ACORN
ENGINEERING, INC.

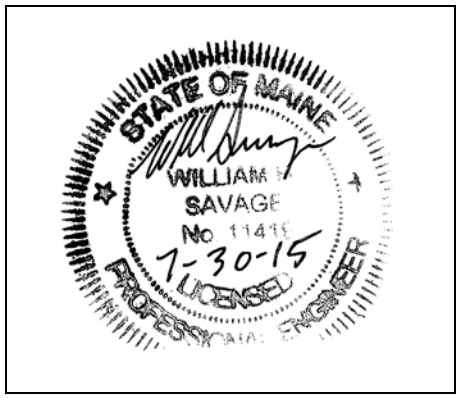
STORMWATER MANAGEMENT REPORT

Prepared For:

Redfern Properties, LLC
667 Congress Street Redevelopment
Portland, Maine 04101

Prepared By:

Acorn Engineering, Inc.
PO Box 3372
Portland, Maine 04104



July 2015

INTRODUCTION

Acorn Engineering, Inc. has been retained by Redfern Properties, LLC to provide civil engineering services for the proposed development of Joe's Variety Store. The proposed redevelopment project is located at 665 Congress Street (Map, Book, Lot 46 C020 and C019) bordered by Congress Street, Vernon Place, and Avon Street in Portland, Maine. The existing commercial building and parking lot are to be redeveloped to include:

- 1 Commercial Spaces on the first floor (approximately 4500 SF).
- 139 Residential Units on seven floors.
- 44 Parking Spaces on the first floor off of Commercial Street and 37 spaces located below in a lower level parking garage.

A stormwater analysis will be prepared to demonstrate that the project will meet the following requirements of the City of Portland (the City):

- City of Portland Land Use Ordinance Chapter 14, Article V. Site Plan Section 14-523. Required Approvals and Applicability (F) Level III Site Plan Review.
- City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500 Stormwater Management Amended January 11, 2015.

On May 12th representatives of Acorn Engineering met with Frank Rubino onsite to discuss the condition existing sewer main with Avon St. Under Frank's supervision the City of Portland – Department of Public Services tv'd approximately 246 lf of the existing 10" vitrified clay pipe starting at the intersection with Deering St working south. Overall the condition of the existing sewer main was found to be in good condition with relatively few cracks. A copy of the video inspection and observation and report with still images was provided for Acorn Engineering documenting the results.

Acorn has also coordinated with Woodard & Curran Deering Street Reconstruction Plans Sheets 4 and 7, dated 3/23/2015. Specifically the separation of the combined sewer with the construction of CB12A and Pipe 9D within Avon Street. Should field conditions change the inverts of CB12A we would request that the City provide the applicant with a set of As-Built Plans.

EXISTING CONDITIONS

The proposed redevelopment project is located at 667 Congress Street (Map, Book, Lot 46 C020 and C019) bordered by Congress Street, Vernon Place, and Avon Street in Portland, Maine. There is an existing smoke shop/variety store building and parking lot located within the project location which are to be demolished as part of the proposed project.

The City of Portland has rezoned the entire parcel as a B-3 zone due to its proximity to Commercial Street and Downtown Portland.

Abutting Uses:

- North R-6 Zone – Single and Multi-Family Residential

- East B-3 Zone – Green Hand Bookshop, Parking Lot
- Southwest B-3 Zone – Boda/Bangkok Thai
- Northwest R-6 Zone – Single and Multi-Family Residential
- South B-3 Zone – Video Expo, Empire Theater, Barber Shop

The existing project area is made up of a single paved and gravel parking area with a single, existing building. The distribution of surfaces is as follows:

- Paved Surface: 81%
- Existing Building: 14%
- Gravel with Limited Overgrowth: 5%

All surfaces are impervious with an existing grade ranging from approximately 0-10%.

Based on the most recent survey data, all surface runoff can be defined in two subcatchments ending in the existing catch basins located in the Northeast and Northwest corners of the property. The majority of runoff, about 96%, flows from the existing building, parking lot, and eastmost border to the newly proposed catchbasin and separated storm drain piping on Avon Street. The remaining runoff, about 4%, consists of flow from the westmost border along an overgrown gravel area to the catch basin at the end of Vernon Place. This catch basin also flows to the newly built catch basin on Avon St.

The project team is not aware of the presence of any existing significant natural features located on the site. Given the urban setting and existing impervious surfaces, a field inventory of significant natural feature was not undertaken. The project is also not located within a watershed classified as an Urban Impaired Stream.

PROPOSED DEVELOPMENT

The 667 Congress Street Redevelopment is an eight floor, 139-unit residential and commercial building with parking garage features on the basement and first floors. Both the basement and first floor will include mechanical and electrical facilities for development as well as two elevator shafts located at the North and South ends of the building.

The parking lot grading topography will be kept between 1% to 2% slopes directing stormwater towards internal floor drains on the eastern and western sides of the development; all stormwater flow, including snowmelt, from the first floor parking with be redirected to the basement floor and then connected to the existing municipal system. The majority of the first floor parking will be covered by the proposed building while the perimeter parking will be open (no roof). The drainage collection points are located as not to direct surface below the proposed building. The basement parking will be covered by the first floor parking with the exception of the basement entrance ramp.

Due to proposed basement grades the existing 12" RCP pipe along the northern property line will need to be rebuilt to lower the elevations. The work will be coordinated with recently completed catch basin along Avon St.

No landscape is anticipated and all undeveloped areas are assumed to be covered with mulch. Currently, only overgrown weeds cover a very small section of non-paved impervious gravel adjacent to a guardrails and signage.

The development is anticipated to be served by the Portland Water District, underground power/cable/communications, natural gas and the municipal sewer system. Solid waste and recycling will be contracted through a private waste disposal and recycling provider.

GENERAL STANDARDS - WATER QUALITY

It is our understanding that the project will not be required to meet the General Standards because of the exception set forth in the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards and Maine DEP Chapter 500, B. General Standards (3) Exception from the general standards, (e).

> "Stormwater Management Law project including redevelopment. For a project requiring a Stormwater Management Law permit that includes redevelopment of impervious area that was in existence as of November 16, 2005 (the effective date of Chapter 500 revisions), the redevelopment of that impervious area is not required to meet General standards provided the department determines that the new use of the existing impervious area is not likely to increase stormwater impacts resulting from the proposed project's stormwater runoff beyond the level of impact already caused by the runoff from the existing impervious area. The requirements of Appendix D must still be met, if applicable."

Although additional stormwater treatment is not required, the project has been designed to improve upon the existing condition for the following reasons:

- The significant change in land use from surface parking to the building/covered parking.
- The stabilization of the existing gravel areas with pavement or landscaping.
- The elimination surface stormwater flows directly to the municipal sewer.
- The installation of catch basins with catch basin hoods to mitigate transport of oil, floating debris, and larger suspended particles into the storm drain piping.
- The installation of catch basins which incorporates a deeper 3-ft (2 ft typ.) sump to store items listed above until routine cleaning is performed.

FLOODING STANDARD – WATER QUANTITY

To review the Section E. Flooding Standard, the proposed development was modeled using HydroCAD to verify that the post-development conditions do not exceed the pre-development conditions. A 24-hour SCS Type III storm distribution for the 2, 10, and 25 year storm events were used. The corresponding rainfall amounts for these storms are 3.00", 4.70", and 5.50" respectively. Rainfall amounts from the Maine DEP Volume III: BMPs Technical Design Manual Chapter 2 Stormwater Hydrology Table 2-1 Rev. 4/10/92.

Due to the numerous variables, and inherent inaccuracies with the modeling program used to calculate stormwater runoff it is custom at Acorn Engineering, Inc. to round to the nearest whole number. However due to the small size of the project the stormwater runoff shall be rounded to the nearest tenth of a cubic feet per second (cfs). Given the relatively small watershed areas, urban setting, and predominance of impervious area, a 5 minute time of concentration (T_c) was applied to each subcatchment for both the pre and post-development conditions.

Pre-development Calculations

The pre-development condition was modeled as two subcatchments. Subcatchment 1 is tributary to the catch basin at the end of Vernon Place. Subcatchment 2 is tributary to the newly constructed catch basin on Avon Street at the Northeast end of the property line.

- Subcatchment 1, Existing Northwest Subcatchment – Area (337 SF, 0.02 acres) tributary to the existing municipal sewer (POI#1) on Avon Street.
- Subcatchment 2, Existing Northeast Subcatchment – Area (20,856 sf, 0.58 acres) tributary to the existing municipal storm drain catch basin on Avon Street. This storm drain is then tributary to the municipal sewer (POI#1) also located on Avon Street.

The surface flows tributary to the municipal storm sewer are also included below. A Pre-development Watershed Map developed for this project can be viewed in Attachment A, and a copy of the HydroCAD calculations is included within Attachment D of this report. Peak flow rates for the storm events are as follows:

Table 1 – Pre-Development Peak Stormwater Flows			
Drainage Area	**2 – Year Storm Event (cfs)**	**10 – Year Storm Event (cfs)**	**25 – Year Storm Event (cfs)**
Subcatchment 1	.1	.1	.1
Subcatchment 2	1.7	2.7	3.1
Point of Interest #1	1.8	2.8	3.3

Post-development Calculations:

The post-development condition was modeled as one subcatchment with the same point of interest, as all stormwater is anticipated to leave the site through one location and connect to the recently completed 15" storm drain within Avon. The proposed Grading and Drainage Plan was designed to maintain the historical area tributary to the municipal storm sewer on Avon Street.

- Subcatchment 1 – Area (0.60 acres) tributary to the existing municipal sewer within Avon Street

The post development calculations assumed that there was no land change; all surfaces on the property will remain impervious and therefore did not result in a net stormwater increase. The post-development conditions now convey all stormwater flows to the municipal sewer on Avon Street (POI #1). The following table represents comparison of predevelopment and post-development condition peak runoff rates at the respective point of interest.

Table 2 – Comparison of Peak Flows						
Drainage Area	**2 – Year Storm Event (cfs)**		**10 – Year Storm Event (cfs)**		**25 – Year Storm Event (cfs)**	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
POI #1	1.8	1.8	2.8	2.8	3.3	3.3

As shown in Table 2, the post development peak flows shall remain at or below the predevelopment levels. A Post-development Watershed Map developed for this project can be viewed in Attachment B, and a copy of the HydroCAD calculations is included within Attachment D, of this report.

Pipe sizes were generated using the rational method.

SOILS

Onsite soil information includes the following:

- Summit Geoengineering Services – Soil Boring Logs, dated March 31st, 2015 and April 15th, 2015. A formal Geotechnical Report has also been prepared by Summit Geoengineering Services for the project, dated May 2015.
- Soil Conservation Service Medium Intensity Soil Survey for Cumberland County.

Given the soils information, listed above, and the fact that greater than 50% of the proposed development site is currently developed, it is Acorn Engineering's professional opinion that a more intense hydric soil boundary delineation is not required because the waiver requirements set forth in the City of Portland Technical Manual – Section 7 – Soil Survey, Rev. 6/17/11 are met.

The area within and surrounding the project includes soils types listed in the table below. The susceptibility of soils to erosion is indicated on a relative "K" scale of values over a range of 0.02 to 0.69. Higher "K" values indicate more erodible soils.

Table 1 - "K" Value

Soils Type	Subsurface	Substratum
Hinckley	.17	.17

The soil "K" values for the soils, listed above, indicate a low susceptibility to erosion. The site's susceptibility to erosion is from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County. The site's soils map from the Soil Conservation Service Medium Intensity Soil Survey for Cumberland County is included as Attachment C.

Conclusion

The proposed development was designed to meet the requirements implemented by the MDEP under the Stormwater Management Statute (38 M.R.S.A. § 420-D) as well as the City of Portland Technical Manual – Section 5 – Portland Stormwater Management Standards. The proposed project as envisioned shall improve upon the existing stormwater management.

Attachments

Attachment A: Pre Development Watershed Map
Attachment B: Post Development Watershed Map
Attachment C: Soils Map
Attachment D: HydroCAD Calculations
Attachment E: Summit Geoengineering Services – Soil Boring Logs, dated May 2015

GENERAL NOTES:

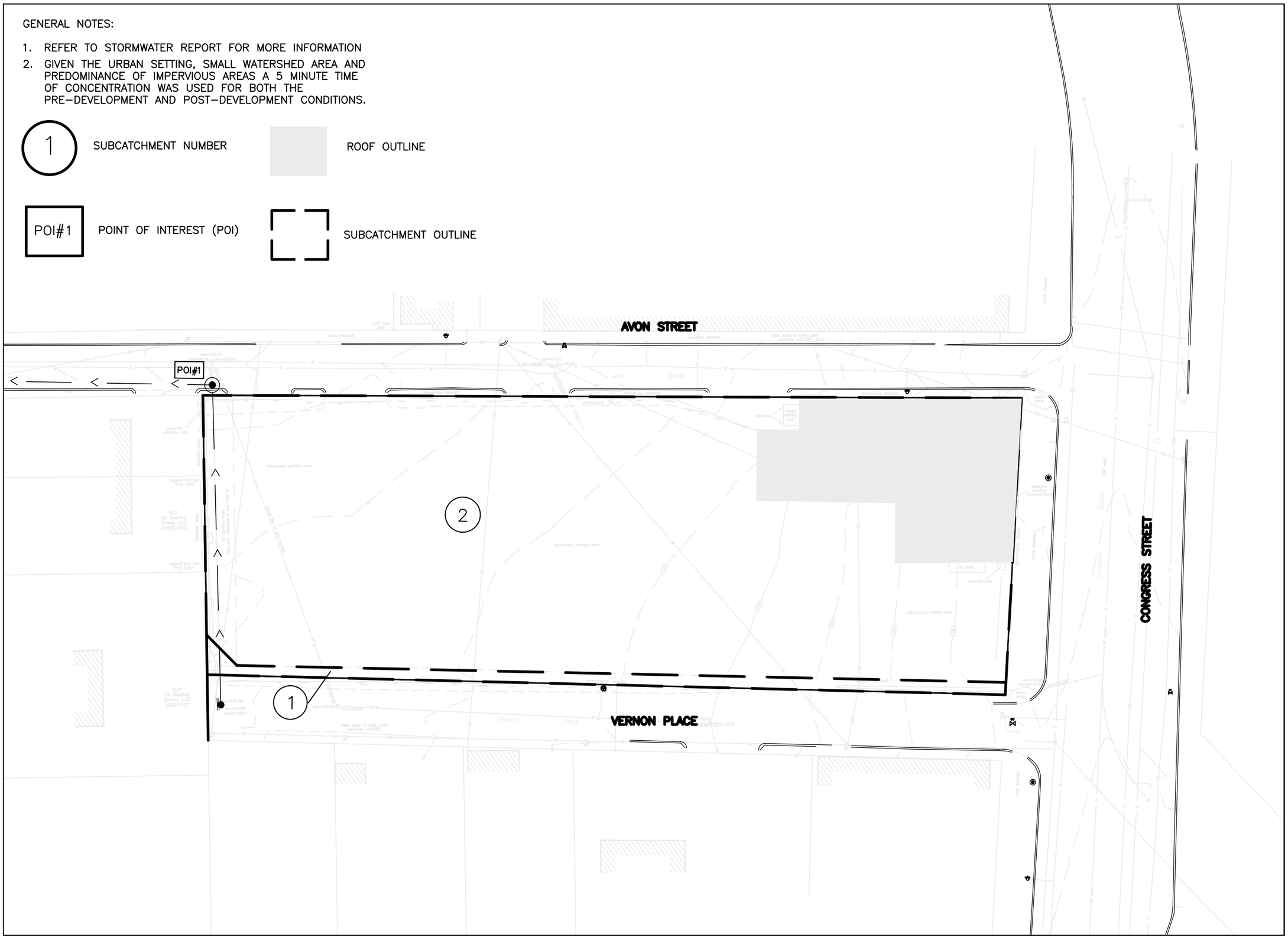
1. REFER TO STORMWATER REPORT FOR MORE INFORMATION
2. GIVEN THE URBAN SETTING, SMALL WATERSHED AREA AND PREDOMINANCE OF IMPERVIOUS AREAS A 5 MINUTE TIME OF CONCENTRATION WAS USED FOR BOTH THE PRE-DEVELOPMENT AND POST-DEVELOPMENT CONDITIONS.

1 SUBCATCHMENT NUMBER

ROOF OUTLINE

POI#1 POINT OF INTEREST (POI)

SUBCATCHMENT OUTLINE



ISSUED FOR	BY DATE
REVISION	REV. DATE

DRAWING NAME: PRE-DEVELOPMENT STORMWATER PLAN

PROJECT NAME: 667 CONGRESS ST. REDEVELOPMENT

CLIENT: REDFERN PROPERTIES, LLC.
P.O. BOX 8816, PORTLAND, MAINE 04104

ACORN ENGINEERING, INC
P.O. BOX 3372
PORTLAND, MAINE 04104
(207) 775-2655

FILE:	1060_CIVIL
DATE:	7/29/15
JN:	1060
SCALE:	1"=20'
DESIGN BY:	WHS
DRAWN BY:	
CHECKED BY:	WHS

DRAWING NO.

PRE

GENERAL NOTES:

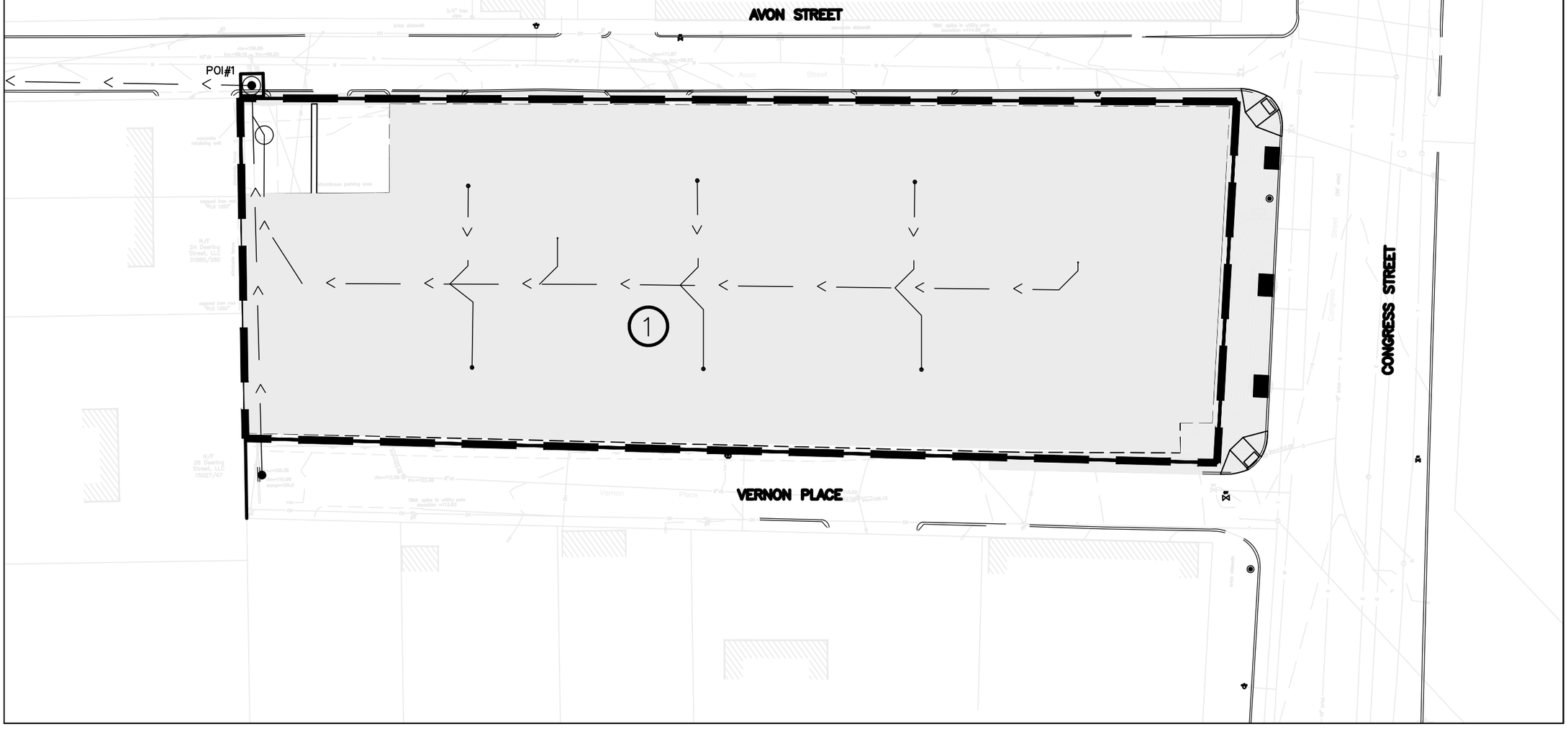
1. REFER TO STORMWATER REPORT FOR MORE INFORMATION
2. GIVEN THE URBAN SETTING, SMALL WATERSHED AREA AND PREDOMINANCE OF IMPERVIOUS AREAS A 5 MINUTE TIME OF CONCENTRATION WAS USED FOR BOTH THE PRE-DEVELOPMENT AND POST-DEVELOPMENT CONDITIONS.

1 SUBCATCHMENT NUMBER

ROOF OUTLINE

POI#1 POINT OF INTEREST (POI)

SUBCATCHMENT OUTLINE



ISSUED FOR	BY DATE
REVISION	REV. DATE

DRAWING NAME: POST-DEVELOPMENT WATER QUALITY PLAN

PROJECT NAME: 667 CONGRESS ST. REDEVELOPMENT

CLIENT: REDFERN PROPERTIES, LLC.
P.O. BOX 8816, PORTLAND, MAINE 04104

ACORN ENGINEERING, INC
P.O. BOX 3372
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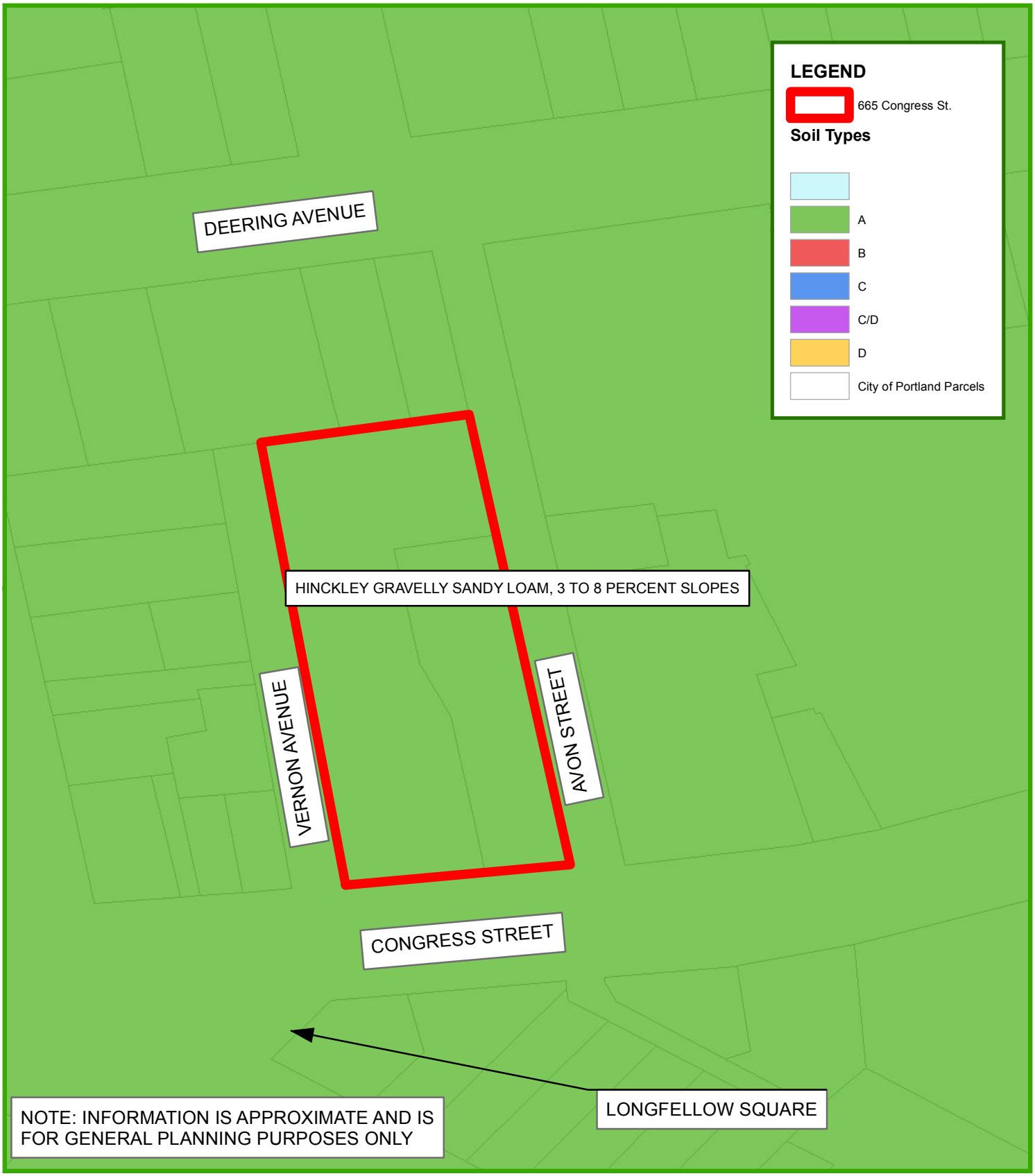


665 CONGRESS STREET DEVELOPMENT

SOILS ADJACENT TO DEVELOPMENT

665 CONGRESS STREET, PORTLAND, MAINE

Data Sources: MEGIS, City of Portland, Acorn Engineering, Inc.

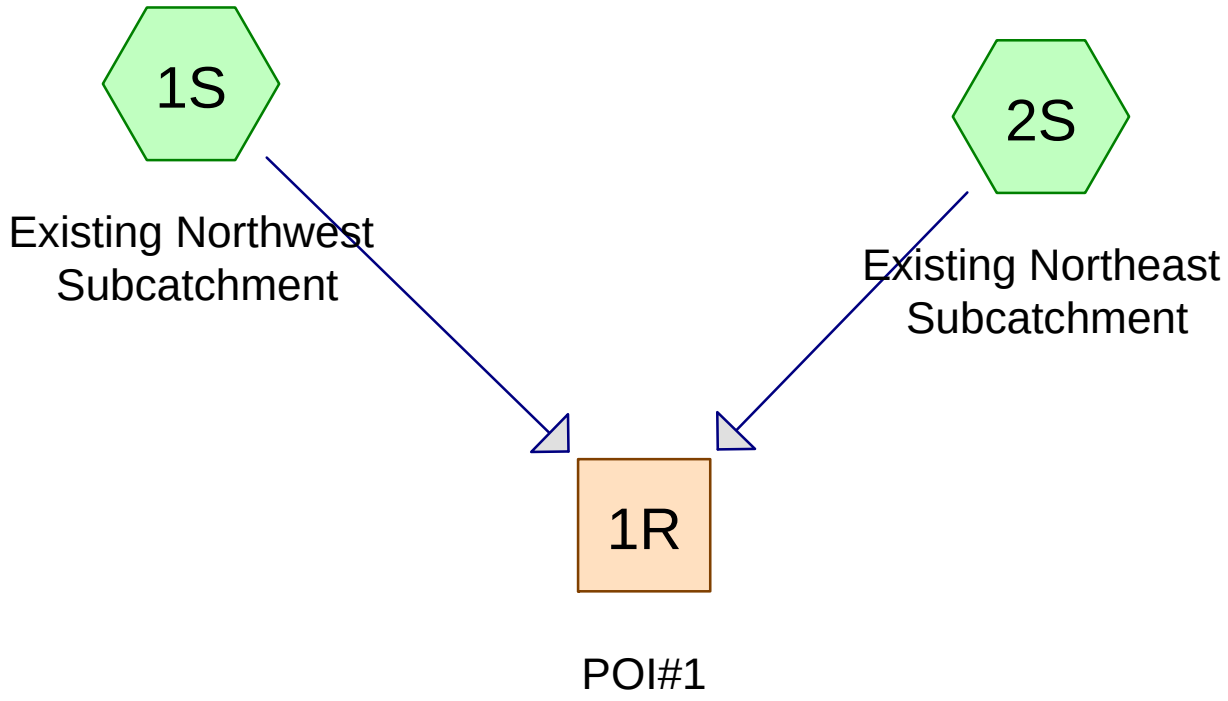
Date: 4/8/2015 by Acorn Engineering, Inc. for Redfern Properties, LLC

N

1 INCH = 80 FEET

0 40 80

ACORN ENGINEERING, INC



Subcat Reach Pond Link

Drainage Diagram for JSH Pre-Development 7-24-15
Prepared by {enter your company name here}, Printed 7/27/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.028	96	Gravel (1S,2S)
0.084	98	Building (2S)
0.487	98	Pavement (1S,2S)
0.599		**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.599	Other	1S, 2S
0.599		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Northwest Runoff Area=0.024 ac 33.33% Impervious Runoff Depth>2.50"
Tc=5.0 min CN=97 Runoff=0.07 cfs 0.005 af

Subcatchment 2S: Existing Northeast Runoff Area=0.575 ac 97.91% Impervious Runoff Depth>2.59"
Tc=5.0 min CN=98 Runoff=1.71 cfs 0.124 af

Reach 1R: POI#1 Inflow=1.78 cfs 0.129 af
Outflow=1.78 cfs 0.129 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.129 af Average Runoff Depth = 2.59"
4.67% Pervious = 0.028 ac 95.33% Impervious = 0.571 ac

Summary for Subcatchment 1S: Existing Northwest Subcatchment

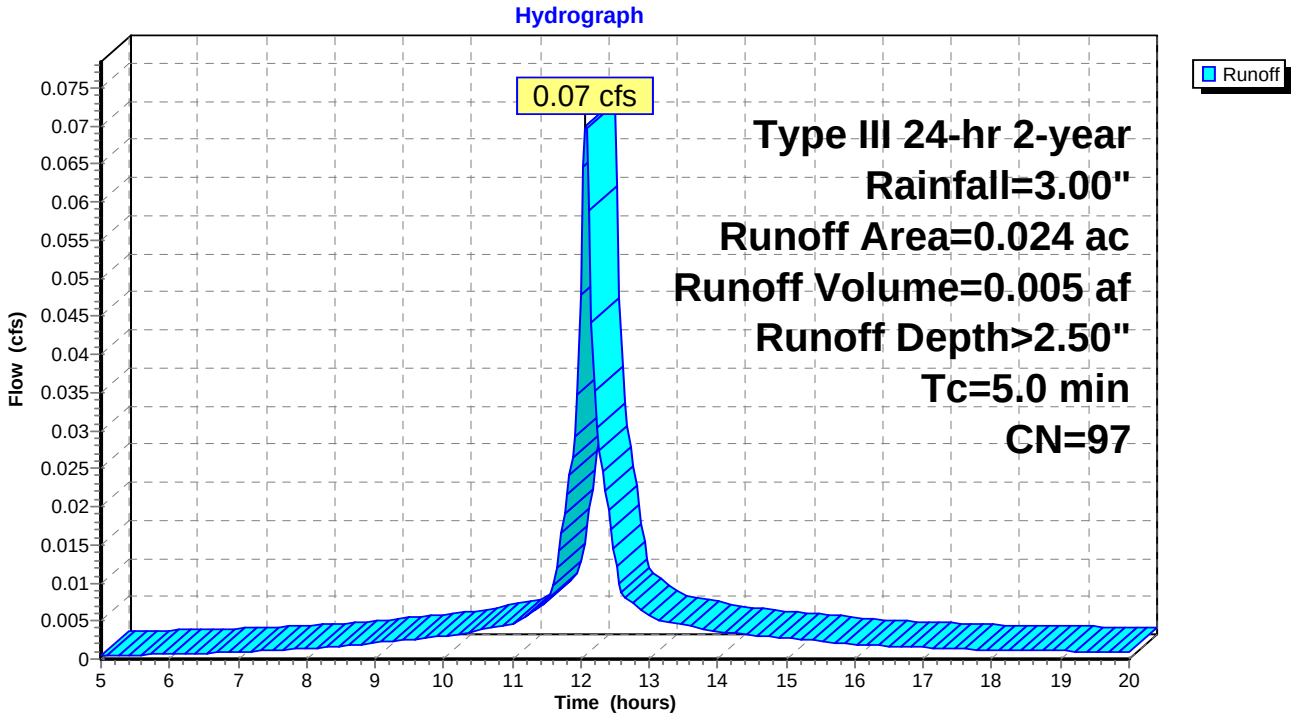
Runoff = 0.07 cfs @ 12.07 hrs, Volume= 0.005 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.00"

	Area (ac)	CN	Description
*	0.008	98	Pavement
*	0.000	98	Building
*	0.016	96	Gravel
	0.024	97	Weighted Average
	0.016		Pervious Area
	0.008		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum 5**

Subcatchment 1S: Existing Northwest Subcatchment



Summary for Subcatchment 2S: Existing Northeast Subcatchment

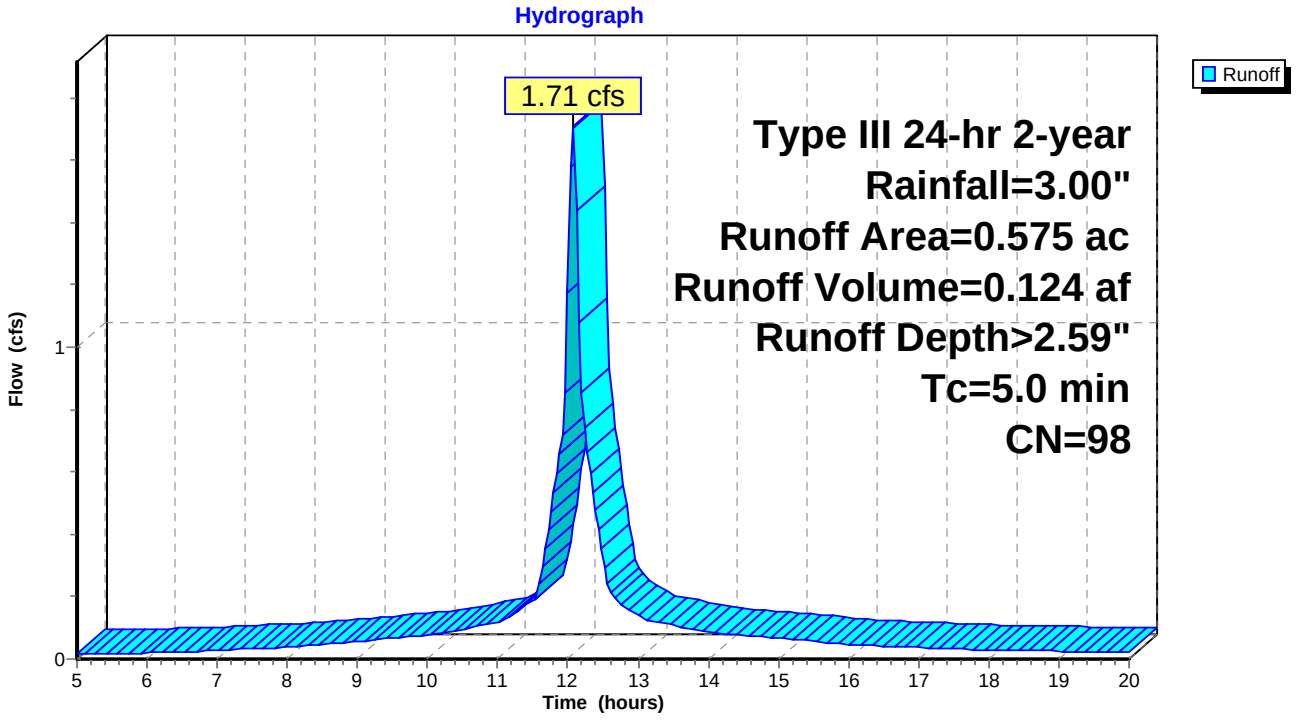
Runoff = 1.71 cfs @ 12.07 hrs, Volume= 0.124 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.00"

	Area (ac)	CN	Description
*	0.012	96	Gravel
*	0.084	98	Building
*	0.479	98	Pavement
	0.575	98	Weighted Average
	0.012		Pervious Area
	0.563		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum 5**

Subcatchment 2S: Existing Northeast Subcatchment



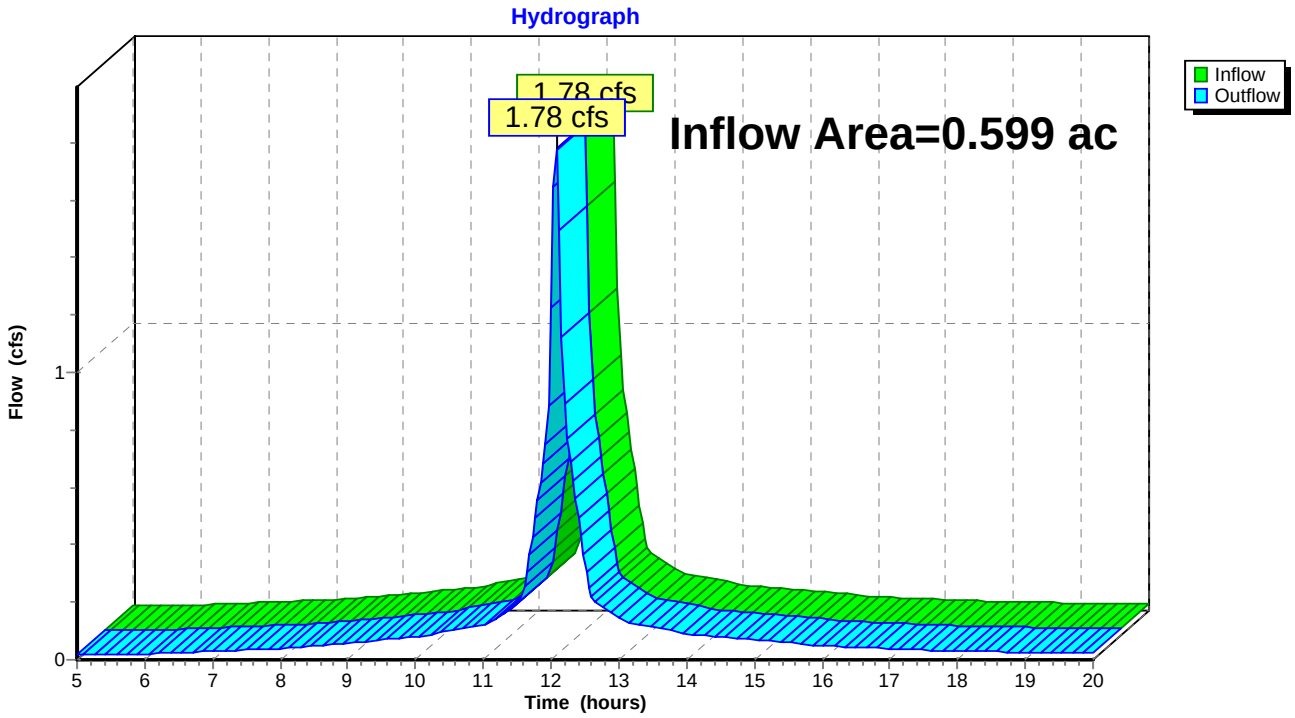
Summary for Reach 1R: POI#1

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

Inflow Area = 0.599 ac, 95.33% Impervious, Inflow Depth > 2.59" for 2-year event
Inflow = 1.78 cfs @ 12.07 hrs, Volume= 0.129 af
Outflow = 1.78 cfs @ 12.07 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs

Reach 1R: POI#1



Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Northwest Runoff Area=0.024 ac 33.33% Impervious Runoff Depth>4.07"
Tc=5.0 min CN=97 Runoff=0.11 cfs 0.008 af

Subcatchment 2S: Existing Northeast Runoff Area=0.575 ac 97.91% Impervious Runoff Depth>4.14"
Tc=5.0 min CN=98 Runoff=2.70 cfs 0.199 af

Reach 1R: POI#1 Inflow=2.81 cfs 0.207 af
Outflow=2.81 cfs 0.207 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.207 af Average Runoff Depth = 4.14"
4.67% Pervious = 0.028 ac 95.33% Impervious = 0.571 ac

Summary for Subcatchment 1S: Existing Northwest Subcatchment

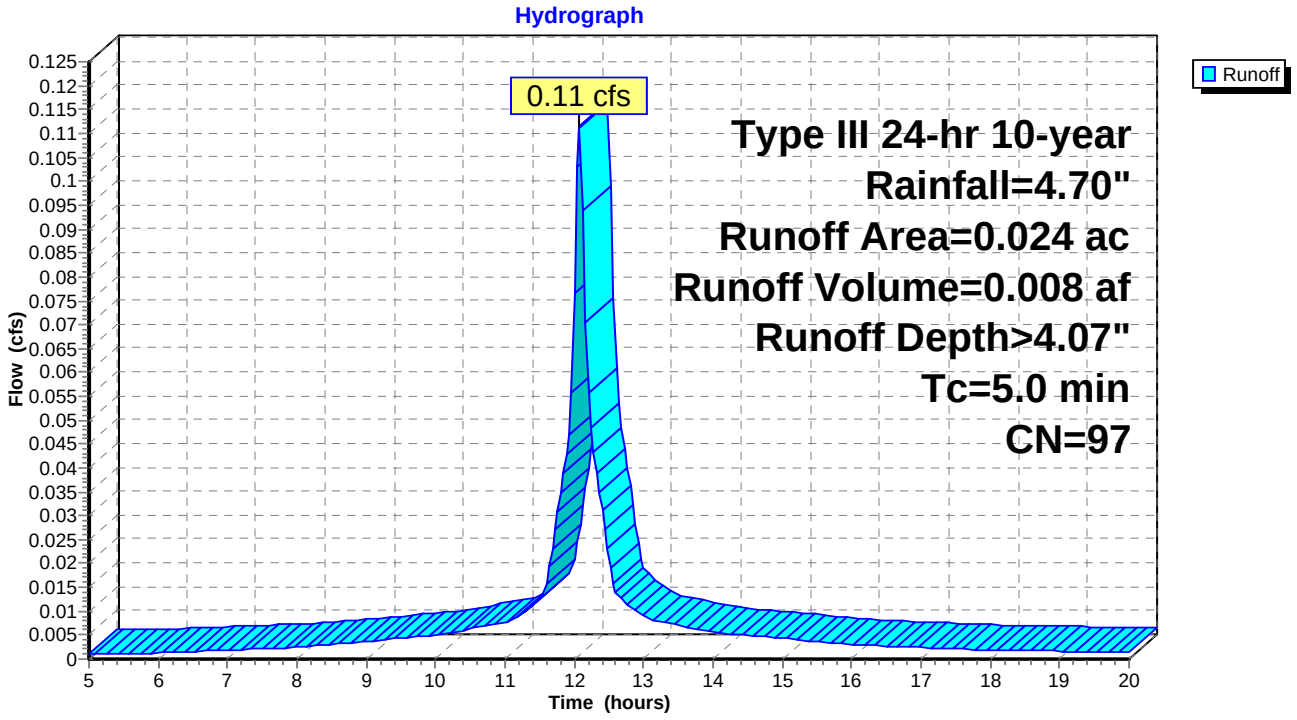
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.008 af, Depth> 4.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (ac)	CN	Description
*	0.008	98	Pavement
*	0.000	98	Building
*	0.016	96	Gravel
	0.024	97	Weighted Average
	0.016		Pervious Area
	0.008		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum 5**

Subcatchment 1S: Existing Northwest Subcatchment



Summary for Subcatchment 2S: Existing Northeast Subcatchment

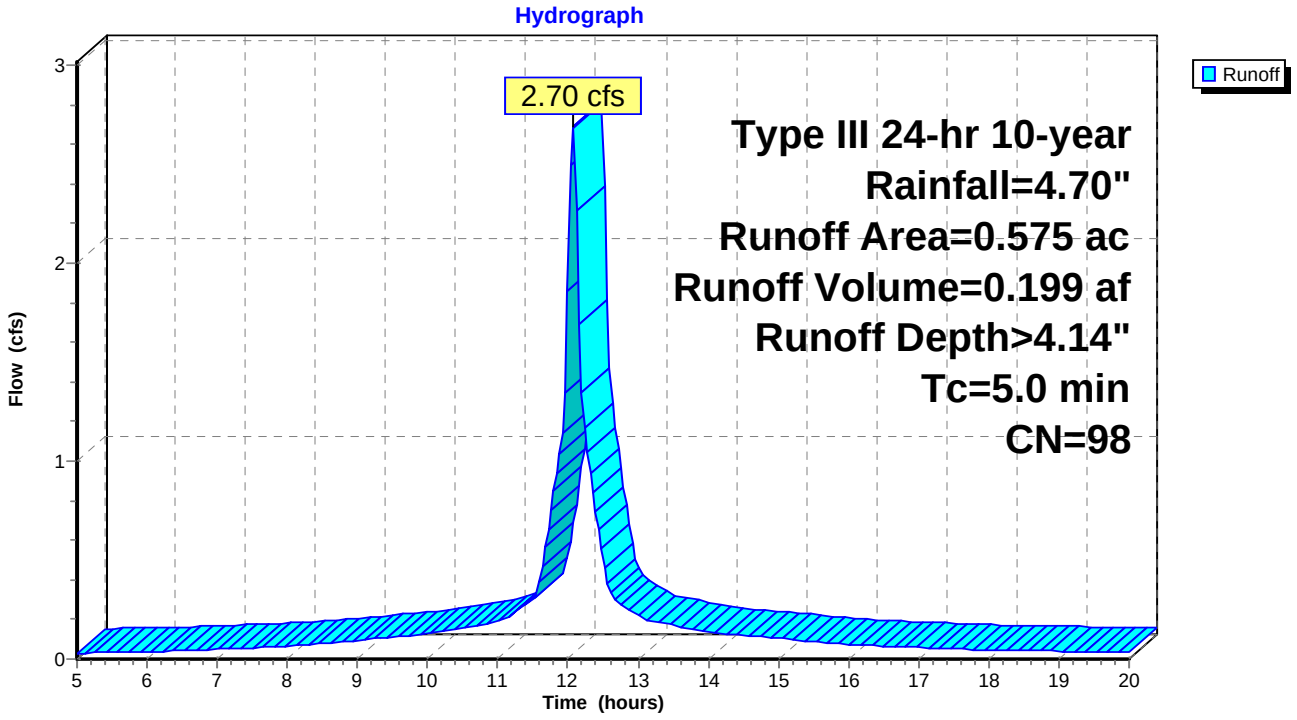
Runoff = 2.70 cfs @ 12.07 hrs, Volume= 0.199 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (ac)	CN	Description
*	0.012	96	Gravel
*	0.084	98	Building
*	0.479	98	Pavement
	0.575	98	Weighted Average
	0.012		Pervious Area
	0.563		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum 5**

Subcatchment 2S: Existing Northeast Subcatchment



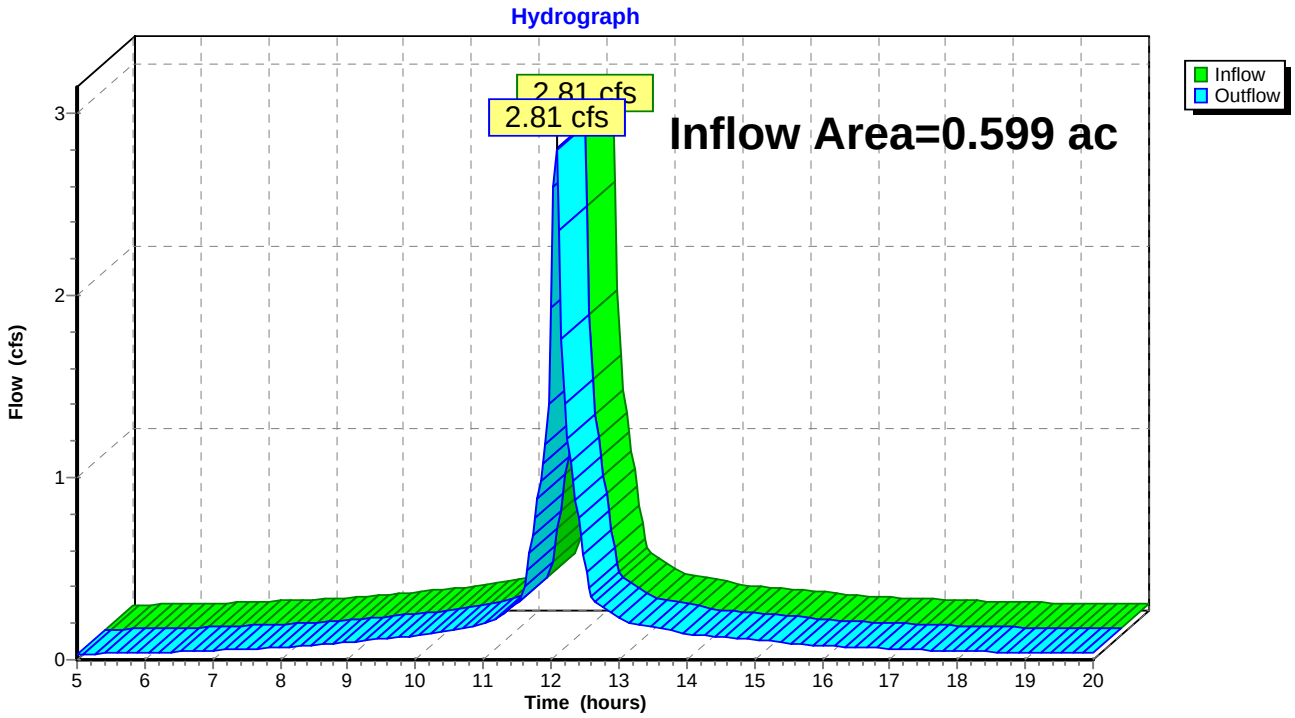
Summary for Reach 1R: POI#1

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

Inflow Area = 0.599 ac, 95.33% Impervious, Inflow Depth > 4.14" for 10-year event
Inflow = 2.81 cfs @ 12.07 hrs, Volume= 0.207 af
Outflow = 2.81 cfs @ 12.07 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs

Reach 1R: POI#1



Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Existing Northwest Runoff Area=0.024 ac 33.33% Impervious Runoff Depth>4.80"
Tc=5.0 min CN=97 Runoff=0.13 cfs 0.010 af

Subcatchment 2S: Existing Northeast Runoff Area=0.575 ac 97.91% Impervious Runoff Depth>4.87"
Tc=5.0 min CN=98 Runoff=3.16 cfs 0.234 af

Reach 1R: POI#1 Inflow=3.29 cfs 0.243 af
Outflow=3.29 cfs 0.243 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.243 af Average Runoff Depth = 4.87"
4.67% Pervious = 0.028 ac 95.33% Impervious = 0.571 ac

Summary for Subcatchment 1S: Existing Northwest Subcatchment

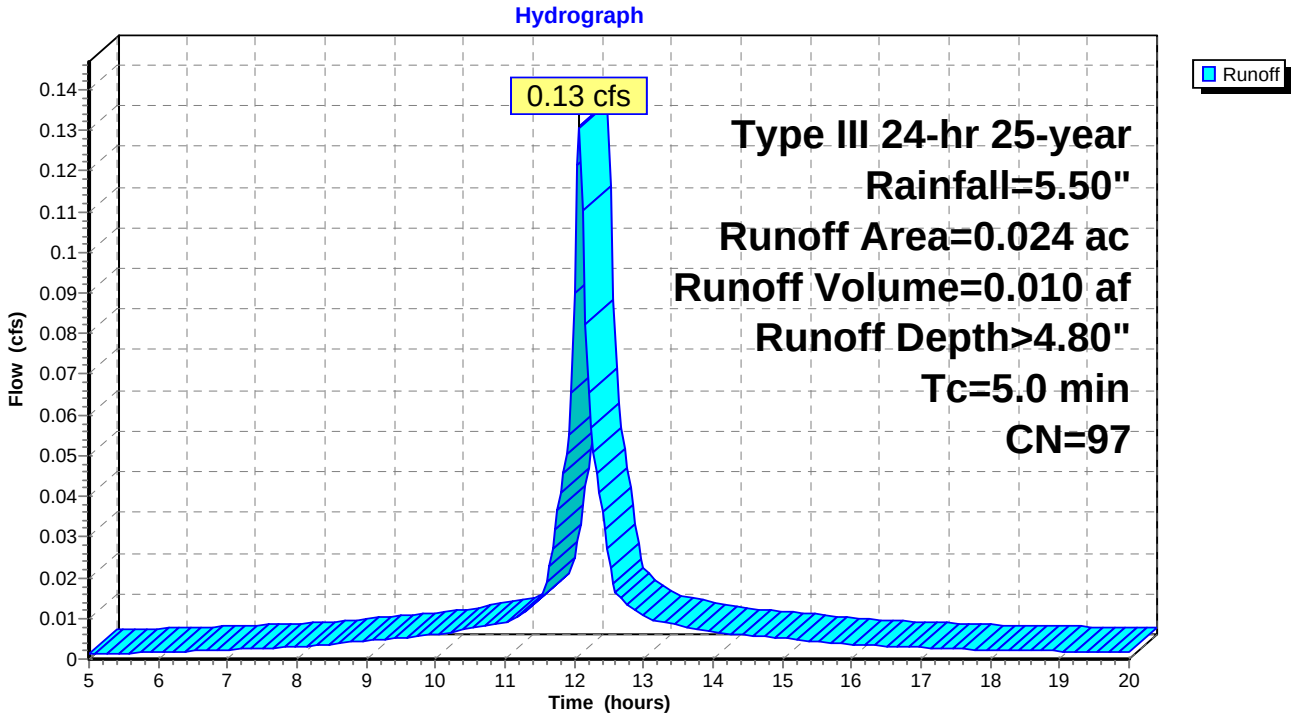
Runoff = 0.13 cfs @ 12.07 hrs, Volume= 0.010 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (ac)	CN	Description
*	0.008	98	Pavement
*	0.000	98	Building
*	0.016	96	Gravel
	0.024	97	Weighted Average
	0.016		Pervious Area
	0.008		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum 5**

Subcatchment 1S: Existing Northwest Subcatchment



Summary for Subcatchment 2S: Existing Northeast Subcatchment

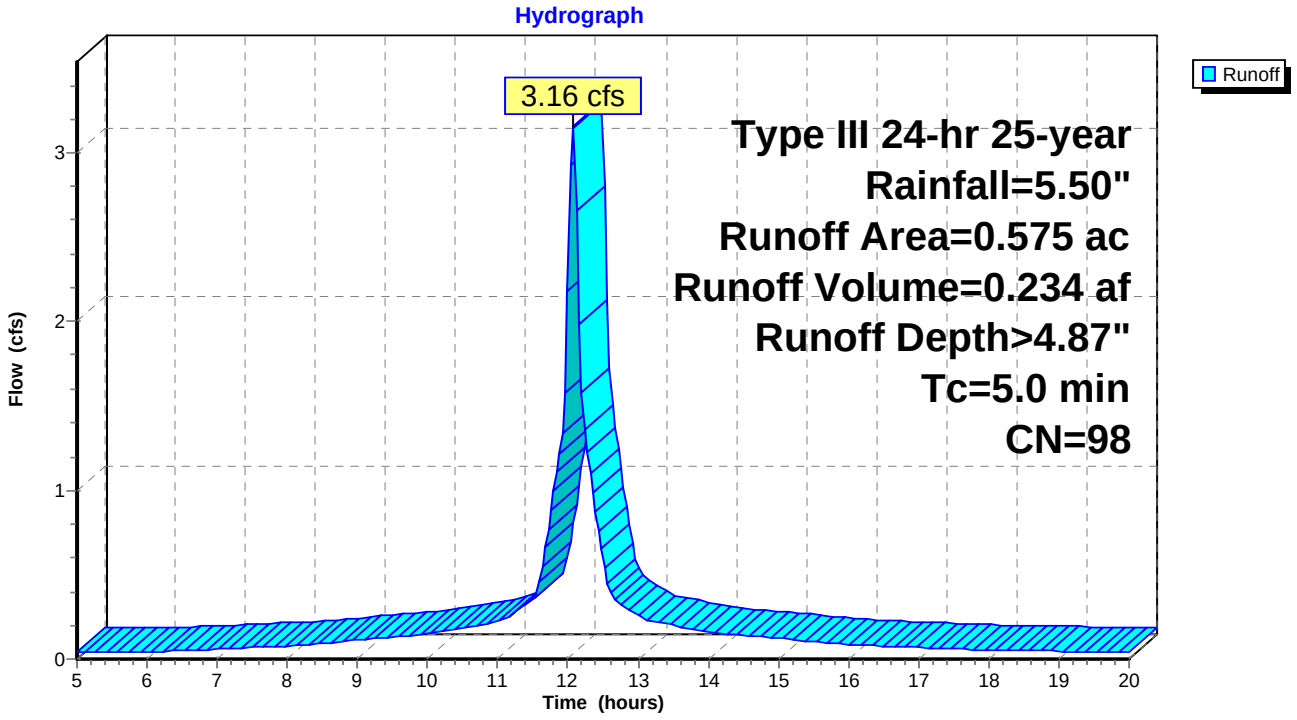
Runoff = 3.16 cfs @ 12.07 hrs, Volume= 0.234 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (ac)	CN	Description
*	0.012	96	Gravel
*	0.084	98	Building
*	0.479	98	Pavement
	0.575	98	Weighted Average
	0.012		Pervious Area
	0.563		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Minimum 5**

Subcatchment 2S: Existing Northeast Subcatchment



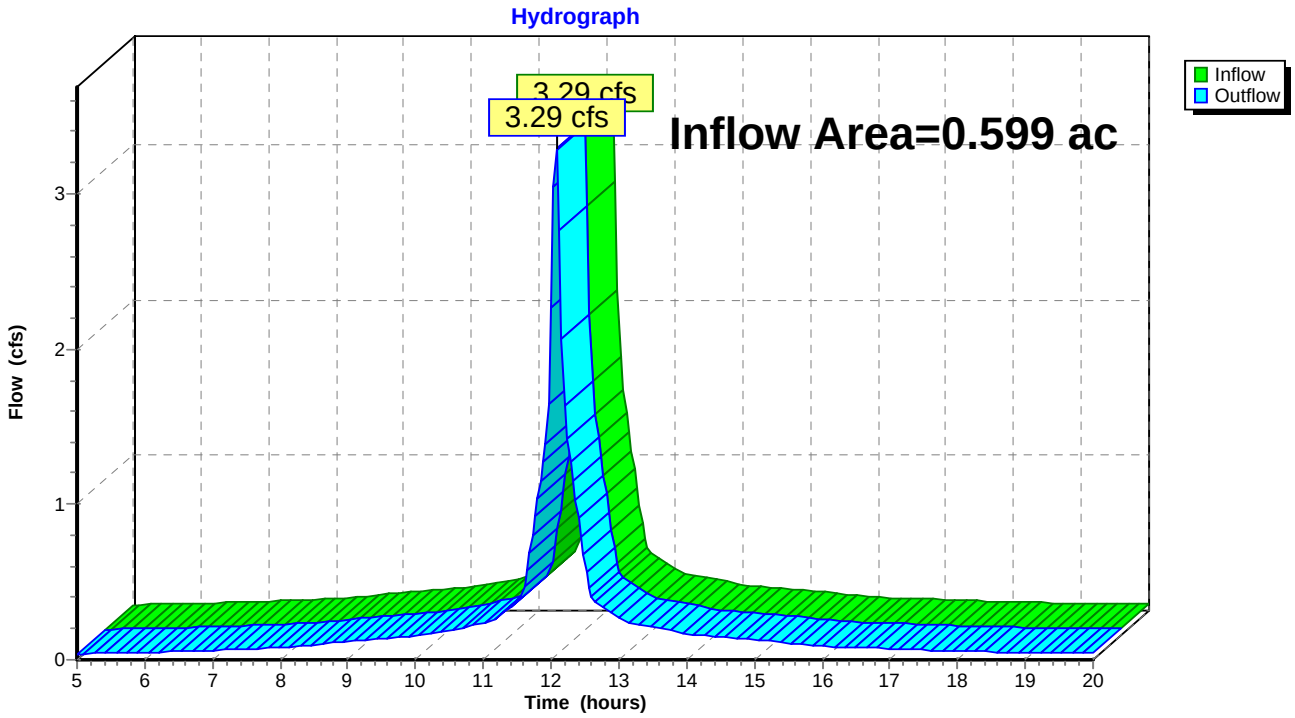
Summary for Reach 1R: POI#1

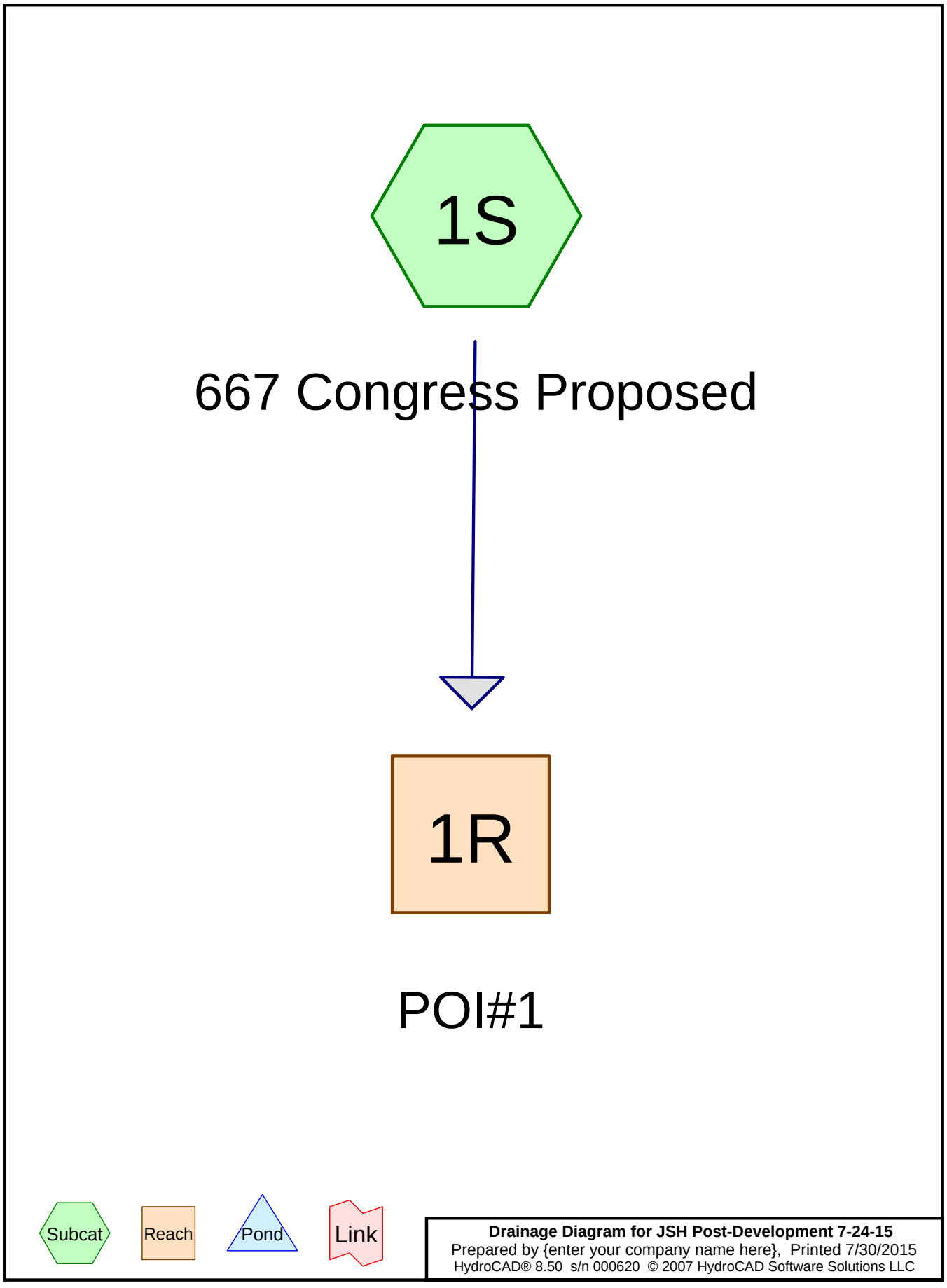
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.599 ac, 95.33% Impervious, Inflow Depth > 4.87" for 25-year event
Inflow = 3.29 cfs @ 12.07 hrs, Volume= 0.243 af
Outflow = 3.29 cfs @ 12.07 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs

Reach 1R: POI#1





Drainage Diagram for JSH Post-Development 7-24-15
Prepared by {enter your company name here}, Printed 7/30/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.599	98	Building & Parking (1S)
0.599		**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.599	Other	1S
0.599		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 667 Congress Proposed Runoff Area=0.599 ac 100.00% Impervious Runoff Depth>2.59"
Tc=5.0 min CN=98 Runoff=1.78 cfs 0.129 af

Reach 1R: POI#1 Inflow=1.78 cfs 0.129 af
Outflow=1.78 cfs 0.129 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.129 af Average Runoff Depth = 2.59"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.599 ac

Summary for Subcatchment 1S: 667 Congress Proposed

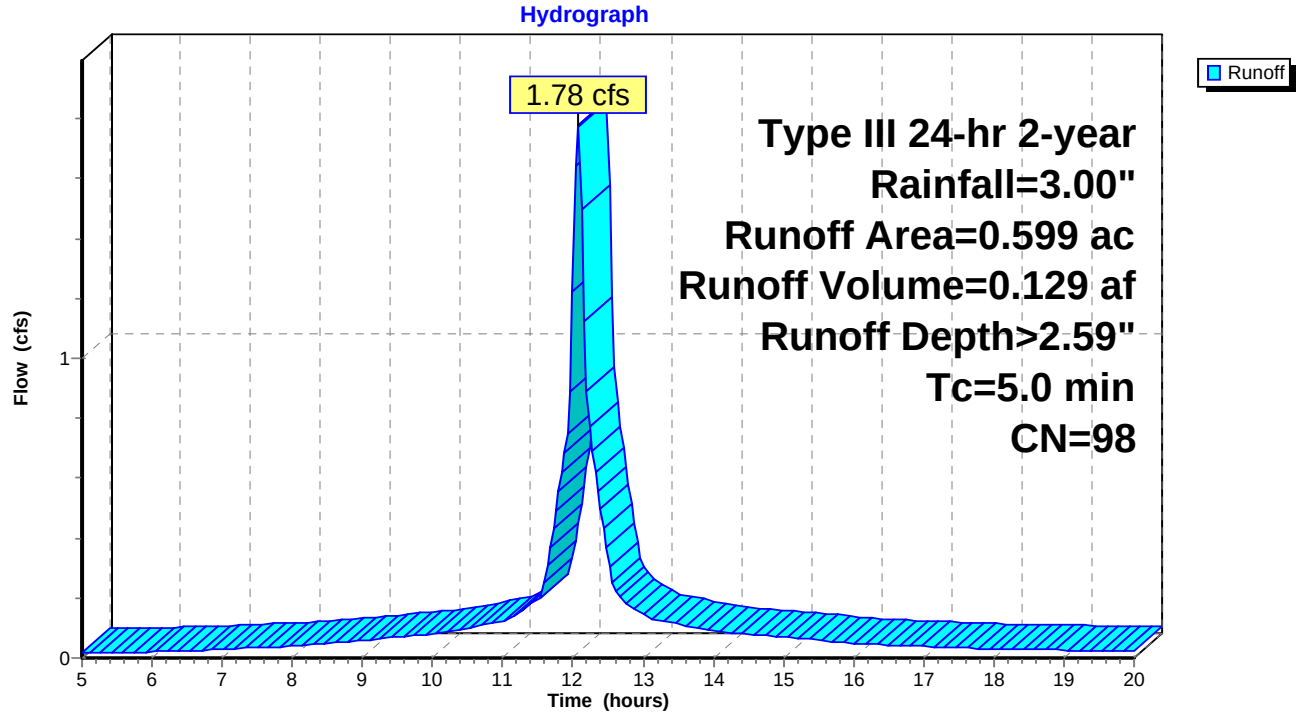
Runoff = 1.78 cfs @ 12.07 hrs, Volume= 0.129 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-year Rainfall=3.00"

	Area (ac)	CN	Description
*	0.599	98	Building & Parking
	0.599		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: 667 Congress Proposed



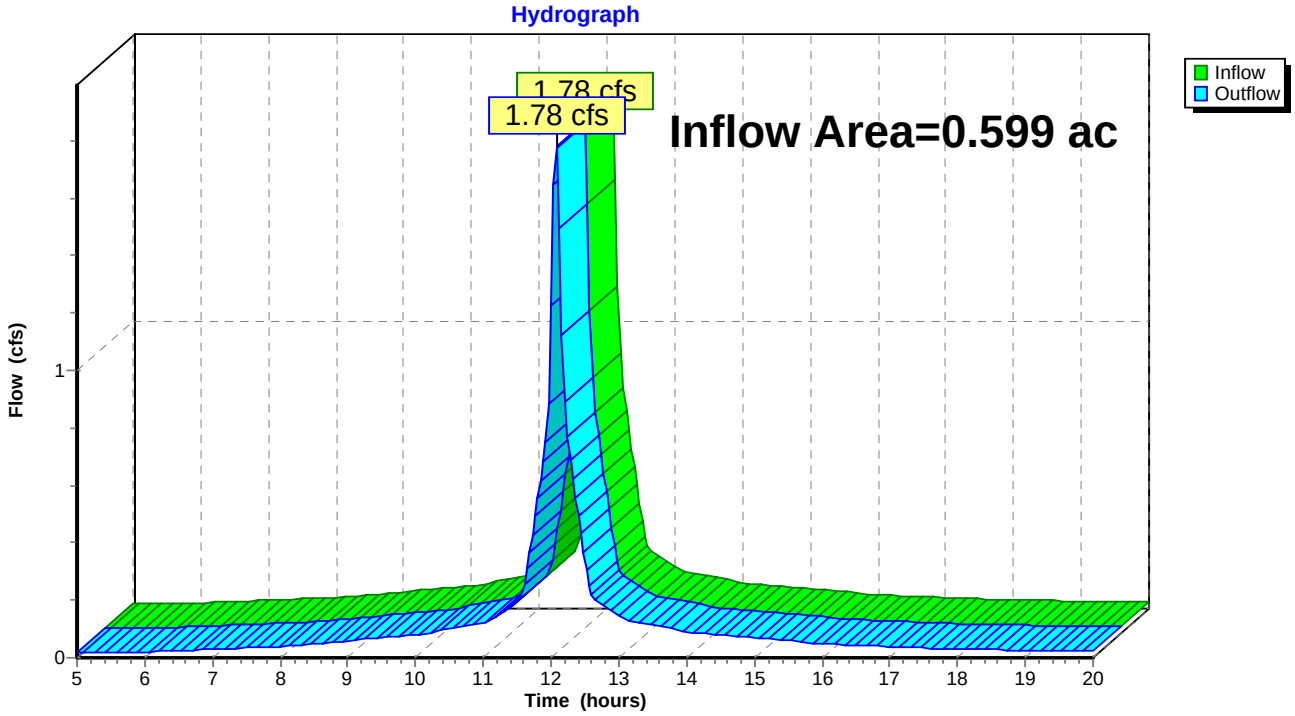
Summary for Reach 1R: POI#1

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

Inflow Area = 0.599 ac,100.00% Impervious, Inflow Depth > 2.59" for 2-year event
Inflow = 1.78 cfs @ 12.07 hrs, Volume= 0.129 af
Outflow = 1.78 cfs @ 12.07 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs

Reach 1R: POI#1



Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 667 Congress Proposed Runoff Area=0.599 ac 100.00% Impervious Runoff Depth>4.14"
Tc=5.0 min CN=98 Runoff=2.81 cfs 0.207 af

Reach 1R: POI#1 Inflow=2.81 cfs 0.207 af
Outflow=2.81 cfs 0.207 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.207 af Average Runoff Depth = 4.14"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.599 ac

Summary for Subcatchment 1S: 667 Congress Proposed

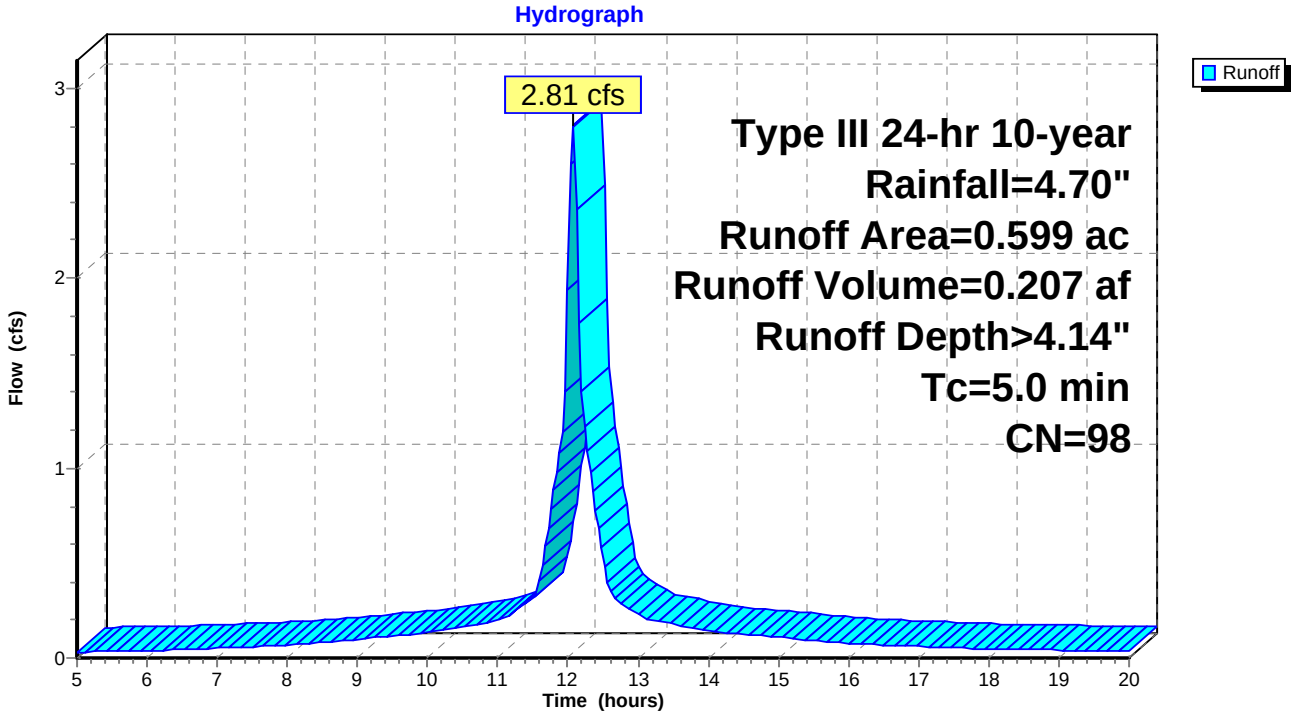
Runoff = 2.81 cfs @ 12.07 hrs, Volume= 0.207 af, Depth> 4.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-year Rainfall=4.70"

	Area (ac)	CN	Description
*	0.599	98	Building & Parking
	0.599		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: 667 Congress Proposed



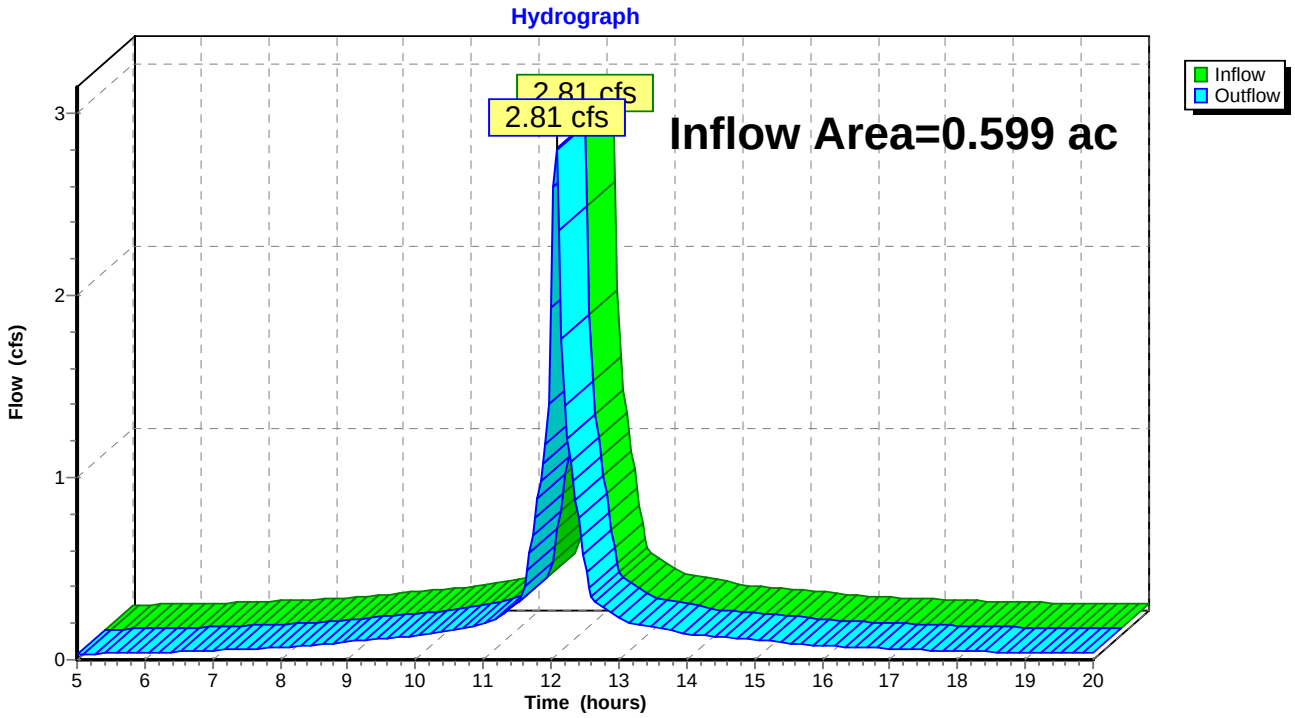
Summary for Reach 1R: POI#1

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

Inflow Area = 0.599 ac,100.00% Impervious, Inflow Depth > 4.14" for 10-year event
Inflow = 2.81 cfs @ 12.07 hrs, Volume= 0.207 af
Outflow = 2.81 cfs @ 12.07 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs

Reach 1R: POI#1



Time span=5.00-20.00 hrs, dt=0.04 hrs, 376 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: 667 Congress Proposed Runoff Area=0.599 ac 100.00% Impervious Runoff Depth>4.87"
Tc=5.0 min CN=98 Runoff=3.29 cfs 0.243 af

Reach 1R: POI#1 Inflow=3.29 cfs 0.243 af
Outflow=3.29 cfs 0.243 af

Total Runoff Area = 0.599 ac Runoff Volume = 0.243 af Average Runoff Depth = 4.87"
0.00% Pervious = 0.000 ac 100.00% Impervious = 0.599 ac

Summary for Subcatchment 1S: 667 Congress Proposed

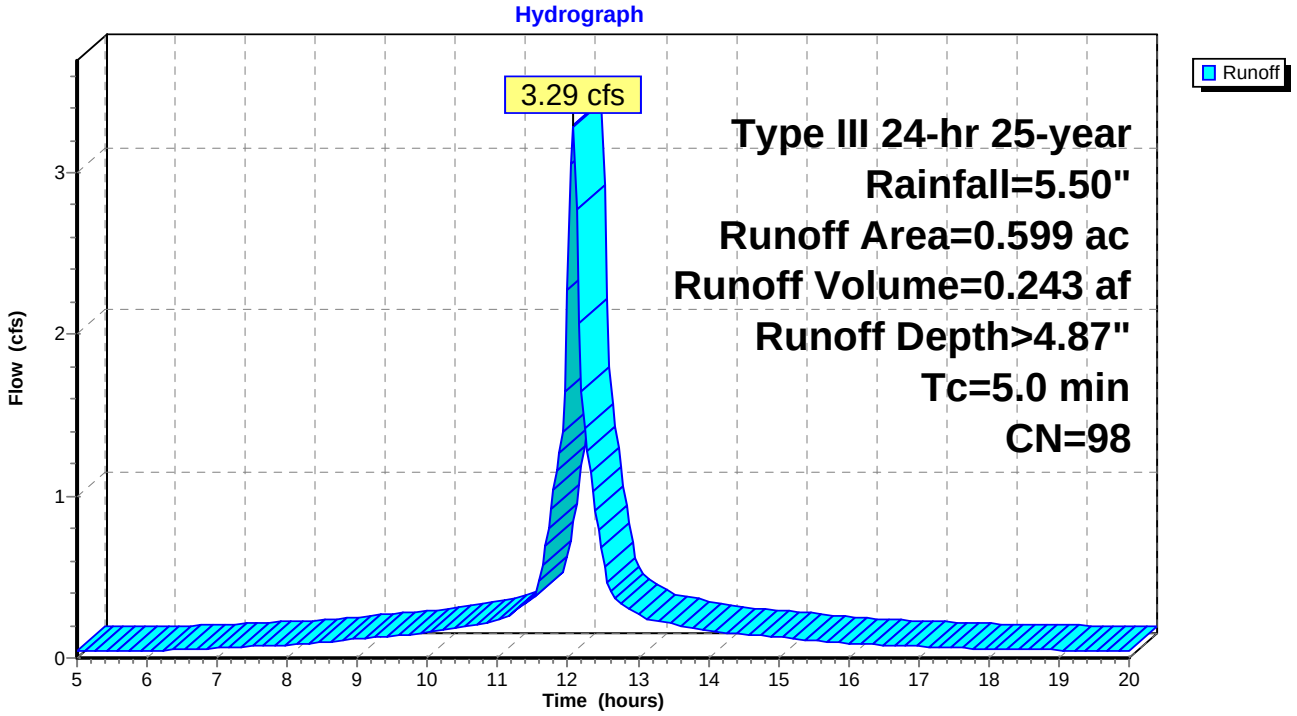
Runoff = 3.29 cfs @ 12.07 hrs, Volume= 0.243 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-year Rainfall=5.50"

	Area (ac)	CN	Description
*	0.599	98	Building & Parking
	0.599		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: 667 Congress Proposed



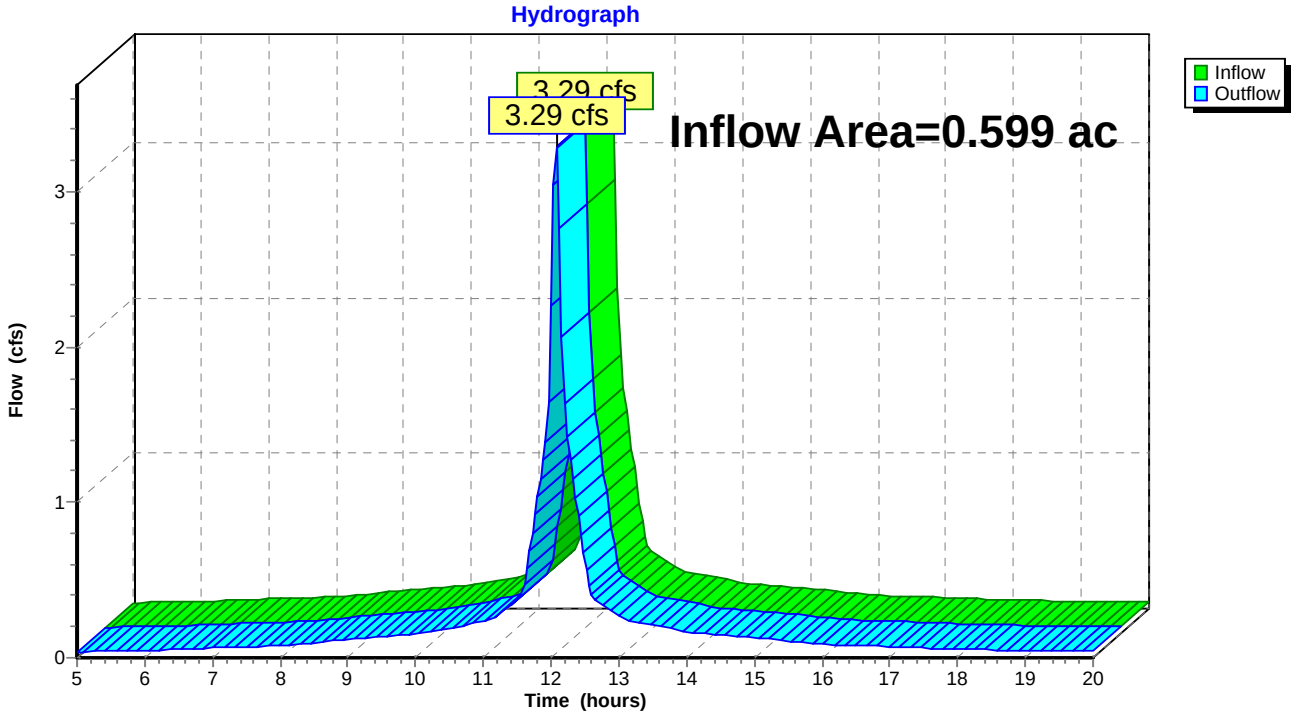
Summary for Reach 1R: POI#1

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

Inflow Area = 0.599 ac,100.00% Impervious, Inflow Depth > 4.87" for 25-year event
Inflow = 3.29 cfs @ 12.07 hrs, Volume= 0.243 af
Outflow = 3.29 cfs @ 12.07 hrs, Volume= 0.243 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.04 hrs

Reach 1R: POI#1



PLAN REFERENCE

AERIAL IMAGE (MAY 18, 2012) OBTAINED FROM GOOGLE EARTH.

LEGEND

B-1	SUMMIT TEST BORING (MARCH 31, 2015)
P-1	SUMMIT TEST PROBE (MARCH 31, 2015)
B-101	SUMMIT TEST BORING (APRIL 15, 2015)
P-101	SUMMIT TEST PROBE (APRIL 15, 2015)

REVISED: APRIL 16, 2015 - ADDITIONAL TEST BORINGS AND PROBES

REVISED: APRIL 6, 2015 - UPDATE LOCATIONS OF BORINGS AND PROBES

SUBSURFACE EXPLORATION LOCATION PLAN

PROPOSED BUILDING SITE

665 CONGRESS STREET - PORTLAND, MAINE

PREPARED FOR

REDFERN PROPERTIES

DATE: 4-1-2015	DRAWN BY: KRF	CHECKED BY: WMP
JOB: 15040	SCALE: 1" = 40'	FILE: 15040 BOR

145 LISBON ST. - SUITE 601
LEWISTON, ME 04240
Tel.: (207) 576-3313

173 PLEASANT STREET
ROCKLAND, ME 04841
Tel.: (207) 318-7761

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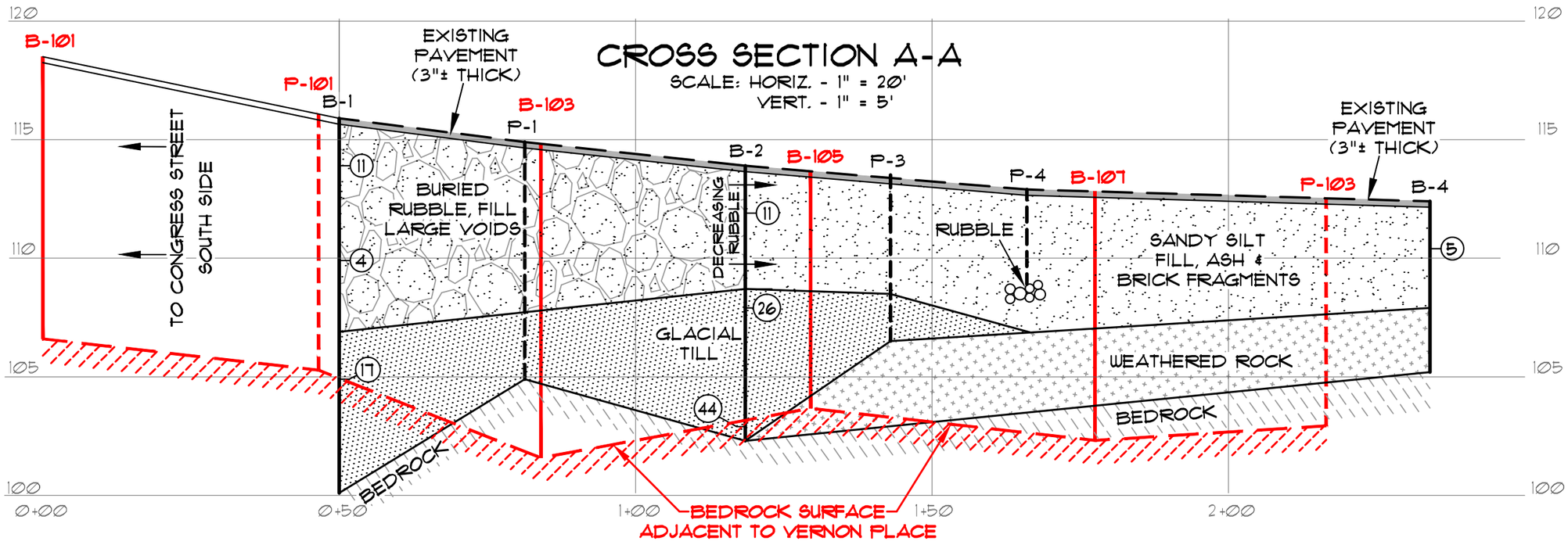
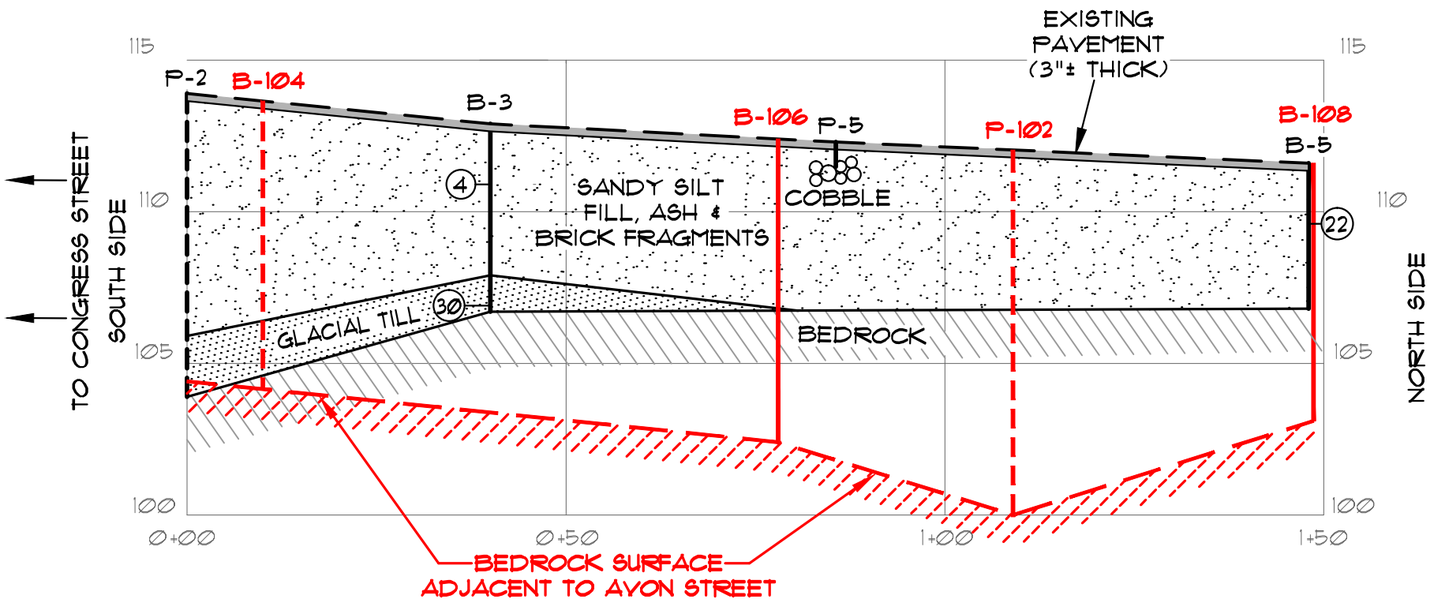
GEOENGINEERING SERVICES
www.summitgeoeng.com

CROSS SECTION A-A

SCALE: HORIZ. - 1" = 20'
VERT. - 1" = 5'



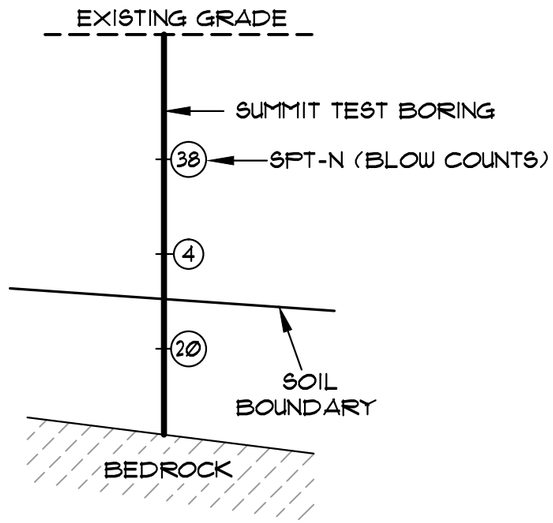
REVISED: APRIL 20, 2015 - CORRECTED SCALE OF CROSS SECTION B-B AND ADDED RED LINES
REVISED: APRIL 6, 2015 - UPDATE LOCATIONS AND ELEVATIONS OF BORINGS AND PROBES



CROSS SECTION B-B

SCALE: HORIZ. - 1" = 20'
VERT. - 1" = 5'

LEGEND



PROJECT:
PROPOSED BUILDING SITE
665 CONGRESS STREET - PORTLAND, MAINE

CLIENT:
REDFERN PROPERTIES

TITLE:
INTERPRETIVE SOIL PROFILES

SCALE: AS NOTED
DRAWN BY: KRF
DATE: APRIL 2, 2015
APPR. BY: WAP

SUMMIT
GEOENGINEERING SERVICES
173 PLEASANT STREET
ROCKLAND, ME 04841
Tel: (207) 318-7161
145 LISBON ST. - SUITE 601
LEWISTON, ME 04240
Tel: (207) 576-3313

PROJ.#: 15040

FIGURE:
1

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EXPLORATION COVER SHEET

The exploration logs are prepared by the geotechnical engineer from both field and laboratory data. Soil descriptions are based upon the Unified Soil Classification System (USCS) per ASTM D2487 and/or ASTM D2488 as applicable. Supplemental descriptive terms for estimated particle percentage, color, density, moisture condition, and bedrock may also be included to further describe conditions.

Drilling and Sampling Symbols:

SS = Split Spoon Sample
UT = Thin Wall Shelby Tube
SSA = Solid Stem Auger
HSA = Hollow Stem Auger
RW = Rotary Wash
SV = Shear Vane
PP = Pocket Penetrometer
RC = Rock Core Sample
Hyd = Hydraulic Advancement of Drilling Rods
Push = Direct Push of Drilling Rods
WOH = Weight of Hammer
WOR = Weight of Rod
PI = Plasticity Index
LL = Liquid Limit
W = Natural Water Content
USCS = Unified Soil Classification System

Water Level Measurements:

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations. Groundwater monitoring wells may be required to record accurate depths and fluctuation.

Gradation Description and Terminology:

Boulders:	Over 12 inches	Trace:	Less than 5%
Cobbles:	12 inches to 3 inches	Little:	5% to 15%
Gravel:	3 inches to No.4 sieve	Some:	15% to 30%
Sand:	No.4 to No. 200 sieve	Silty, Sandy, etc.:	Greater than 30%
Silt:	No. 200 sieve to 0.005 mm		
Clay:	less than 0.005 mm		

Density of Granular Soils and Consistency of Cohesive Soils:

CONSISTENCY OF COHESIVE SOILS		DENSITY OF GRANULAR SOILS	
SPT N-value blows/ft	**Consistency**	**SPT N-value blows/ft**	**Relative Density**
0 to 2	Very Soft	0 to 4	Very Loose
2 to 4	Soft	5 to 10	Loose
5 to 8	Firm	11 to 30	Compact
9 to 15	Stiff	31 to 50	Dense
16 to 30	Very Stiff	>50	Very Dense
>30	Hard		

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GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	**B-1**
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	115.9'
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	2-1/2" H.S.A.	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						2" to 2.5" of Pavement		PAVEMENT
1								0.2'
	S-1	24/4	1 to 3	6		Dark tan Gravelly SAND, little Silt, compact, humid,		FILL
2				11		SP-SM		
				*		* Spoon sampler skewed horizontally, unable to collect		2.0'
3				*		blow counts. Likely due to encountered rubble		
4						Auger advancement produced no cuttings, likely rubble		
						fill with large voids		
5								
	S-2	24/3	5 to 7	WH		Light gray Sandy GRAVEL, cobble pieces, little white Ash		
6				1		trace Silt, very loose, humid, GP		
				3				
7				1				
8								
9								
								9.0'
10								GLACIAL TILL
	S-3	24/20	10 to 12	6		Olive green SILT, little Clay and Sand, trace Gravel,		
11				8		compact, humid, ML	PP = 8,000 to	
				9			9,000 psf	
12				12				
13								
14								
15								
	S-4	24/9	15 to 17	6		Same as above, slightly mottled		
16				50/3"				
						End of Exploration at 15.8', Auger and Spoon refusal		15.8'
17								BEDROCK
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-2
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	114 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	2-1/2" H.S.A.	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						2" to 2.5" of Pavement		PAVEMENT
1	S-1	24/20	1 to 3	3		Dark brown Gravelly SAND, little Silt and black/white Ash,		0.2' FILL
2				6		loose to compact, frozen, SP-SM		
				5				
3				3				
4								
5	S-2	24/22	5 to 7	10		Same as above		
6				13		Olive green slightly mottled SILT, little Sand, trace Clay		5.2' GLACIAL TILL
				13		and Gravel, compact, damp, ML		
7				14				
8								
9								
10	S-3	24/16	10 to 12	8		Same as above, heavily mottled seam at 10.8', dense	PP = 4,000 to 7,000 psf	
11				12				
				32				
12				50/1"		End of Exploration at 11.6', Spoon refusal		11.6' BEDROCK
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-3
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.9 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	2-1/2" H.S.A.	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" to 3.5" of Pavement		PAVEMENT
1								0.3'
	S-1	24/12	1 to 3	4		Dark brown SILT, large brick fragment in spoon, small		FILL
2				11*		brick fragment in spoon tip, loose, humid, ML		
				4				
3				2		* blow count due to brick fragment		
4								
5								
	S-2	24/12	5 to 7	12		Olive green SILT, little Sand, trace Clay and Gravel,		5' +/-
6				18		compact, humid, ML	PP = 5,000 psf	GLACIAL TILL
				50/3"				
7						End of Exploration at 6.2', Spoon and Auger refusal		6.2'
								BEDROCK
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
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21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-4
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.5 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	2-1/2" H.S.A.	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						2.5" of Pavement		PAVEMENT
1								0.2'
	S-1	24/10	1 to 3	2		Brown Sandy SILT, little fine Gravel and black Ash, loose, humid, ML		FILL
2				2				
				3				
3				2				
						Auger cuttings show increasing ash content with depth and some brick fragments		
4								
	S-2	24/2	4.5 to 6.5	50/5"		Weathered rock fragments in spoon tip		
5								4.5'
						Augered through weathered rock to competent refusal		WEATHERED ROCK
6								
7								
						End of Exploration at 7.2', Auger refusal		7.2'
8								BEDROCK
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-5
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.5 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	AMS Power Probe	Diameter:	2"OD/1.5"ID
Method:	2-1/2" H.S.A.	Hammer:	140 lb
Hammer Style:	Auto	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						2.5" of Pavement		PAVEMENT
1								0.2'
	S-1	24/8	1 to 3	15		Dark brown to black Sandy SILT, little Gravel and black		FILL
2				16		and white Ash, ML		
				6				
3				2				
4								
						Dense drilling at 4.8'		
5	S-2	24/1	4.8 to 6.8	50/3"		Rock in spoon tip		
						End of Exploration at 4.8', Spoon and Auger refusal		4.8'
6								BEDROCK
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-101
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	118.5 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	Mobile B-53	Diameter:	2"OD/1.5"ID
Method:	4" Solid Stem Auger	Hammer:	140 lb
Hammer Style:	R&C	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1	S-1	24/4	0.5 to 2.5	4		Brown Silty SAND, loose, humid, SM		0.25' FILL
				3				
2				3				
				3				
3								
4						Possible rubble encountered at 4' during drilling		
5								
	S-2	24/4	5 to 7	7		Brown Silty SAND, trace Gravel, compact humid, SM		
6				7				
				7				
7				7				
8								
9								
10								
	S-3	24/12	10 to 12	4		Dark olive green SILT, little Sand and Gravel, trace Clay,		10.0' +/-
11				8		dense/very stiff, slightly mottled, humid, ML	PP = *1,000 to *3,000 psf	GLACIAL TILL
				30				
12				50/5		* = Specimen failed via tension crack, low clay content		
						End of Exploration at 11.9', Auger and Spoon refusal		11.9' BEDROCK
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-102
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	118.7 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	Mobile B-53	Diameter:	2"OD/1.5"ID
Method:	4" Solid Stem Auger	Hammer:	140 lb
Hammer Style:	R&C	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1	S-1	24/4	0.5 to 2.5	4		Dark brown Silty SAND, little Gravel, Gravel pieces in spoon tip, loose, dry, SM		0.25' FILL
				5				
2				5				
				3				
3						Rubble fill, large voids apparent from open hole inpection		
4						Auger encountered refusal at 4.9' during drilling. Moved over 1' and attempted to drill past, refusal encountered in second hole at 3.2'		
5								
						End of Exploration at 4.9', Auger refusal on rubble		4.9'
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-103
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	115.0 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method: 4" Solid Stem Auger	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1	S-1	24/8	0.5 to 2.5	4		Brown to dark brown SAND, trace silt, large brick fragment		0.25'
				6		in top 4" of sample, brick fragment in spoon tip, loose,		FILL
2				7		humid, SP		
				9				
3								
4								
5								
	S-2	24/6	5 to 7	5		same as above, no brick fragment, some white Ash		
6				7				
				15				
7				15				
8								
9								
								9.0' +/-
10								GLACIAL TILL
	S-3	24/20	10 to 12	14		Olive green SILT, little Gravel, Sand, and Clay, cobble	PP = 6,000 to	
11				24		pieces fro 10.5 to 11.0', humid, dense/hard, ML	> 9,000 psf	
				20				
12				20				
13								
14								
15						End of Exploration at 14.5', Auger refusal		14.5'
								BEDROCK
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-104
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	113.1 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method: 4" Solid Stem Auger	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						4" Pavement		PAVEMENT
1						Augered to 5', relatively easy drillling (no rubble)		0.3' FILL
2								
3								
4								
5								
	S-1	24/18	5 to 7	7		Olive green SILT, little Gravel, Sand, and Clay, mottled,	PP = 5,000 to	5.0' +/-
6				7		damp, compact/very stiff, cobble pieces at 6.5', ML	7,000 psf	GLACIAL TILL
				17				
7				23				
8								
9								8.5' WEATHERED ROCK
10						End of Exploration at 9.5', Auger refusal		9.5' BEDROCK
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-105
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	113.8 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method: 4" Cased Wash	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1						Augered to refusal for Rock Core		0.25'
2								
3								
4								
5								
6								
7								
8								
9								
10	ROCK CORE DATA							9.1' +/- WEATHERED ROCK
	RUN	DEPTH	RUN	RECOVERY	RQD			10.0'
11	C-1a	10 to 13.3	40"	70%	0%	Moderately weathered, very thinly spaced vertical joints, very hard, light to medium gray SCHIST		BEDROCK
12								
13								
	C-1b	13.3 to 15	20"	100%	80%	Same as above, moderately spaced joints		
14								
15								
						End of Exploration at 15.0', rock core terminated		15.0'
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Boring #: **B-106**

Project:	Proposed Apartment Building	Project #:	15040
Location:	665 Congress St.	Sheet:	1 of 1
City, State:	Portland, ME	Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	112.0 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method: 4" Cased Wash	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						3" Pavement		PAVEMENT
1						Augered to refusal for Rock Core		0.25'
2								
3								
4						Dense drilling from approximately 2' to 8', frequent rubble or cobble		
5								
6								
7								
8								
9								
10	ROCK CORE DATA							
	RUN	DEPTH	RUN	RECOVERY	RQD			10.0'
11	C-2	10 to 15	60"	66%	33%	Moderately weathered, very thinly spaced joints, very hard light gray to blue SCHIST		BEDROCK
12						most fractures range from 45° to vertical		
13								
14								
15								
	C-3	15 to 19	48"	96%	65%	Same as above, most joints and fractures are vertical		
16								
17								
18								
19								
20						End of Exploration at 19.0', rock core terminated		19.0'
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	**B-107**
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	112.9 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method: 4" Solid Stem Auger	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						4" Pavement		PAVEMENT
1	S-1	24/6	0.5 to 2.5	3		Dark brown Sandy SILT, trace Ash and Brick fragments, loose, dry, ML		0.3' FILL
				4				
2				4				
				3				
3								
4								
5								
	S-2	24/24	5 to 7	7		Olive green SILT, slight mottling, litte fine Sand, trace Gravel and Clay, compact/very stiff, humid, ML		5.0' +/- GLACIAL TILL
6				10				
				14				
7				14				
8								
9								
10						Soft rock encountered during augering, drilled 1.5' into rock to hard refusal		9.0' +/- WEATHERED ROCK
11						End of Exploration at 10.5', Auger refusal		10.5' BEDROCK
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL BORING LOG

Project:	Proposed Apartment Building	Boring #:	B-108
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	110.2 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD		SAMPLER	
Vehicle:	Tracked	Length:	24" SS
Model:	Mobile B-53	Diameter:	2"OD/1.5"ID
Method:	4" Solid Stem Auger	Hammer:	140 lb
Hammer Style:	R&C	Method:	ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
						4" Pavement		PAVEMENT
1	S-1	24/10		8		Tan fine to coarse SAND, little silt, compacy, humid, SW-SM		0.3'
				9				
2				8		large Brick fragment and white ASH		1.1' +/-
				3				
3								FILL
4								
5								
	S-2	24/4		*50/6"		Light brown Gravelly SAND, cobble piece in spoon tip,		
6						humid, SP		
						* high blow count due to cobble in fill		
7								
8								
9						End of Exploration at 8.5', Auger refusal		8.5'
								BEDROCK
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-1
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	114.9 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: AMS Power Probe	Diameter: N/A
Method: 2-1/2" H.S.A.	Hammer: N/A
Hammer Style: Auto	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015			

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		2.5" of Pavement		PAVEMENT
1								0.2' FILL
2								
3						Dense drilling at 3', likely rubble		
4						Auger advancement produced no cuttings, large voids apparent from hole inspection, likely rubble fill		
5								
6								
7								
8								
9								
10								9.0' +/- WEATHERED ROCK
11						End of Probe at 10.0', Auger Refusal		10.0' BEDROCK
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-2
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	113.9 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: AMS Power Probe	Diameter: N/A
Method: 2-1/2" H.S.A.	Hammer: N/A
Hammer Style: Auto	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015			

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		2.5" of Pavement		PAVEMENT
1								0.2' FILL
2						Auger cuttings: tan Sandy SILT, some brick fragments,		
3								
4								
5								
6								
7								
8								
9								
10								9.0' +/- WEATHERED ROCK
11						End of Probe at 10.0', Auger refusal		10.0' BEDROCK
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-3
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.8 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: AMS Power Probe	Diameter: N/A
Method: 2-1/2" H.S.A.	Hammer: N/A
Hammer Style: Auto	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015			

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		3.5" of Pavement		PAVEMENT
1						Dense drilling at 8", moved over and started new hole		0.3' FILL
2						Auger cuttings: Dark tan SAND, little Silt and Gravel		
3								
4								
5								
6						Auger cuttings: similar to above, little Clay		5.0' +/- GLACIAL TILL
7								
8						Auger cuttings: light tan fine SAND (rock dust)		7.0' +/- WEATHERED ROCK
9								
10				↓				
11						End of Probe at 9.9', Auger refusal		9.9' BEDROCK
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-4
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.9 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: AMS Power Probe	Diameter: N/A
Method: 2-1/2" H.S.A.	Hammer: N/A
Hammer Style: Auto	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015			

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		3.5" of Pavement		PAVEMENT
1						Auger refusal at 2', moved over and started new hole		0.3' FILL
2								
3						Encountered dense drilling at 2' again in second hole, drilled past it. Dense driilling ecountered again at 4'. Likely rubble		
4								
5						End of Probe at 4.0', Auger refusal		4.0' RUBBLE
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-5
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.3 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: AMS Power Probe	Diameter: N/A
Method: 2-1/2" H.S.A.	Hammer: N/A
Hammer Style: Auto	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015			

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		3" of Pavement		PAVEMENT
1				↓		Auger refusal at 9"', moved over and started new hole, encounered same refusal. Likely cobble		0.3'
2						End of Probe at 0.8', Auger refusal		0.8' COBBLE
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-6
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Summit Geoengineering Services	Boring Elevation:	112.3 ft
Driller:	C. Coolidge, P.E.	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 3/31/2015	Date Completed: 3/31/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: AMS Power Probe	Diameter: N/A
Method: 2-1/2" H.S.A.	Hammer: N/A
Hammer Style: Auto	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
3/31/2015			

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		2.5" of Pavement		PAVEMENT
1								0.2' FILL
2						Auger cuttings: Black Sandy SILT, frequent brick fragments, little Clay and black Ash		
3								
4								
5								
6						End of Probe at 5.0', Auger refusal		5.0' BEDROCK
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	**P-101**
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	116.4 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: N/A
Model: Mobile B-53	Diameter: N/A
Method 4" Solid Stem Auger	Hammer: N/A
Hammer Style: R&C	Method: N/A

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		3" Pavement		PAVEMENT
1						Very difficult drilling, frequent rubbe encountered, refusal encountered in first hole at 4.5', moved over 1' to start new hole		0.25' +/- FILL
2								
3								
4								
5								
6								
7								
8								
9								
10						Smoother drilling started around 9', assumed transizion zone into native till		9' +/- GLACIAL TILL
11						End of Probe at 10.8', Auger refusal		10.8' BEDROCK
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	**P-102**
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	111.9 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method 4" Solid Stem Auger	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		3" Pavement		PAVEMENT
1								
2						Smooth drilling throughout fill layer (no rubble/cobbles)		
3								
4								
5						Increased resistance at 4.8, potential till or soft rock		
6								
7								
8								
9								
10								
11								
12						End of Probe at 12.1', Auger refusal		12.1' BEDROCK
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								

Granular Soils		Cohesive Soils		% Composition
Blows/ft.	Density	Blows/ft.	Consistency	ASTM D2487
0-4	V. Loose	<2	V. soft	
5-10	Loose	2-4	Soft	< 5% Trace
11-30	Compact	5-8	Firm	5-15% Little
31-50	Dense	9-15	Stiff	15-30% Some
>50	V. Dense	16-30	V. Stiff	> 30% With
		>30	Hard	

NOTES: PP = Pocket Penetrometer, MC = Moisture Content
LL = Liquid Limit, PI = Plastic Index

Bedrock Joints
Shallow = 0 to 35 degrees
Dipping = 35 to 55 degrees
Steep = 55 to 90 degrees

Boulders = diameter > 12 inches, Cobbles = diameter < 12 inches and > 3 inches
Gravel = < 3 inch and > No 4, Sand = < No 4 and >No 200, Silt/Clay = < No 200

Soil Moisture Condition
Dry: S = 0%
Humid: S = 1 to 25%
Damp: S = 26 to 50%
Moist: S = 51 to 75%
Wet: S = 76 to 99%
Saturated: S = 100%

SUMMIT
GEOENGINEERING SERVICES

SOIL PROBE LOG

Project:	Proposed Apartment Building	Boring #:	P-103
Location:	665 Congress St.	Project #:	15040
City, State:	Portland, ME	Sheet:	1 of 1
		Chkd by:	

Drilling Co:	Great Works Test Boring	Boring Elevation:	112.3 ft
Driller:	Jeff Lee	Reference:	Site Survey by Titcomb Associates
Summit Staff:	M. Hardison, E.I.	Date started: 4/15/2015	Date Completed: 4/15/2015

DRILLING METHOD	SAMPLER
Vehicle: Tracked	Length: 24" SS
Model: Mobile B-53	Diameter: 2"OD/1.5"ID
Method 4" Solid Stem Auger	Hammer: 140 lb
Hammer Style: R&C	Method: ASTM D1586

ESTIMATED GROUND WATER DEPTH

Date	Depth	Elevation	Reference
4/15/2015	-		None observed

Depth (ft.)	No.	Pen/Rec (in)	Depth (ft)	blows/6"	N_{60}	SAMPLE DESCRIPTION	Geological/ Test Data	Geological Stratum
				PROBE		4" Pavement		PAVEMENT
1								0.3'
2								
3						Relatively easy drilling, no rubbe/cobbles encountered		
4								
5								
6								
7								
8								
9								
10						End of Probe at 9.6', Auger refusal		9.6' BEDROCK
11								
12								
13								
14								
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16								
17								
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