.09 MANHOLE FRAMES AND COVERS:

A. CASTINGS SHALL BE OF GOOD QUALITY, STRONG, TOUGH EVENLY GRAINED, SMOOTH CAST IRON, FREE FROM SCALE, LUMPS, BLISTERS, SAND HOLES, AND DEFECTS OF ANY KIND. CASTINGS SHALL BE THOROUGHLY CLEANED AND ALL FINISHED SURFACES SHALL BE MACHINED TO A TRUE PLANED SURFACE AND SHALL SEAT AT ALL POINTS WITHOUT ROCKING.

B. CASTINGS SHALL NOT BE ACCEPTABLE IF THE ACTUAL WEIGHT IS LESS THAN 95% OF THE THEORETICAL WEIGHT OF THE CASTINGS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL FURNISH INVOICES TO THE OWNER SHOWING TRUE WEIGHTS, CERTIFIED BY THE SUPPLIER.

C. CAST IRON SHALL CONFORM TO ASTM A48, CLASS 30 AND FRAMES, COVERS AND GRATES SHALL BE ABLE TO WITHSTAND H-20 LOADING.

D. PROVIDE A 30 INCH DIAMETER CLEAR OPENING. SEWER MANHOLE COVERS SHALL HAVE THE WORD "SEWER" IN 3" LETTERS CAST INTO THE TOP SURFACE.

2.10 FORCE MAINS

A. FORCE MAINS FOR CONSTANT SPEED PUMPS SHALL BE SIZED TO YIELD A CLEANSING VELOCITY OF 3 FEET PER SECOND OR GREATER AT DESIGN PUMP CAPACITY.

B. FORCE MAINS SHALL ENTER THE GRAVITY SEWER SYSTEM AT THE FLOW LINE OF THE RECEIVING MANHOLE.

C. TO PREVENT AIR LOCKING, FORCE MAINS SHALL BE PROVIDED WITH AN AUTOMATIC AIR RELIEF VALVE AT EACH HIGH POINT, INSTALLED WITHIN A MANHOLE STRUCTURE THAT MEETS THE DESIGN REQUIREMENTS OF ENV-WQ 704.12 THROUGH ENV-WQ 704.17.

D. FORCE MAINS SHALL BE PROVIDED WITH A DRAINAGE BLOW-OFF AT EACH LOW POINT THAT:

- HAS A PROPERLY VALVED CONNECTION FOR A VACUUM TRUCK OR OTHER SUITABLE CONTAINMENT DEVICE;
- IS INSTALLED WITHIN A MANHOLE STRUCTURE THAT MEETS THE DESIGN REQUIREMENTS OF ENV-WQ 704.12 THROUGH ENV-WQ 704.17, WITH SUFFICIENT SPACE FOR HANDLING THE DISPLACED WASTE WITHOUT DANGER OF POLLUTION OR HEALTH HAZARD.

E. FORCE MAINS SHALL BE DESIGNED IN ACCORDANCE WITH ENV-WQ 704.07, CONSTRUCTED WITH MATERIALS AS SPECIFIED IN ENV-WQ 704.08, AND TESTED AS SPECIFIED IN ENV-WQ 704.09.

F. THRUST BLOCKS MADE FROM INORGANIC, CORROSION-RESISTANT MATERIAL SHALL BE PLACED AT ALL BENDS, ELBOWS, TEES, AND JUNCTIONS.

G. FORCE MAINS SHALL BE DESIGNED TO WITHSTAND HYDROSTATIC PRESSURES OF AT LEAST 2.5 TIMES THE DESIGN TOTAL DYNAMIC HEAD;

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS:

A. OBTAIN DETAILED INFORMATION FROM THE MANUFACTURERS OF APPARATUS AS TO THE PROPER METHOD OF INSTALLING AND CONNECTING SAME.

B. CAREFULLY STORE MATERIALS AND EQUIPMENT WHICH ARE NOT IMMEDIATELY INSTALLED AFTER DELIVERY. CLOSE OPEN ENDS OF WORK WITH TEMPORARY COVERS OR PLUG DURING CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIAL.

C. ANY DEFECTIVE PIPE, FITTING OR DRAIN APPARATUS THAT IS DISCOVERED AFTER IT HAS BEEN INSTALLED OR HAS BEEN INSTALLED IMPROPERLY, SHALL BE REMOVED AND REPLACED WITH NON-DEFECTIVE PARTS TO THE SATISFACTION OF THE OWNER OR OWNER'S REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.

D. TRENCHES SHALL BE KEPT FREE OF WATER AND AS DRY AS POSSIBLE DURING THE INSTALLATION OF THE BEDDING MATERIAL, PIPE AND JOINTING FOR AS LONG A PERIOD AS REQUIRED. PIPE SHALL NOT BE LAID IN WATER OR WHEN TRENCH CONDITIONS ARE UNSUITABLE FOR THE WORK.

E. PROVIDE ALL INSPECTION AGENTS AT LEAST 24 HOURS NOTICE PRIOR TO WORK BEGINNING. INSPECTOR SHALL BE ON-SITE DURING ANY/ALL EXCAVATION, INSTALLATION, BACKFILL, AND TESTING OF ALL SEWERAGE PIPES, MANHOLES, AND APPURTENANCES.

F. NO BACKFILLING SHALL TAKE PLACE, UNLESS OTHERWISE ORDERED BY THE OWNER OR OWNER'S REPRESENTATIVE, UNTIL THE INSPECTION HAS BEEN COMPLETED.

G. EXCAVATION, BACKFILL AND PIPE BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 31 23 00, EARTHWORK.

3.02 LAYING PIPE:

A. THIS WORK SHALL INCLUDE ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR THE COMPLETE INSTALLATION OF DRAIN LINES IN ACCORDANCE WITH THESE SPECIFICATIONS, THE MUNICIPALITY AND OTHER AUTHORITIES HAVING JURISDICTION.

B. ALL PIPE SHALL BE SOUND AND CLEAN BEFORE INSTALLING. WHEN LAYING OF PIPE IS NOT IN PROGRESS, INCLUDING LUNCH TIME, THE OPEN ENDS OF THE PIPE SHALL BE CLOSED BY WATERTIGHT PLUGS OR OTHER APPROVED MEANS.

C. THE FULL LENGTH OF PIPE SHALL REST SOLIDLY ON THE UNDISTURBED TRENCH BOTTOM, WITH RECESSES EXCAVATED TO ACCOMMODATE BELLS, COUPLINGS AND JOINTS. BLOCKING WILL NOT BE PERMITTED.

D. PIPE SHALL BE LAID TRUE TO THE SPECIFIED LINES AND GRADES. THE BELL END SHALL BE TOWARD THE RISING GRADE AND EACH SECTION OF PIPE SHALL HAVE A FIRM BEARING THROUGHOUT ITS LENGTH. MATERIAL PLACED AROUND AND UNDER THE PIPE SHALL BE FREE OF STONES. ROCKS SHALL NOT BE ROLLED INTO TRENCHES AND ALLOWED TO DROP ONTO PIPES. PIPE SHALL BE BEDDED IN $\frac{3}{4}$" STONE TO SPRING LINE OF PIPE AND THEN BURIED IN CLEAN SAND FREE OF STONES. STONE AND SAND SHALL BE IN ACCORDANCE WITH ENV-WQ 704.11(a) AND (b).

E. WHEN PIPE CUTTING IS REQUIRED AND APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE, THE PIPE MATERIAL SHALL BE CUT BY USING A SAW OR MILLING PROCESS, APPROVED BY THE PIPE MANUFACTURER AND NOT BY ANY IMPACT DEVICE, SUCH AS A HAMMER AND CHISEL, TO BREAK THE PIPE. THE PIPE SHALL BE CUT, NOT BROKEN. THE CUT END OF THE PIPE SHALL BE SQUARE TO THE AXIS OF THE PIPE AND ANY ROUGH EDGES GROUND SMOOTH.

F. INSTALLATION OF HIGH DENSITY POLYETHYLENE PIPE SHALL BE IN ACCORDANCE WITH ASTM D2321 AND AS RECOMMENDED BY THE PIPE MANUFACTURER. BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 31 23 00, EARTHWORK. BACKFILL SHALL BE PLACED IN SIX INCH LIFTS AND COMPACTED TO 95% MINIMUM DENSITY AS PER AASHTO T99. CARE SHOULD BE TAKEN TO AVOID ANY USE OF FRACTURED STONE IN BACKFILL EXCEEDING TWO INCHES (2").

G. THE CONTRACTOR MAY USE A LASER BEAM TO ASSIST IN SETTING THE PIPE, PROVIDED HE CAN DEMONSTRATE SATISFACTORY SKILL IN ITS USE. THE USE OF STRING LEVELS, HAND LEVELS, CARPENTERS LEVELS OR OTHER RELATIVELY CRUDE DEVICES FOR TRANSFERRING GRADE OR SETTING PIPE WILL NOT BE PERMITTED.

H. WHEN LAYING REINFORCED CONCRETE PIPE, BEDDING SHALL CONSIST OF CAREFULLY PREPARING AND SHAPING A BED OF FINE GRANULAR MATERIAL TO FIT THE LOWER 15 PERCENT OF THE EXTERNAL HEIGHT OF THE PIPE WITH A MINIMUM OF 4 IN. UNDER THE BOTTOM OF THE PIPE. RECESS SHALL BE EXCAVATED FOR THE BELLS OF THE PIPE. AS SOON AS THE EXCAVATION IS COMPLETED AND THE SPECIFIED PIPE BEDDING PROVIDED, THE CONTRACTOR SHALL FIRMLY BED THE PIPE TO CONFORM ACCURATELY TO THE LINE AND GRADE INDICATED ON THE PLANS. NO BLOCKING WILL BE PERMITTED UNDER THE PIPE. AS SOON AS THE PIPE IS IN PLACE, FINE GRANULAR MATERIAL SHALL BE PLACED AND COMPACTED TO THE MID-DIAMETER OF THE PIPE. THE REMAINING BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 31 23 00, EARTHWORK. BACKFILL SHALL BE PLACED IN SIX INCH LIFTS AND COMPACTED TO 95% MINIMUM DENSITY AS PER AASHTO T99.

3.03 SEWER MANHOLES:

A. SEWER MANHOLES, DRAIN MANHOLES, CATCH BASINS AND INSPECTION MANHOLES SHALL BE BUILT TO THE LINES, GRADES, DIMENSIONS AND DESIGN SHOWN ON THE PLANS WITH THE NECESSARY FRAMES, COVERS AND GRATES.

B. MANHOLE AND CATCH BASIN BASES SHALL BE PLACED ON 6 INCHES OF COMPACTED BEDDING MATERIAL.

C. PRECAST SECTIONS SHALL BE SET SO AS TO BE VERTICAL AND IN TRUE ALIGNMENT WITH A 1/4 INCH MAXIMUM TOLERANCE TO BE ALLOWED. THE PRECAST SECTIONS SHALL BE INSTALLED IN A MANNER THAT WILL RESULT IN A WATERTIGHT JOINT.

D. WHERE HOLES MUST BE CUT IN THE PRECAST SECTIONS TO ACCOMMODATE PIPES, CUTTING SHALL BE DONE PRIOR TO SETTING THEM IN PLACE TO PREVENT ANY SUBSEQUENT JARRING WHICH MAY LOOSEN THE JOINTS.

3.04 BRICKWORK:

A. MORTAR SHALL BE MIXED ONLY IN SUCH QUANTITY AS MAY BE REQUIRED FOR IMMEDIATE USE AND USED BEFORE THE INITIAL SET HAS TAKEN PLACE. MORTAR SHALL NOT BE RETAINED FOR MORE THAN ONE HOUR AND SHALL BE CONSISTENTLY WORKED OVER WITH A SHOVEL OR HOE UNTIL USED.

B. BRICK MASONRY SHALL BE PROTECTED FROM TOO RAPID DRYING BY APPROVED MEANS AND SHALL BE PROTECTED FROM WEATHER AND FROST AS REQUIRED.

C. BRICKS SHALL BE CLEANED AND THOROUGHLY WETTED SHORTLY BEFORE THEY ARE PUT INTO THE WORK, AND EACH BRICK SHALL BE LAID IN A FULL BED OF MORTAR WITHOUT REQUIRING SUBSEQUENT GROUTING OR FILLING. JOINTS BETWEEN BRICKS SHALL NOT EXCEED 1/2 INCH AND SHALL BE POINTED.

3.05 FRAMES AND COVERS:

A. MANHOLE FRAMES – SHALL BE SET WITH THE TOPS CONFORMING ACCURATELY TO THE GRADE OF THE PAVEMENT OR FINISHED GROUND SURFACE OR AS INDICATED ON THE DRAWINGS. FRAMES SHALL BE SET CONCENTRIC WITH THE TOP OF THE MASONRY AND IN A FULL BED OF MORTAR SO THAT THE SPACE BETWEEN THE TOP OF THE MANHOLE MASONRY AND THE BOTTOM FLANGE OF THE FRAME SHALL BE COMPLETELY FILLED AND MADE WATERTIGHT. A THICK RING OF MORTAR EXTENDING TO THE OUTER EDGE OF THE MASONRY SHALL BE PLACED ALL AROUND AND ON THE TOP OF THE BOTTOM FLANGE. THE MORTAR SHALL BE SMOOTHLY FINISHED AND HAVE A SLIGHT SLOPE TO SHED WATER AWAY FROM THE FRAME.

B. MANHOLE COVERS SHALL BE LEFT IN PLACE IN THE FRAMES ON COMPLETION OF OTHER WORK AT THE MANHOLES.

C. A MAXIMUM OF 12" OF BRICK AND MORTAR SHALL BE ALLOWED FOR GRADE ADJUSTMENT.

D. COVERS AND GRATES SHALL BE SET IN THE FRAMES, SEATING BEING CLEANED BEFORE COVERS AND GRATES ARE SET.

3.06 SEWER SERVICE CONNECTIONS:

A. THE MINIMUM SIZE FOR THE BUILDING SEWER SERVICE CONNECTION SHALL BE 6".

B. THE MINIMUM SLOPE FOR THE BUILDING SEWER SERVICE SHALL BE 1/4" PER, FOOT, UNLESS OTHERWISE APPROVED BY THE OWNER OR OWNER'S REPRESENTATIVE.

C. BEFORE BACKFILLING, THE CONTRACTOR SHALL NOTIFY THE INSPECTOR SO THAT HE CAN MAKE THE NECESSARY MEASUREMENTS TO LOCATE THE OPENING LATER. IN ADDITION, AN APPROVED FERROUS ROD OR PIPE SHALL BE PLACED OVER THE PLUGGED OPENING AT THE PROPERTY LINE, EXTENDING TO WITHIN 2 INCHES OF THE FINAL GROUND SURFACE.

1. PROXIMITY TO WATER LINES:

a. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND A SEWER OR SEWER APPURTENANCE WHICH WOULD PERMIT THE PASSAGE OF SEWAGE OR POLLUTED WATER INTO THE POTABLE SUPPLY. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER OR SEWER MANHOLE.

1) NO SEWER SHALL BE LOCATED WITHIN THE WELL PROTECTIVE RADII ESTABLISHED IN ENV-WS 300 FOR ANY PUBLIC WATER SUPPLY WELLS OR WITHIN 100 FEET OF ANY PRIVATE WATER SUPPLY WELL.

2) SEWERS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN.

3) A DEVIATION FROM THE SEPARATION REQUIREMENTS OF (1) OR (2) ABOVE SHALL BE ALLOWED WHERE NECESSARY TO AVOID CONFLICT WITH SUBSURFACE STRUCTURES, UTILITY CHAMBERS, AND BUILDING FOUNDATIONS, PROVIDED THAT THE SEWER IS CONSTRUCTED IN ACCORDANCE WITH THE FORCE MAIN CONSTRUCTION REQUIREMENTS SPECIFIED IN ENV-WQ 704.08.

b. WHENEVER SEWERS MUST CROSS WATER MAINS, THE SEWER SHALL BE CONSTRUCTED AS FOLLOWS:

c. VERTICAL SEPARATION OF THE SEWER AND WATER MAIN SHALL BE NOT LESS THAN 18 INCHES, WITH WATER ABOVE SEWER; AND

d. SEWER PIPE JOINTS SHALL BE LOCATED AT LEAST 6 FEET HORIZONTALLY FROM THE WATER MAIN.

e. HOWEVER, SHOULD CONSTRUCTION OPERATIONS REVEAL OR EXPOSE A WATERLINE MAIN OR SERVICE RUNNING APPROXIMATELY PARALLEL AND LESS THAN 10 FEET HORIZONTALLY FROM THE PROPOSED SEWER INSTALLATION AND WHERE IT IS NOT PRACTICABLE TO RELOCATE THE SEWER, THE FOLLOWING METHODS OF PROTECTION MUST BE EMPLOYED:

1) IF THE ABOVE SEPARATION CANNOT BE ACHIEVED, THE SEWER SHALL BE DUCTILE IRON PIPE OF THE SAME SIZE SHALL BE UTILIZED. APPROPRIATE MANUFACTURED FITTINGS SHALL BE EMPLOYED TO ADAPT THE IRON PIPE TO THE CONTRACT SEWER PIPE.

2) WHENEVER THE WATERLINE CROSSES OVER THE NEW SEWER WITH LESS THAN 18 INCHES OF SEPARATION, THE SEWER PIPE FOR A DISTANCE OF 6 FEET ON EACH SIDE OF THE WATERLINE SHALL BE CLASS 52 DUCTILE IRON PIPE. APPROPRIATE MANUFACTURED FITTINGS SHALL BE EMPLOYED TO ADAPT THE IRON PIPE TO THE CONTRACT SEWER PIPE. AS AN ALTERNATIVE, THE WATERLINE MAY BE RAISED, IF FEASIBLE, TO ACHIEVE THE REQUIRED SEPARATION.

3) SHOULD THE WATERLINE IN EITHER SITUATION BE AT OR BELOW THE SEWER ELEVATION, THE WATERLINE OR THE SEWER MUST BE RELOCATED TO ACHIEVE 10 FT. SEPARATION OR THE WATERLINE RAISED.

3.07 GRAVITY SEWER PIPE TESTING:

A. ALL NEW GRAVITY SEWERS SHALL BE TESTED FOR WATER TIGHTNESS BY THE USE OF LOW-PRESSURE AIR TESTS.

B. LOW-PRESSURE AIR TESTING SHALL BE IN CONFORMANCE WITH:

1. ASTM F1417-92(2005) "STANDARD TEST METHOD FOR INSTALLATION ACCEPTANCE OF PLASTIC GRAVITY SEWER LINES USING LOW-PRESSURE AIR"; OR

2. UNI-BELL PVC PIPE ASSOCIATION UNI-B-6, "LOW-PRESSURE AIR TESTING OF INSTALLED SEWER PIPE" (1998).

C. ALL NEW GRAVITY SEWERS SHALL BE:

1. CLEANED AND VISUALLY INSPECTED USING A LAMP TEST AND BY INTRODUCING WATER TO DETERMINE THAT THERE IS NO STANDING WATER IN THE SEWER; AND

2. TRUE TO LINE AND GRADE FOLLOWING INSTALLATION AND PRIOR TO USE.

D. ALL PLASTIC SEWER PIPE SHALL BE VISUALLY INSPECTED AND DEFLECTION TESTED NOT LESS THAN 30 DAYS NOR MORE THAN 90 DAYS FOLLOWING INSTALLATION.

E. THE MAXIMUM ALLOWABLE DEFLECTION OF FLEXIBLE SEWER PIPE SHALL BE 5% OF AVERAGE INSIDE DIAMETER. A RIGID BALL OR MANDREL WITH A DIAMETER OF AT LEAST 95% OF THE AVERAGE INSIDE PIPE DIAMETER SHALL BE USED FOR TESTING PIPE DEFLECTION. THE DEFLECTION TEST SHALL BE CONDUCTED WITHOUT MECHANICAL PULLING DEVICES.

F. INSPECTION AND TESTING: – UPON COMPLETION OF THE INSTALLATION AND BACKFILLING PORTIONS OF THE SANITARY SEWER, THE PIPE SHALL BE INSPECTED BY THE VISUAL AND AIR TEST METHODS SUBSEQUENTLY DESCRIBED, OR AS REQUIRED BY THE TOWN DPW AND THE NHDES. THIS INSPECTION AND TESTING SHALL BE UNDERTAKEN AS THE WORK PROGRESSES. THE ENGINEER SHALL BE NOTIFIED IN ADVANCE OF SUCH INSPECTION AND TESTING AND THE CONTRACTOR SHALL PROVIDE ALL FACILITIES, MATERIALS, EQUIPMENT AND LABOR REQUIRED FOR SUCH TESTING. SUCH INSPECTION AND TESTING SHALL BE A PREREQUISITE FOR ACCEPTANCE OF ALL WORK.

1. VISUAL INSPECTION: – AN INSPECTION OF THE INTERIOR OF THE COMPLETED SANITARY SEWER PIPE BY DIRECT VISUAL INSPECTION SHALL BE MADE FOR ALL PIPE INSTALLED FROM MANHOLE TO MANHOLE AND FOR SERVICE LATERALS. ANY LIGHTS, EQUIPMENT OR LABOR NECESSARY FOR SUCH INSPECTION SHALL BE PROVIDED BY THE CONTRACTOR. CAMERA WORK TO BE PERFORMED BY NASSCO CERTIFIED CONTRACTOR.

ANY FOREIGN MATERIAL FOUND IN THE INTERIOR OF THE SEWER, ANY DIRT, DEBRIS OR OTHER OBJECTS SHALL BE REMOVED BY THE CONTRACTOR. VISIBLE DEFECTS SUCH AS BROKEN PIPE SECTIONS, IMPROPERLY INSTALLED GASKETS, PROJECTING CONNECTIONS, CRACKS, VISIBLE LEAKS OR OTHER DEFECTS SHALL BE NOTED, CORRECTED AND THE PIPE RE-INSPECTED.

2. AIR TESTING OF MAIN LINE GRAVITY SEWERS:

PROCEDURE:

a. PLUG PIPE OUTLETS WITH SUITABLE TEST PLUGS. BRACE EACH PLUG SECURELY.

b. PIPE AIR SUPPLY TO PIPELINE TO BE TESTED IN SUCH MANNER THAT AIR SUPPLY MAY BE SHUT OFF, PRESSURE OBSERVED, AND AIR PRESSURE RELEASED FROM PIPE WITHOUT WORKMEN ENTERING MANHOLE.

c. ADD AIR SLOWLY TO PORTION OF PIPE UNDER TEST UNTIL INTERNAL PRESSURE OF LINE IS RAISED TO APPROXIMATELY 4 PSIG, BUT LESS THAN 5 PSIG.

d. SHUT AIR SUPPLY OFF AND ALLOW AT LEAST 2 MINUTES FOR AIR PRESSURE TO STABILIZE.

e. WHEN PRESSURE HAS STABILIZED AND IS AT OR ABOVE STARTING TEST PRESSURE OF 3.5 PSI, START TEST.

f. DETERMINE TIME IN SECONDS WITH STOPWATCH FOR PRESSURE TO FALL 0.5 PSIG SO THAT PRESSURE AT END OF TIME IS AT OR ABOVE 3.0 PSIG.

g. COMPARE OBSERVED TIME WITH MINIMUM ALLOWABLE TIMES IN CHART BELOW FOR PASS/FAIL DETERMINATION.

AIR TESTING PASS/FAIL TESTING CRITERIA
SPECIFICATION TIME FOR LENGTH (L) SHOWN (MIN:SEC)

1 Pipe Diameter (in.)	2 Minimum Time (min:sec)	3 Length for Minimum Time (ft.)	4 Time for Longer Length (sec.)	100 ft	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.
4	1:53	597	.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51
8	3:47	298	.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38
24	11:20	99	2.671L	11:24	17:57	22:48	28:30	34:11	39:53	45:35

3. SAFETY PRECAUTIONS:

LOW-PRESSURE AIR TEST MAY BE DANGEROUS TO PERSONNEL IF, THROUGH LACK OF UNDERSTANDING OR CARELESSNESS, LINE IS OVERPRESSURIZED OR PLUGS ARE INSTALLED IMPROPERLY. IT IS EXTREMELY IMPORTANT THAT VARIOUS PLUGS BE INSTALLED SO AS TO PREVENT THE SUDDEN EXPULSION OF POORLY INFLATED PLUGS. AS EXAMPLE OF HAZARD, FORCE OF 250-LB IS EXERTED ON 8-IN. PLUG BY INTERNAL PRESSURE OF 5 PSI. OBSERVE FOLLOWING SAFETY PRECAUTIONS:

a. NO PERSON SHALL BE ALLOWED IN MANHOLES DURING TEST OR WHEN PLUGGED PIPE IS UNDER PRESSURE.

b. GAUGES, AIR PIPING MANIFOLDS AND VALVES SHALL BE LOCATED AT TOP OF GROUND.

c. INSTALL AND BRACE PLUGS SECURELY.

d. DO NOT OVERPRESSURE LINES.

4. GROUNDWATER ELEVATION:

IF PIPELINE TO BE TESTED IS BELOW GROUNDWATER LEVEL, STARTING TEST PRESSURE SHALL BE INCREASED BY 0.433 PSI FOR EACH FOOT GROUNDWATER LEVEL IS ABOVE INVERT OF SEWER PIPE. IN NO CASE SHALL STARTING TEST PRESSURE EXCEED 9.0 PSIG.

FOR THE DETERMINATION OF GROUNDWATER LEVELS, OBSERVATION PIPES MAY BE PLACED IN THE TRENCH PRIOR TO BACKFILLING AS REQUIRED. THE LOWER END OF THE OBSERVATION PIPE SHALL BE EMBEDDED IN THE FOUNDATION STONE USED FOR SEWER BEDDING AT APPROXIMATELY THE SEWER INVERT ELEVATION AND THE UPPER END AT OR ABOVE FINISHED GRADE. PIPE SO INSTALLED FOR DEWATERING PURPOSES MAY BE USED FOR THIS PURPOSE. OBSERVATION PIPES SHALL BE INSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER AT LOCATIONS ADJACENT TO MANHOLES WHERE ORDERED BY THE ENGINEER.

5. ACCEPTANCE OF INSTALLATION:

NO GRAVITY SEWER OR MANHOLE WILL BE ACCEPTED THAT DOES NOT COMPLY WITH MINIMUM REQUIREMENTS OF TESTS DESCRIBED IN HEREIN. SEWERS, WHICH FAIL TO MEET TESTS, SHALL BE REPAIRED UNTIL THE NECESSARY REQUIREMENTS OF THIS SPECIFICATION ARE COMPLIED WITH AS EVIDENCED BY SUBSEQUENT TESTS. GROUNDWATER LEAKAGE INTO MANHOLES SHALL BE SUFFICIENT REASON FOR REQUIRING THE CONTRACTOR TO UNCOVER OR EXPOSE ANY PORTION OF THE MANHOLE FOR A THOROUGH EXAMINATION BY THE ENGINEER, AFTER WHICH THE MANHOLE SHALL BE REPAIRED AND AGAIN TESTED BY THE CONTRACTOR. FINAL ACCEPTANCE OF THE ENTIRE LENGTH OF SEWER CONSTRUCTED UNDER THIS CONTRACT WILL NOT BE ISSUED UNTIL THE ACCEPTABLE CRITERIA FOR EACH SECTION TESTED HAS BEEN REDUCED TO RATES HEREINBEFORE SPECIFIED. FAILURE TO CONFORM TO THE FOREGOING REQUIREMENTS SHALL CAUSE THE WORK TO BE REJECTED. IF THERE IS A VISIBLE LEAK AT ANY JOINT OR AT ANY OTHER PART OF THE SEWER OR SEWER STRUCTURE, THE WORK SHALL BE REJECTED.

6. TEST EQUIPMENT:

NECESSARY EQUIPMENT TO PERFORM AIR TEST IN ACCORDANCE WITH SPECIFICATIONS SHALL BE PROVIDED BY CONTRACTOR. TEST GAUGE SHALL PREFERABLY HAVE INCREMENTAL DIVISION OF 0.10 PSI AND HAVE ACCURACY OF AT LEAST 0.04 PSI. IN NO CASE SHALL TEST GAUGE BE USED WHICH HAS INCREMENTAL DIVISIONS OF GREATER THAN 0.25 PSI. GAUGE SHALL BE OF SUFFICIENT SIZE IN ORDER TO DETERMINE THIS ACCURACY.

7. SUBMITTALS:

FURNISH 1 COPY OF GRAVITY SEWER AND MANHOLE TEST RESULTS TO OWNER AND GOVERNING AGENCY UPON COMPLETION OF GRAVITY SEWER SYSTEM BACKFILLING OPERATIONS.

3.08 SANITARY MANHOLE TESTING:

A. MANHOLES SHALL BE TESTED FOR LEAKAGE USING A VACUUM TEST.

B. THE MANHOLE VACUUM TEST SHALL CONFORM TO THE FOLLOWING:

C. THE INITIAL VACUUM GAUGE TEST PRESSURE SHALL BE 10 INCHES HG; AND

1. THE MINIMUM ACCEPTABLE TEST HOLD TIME FOR A 1-INCH HG PRESSURE DROP TO 9 INCHES HG SHALL BE:

a. NOT LESS THAN 2 MINUTES FOR MANHOLES LESS THAN 10 FEET DEEP IN DEPTH;

b. NOT LESS THAN 2.5 MINUTES FOR MANHOLES 10 TO 15 FEET DEEP; AND

c. NOT LESS THAN 3 MINUTES FOR MANHOLES MORE THAN 15 FEET DEEP;

2. THE MANHOLE SHALL BE REPAIRED AND RETESTED IF THE TEST HOLD TIMES FAIL TO ACHIEVE THE ACCEPTANCE LIMITS SPECIFIED ABOVE.

3. FOLLOWING COMPLETION OF THE LEAKAGE TEST, THE FRAME AND COVER SHALL BE PLACED ON THE TOP OF THE MANHOLE OR SOME OTHER MEANS USED TO PREVENT ACCIDENTAL ENTRY BY UNAUTHORIZED PERSONS, CHILDREN, OR ANIMALS, UNTIL THE CONTRACTOR IS READY TO MAKE FINAL ADJUSTMENT TO GRADE

4. NO INVERTS SHALL BE INSTALLED UNTIL MANHOLE TESTING HAS BEEN SATISFACTORILY COMPLETED.

3.09 FORCE MAIN TESTING: PER Env-Wq 704.09, FORCE MAINS AND PRESSURE SEWERS SHALL BE TESTED IN ACCORDANCE WITH SECTION 5 OF THE AWWA C600, "INSTALLATION OF CAST IRON WATER MAINS AND THEIR APPURTENANCES" STANDARD IN EFFECT WHEN THE TEST IS CONDUCTED AT A PRESSURE EQUAL TO THE GREATER OF 150 PERCENT OF THE DESIGN OPERATING TOTAL DYNAMIC HEAD OR AT LEAST 100 PSI.

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\C-3250-01_DETAILS.DWG

BRIAN D. JONES No. 13809

08-17-23

PROFESSIONAL ENGINEER FOR
ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:

ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:

ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME:	C-3250-01.dwg
DESIGNED BY:	BDJ	CHECKED BY:	RPC

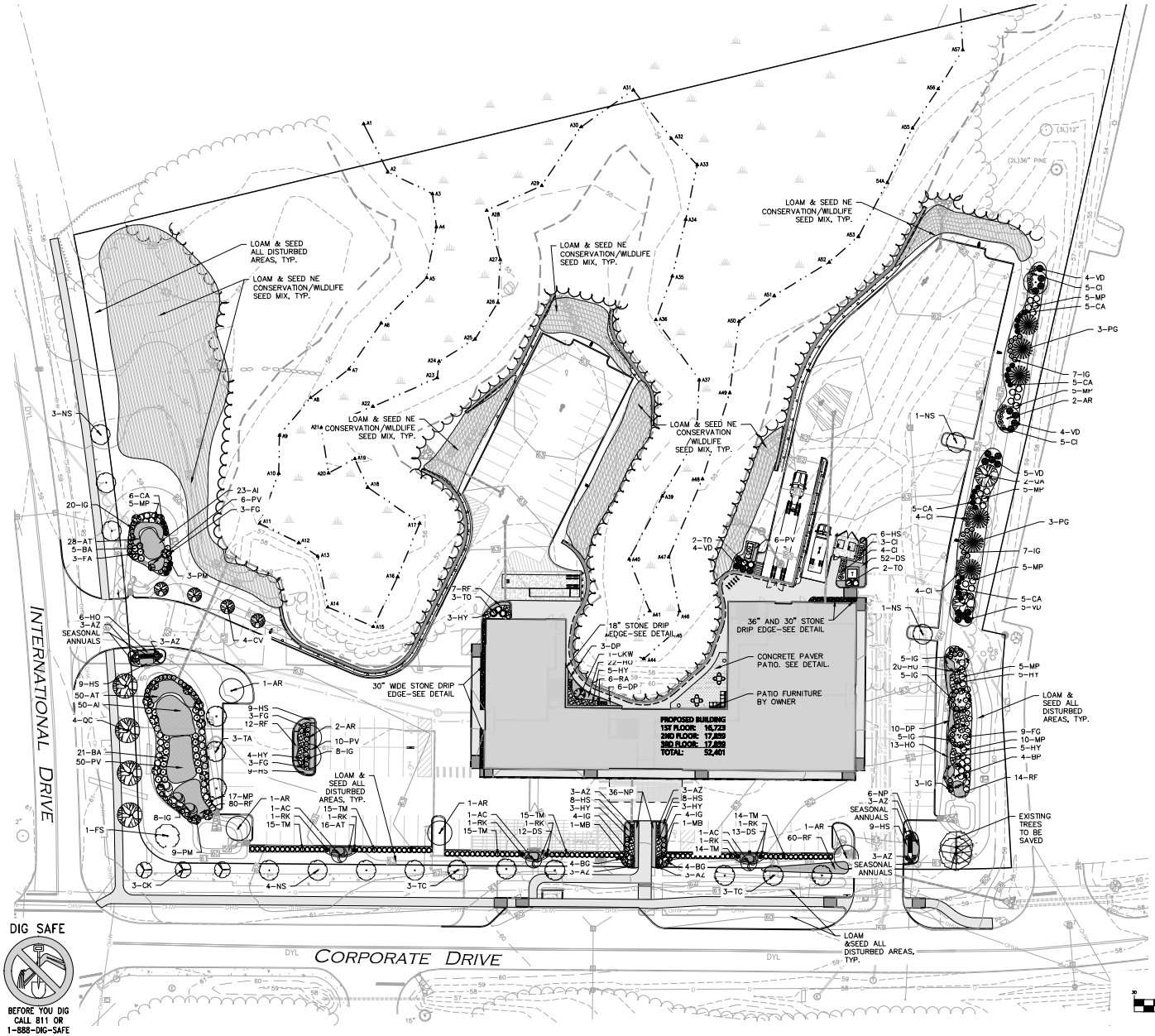
PREPARED BY:

ALLEN & MAJOR
ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

THIS DRAWING HAS BEEN PREPARED IN DIGITAL FORMAT. CLIENT/CLIENT'S REPRESENTATIVE OR CONSULTANTS MAY BE PROVIDED COPIES OF DRAWINGS AND SPECIFICATIONS FOR HIS/HER INFORMATION AND/OR SPECIFIC USE ON THIS PROJECT. DUE TO THE POTENTIAL THAT THE PROVIDED INFORMATION MAY BE MODIFIED UNINTENTIONALLY OR OTHERWISE, ALLEN & MAJOR ASSOCIATES, INC. MAY REMOVE ALL INDICATION OF THE DOCUMENT'S AUTHORSHIP ON THE DIGITAL MEDIA. PRINTED REPRESENTATIONS OR PORTABLE DOCUMENT FORMAT OF THE DRAWINGS AND SPECIFICATIONS ISSUED SHALL BE THE ONLY RECORD COPIES OF ALLEN & MAJOR ASSOCIATES, INC.'S WORK PRODUCT.

DRAWING TITLE:	SHEET No.
DETAILS	C-508



LEGEND

- DECIDUOUS TREE
- EVERGREEN TREE
- FLOWERING TREE
- SHRUBS
- MULCH BED
- PERENNIALS/GROUNDCOVER
- WILDFLOWER SEED MIX
- EROSION CONTROL SEED MIX

GENERAL NOTES

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR IT'S REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
2. THE INFORMATION SHOWN ON THIS PLAN IS THE SOLE PROPERTY OF ALLEN & MAJOR ASSOCIATES, INC. IT'S INTENDED USE IS TO PROVIDE INFORMATION. ANY ALTERATION, MISUSE, OR RECALCULATION OF INFORMATION OR DATA WITHOUT THE EXPRESSED, WRITTEN CONSENT OF ALLEN & MAJOR ASSOCIATES, INC. IS STRICTLY PROHIBITED.
3. ALL LANDSCAPED AREAS WITH SHRUBS, TREES, AND PERENNIALS TO HAVE 2 FEET MINIMUM DEPTH OF TOPSOIL. TWO FEET OF TOPSOIL AROUND TREES AND SHRUBS DOES NOT INCLUDE AMENDED PLANTING SOIL WITHIN TREE / SHRUB PIT FOR FULL DEPTH OF ROOTBALLS. SEE PLANTING DETAILS FOR PLANTING DEPTH AT SHRUBS AND TREES. ALL AREAS OF LOAM AND SEED TO HAVE 6" MINIMUM DEPTH OF TOPSOIL. TOPSOIL TO BE TESTED BY CONTRACTOR, AND APPROVED BY A&M PRIOR TO PURCHASE AND OR PLACEMENT. GENERAL CONTRACTOR, DEMOLITION CONTRACTOR, AND LANDSCAPE CONTRACTOR TO COORDINATE PROPER DEPTH OF EXISTING MATERIAL REMOVAL ACROSS SITE SO THAT 2 FEET MINIMUM AND 6" MINIMUM DEPTHS OF PROPOSED TOPSOIL NOTED ABOVE ARE MET AT NO ADDITIONAL COST TO OWNER. SEE TOPSOIL DETAIL.

BETHANY C DERMODY
006
STATE OF NEW HAMPSHIRE
PROFESSIONAL LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO. 3250-01	DATE: 08-14-23
SCALE: 1" = 30'	DWG. NAME: L-3250-01.dwg
DESIGNED BY: BCD	CHECKED BY: RPC

PREPARED BY:
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: LANDSCAPE PLAN

SHEET No. L-101

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\L-3250-01_LANDSCAPE.DWG

PEASE DEVELOPMENT CONTROLS REGULATIONS:

305.03 LANDSCAPING AND SCREENING

(a) LANDSCAPING

(1) APPROPRIATE LANDSCAPING SHALL BE PROVIDED IN ACCORDANCE WITH AN APPROVED LANDSCAPING PLAN.

(2) LANDSCAPING TREATMENT SHALL CONSIST OF NATURAL VEGETATION OR FEATURES, GROUND COVER, SHRUBS AND TREES AS APPROPRIATE.

(3) LANDSCAPING PLANS SHALL MEET THE REQUIREMENTS OF SECTION 405.03 OF THE PEASE DEVELOPMENT AUTHORITY SITE PLAN REGULATIONS.

(b) SCREENING

(1) APPROPRIATE BUFFERS SHALL BE PROVIDED AND MAINTAINED TO SCREEN THE FOLLOWING USES FROM ADJOINING PROPERTIES:

a) ANY OFF-STREET PARKING OR LOADING AREA.

b) ALL OUTDOOR AREAS OR FACILITIES FOR THE STORAGE OF FUEL, SOLID WASTE, MATERIALS OR PRODUCTS.

c) ANY COMMERCIAL PARKING LOT.

d) ANY PRINCIPAL USE NOT CONDUCTED WHOLLY WITHIN A BUILDING.

1. E) AS OTHERWISE REQUIRED BY THE BOARD.

PEASE DEVELOPMENT SITE PLAN REGULATIONS:

405.03

SCREENING AND LANDSCAPING

(a) LANDSCAPING PLAN

(1) A LANDSCAPING PLAN SHALL BE SUBMITTED AS PART OF THE SITE PLAN APPLICATION. THE PLAN SHALL IDENTIFY EXISTING AND PROPOSED LANDSCAPING ELEMENTS AND SHOW LOCATION AND PLANTING AND/OR CONSTRUCTION DETAILS. WHERE EXISTING PLANTINGS ARE TO BE RETAINED, PROPOSED METHODS OF PROTECTING SUCH PLANTINGS DURING CONSTRUCTION SHALL BE INCLUDED WHERE APPLICABLE.

(2) LANDSCAPING SHALL BE CONCEIVED IN A TOTAL PATTERN THROUGHOUT THE SITE, INTEGRATING THE VARIOUS ELEMENTS OF SITE DESIGN, PRESERVING AND ENHANCING THE PARTICULAR IDENTITY OF THE SITE, AND CREATING A PLEASING SITE CHARACTER.

(3) LANDSCAPING MAY INCLUDE PLANT MATERIALS SUCH AS TREES, SHRUBS, GROUND COVERS, PERENNIALS, AND ANNUALS, AND OTHER MATERIALS SUCH AS ROCKS, WATER, SCULPTURE, ART, WALLS, FENCES, PAVING MATERIALS AND STREET FURNITURE.

(4) ALL PARKING LOTS CONSTRUCTED OR REDEVELOPED AT PEASE SHALL MEET THE FOLLOWING REQUIREMENTS:

a) SCREENING: ALL PARKING LOTS CONTAINING MORE THAN 25 PARKING SPACES SHALL BE APPROPRIATELY SCREENED FROM ADJACENT PROPERTIES AND ROADWAYS WITH LANDSCAPE BERMS AND/OR PLANTINGS IN ORDER TO MINIMIZE THE AESTHETIC IMPACT OF THE PARKING LOT.

b) LANDSCAPED ISLANDS: ALL PARKING ROWS CONTAINING MORE THAN 10 SPACES SHALL HAVE LANDSCAPED ISLANDS THE SIZE OF A PARKING SPACE AT BOTH ENDS OF THE ROW.

c) LENGTH OF ROWS: NO PARKING LOT SHALL CONTAIN MORE THAN 18 PARKING SPACES IN A ROW WITHOUT THE INCLUSION OF A LANDSCAPED ISLAND OF THE SAME SIZE AS THE PARKING SPACES IN THAT ROW.

d) MULTIPLE PARKING AISLES: THERE MUST BE A 12' WIDE LANDSCAPED STRIP BETWEEN EVERY SECOND ROW OF DOUBLE STACKED PARKING.

e)LANDSCAPE ISLANDS EXCEPT THAT THE CURBING MAY BE INTERRUPTED TO ALLOW FOR INFILTRATION OF STORMWATER.

(B) SCREENING

(1) SCREENING SHALL BE PROVIDED FOR ALL DEVELOPMENT OF LAND IN ORDER TO MINIMIZE ADVERSE VISUAL IMPACTS.

(2) STRUCTURES VISIBLE FROM A PUBLIC STREET SHALL BE PARTIALLY SCREENED WITH FLOWERING OR EVERGREEN SHRUBS.

(3) SOLID WASTE COLLECTION EQUIPMENT, PUMP STATIONS, OUTDOOR STORAGE AND OTHER OUTDOOR USES VISIBLE FROM A PUBLIC STREET SHALL BE SCREENED WITH A SOLID FENCE AND/OR EVERGREEN SHRUBS.

PLANTING SCHEDULE -TREES, SHRUBS, GROUNDCOVERS & PERENNIALS

KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	MIN. SIZE	SPACING	COMMENTS
DECIDUOUS TREES						
AR	8	ACER RUBRUM 'RED SUNSET'	RED SUNSET MAPLE	2"-2.5" CAL.	AS SHOWN	B&B
AC	6	AMELANCHIER CANADENSIS	SERVICEBERRY	6-7' HT.	AS SHOWN	B&B, MULTISTEM
BP	4	BETULA PAPYRIFERA	PAPER BIRCH	12-14' HT.	AS SHOWN	B&B, MULTISTEM
CK	3	CORNUS KOUSA	KOUSA DOGWOOD	2"-2.5" CAL.	AS SHOWN	B&B
CKW	1	CORNUS KOUSA 'WOLF EYES'	WOLF EYES KOUSA DOGWOOD	2"-2.5" CAL.	AS SHOWN	B&B-SPECIMEN
CV	4	CHIONANTHUS VIRGINICUS	WHITE FRINGE TREE	2"-2.5" CAL.	AS SHOWN	B&B
FA	3	FRANKLINIA ALATAMAHA	FRANKLIN TREE	6-7' HT.	AS SHOWN	B&B
FS	1	FAGUS SYLVATICA 'RIVERSII'	RIVER'S PURPLE BEECH	2"-2.5" CAL.	AS SHOWN	B&B
MB	2	MAGNOLIA 'BUTTERFLY'	BUTTERFLY MAGNOLIA	6-7' HT.	AS SHOWN	B&B
QA	2	QUERCUS ALBA	WHITE OAK	2"-2.5" CAL.	AS SHOWN	B&B
QC	4	QUERCUS COCCINEA	SCARLET OAK	2"-2.5" CAL.	AS SHOWN	B&B
NS	5	NYSSA SYLVATICA 'GREEN GABLE'	GREEN GABLE TUPELO	2"-2.5" CAL.	AS SHOWN	B&B
TC	9	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	2"-2.5" CAL.	AS SHOWN	B&B
EVERGREEN TREES						
PG	6	PICEA GLAUCA	WHITE SPRUCE	7-8' HT.	AS SHOWN	B&B
TO	7	THUJA OCCIDENTALIS 'NORTH POLE'	NORTH POLE ARBORVITAE	5-6' HT.	AS SHOWN	B&B
SHRUBS						
AZ	24	AZALEA 'DELAWARE WHITE'	DELAWARE WHITE AZALEA	#5	AS SHOWN	POT
BG	8	BUXUS 'GREEN GEM'	GREEN GEM BOXWOOD	#5	AS SHOWN	B&B
CA	25	CLETHRA ALNIFOLIA 'HUMMINGBIRD'	HUMMINGBIRD SUMMERSWEET	#5	AS SHOWN	POT
CI	22	CORNUS SERICEA 'ALLEMAN'S COMPACTA'	ALLEMAN'S COMPACT RED OSIER DOGWOOD	#5	AS SHOWN	POT
FG	15	FOTHERGILLA GARDENII	DWARF FOTHEREGILLA	2-2.5'	AS SHOWN	B&B
HY	32	HYDRANGEA ARBORESCENS 'INCREDIBALL'	INCREDIBALL HYDRANGEA	#5	AS SHOWN	B&B
IG	79	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	#5	AS SHOWN	B&B
MP	57	MYRICA PENSYLVANICA	BAYBERRY	2.5'-3' HT.	AS SHOWN	B&B
RA	6	RHODODENDRON 'APRIL ROSE'	APRIL ROSE RHODODENDRON	2.5'-3' HT.	AS SHOWN	B&B
PM	12	PRUNUS MARITIMA	BEACH PLUM	#10	AS SHOWN	POT
RK	6	PINK DOUBLE KNOCK OUT	PINK DOUBLE KNOCK OUT ROSE	#3	AS SHOWN	POT
TM	88	TAXUS MEDIA 'GREENWAVE'	GREENWAVE YEW	18-24"	AS SHOWN	B&B
VD	22	VIBURNUM DENTATUM 'BLUE MUFFIN'	BLUE MUFFIN VIBURNUM	3-4' HT.	AS SHOWN	B&B
PERENNIALS/GRASSES						
AI	73	ASCLEPIAS INCARNATA	ROSE MILK WEED	#2	36" O.C.	STAGGERED
AT	94	ASCLEPIAS TUBEROSA	BUTTERFLY WEED	#2	24" O.C.	STAGGERED
AH	15	AMSONIA HUBRICHTII	THREAD-LEAFED BLUESTAR	#2	24" O.C.	STAGGERED
BA	26	BAPTISIA AUSTRALIS	BLUE FALSE INDIGO	#2	AS SHOWN	STAGGERED
PV	72	PANICUM VIRGATUM	SWITCH GRASS	#3	36" O.C.	STAGGERED
DP	19	DENSTEADTIA PUNCTILOBA	HAYSCENTED FERN	#2	24" O.C.	STAGGERED
DS	77	SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED	#2	24" O.C.	STAGGERED
HO	61	HOSTA 'GUACAMOLE'	GUACAMOLE HOSTA	#2	24" O.C.	STAGGERED
HS	58	HEMEROCALLIS 'BIG TIME HAPPY'	BIG TIME HAPPY DAYLILLY	#2	24" O.C.	STAGGERED
NP	42	NEPETA 'PURRSIAN BLUE'	PURRSIAN BLUE CATMINT	#2	24" O.C.	STAGGERED
RF	173	RUDBECKIA FULGIDA FULGIDA	BLACK EYED SUSAN	#2	24" O.C.	STAGGERED

*ANNUALS / SEASONAL COLOR TO BE "MIDNIGHT FROST" MIX BY PROVEN WINNERS OR EQUAL.

CONSERVATION WILDLIFE SEED MIX:

NEW ENGLAND CONSERVATION / WILDLIFE MIX

(BY NEW ENGLAND WETLAND PLANTS INC. - NEWP.COM)

APPLICATION RATE: 25 LBS/ACRE | 1750 SQ FT/LB

ITEM	BOTANICAL NAME	COMMON NAME	INDICATOR
1.	ELYMUS VIRGINICUS	VIRGINIA WILD RYE	FACW
2.	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
3.	FESTUCA RUBRA	RED FESCUE	FACU
4.	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
5.	ANDROPOGON GERARDII	BIG BLUESTEM	FACU
6.	PANICUM VIRGATUM	SWITCH GRASS	FAC
7.	DESMODIUM PANICULATUM	PANICLEDLEAF TICK TREFOIL	FACU
8.	SORGHASTRUM NUTANS	INDIAN GRASS	FACU
9.	VERBENA HASTATA	BLUE VERVAIN	FACW
10.	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	
11.	RUDBECKIA HIRTA	BLACK EYED SUSAN	FACU
12.	HELENIUM AUTUMNALE	FALL SNEEZEWEED	FACW
13.	ASTERPILOSUS/SYMPHYOTRICHUM PILOSUM	HEATH ASTER	FACU
14.	SOLIDAGO JUNCEA	EARLY GOLDENROD	
15.	AGROSTIS PERENNANS	UPLAND BENTGRASS	FACU

THE NEW ENGLAND CONSERVATION/WILDLIFE MIX PROVIDES A PERMANENT COVER OF GRASSES, WILDFLOWERS, AND LEGUMES. FOR BOTH GOOD EROSION CONTROL AND WILDLIFE HABITAT VALUE. THE MIX IS DESIGNED TO BE A NO MAINTENANCE SEEDING, AND IS APPROPRIATE FOR CUT AND FILL SLOPES, DETENTION BASIN SIDE SLOPES, AND DISTURBED AREAS ADJACENT TO COMMERCIAL AND RESIDENTIAL PROJECTS.

LANDSCAPE NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY/TOWN OF PORTSMOUTH, NH. PLANTING PLAN IS DIAGRAMMATIC IN NATURE. FINAL PLACEMENT OF PLANTS TO BE APPROVED BY THE LANDSCAPE ARCHITECT IN THE FIELD.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES, ANY PERMITTING AGENCIES, AND "DIG-SAFE" (1-888-344-7233) AT LEAST 72 HOURS IN ADVANCE OF ANY WORK THAT WILL REQUIRE EXCAVATION. CONTRACTOR SHALL NOTIFY THE OWNERS REPRESENTATIVE OF NAY CONFLICTS IN WRITING.
3. NO PLANT MATERIAL SHALL BE INSTALLED UNTIL ALL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
4. ANY TREES NOTED AS "SEAL OR SELECTED SPECIMEN" SHALL BE TAGGED AND SEALED BY THE LANDSCAPE ARCHITECT.
5. ALL TREES SHALL BE BALLED AND BURLAPPED (B&B) UNLESS OTHERWISE NOTED OR APPROVED BY THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT.
6. CONTRACTOR SHALL VERIFY QUANTITIES SHOWN ON PLANT LIST. QUANTITIES SHOWN ON PLANS SHALL GOVERN OVER PLANT LIST.
7. ANY PROPOSED PLANT SUBSTITUTIONS MUST BE APPROVED IN WRITING BY OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT.
8. ALL PLANT MATERIALS INSTALLED SHALL MEET THE GUIDELINES ESTABLISHED BY THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY AMERICANHORT (LATEST EDITION).
9. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE YEAR FOLLOWING DATE OF ACCEPTANCE. ANY PLANT MATERIALS WHICH DIE WITHIN THE ONE YEAR PLANT GUARANTEE PERIOD WILL BE REPLACED BY THE LANDSCAPE CONTRACTOR. OWNERS TO COORDINATE DIRECTLY WITH THE LANDSCAPE CONTRACTOR FOR REPLACEMENT PLANTINGS.
10. ALL DISTURBED AREAS NOT OTHERWISE NOTED SHALL RECEIVE 6" OF SUITABLE LOAM & SEED.
11. LAWNS WITH 3:1 OR GREATER SLOPES SHALL BE PROTECTED WITH AN EROSION CONTROL BLANKET.
12. ANY FALL TRANSPLANTING HAZARD PLANTS SHALL BE DUG IN THE SPRING AND STORED FOR FALL PLANTING.
13. TREES SHALL HAVE A MINIMUM CALIPER AS INDICATED ON THE PLANTING SCHEDULE TAKEN ONE FOOT ABOVE THE ROOT CROWN.
14. ALL PLANT BEDS AND TREE SAUCERS TO RECEIVE 3" OF PINE BARK MULCH. GROUNDCOVER AREAS SHALL RECEIVE 1" OF PINE BARK MULCH.
15. ALL DECIDUOUS TREES ADJACENT TO WALKWAYS AND ROADWAYS SHALL HAVE A BRANCHING PATTERN TO ALLOW FOR A MINIMUM OF 7' OF CLEARANCE BETWEEN THE GROUND AND THE LOWEST BRANCH.
16. ALL TREE STAKES SHALL BE STAINED DARK BROWN.
17. CONTRACTOR RESPONSIBLE FOR WATERING AND RESEEDING OF BARE SPOTS UNTIL A UNIFORM STAND OF VEGETATION IS ESTABLISHED AND ACCEPTED.
18. ALL PARKING ISLANDS PLANTED WITH SHRUBS SHALL HAVE 24" OF TOP SOIL. FINISH GRADE SHALL BE SLOPED TO SIX INCHES (6") ABOVE THE TOP OF CURB.
19. SOIL SAMPLES, TESTS, AND SHOP DRAWINGS SHALL BE PROVIDED TO THE LANDSCAPE ARCHITECT OR THE OWNER FOR APPROVAL PRIOR TO CONSTRUCTION.
20. SLOPES AT 2:1 SHOULD HAVE 6" LOAM & SEED. SEEDING OF 2:1 SLOPES SHALL OCCUR IN THE DRY & AFTER SLOPES ARE COMPACTED.
21. ALL LANDSCAPED AREAS WITH SHRUBS, TREES, AND PERENNIALS TO HAVE 2 FEET MINIMUM DEPTH OF TOPSOIL. TWO FEET OF TOPSOIL AROUND TREES AND SHRUBS DOES NOT INCLUDE AMENDED PLANTING SOIL WITHIN TREE / SHRUB PIT FOR FULL DEPTH OF ROOTBALLS. SEE PLANTING DETAILS FOR PLANTING DEPTH AT SHRUBS AND TREES. ALL AREAS OF LOAM AND SEED TO HAVE 6" MINIMUM DEPTH OF TOPSOIL. TOPSOIL TO BE TESTED BY CONTRACTOR, AND APPROVED BY A&M PRIOR TO PURCHASE AND OR PLACEMENT. GENERAL, DEMOLITION, AND LANDSCAPE CONTRACTORS TO COORDINATE PROPER DEPTH OF EXISTING MATERIAL REMOVAL ACROSS SITE SO THAT 2 FEET MINIMUM AND 6" MINIMUM DEPTHS OF PROPOSED TOPSOIL NOTED ABOVE ARE MET. SEE TOPSOIL DETAIL.
22. PRIOR TO LAYING TOPSOIL, ALL SUBSOIL (BELOW PROPOSED TOPSOIL) TO BE TILLED TO A DEPTH OF AT LEAST 18" TO REMOVE CONSTRUCTION COMPACTION AND ALLOW FOR PROPER DRAINAGE OF TOPSOILS.
23. ALL SEEDING TO BE COMPLETED "IN SEASON" BETWEEN APRIL 1 TO JUNE 15 OR AUGUST 15 TO OCTOBER 1, EXCEPT FOR RE-SEEDING OF BARE SPOTS. AT ALL SLOPED AREAS CONTRACTOR TO INSTALL COCONUT FIBER JUTE MESH NETTING ON ALL SLOPES 3:1 AND GREATER, HYDROSEED ALL EXPOSED AREAS, ADD SOIL STABILIZER "FLEXTERRA HP-FGM" AS MANUFACTURED BY "PROFILE" TO HYDROSEED (AT RATE OF 3,000 LBS PER ACRE). CONTRACTOR TO ALSO BE RESPONSIBLE FOR RE-GRADING AND RE-SEEDING ALL DISTURBED, ERODED, OR BARE SPOTS & UNTIL SLOPES ARE FULLY STABLE. CONTRACTOR RESPONSIBLE FOR ALL MAINTENANCE UNTIL FINAL ACCEPTANCE OF LAWN AREAS INCLUDING: WATERING, ADDING FERTILIZERS AND LIME AND MOWING.
24. AFTER SEEDING, ALL AREAS TO BE LIGHTLY MULCHED WITH WEED FREE STRAW & CONTINUALLY WATERED EVERY DAY SO THAT SEED IS KEPT MOIST UNTIL SEED IS ESTABLISHED & APPROVED BY A&M LANDSCAPE ARCHITECT (USE NO HAY).
25. IF THERE IS NO PROPOSED IRRIGATION SYSTEM AFTER PLANTINGS & LAWNS & SEEDED AREAS HAVE BEEN INSTALLED, LANDSCAPE CONTRACTOR RESPONSIBLE TO TEMPORARILY WATER ALL INSTALLED PLANTINGS, SEEDED AREAS, & LAWN AREAS MIN. 4 TIMES A WEEK DURING INITIAL ESTABLISHMENT PERIOD OF 6 MONTHS AFTER ALL LANDSCAPING IS INSTALLED.
26. ALL PROPOSED LANDSCAPE AREAS INCLUDING MOWED LAWNS, TREES, SHRUB BEDS, AND PERENNIALS SHALL BE PROVIDED WITH WATER EFFICIENT UNDERGROUND IRRIGATION. DESIGN AND INSTALLATION OF IRRIGATION SYSTEM TO BE PERFORMED BY AN APPROVED IRRIGATION DESIGN BUILD CONTRACTOR OR BY AN APPROVED EQUAL TO BE DETERMINED BY THE OWNERS REPRESENTATIVE AND LANDSCAPE ARCHITECT. IRRIGATION SYSTEM IS TO BE DESIGNED FOR EFFICIENT WATER USAGE INCLUDING: USE OF DRIP IRRIGATION FOR SHRUBS AND PERENNIALS, IRRIGATION SYSTEM WITH HEAD-TO-HEAD COVERAGE, A CENTRAL SHUT-OFF VALVE, SEPARATE ZONES FOR EACH TYPE OF BEDDING AREA BASED ON WATERING NEEDS, AND A RAIN SENSOR TO SHUT OFF IRRIGATION DURING RAIN EVENTS.
27. SEEDING OF BIORETENTION & DETENTION AREAS & OTHER SLOPE AREAS SHALL OCCUR IN THE DRY & AFTER SLOPES ARE COMPACTED. IT IS IMPORTANT, THAT THE BIORETENTION AREAS/ DETENTION BASIN BE SEEDED AT THE BEGINNING OF THE PROJECT & PRIOR TO ANY DRAINAGE BEING DIRECTED TOWARDS THE BASIN. THE SEED AT DETENTION AREAS & OTHER SLOPED AREAS WILL NEED A MINIMUM OF 6 MONTHS TO INITIALLY ESTABLISH PRIOR TO THE DETENTION BASIN BEING UTILIZED SO THAT THERE IS NOT EROSION & SLOPE FAILURE. LIGHTLY RAKE SOIL TO ENSURE GOOD SEED-TO-SOIL CONTACT. SEE SEED MIX DETAIL NOTES.
28. FOR SPREADING OF THE SEED WITH DRY DETENTION BASINS, WATER LEVELS MAY BE LOWERED IN THE DETENTION AREAS BY RELYING ON DRY SEASON AND OR DRY SPELLS; OR MAY BE ACCOMPLISHED THROUGH THE USE OF DEWATERING METHODS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ANY DEWATERING METHODS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. WATER FROM ANY DEWATERING OPERATION SHALL BE TREATED TO REDUCE TOTAL SUSPENDED SOLIDS AND BE IN COMPLIANCE WITH STATE AND FEDERAL STANDARDS.
29. NO SOIL MATERIAL TO BE REMOVED OFF SITE PER PEASE DEVELOPMENT REGULATIONS.

BETHANY C DERMODY
LICENSED LANDSCAPE ARCHITECT
006
STATE OF NEW HAMPSHIRE
8-17-23

PROFESSIONAL LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:

ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:

ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME: L-3250-01.dwg	
DESIGNED BY:	BCD	CHECKED BY:	RPC

PREPARED BY:

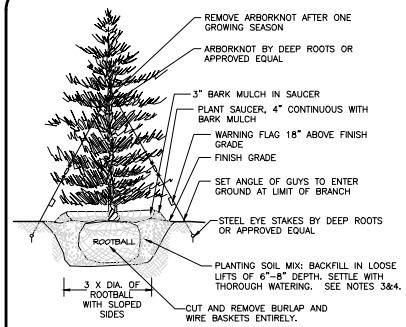
ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501

WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: LANDSCAPE NOTES & DETAILS

SHEET No. L-401

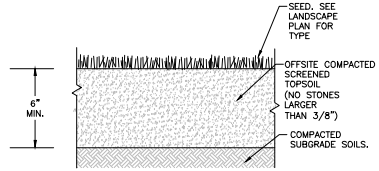
R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\L-3250-01_LANDSCAPE.DWG



NOTES

1. TREES SHALL BEAR SAME RELATIONSHIP TO FINISH GRADE AS IT BORE TO NURSERY OR FIELD GRADE. ROOT FLARE SHALL BE 2" ABOVE FINISH GRADE. REMOVE SOIL FROM TRUNK FLARE OF TREE TO DETERMINE ACTUAL TOP OF ROOTBALL AREA.
2. INSTALL THREE GUYS PER TREE; EQUALLY SPACED AROUND BALL.
3. ATTACH GUYS AT 2/3 HEIGHT OF TREE.
4. BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
5. ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.

EVERGREEN TREE DETAIL (1)
NOT TO SCALE



TEXTURE CLASS	% OF TOTAL WEIGHT
SAND	45% – 65%
SILT	15% – 35%
CLAY	5% – 20%

SIEVE	% PASSING
3/8"	100
NO. 4	85–100
NO. 40	60–85
NO. 100	38–60
NO. 200	10–35
20 um	LESS THAN 5%

NOTES:

1. TOP OF LOAM (TOPSOIL) IS FINISH GRADE.
2. ALL TOPSOIL (BOTH ONSITE AND OFFSITE SOURCES) SHALL BE COMPOSED OF A NATURAL, FERTILE, FRIABLE SOIL TYPICAL OF CULTIVATED TOPSOILS OF THE LOCALITY. OFFSITE SOIL SHALL BE SUITABLE FOR THE GERMINATION OF SEEDS AND SUPPORT OF VEGETATIVE GROWTH, WITH ADDITIVES, IF REQUIRED, TO ACHIEVE PARTICLE DISTRIBUTION AND ORGANIC CONTENT BELOW. TOPSOIL SHALL BE TAKEN FROM A WELL–DRAINED, ARIABLE SITE, FREE OF SUBSOIL, LARGE STONES, EARTH CLODS, STICKS, STUMPS, CLAY LUMPS, ROOTS, OTHER OBJECTIONABLE, EXTRANEOUS MATTER OR DEBRIS NOR CONTAIN TOXIC SUBSTANCES.
3. THE CONTRACTOR SHALL PROVIDE THE OWNER / LANDSCAPE ARCHITECT WITH TOPSOIL TEST RESULTS (RECOMMEND UMASS AMHERST SOIL TESTING LAB) FOR APPROVAL PRIOR TO OBTAINING AND PLACING THE SOIL. IF ANY TOPSOIL IS PURCHASED OR PLACED PRIOR TO APPROVAL BY OWNER / LANDSCAPE ARCHITECT, IT IS AT CONTRACTORS RISK, AND IT CAN BE REMOVED AT NO ADDITIONAL COST TO THE OWNER. IF THE PLANTING SOIL (BOTH ONSITE AND OFFSITE SOURCES) DOES NOT FALL WITHIN THE REQUIRED SIEVE ANALYSIS, TEXTURAL CLASS, ORGANIC CONTENT, OR PH RANGE, IT SHALL BE ADJUSTED TO MEET THE SPECIFICATIONS THROUGH THE ADDITION OF SAND, COMPOST, LIMESTONE, OR ALUMINUM SULFATE TO BRING IT WITHIN THE SPECIFIED LIMITS AT NO ADDITIONAL COST TO THE OWNER.
4. TOPSOIL SHALL HAVE A PH VALUE BETWEEN 5.5 AND 6.5. TOPSOIL SHALL CONTAIN BETWEEN 4% AND 8% ORGANIC MATTER OF TOTAL DRY WEIGHT AND SHALL CONFORM TO THE FOLLOWING GRADATION AND TEXTURE CLASS ABOVE.

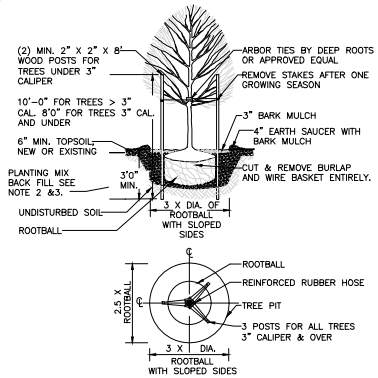
TOPSOIL FOR LAWN, TREES, SHRUBS, & PERENNIALS (2)
NOT TO SCALE

LOAM AND SEEDING NOTES:

CONTRACTOR SHALL SEED ALL DISTURBED AREAS NOT NOTED TO RECEIVE OTHER MATERIALS, AND AT AREAS SHOWN ON THE PLAN PER SPECIFICATIONS BELOW

SCIENTIFIC NAME	COMMON NAME	PROPORTION BY WEIGHT	PERCENT PURITY	PERCENT GERMINATION
FESTUCA RUBRA "RUBRA"	CREEPING RED FESCUE	37%	95%	90%
PAO PRAENTENSIS "BARON"	BARON KENTUCKY BLUEGRASS	40%	85%	90%
LOLIUM PERENNE "PALMER"	PALMER PERENNIAL RYEGRASS	15%	95%	90%
FESTUCA RUBRA COMMUTATA WILMA	WILMA CHEWINGS	8%	95%	80%

1. SEED TO BE SPREAD AT MINIMUM RATE OF 5 LBS. PER 1000 SQ. FT.
2. SEEDING TO BE COMPLETED "IN SEASON" BETWEEN APRIL 1 TO JUNE 15 OR AUGUST 15 TO OCTOBER 1, EXCEPT FOR RESEEDING OF BARE SPOTS. IF UNABLE TO SEED WITHIN THESE TIMEFRAMES, CONTRACTOR TO INSTALL EROSION CONTROL MATS ON ALL SLOPES 3:1 AND OVER. HYDROSEED ALL EXPOSED AREAS, ADD SOIL STABILIZER "FLUX TERRA HP–FGM SOIL STABILIZER" AS MANUFACTURED BY "PROFILE" TO HYDROSEED (AT RATE OF 3,000 LBS PER ACRE), AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR TO COMPLETE ALL ABOVE "OUT OF SEASON" REQUIREMENTS AND THEN ALSO BE RESPONSIBLE FOR RE–GRADING AND RE–SEEDING ALL DISTURBED, ERODED, OR BARE SPOTS WITHIN NEXT CLOSEST PLANTING SEASON IN FALL OR SPRING AT NO ADDITIONAL COST TO OWNER. CONTRACTOR RESPONSIBLE FOR ALL MAINTENANCE UNTIL FINAL ACCEPTANCE OF LAWN AREAS INCLUDING: WATERING, ADDING FERTILIZERS AND LIME AND MOWING AT NO ADDITIONAL COST TO OWNER.
3. COMMERCIAL FERTILIZER SHALL BE APPLIED AT THE RATE OF 25 POUNDS PER 1000 SQ. FT. OR AS RECOMMENDED BY THE TESTING AGENCY. LIME TO BE SPREAD AT THE RATE OF 100 POUNDS PER 1000 SQ. FT OR AS RECOMMENDED BY THE TESTING AGENCY. COMMERCIAL FERTILIZER SHALL BE A COMPLETE FERTILIZER CONTAINING AT LEAST 50% OF THE NITROGEN OF WHICH IS DERIVED FROM NATURAL ORGANIZE SOURCES OF UREAFORM. IT SHALL CONTAIN THE FOLLOWING PERCENTAGES BY WEIGHT: NITROGEN (N) 10%, PHOSPHORUS (P) 6%, POTASH (K) 4%. LIME SHALL BE AN APPROVED AGRICULTURAL LIMESTONE CONTAINING NOT LESS THAN 85% OF TOTAL CARBONATES. LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT 50% WILL PASS A 100 MESH SIEVE AND 90% WILL PASS THROUGH A 20 MESH SIEVE.
4. LAWN AREAS TO BE SEEDED BY SOWING EVENLY WITH AN APPROVED MECHANICAL SEEDER AT THE RATE OF TEN POUNDS PER 1000 SQUARE FEET.
5. CONTRACTOR RESPONSIBLE FOR WATERING, MOWING, AND RESEEDING OF LAWN BARE SPOTS UNTIL A UNIFORM, HEALTHY STAND OF GRASS IS ESTABLISHED AND ACCEPTED.



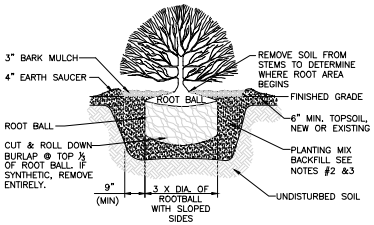
NOTES:

1. ALL TREES SHALL HAVE THE SAME RELATIONSHIP TO FINISH GRADE AFTER PLANTING AS THEY HAD AT THE ORIGINAL NURSERY SETTING. ROOT FLARE SHALL BE 2" ABOVE FINISH GRADE. REMOVE SOIL FROM TRUNK FLARE OF TREE TO DETERMINE ACTUAL ROOTBALL AREA.
2. BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
3. ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.
4. SEE MATERIALS PLAN AND DETAILS PLANS FOR STREET TREE PLANTING IN WITH TREE GRATES DETAIL.

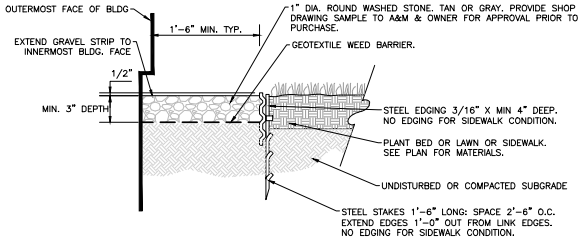
DECIDUOUS TREE PLANTING DETAIL (3)
NOT TO SCALE

NOTES:

1. ALL SHRUBS SHALL HAVE THE SAME RELATIONSHIP TO FINISH GRADE AFTER PLANTING AS THEY HAD AT THE ORIGINAL NURSERY SETTING. SET SHRUB 1"–2" ABOVE FINISH GRADE.
2. BACKFILL WITH PLANTING MIX. PLANT MIX TO BE: 50% NATIVE TOPSOIL, 20% COMPOST (LEAVES & ORGANIC MATERIAL, NO ASH) 20% PEAT MOSS, 10% SAND.
3. ADD MYCORRHIZA SOIL ADDITIVES AND SLOW RELEASE FERTILIZER WHEN PLANT HOLES ARE 50% FILLED AND WATER THOROUGHLY AT COMPLETION.
4. SHRUB BEDS TO HAVE 24" MIN. OF CONTINUOUS PLANTING SOIL.



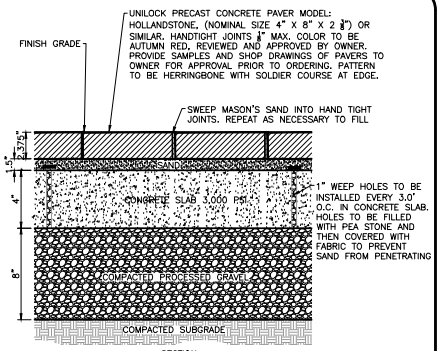
SHRUB PLANTING DETAIL (5)
NOT TO SCALE



NOTES:

1. STONE EDGE IS TO BE INSTALLED CONTINUOUS ADJACENT TO THE ENTIRE FACE OF BUILDINGS EXCEPT WHERE OTHER HARD SURFACING MATERIALS ARE SPECIFIED OR IF SHOWN OTHERWISE ON PLAN.

LANDSCAPE STONE AROUND BUILDING DETAIL (4)
NOT TO SCALE



SECTION

NOTES:

1. INSTALL EXPANSION JOINTS @ 30'–0" O.C. MIN. IN CONCRETE SLAB
2. WHERE PAVEMENT ABUTS LAWN OR SHRUB BED, PROVIDE 'PAVE–EDGE' OR APPROVED EQUAL.
3. 1" WEEP HOLES TO BE INSTALLED EVERY 3.0' O.C. IN CONCRETE SLAB. HOLES TO BE FILLED WITH GRAVEL AND THEN COVER WITH FABRIC TO PREVENT SAND FROM PENETRATING.

PEDESTRIAN CONCRETE PAVERS OR EQUAL
NOT TO SCALE (6)

BETHANY C. DERMODY
006
STATE OF NEW HAMPSHIRE
PROFESSIONAL LANDSCAPE ARCHITECT
8-17-23

PROFESSIONAL LANDSCAPE ARCHITECT FOR ALLEN & MAJOR ASSOCIATES, INC.

REV	DATE	DESCRIPTION
1	08-17-23	REVISED PER PDA COMMENTS

APPLICANT/LESSEE:
ATDG, LLC
7 SINCLAIR DRIVE
EXETER, NH 03833

PROJECT:
ASC / MEDICAL OFFICE
360 CORPORATE DRIVE
TAX MAP 315, LOT 5
PORTSMOUTH, NH 03801

PROJECT NO.	3250-01	DATE:	08-14-23
SCALE:	AS SHOWN	DWG. NAME: L-3250-01.dwg	
DESIGNED BY:	BCD	CHECKED BY:	BPC

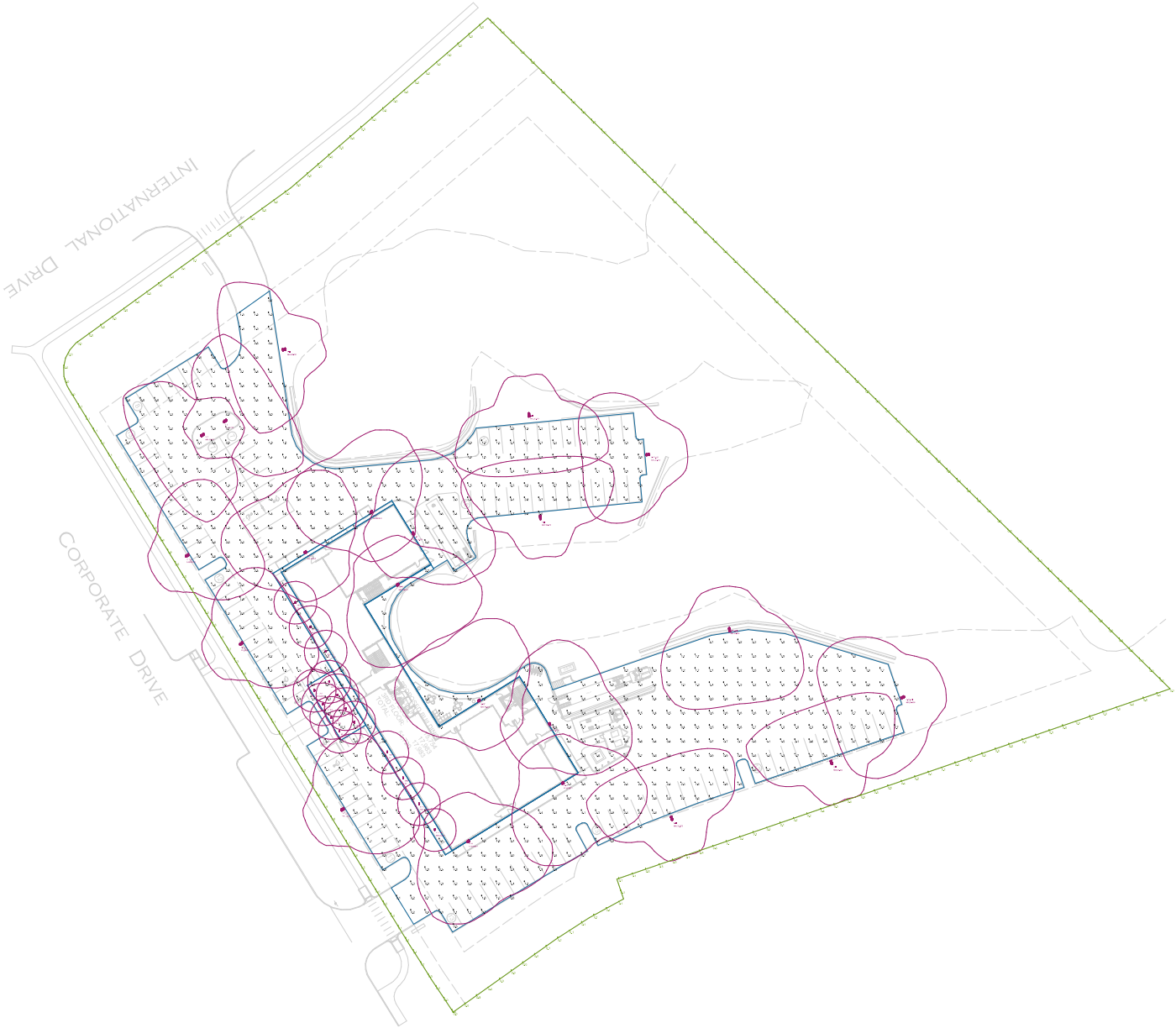
PREPARED BY:

ALLEN & MAJOR ASSOCIATES, INC.
civil engineering ◆ land surveying
environmental consulting ◆ landscape architecture
www.allenmajor.com
400 HARVEY ROAD
MANCHESTER, NH 03103
TEL: (603) 627-5500
FAX: (603) 627-5501
WOBURN, MA ◆ LAKEVILLE, MA ◆ MANCHESTER, NH

DRAWING TITLE: LANDSCAPE NOTES & DETAILS

SHEET No. L-501

R:\PROJECTS\3250-01\CIVIL\DRAWINGS\CURRENT\L-3250-01_LANDSCAPE.DWG



Luminaire Schedule										
Symbol	Qty	Tag	Mfer	Description	LLF	Luminaire Lumens	Luminaire Watts	Tot, Watts	BUG Rating	Dark Sky
	15	EXT LT-2	WILLIAMS	4DR-TL-L30-840-DIM-UNV-LW-OF-WH-WETCC	0.900	2042	27.8	417	B2-U1-G0	N
	2	S-FT_HI	LSI INDUSTRIES, INC.	MRM-LED-12L-SIL-FT-40-70CRI	0.900	13138	85	170	B2-U0-G3	Y
	4	S-FT_LO	LSI INDUSTRIES, INC.	MRM-LED-09L-SIL-FT-40-70CRI	0.900	9856	62	248	B2-U0-G3	Y
	7	S-III	LSI INDUSTRIES, INC.	MRM-LED-09L-SIL-3-40-70CRI	0.900	9926	62	434	B2-U0-G2	Y
	8	W-FT	LSI INDUSTRIES, INC.	XWM-FT-LED-18L-40	0.900	17920	130	1040	B3-U0-G3	Y

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Min
PARKING_SURFACE	Illuminance	Fc	2.35	11.4	0.1	114.00
PROPERTY LINE	Illuminance	Fc	0.18	2.8	0.0	N.A.

A+M

Photometric calculations are being provided to the recipient per the following disclaimers. The light level analysis is an estimate only, and is based on standard interior reflectance values of 0.8 ceilings, 0.5 walls, and 0.2 floors, unless otherwise specified. Any variance from reflectance values, obstructions, light loss factors or dimensional data will affect the actual light levels obtained. This analysis is a mathematical model and can only be as accurate as is permitted by the third party software and the IES files provided by our manufacturers.

Calculation by:
Chris Collins
Email:
ccollins@amirep.com

REVISIONS

#	DATE	COMMENTS

Calculation For:

Apex Design Build

Project:

NEW HAMPSHIRE PROJECT

Date:8/9/2023

Scale: NTS

PROJECT ENERGY CODE INFORMATION

CLIMATE ZONE ZONE 5A

DOES THE BUILDING INCLUDE GROUP R OCCUPANCY? NO

OPAQUE ENVELOPE ITEM	REQUIRED R-VALUE	ACTUAL R-VALUE
ROOF (ATTIC AND OTHER)	R38	NA
WALLS ABOVE GRADE (WOOD FRAMED AND OTHER)	R13 + R7.5ci	R13+R10ci
WALLS BELOW GRADE	R7.5ci	R7.5ci
SLAB-ON-GRADE FLOORS (UNHEATED SLABS)	R10 FOR 24" BELOW	R10 FOR 24" BELOW
OPAQUE DOORS (NONSWINGING)	R4.75	R8
OPAQUE DOORS (SWINGING)	0.37 U-VALUE	0.37 U-VALUE

ENVELOPE FENESTRATION	REQUIRED	ACTUAL
FIXED FENESTRATION	0.38	0.38
OPERABLE FENESTRATION	0.45	0.45
ENTRANCE DOORS	0.77	0.77
SHGC - NORTH ORIENTATION (PF < 0.2)	0.51	0.53
SHGC - SEW ORIENTATION (PF < 0.2)	0.38	0.38
SKYLIGHTS U-FACTOR	0.50	N/A
SKYLIGHTS SHGC	0.40	N/A

EXTERIOR FINISH SCHEDULE

1. EQUAL PRODUCTS ARE ACCPETABLE AFTER IT HAS BEEN SUBMITTED & APPROVED BY ARCHITECT.

2. ALL PRODUCTS TO BE INSTALLED PER MANUFACTURER REQUIREMENTS

TAG	MATERIAL	MFG.	SPECIFICATION / DESCRIPTION	LOCATION	REMARKS
EXT. AP-1	ACM PANEL	STACBOND	ACM PANEL, SEE ELEVATIONS FOR DIMENSOINS, FINISH: DUSTY GREY	PER ELEVATIONS	SEE ELEVATIONS FOR DIMENISONS
EXT. AP-2	ACM PANEL	STACBOND	ACM PANEL, SEE ELEVATIONS FOR DIMENSOINS, FINISH: ANTHRACITE GREY	PER ELEVATIONS	SEE ELEVATIONS FOR DIMENISONS
EXT. BR-1	FACE BRICK	SPAULDING BRICK	BELGIAN GRAY WIRE CUT FACE BRICK	PER ELEVATIONS	SEE ELEVATIONS
EXT. CP-1	METAL COPING	MORIN	ALUMINUM CUSTOM BENT METLA SHEET, FINISH: MATCH WITH EXT. AP-1	PER ELEVATIONS	SEE ELEVATIONS FOR DIMENISONS
EXT. CP-2	PREFAB. CANOPY	AWNEX	COLLORADO SYSTEM, CANTILEVERED, 10" FLAT, OUTLET DRAINAGE, LED LIGHT WITH OUTRIGGER, FINISH: BLACK HORIZON	PER ELEVATIONS	SEE ELEVATIONS AND RCP FOR DIMENISONS
EXT. CS-1	STONE SILL	ROCKCAST	BY ROCKCAST, SL-7315, 6" D X 3 5/8" H, FINISH: LIGHT GREY	PER ELEVATIONS	
EXT. MP-1	EXPOSED FASTNER METAL PANEL	PACCLAD	PACCLAD PETERSON M-36 WITH TRIMS, FINISH: MUSKET GREY	PER ELEVATIONS	
EXT. R-1	TPO ROOFING	HOLCIM	PROFILE: HOLCIM TPO SELF ADHERED MEMBRANE	PER ROOF PLAN	
EXT. RR-1	ROD RAILING	VIEW RAIL	STAINLESS ROD RAILING, FINISH: STAINLESS	PER PLAN AND ELEVATION	SEE ELEVATIONS FOR DIMENISONS
EXT. SF-1	SOFFIT	STACBOND	ACM PANEL, SEE ELEVATIONS FOR DIMENSOINS, FINISH: DUSTY GREY	PER RCP	SEE ELEVATIONS FOR DIMENISONS
EXT. VF-1	VINYL FENCE	CERTAINTEED	CHESTERFIELD SMOOTH PRIVACY FENCE; 8' HIGH; COLOR: WHITE; FLAT EXTERNAL CAP;	PER ELEVATIONS	
EXT. VG-1	VINYL FENCE GATE	CERTAINTEED	CHESTERFIELD SMOOTH STRAIGHT GATES PRIVACY, 1/2" CLEAR FENCE GATE; 6' HIGH; COLOR: GRAY	PER ELEVATIONS	12' LONG CUSTOM DESIGN
EXT. VG-2	VINYL FENCE GATE	CERTAINTEED	CHESTERFIELD SMOOTH STRAIGHT GATES PRIVACY, 8' CLEAR FENCE GATE; 6' HIGH; COLOR: GRAY	PER ELEVATIONS	

STOREFRONT SCHEDULE

1. REFER TO APPROVED COMPONENT BOOK FOR MORE DETAILED WINDOW SPECIFICATION INFORMATION.

TUBELITE: T14000 SERIES STOREFRONT 2" X 4 1/2", FINISH: DARK BRONZE, REFER TO A1-4.3, A1-4.5, AND A1-4.8 EXTERIOR ELEVATION.

TAG	WIDTH	HEIGHT	SILL HEIGHT	WINDOW TYPE	WINDOW MATERIAL	FRAME MATERIAL	REMARKS	Remarks
A	3' - 11 1/4"	7' - 6"	3' - 0"	A	TEMPERED GLASS	HOLLOW METAL	TUBELITE: T14000 SERIES STOREFRONT 2" X 4 1/2", FINISH: DARK BRONZE, DIMENSION: 4' X 7' -6"	SEE EXT. ELEVATIONS FOR LOCATIONS.
B	1' - 11 1/4"	7' - 6"	3' - 0"	A	TEMPERED GLASS	HOLLOW METAL	TUBELITE: T14000 SERIES STOREFRONT 2" X 4 1/2", FINISH: DARK BRONZE, DIMENSION: 2' X 7' -6"	SEE EXT. ELEVATIONS FOR LOCATIONS.
C	4' - 5 1/4"	7' - 6"	3' - 0"	A	TEMPERED GLASS	HOLLOW METAL	TUBELITE: T14000 SERIES STOREFRONT 2" X 4 1/2", FINISH: DARK BRONZE, DIMENSION: 4'-6" X 7' -6"	SEE EXT. ELEVATIONS FOR LOCATIONS.
D	5' - 11 1/2"	7' - 6"	3' - 0"	A	TEMPERED GLASS	HOLLOW METAL	TUBELITE: T14000 SERIES STOREFRONT 2" X 4 1/2", FINISH: DARK BRONZE, DIMENSION: 6' X 7' -6"	SEE EXT. ELEVATIONS FOR LOCATIONS.

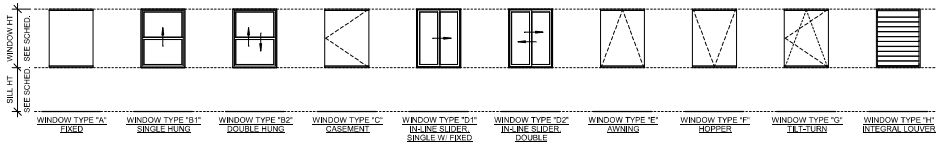
EXT LIGHT FIXTURE SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL	LAMP	WATTAGE	COLOR TEMPERATURE	QTY	IMAGE	REMARKS	LOCATION
EX. LT-1	OUTDOOR WALL SCONCE	KUZCO LIGHTING	MFR ID: AT797-BK; FINISH: BLACK; HEIGHT: 72"	LED BUILT IN	92 W	3000K	2		SEE ELEVATIONS FOR LOCATION	
EX. LT-2	LED OUTDOOR WALL LIGHT	DAZUMA	SKU: LI000934-01B*4, FINISH: GRAY	INTEGRATED LED	2 W	3000K	3		SEE ELEVATIONS FOR LOCATION	
EX. LT-3	OUTDOOR WALL SCONCE	KUZCO LIGHTING	MFR ID: AT7935-BK; FINISH: BLACK; HEIGHT: 35"	LED BUILT IN	41 W	3000K	4		SEE ELEVATIONS FOR LOCATION	
EX. LT-5	WALLPACK LIGHT	LSI INDUSTRIES	XWM-FT-LED-18L-40, FINISH: GUN METAL	LED	37 W	4000K	8		SEE ELEVATIONS FOR LOCATION	
EX. LT-6	5" RECESSED CAN FIXTURE	SATCO	S29726	LED BUILT IN	11 W	4000K	27		TO BE INSTALLED WITH SATCO S9540 HOUSING; 840L	

SUBCONTRACTOR NOTES

A. PROVIDE WEATHER BARRIER OVER ALL EXTERIOR SHEATHING PRIOR TO THE INSTALLATION OF ANY EXTERIOR FINISH MATERIAL.
B. INSTALL PER MANUFACTURER'S SPECIFICATIONS AND PROVIDE ALL MANUFACTURER'S ACCESSORIES TO FULLY FLASH AND COUNTER-FLASH AT ALL WINDOWS, DOORS, AND EXTERIOR PENETRATIONS.
C. PROVIDE A WEATHER TIGHT BARRIER AT ALL SURFACES.
D. COORDINATE FLASHING WITH WINDOW, DOOR, VENT, ETC. MANUFACTURER'S FOR A WEATHER TIGHT SEAL AT ALL OPENINGS.
E. TAPE FLASH AROUND ALL OPENINGS AND ON WALL JOINTS PER MANUFACTURER REQUIREMENTS.

WINDOW TYPES



apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

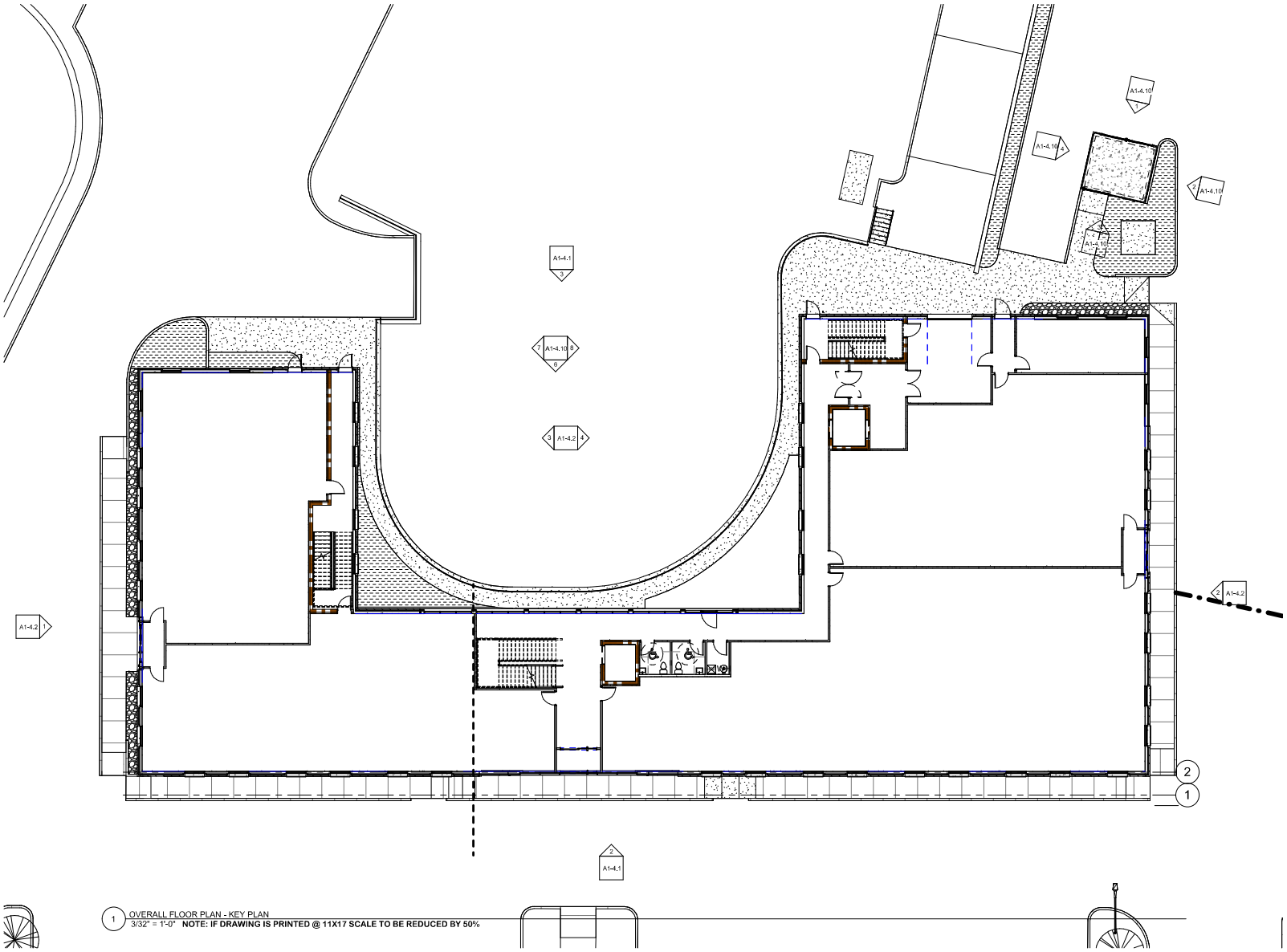
SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR SCHEDULES

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
	A1-2
Scale	As indicated

8/17/2023 2:26:47 PM



1 OVERALL FLOOR PLAN - KEY PLAN
3/32" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

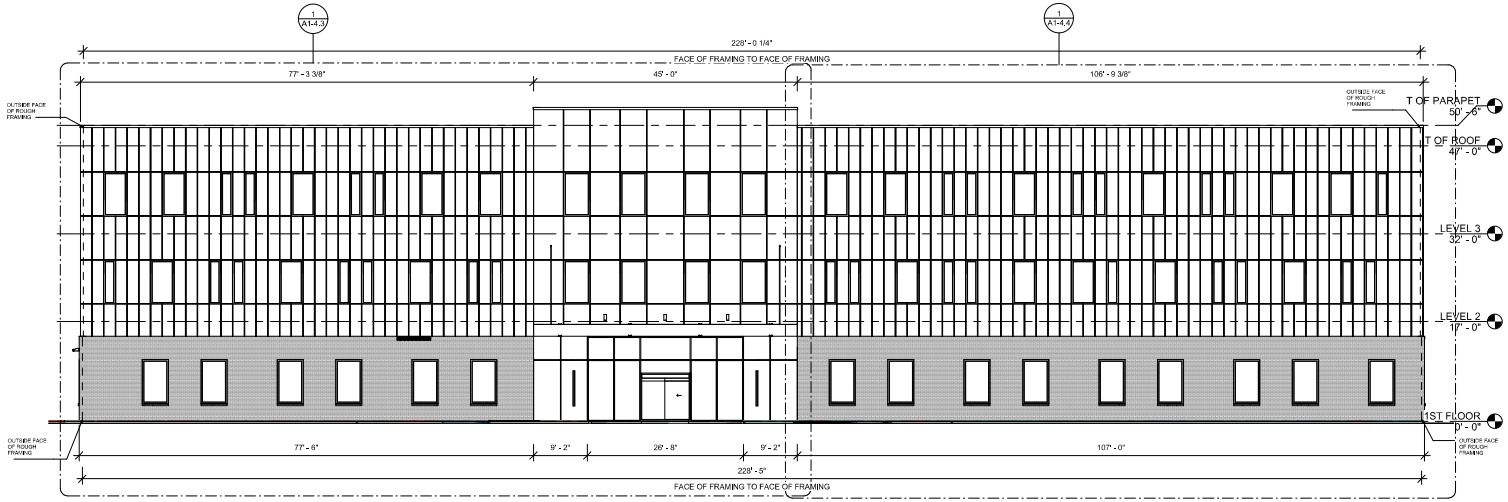
EXTERIOR VIEWS KEY

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

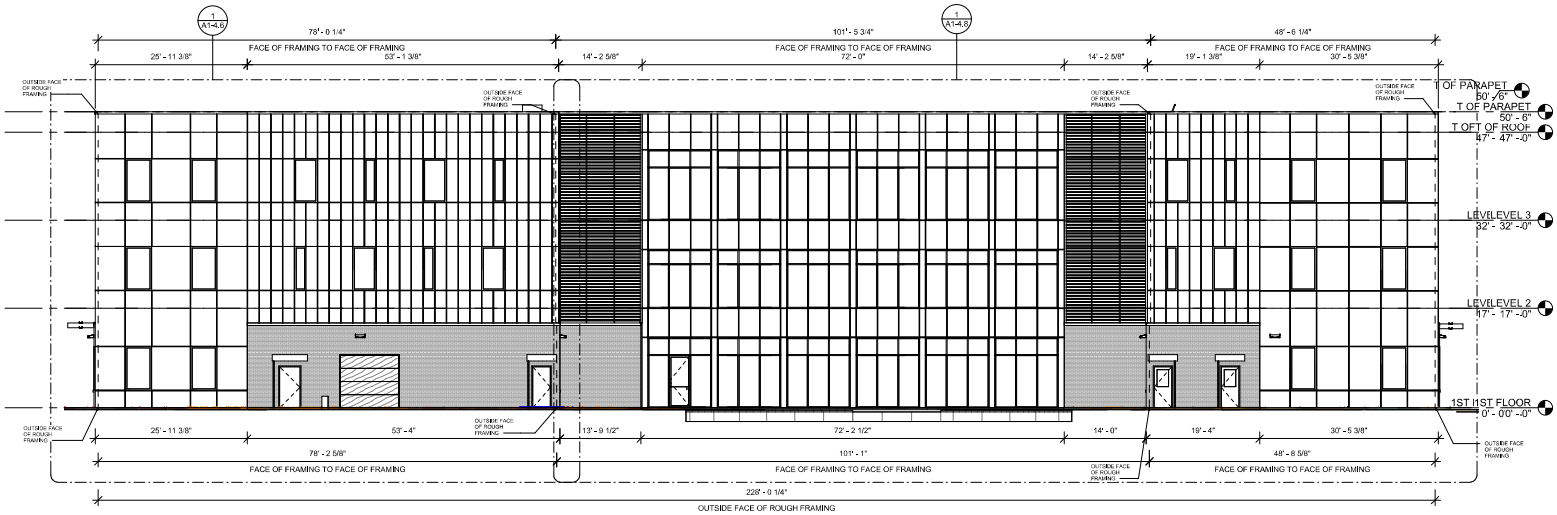
A1-3

Scale 3/32" = 1'-0"

8/17/2023 4:45:12 PM



2 ELEVATION WEST
1" = 10'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



3 ELEVATION EAST
1" = 10'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

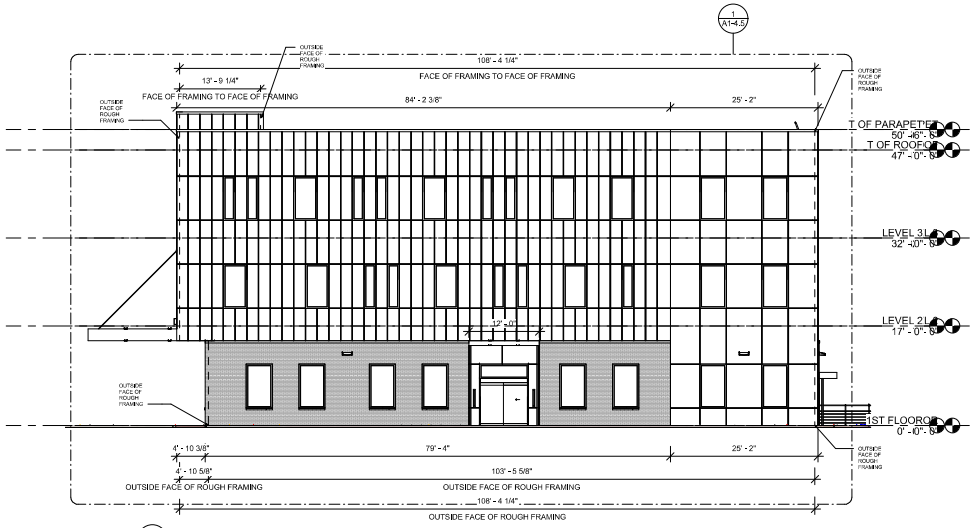
SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

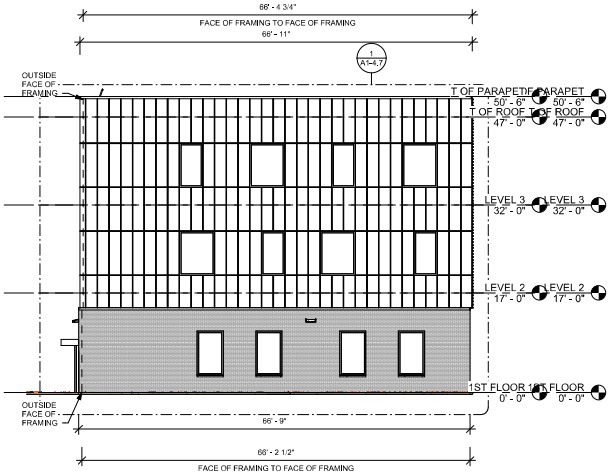
OVERALL EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
A1-4.1	
Scale	1" = 10'-0"

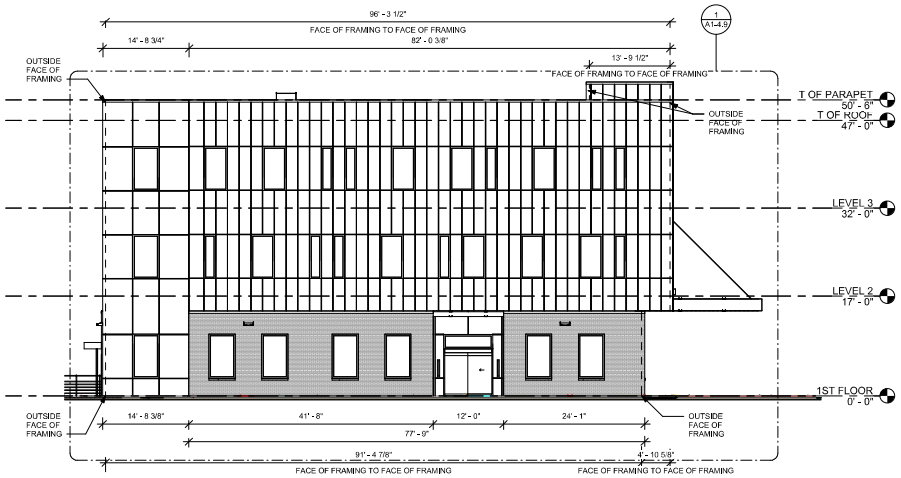
8/17/2023 2:26:50 PM



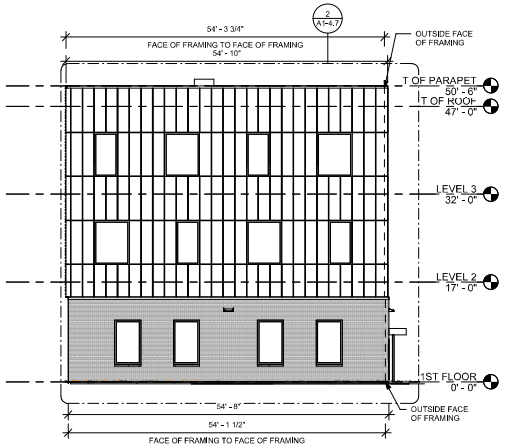
2 ELEVATION SOUTH
1" = 10'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



4 Elevation 3 - d
1" = 10'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



1 ELEVATION NORTH
1" = 10'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



3 Elevation 3 - b
1" = 10'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

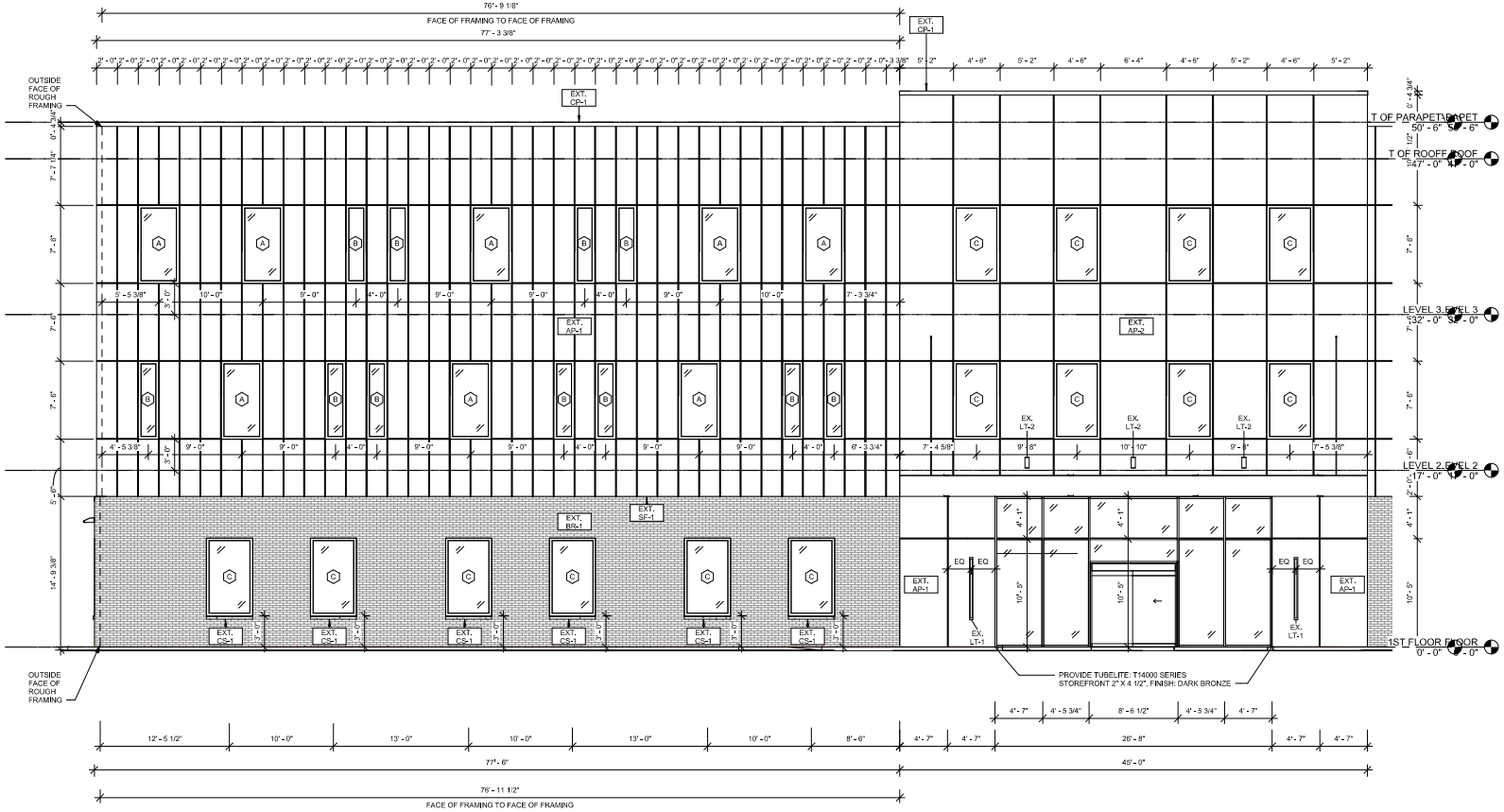
SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

OVERALL EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
A1-4.2	
Scale	1" = 10'-0"

8/17/2023 2:26:52 PM



1 ELEVATION WEST - Callout 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

A1-4.3

Scale 3/16" = 1'-0"

8/17/2023 2:26:52 PM

1 ELEVATION WEST - Callout 2
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

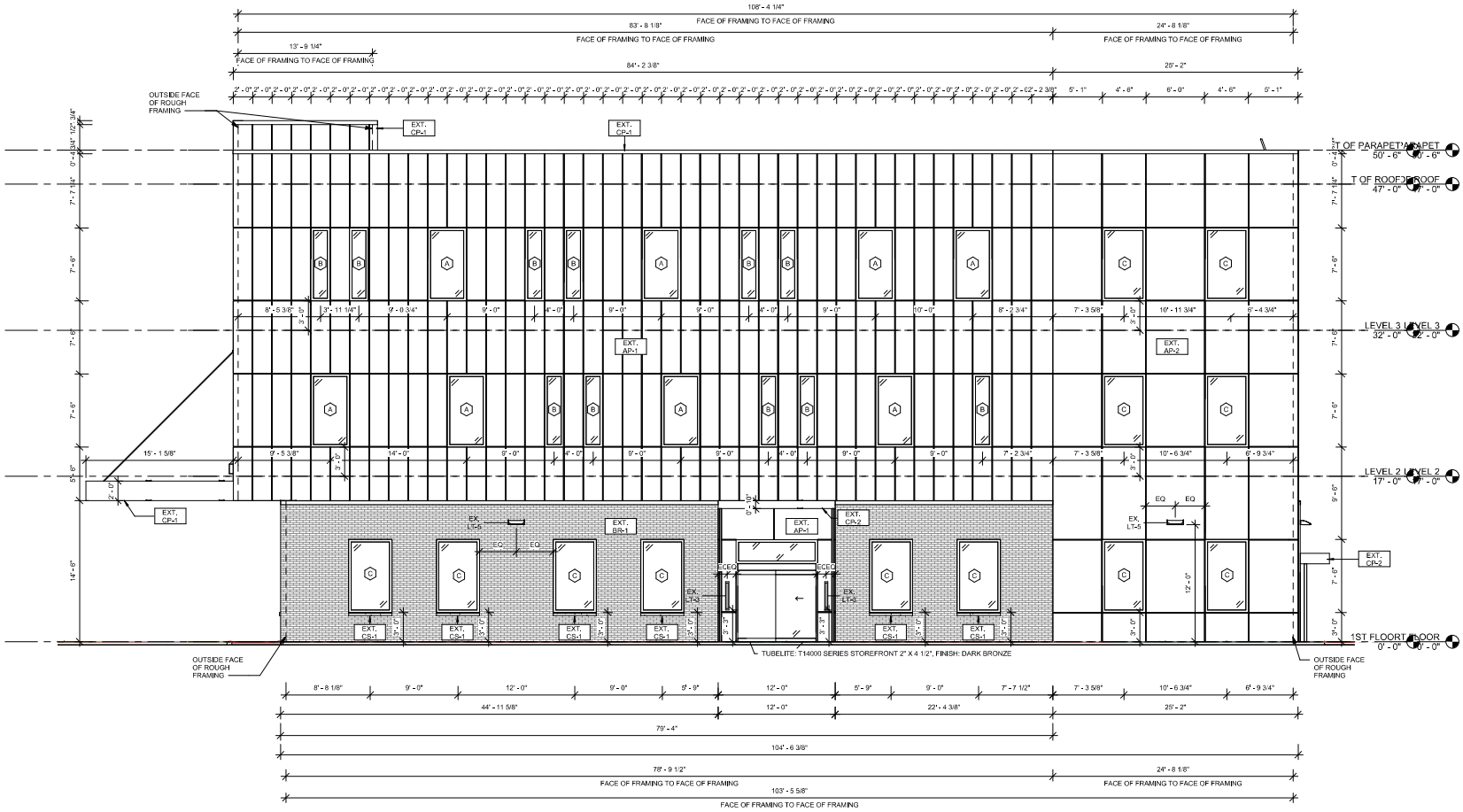
SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
A1-4.4	
Scale	3/16" = 1'-0"

8/17/2023 2:26:53 PM



1 ELEVATION SOUTH - Callout 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

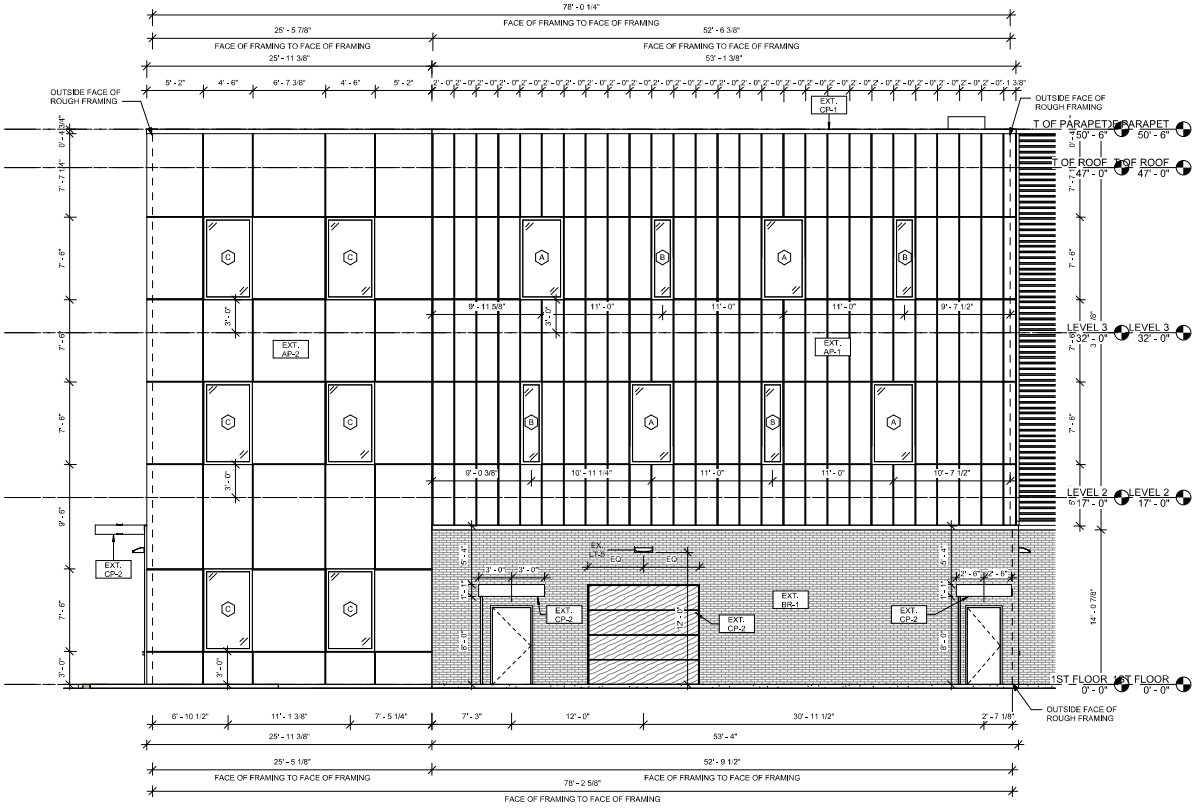
SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
	A1-4.5
Scale	3/16" = 1'-0"

8/17/2023 2:26:54 PM



1 ELEVATION EAST - Callout 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

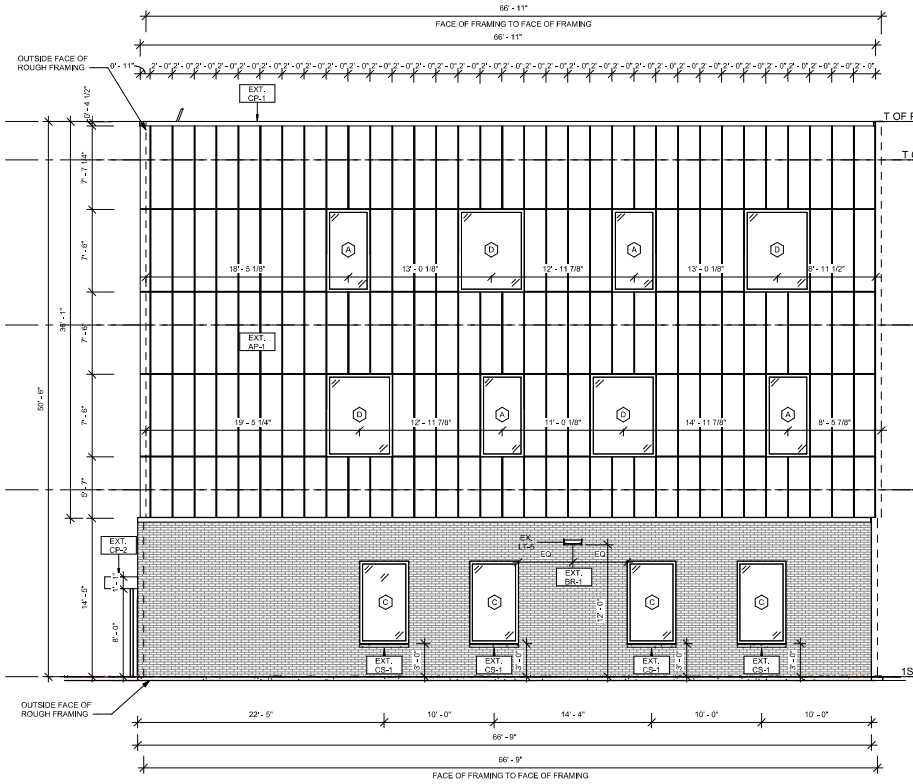
EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

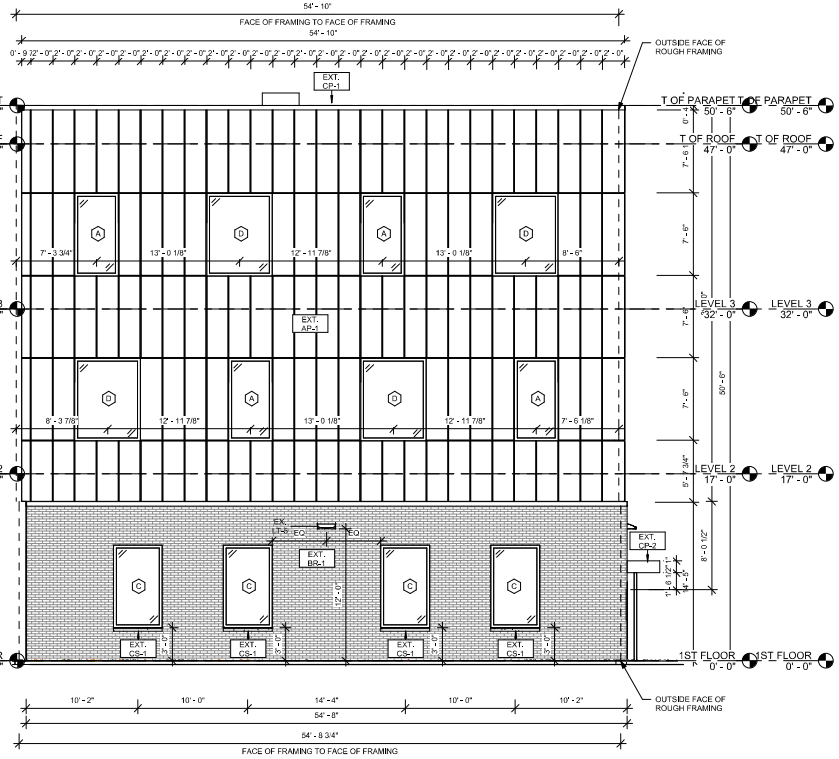
A1-4.6

Scale 3/16" = 1'-0"

8/17/2023 2:44:37 PM



1 Elevation 3 - d - Callout 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



2 Elevation 3 - b - Callout 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

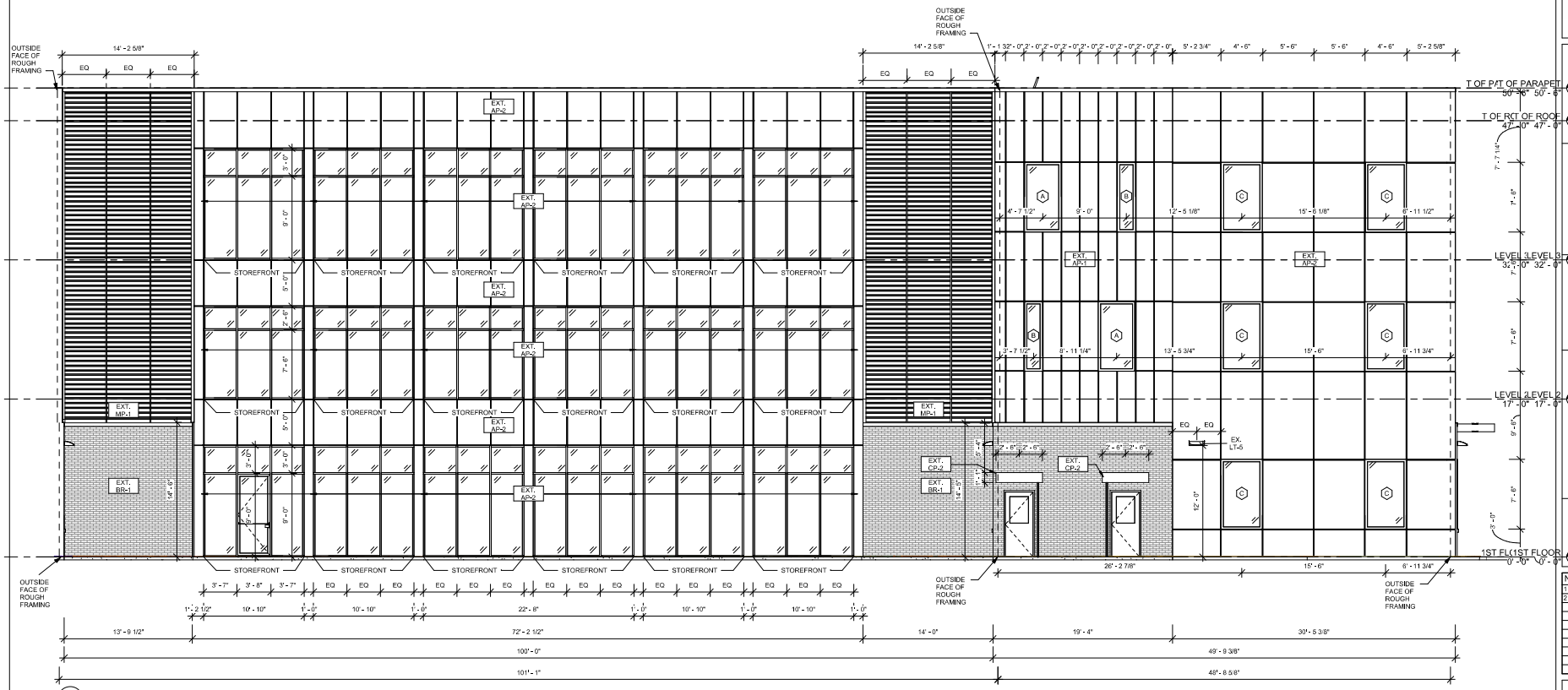
EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

A1-4.7

Scale 3/16" = 1'-0"

8/17/2023 2:26:55 PM



1 ELEVATION EAST - Callout 2
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC
360 CORPORATE DR.
PORTSMOUTH , NH 03801

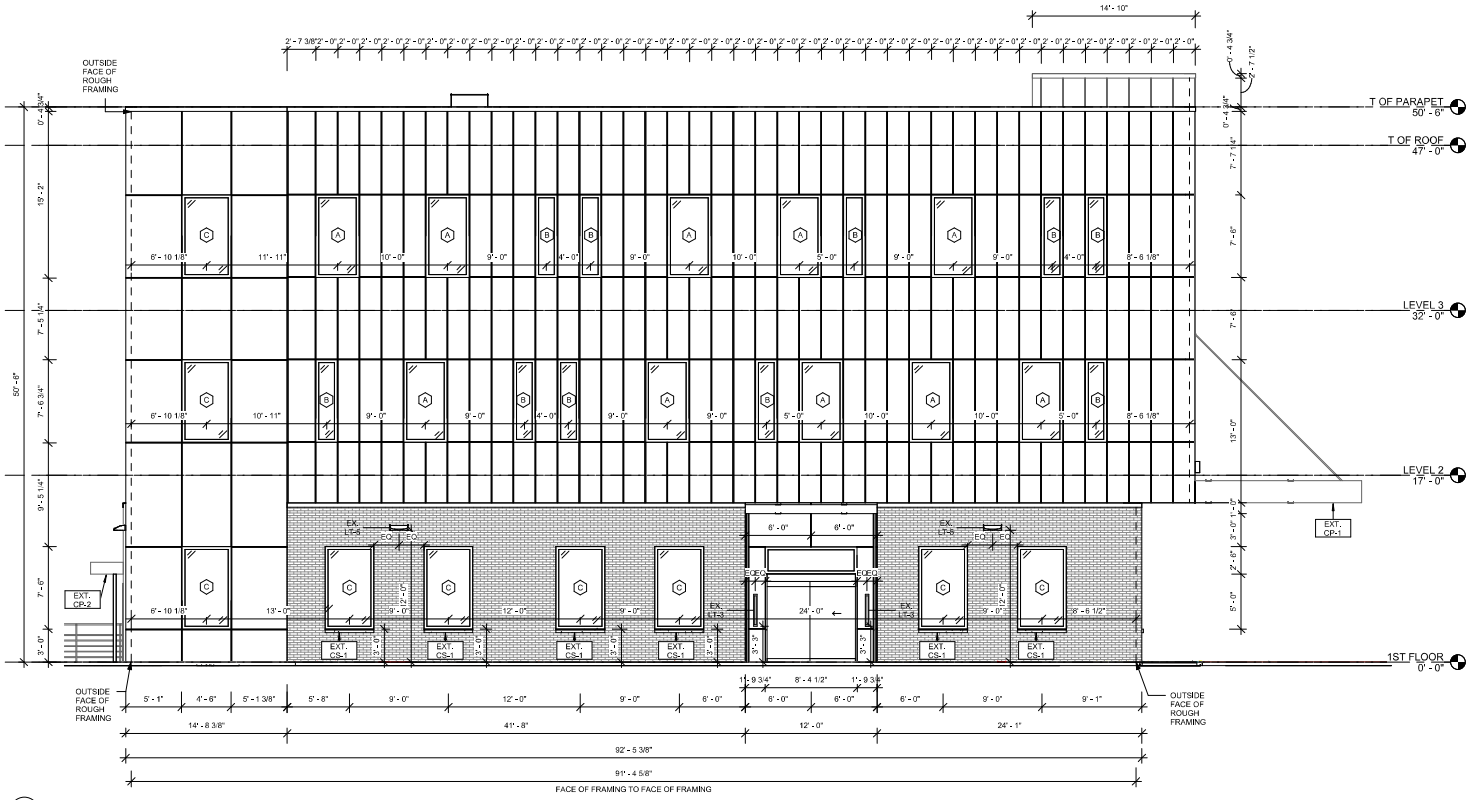
SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
A1-4.8	
Scale	3/16" = 1'-0"

8/17/2023 2:26:55 PM



1 ELEVATION NORTH - Callout 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
1	TAC WORKSHOP REVIEW	07/25/2023
2	TAC PUBLIC HEARING	08/21/2023

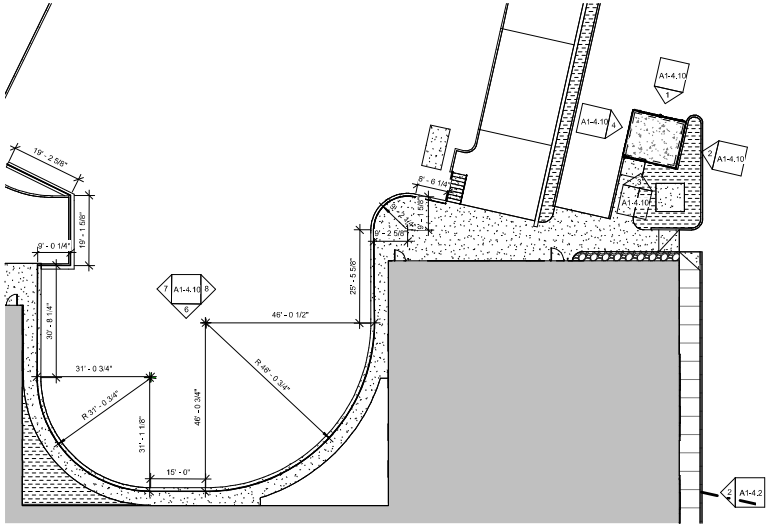
EXTERIOR ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

A1-4.9

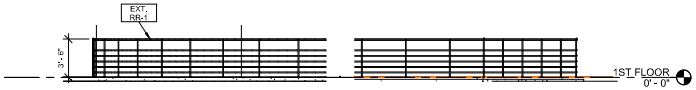
Scale 3/16" = 1'-0"

8/17/2023 2:26:56 PM



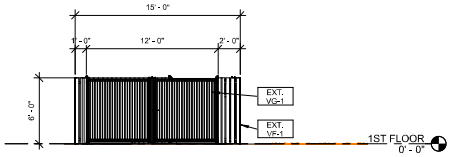
5 RAILING PLAN
1/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

8 FENCE ELEVATION 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

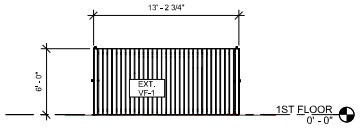


7 FENCE ELEVAITON 2
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

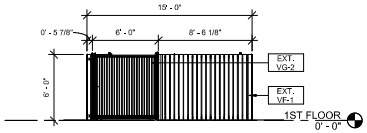
6 FENCE ELEVATION 3
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



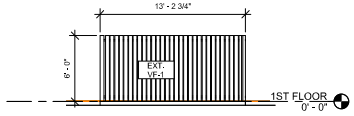
1 GARBAGE ENCLOSURE ELEVATION 1
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



2 GARBAGE ENCLOSURE ELEVATION 2
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



3 GARBAGE ENCLOSURE ELEVATION 3
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**



4 GARBAGE ENCLOSURE ELEVATION 4
3/16" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
2	TAC PUBLIC HEARING	08/21/2023

FENCE ELEVATIONS

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

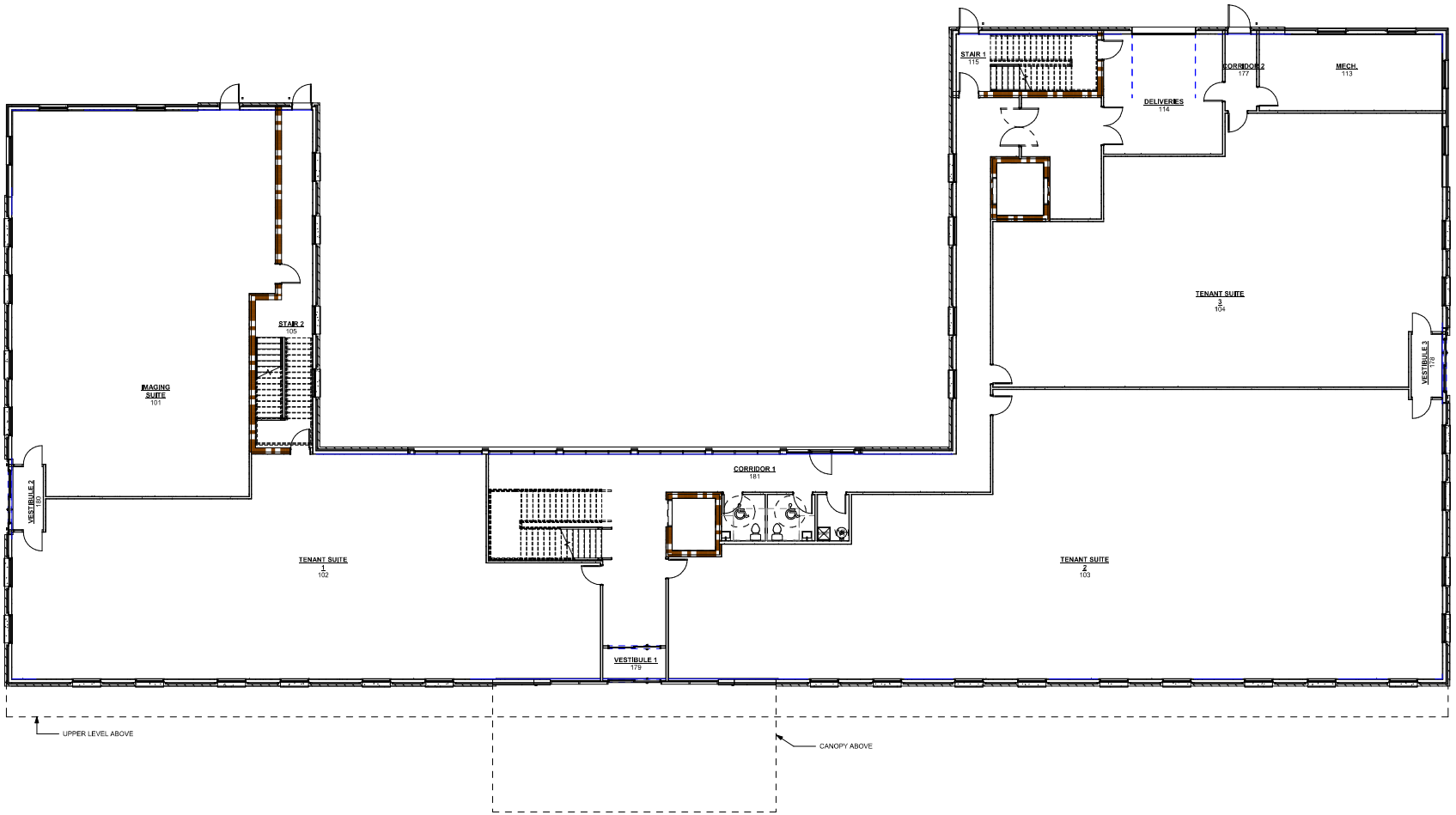
A1-4.10

Scale As indicated

8/17/2023 2:26:59 PM

FLOOR PLAN LEGEND

1 HOUR WALL TYPE



1 OVERALL FLOOR PLAN - 1ST FLOOR - PUBLIC SPACE
1/8" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

0' 4' 8' 16' 32'

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

DISCLAIMER: All drawings are proprietary and the exclusive property of our company. This/These print(s) shall not be shared, copied or reproduced without expressed permission of our company. This print is loaned in confidence and subject to return upon request by our company.

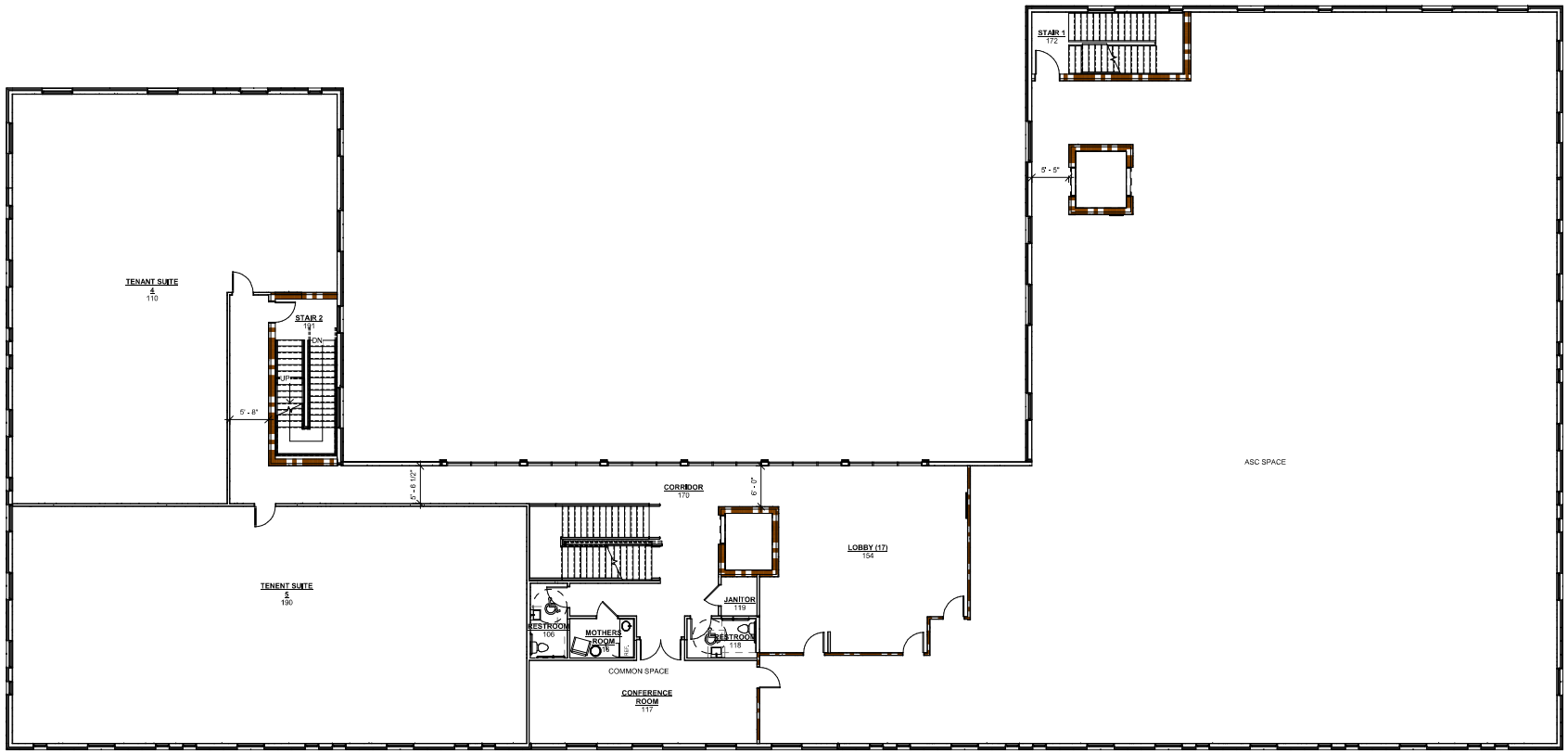
No.	Description	Date
2	TAC PUBLIC HEARING	08/21/2023

OVERALL FLOOR PLAN - LEVEL 1

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker
	A2-3.7
Scale	1/8" = 1'-0"

8/17/2023 2:45:57 PM

FLOOR PLAN LEGEND
1 HOUR WALL TYPE



1 OVERALL FLOOR PLAN - 2ND FLOOR - PUBLIC SPACE
1/8" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

0' 4' 8' 16' 32'

apex DESIGN > BUILD

9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
2	TAC PUBLIC HEARING	08/21/2023

OVERALL FLOOR PLAN - LEVEL 2

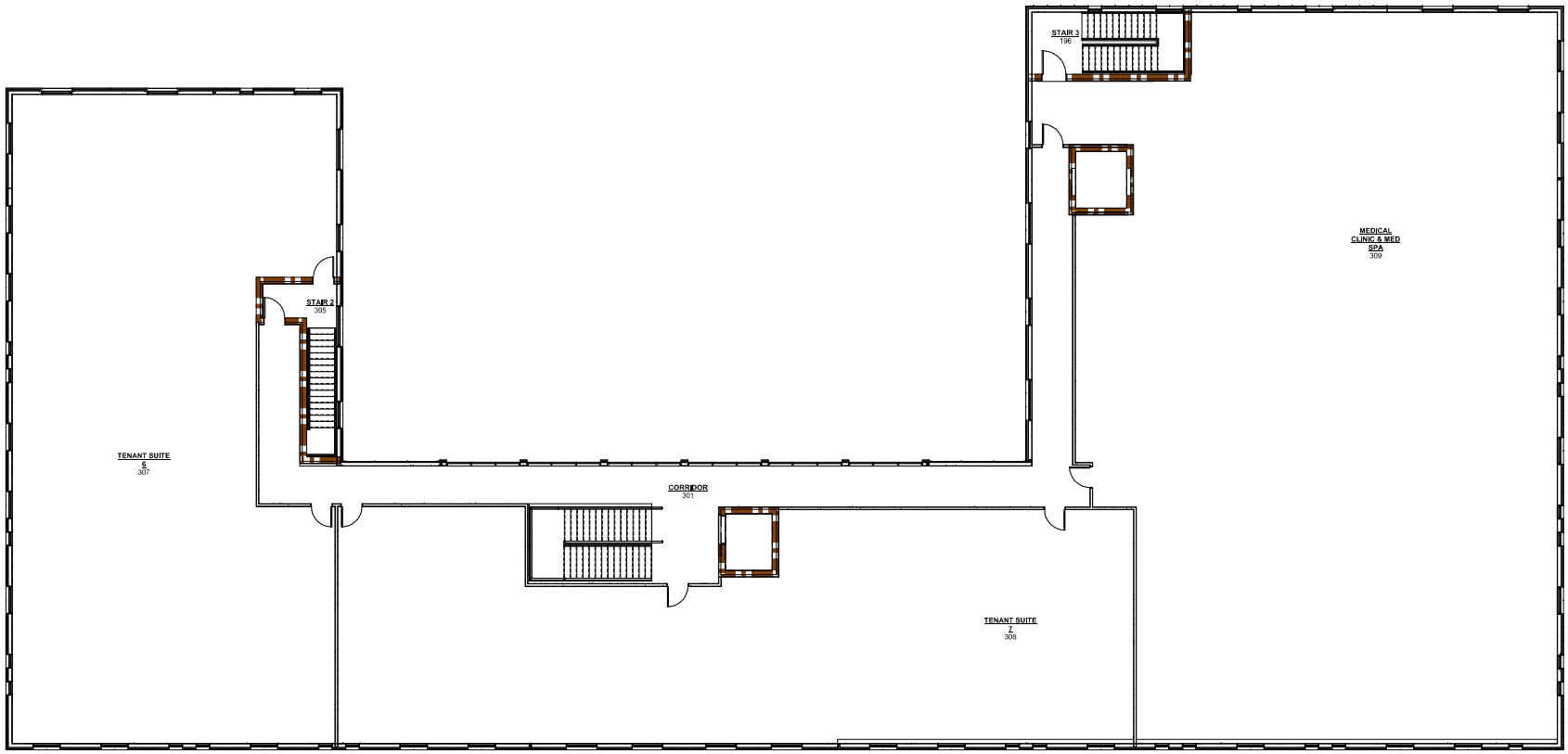
Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

A2-3.8

Scale 1/8" = 1'-0"

8/17/2023 2:27:01 PM

FLOOR PLAN LEGEND
1 HOUR WALL TYPE



1 OVERALL FLOOR PLAN - 3RD FLOOR - PUBLIC SPACE
1/8" = 1'-0" **NOTE: IF DRAWING IS PRINTED @ 11X17 SCALE TO BE REDUCED BY 50%**

0' 4' 8' 16' 32'

apex DESIGN > BUILD
9550 W.Higgins Rd. 170
Rosemont, IL 60018

ADTG, LLC

360 CORPORATE DR.
PORTSMOUTH , NH 03801

SEAL:

No.	Description	Date
2	TAC PUBLIC HEARING	08/21/2023

OVERALL FLOOR PLAN - LEVEL 3

Project number	#10323
Date	Issue Date
Drawn by	Author
Checked by	Checker

A2-3.9

Scale 1/8" = 1'-0"

8/17/2023 2:41:19 PM