DRAINAGE SUMMARY

PROPOSED CONDOMINIUM DEVELOPMENT 120 NORWOOD AVE NEWTON, MASSACHUSETTS

July 29, 2022

VERNE T. PORTER JR., PLS LAND SURVEYORS – CIVIL ENGINEERS 354 ELLIOT STREET NEWTON, MA 02464

DRAINAGE SUMMARY PROPOSED CONDOMINIUM DEVELOPMENT <u>120 NORWOOD AVE</u> <u>NEWTON, MASSACHUSETTS</u>

The proposed project consists of the demolition of an existing multi-family residential dwelling, and the construction of a 4-unit condominium development including new driveways at 120 Norwood Ave in Newton, MA, under the requirements of the City of Newton Stormwater Management and Erosion Control Rules & Regulations.

The on-site soils in the area are shown as "626B – Merrimac-Urban land complex, 0 to 8 percent slopes" soils on the NRCS Soils Survey map of the area, which are areas that fall within Hydrological Soil Groups of A & D. To confirm soil conditions, VTP performed three (3) test pits onsite on February 17, 2022 and found the parent material to be sand and gravel. For purposes of our design, VTP has used A soils with an infiltration rate of 8.27 in/hr in accordance with Table 2.3.3. 1982 Rawles Rates from the Massachusetts Stormwater Handbook.

Ground cover on the site is a dense residential grass area, buildings, and bituminous concrete walkways and driveway. The existing drainage on the site flows overland from to a lowpoint in the northeast corner of the property. Overall, the site will maintain the current flow pattern, however new collection systems for the proposed impervious areas have been provided to collect the runoff and attenuate offsite flows.

There are no wetlands or other Resource Areas within 100 feet of the lot. The proposed drainage controls are designed to capture & contain the runoff from the proposed impervious areas. This system will store the runoff from the new impervious area and allow the stored water to slowly infiltrate after the storm event and overflow offsite.

Under the proposed conditions, with the new building and driveways the rate of site runoff from the re-developed lot area will be less than the existing conditions for the 2, 10, 25 & 100-year storm events. The proposed controls have been designed to store this increase to maintain the pre and post runoff rates.

COMPLIANCE WITH STORMWATER STANDARDS

Untreated Stormwater (Standard 1)

The project is designed so that new stormwater conveyances (outfalls/discharges) do not discharge untreated stormwater into, or cause erosion to, existing wetlands.

Post-Development Peak Rates (Standard 2)

A <u>hydrologic study</u> was performed to determine the rate of runoff for the 100-year storm events under pre-development (existing) conditions. Unmitigated post-development rates were then computed in a similar manner. The study point where the peak rates were compared were taken at one (1) location at the existing offsite flow area. From these analyses, it was determined that the proposed project and its stormwater management system would not increase the peak runoff rates above existing levels. It is the intent of the stormwater management system to minimize impacts to drainage patterns, and downstream property prior to its release from the site or discharge to wetlands.

The United States Department of Agriculture (U.S.D.A). Soil Conservation Service (SCS) Technical Release 55 (TR-55), 1986, was used as the procedure for estimating runoff. A SCS TR-20-based computer program was used for estimating peak discharges. TR-55 is a generally accepted model for use on small sites that begin with a rainfall amount uniformly imposed on the watershed over a specified time distribution. Mass rainfall is converted to mass runoff by using a runoff curve number (CN). CN is based on soils, plant cover, impervious areas, interception, and surface storage. Runoff is then transformed into a hydrograph that depends on runoff travel time through segments of the watershed.

Development in a watershed changes the watershed's response to precipitation. The most common effects are reduced infiltration and decreased travel time, which can result in significantly higher peak rates of runoff. The volume of runoff is determined primarily by the amount of precipitation and by infiltration characteristics related to soil type, antecedent rainfall, type of vegetal cover, impervious surfaces, and surface retention. Travel time is determined primarily by slope, flow length, depth of flow, and roughness of flow surfaces. Peak rates of discharge are based on the relationship of the above parameters, as well as the total drainage area of the watershed, the location of the development in relation to the total drainage area, and the effect of any flood control works or other manmade storage. Peak rates of discharge are also influenced by the distribution of rainfall within a given storm event.

Stormwater management computations for the full-build were performed using a SCSbased *HYDROCAD* for existing and proposed conditions, curve numbers, time of concentrations and unit hydrograph computations.

Existing Conditions

Table 1. Shows the curve numbers, areas and times of concentration used to develop the pre-development hydrologic model of the site.

Table 1. – Existing Conditions								
Sub-Areas	Surface Cover	Curve Number (CN)	Area (SF)	Tc (Mins.)	Remarks			
Area #1				6.0				
	Exist. Bldgs.	98	3,350		Incls. decks			
	Exist. Walks	98	1,163		Incls. Patios			
	Exist. Drive	98	3,800		Incl. Walks			
	Exist.	98	1,160					
	Passageway							
	Lawn Areas	39	15,424					

120 Norwood Ave Newton, MA

	,	Total Area	24,897			
*CN based on Class A soils.						

Proposed Conditions

The proposed conditions will result in a new collection system that will collect the site run-off from the proposed dwellings and proposed driveways and direct it to underground leaching systems prior to overflowing off-site.

Table 2. Shows the curve numbers, areas and times of concentration used to develop the post-development hydrologic model of the site.

Table 2. – Proposed Conditions								
Sub- Areas	Surface Cover	Curve Number (CN)	Area (SF)	Tc (Mins.)	Remarks			
Area #1				6.0				
	Lawn Area	39	12,326					
	Prop. Patios	98	1,040					
	Exist. Drive	98	1,160		Passageway			
Area #2								
	Prop. Building	98	2,324		Unit 1 & 2			
	Prop. Driveways	98	4,000		Front Portion			
Area #3								
	Prop. Building	98	2,324		Unit 3 & 4			
	Prop. Driveway	98	1,723		Rear Portion			
		Total Area	24,897					
		*CN based o	n Class A s	soils.				

Peak Rate Summary

Table 3. Shows the peak runoff for the existing, as well as for the developed site at 2, 10, 25 & 100-year design storms.

Areas	Design Storm	Existing Runoff* (CFS)	Existing Volume* (Ac-Ft)	Proposed Runoff* (CFS)	Proposed Volume* (Ac- Ft)
Offsite Flow					
Existing	2-yr.	0.17	0.018	0.00	0.002
	10-yr.	0.73	0.053	0.09	0.012
	25-yr.	1.27	0.088	0.29	0.025
	100-yr.	2.65	0.179	1.23	0.087

Recharge to Groundwater (Standard 3)

The change in groundcover for the new development will change by increasing the impervious areas by approximately 1,935 sf. Groundwater infiltration will be achieved through the individual underground storage areas.

Required Recharge Volume for the entire site was calculated in accordance with the Massachusetts Stormwater Management Standards:

Rv = F * impervious area (in acres) Rv = (0.60/12) * 0.288 = 0.014 Ac-ft. = 628.55 CF

Rv = Required Recharge Volume; F = Target Depth Factor (0.60 in. for soils of Hydrologic Soil Group A); Impervious area = building, pavement on site in post development condition (0.288 Ac).

The two proposed onsite leaching systems will store and infiltrate 628.55 cf in just the 2-year storm event.

Removal of TSS (Standard 4)

The proposed building will have clean runoff and the proposed driveways will flow through catchbasins/manholes with a 4' deep sump, and then infiltration to address TSS removal.

			Removed	
BMP ¹	Rate ¹	Load*	(C*D)	Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
Subsurface Infiltration Structure	0.80	0.75	0.60	0.15
		Total TSS Removal =	85%	

Land Uses with Higher Potential Pollutant Loads (Standard 5)

The use proposed does not differ from the current use of the space and has no higher potential for pollution.

Critical Areas (Standard 6 – Water Quality Treatments)

This site does not lie within a critical area. One-half inch (1/2") of runoff is the standard for treatment relative to water quality, but as stated prior, the proposed use will not create pollutants in excess of what exists today.

Redevelopment (Standard 7)

Redevelopment projects are those that involve development, rehabilitation or expansion on previously developed sites provided the redevelopment results in no net increase in impervious area. Furthermore, components of redevelopment project, which include development of previously undeveloped sites, do not fall under Standard 7. In addition, redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.

The project, as proposed, are new buildings, replacing existing buildings on a developed sited and we are increasing the impervious area, however it is minimal. VTP has considered this project a new development and we have met all of the applicable standards of the Massachusetts Stormwater Policy.

Erosion and Sedimentation Controls (Standard 8)

Erosion Control measures have been provided on the plans that accompany this application.

Operation and Maintenance Plan (Standard 9)

An Operation and Maintenance (O&M) Plan is provided as part of the application.

Prohibition of Illicit Discharges

The Owner and User of the facility, assures that there will not be illicit discharges to the nearby wetlands from the proposed facility.

Floodplain (310 CMR 10.57)

The project site does not fall with a floodplain district.

City of Newton Standards

In accordance with the City of Newton's Stormwater Management and Erosion Control Rules and Regulations, this project requires a Minor Stormwater Permit, as it is a residential development less than 4 units with land disturbance less than 0.5 acres.

Storage of Total Impervious area

The proposed project results in a post-development total impervious area of 3,575 SF. Per the City of Newton's Stormwater Management and Erosion Control Rules and Regulations, Section 5, Subsection B.1, this project is a teardown of an existing structure and therefore requires the applicant to retain 2" of runoff for the total of all impervious area.

Volume = (2"/12) * (4,048 sf) = 2,095 CF

As noted in the post-development HydroCAD report provided, the proposed BMP's offer a total storage volume of 0.05 acre-ft, which is equivalent to 2,178 CF of available storage, which exceeds the required storage capacity of 2,095 CF

Total Phosphorus Removal

Existing Phosphorus Load

BMP Sub Area	Land Use Category	Cover Type	Area (Acres)	PLER (lb/acre/yr)*
1	Developed Land Pervious (HSG- A)	Impervious	0.217	1.96
2	Medium-Density Residential (MDR)	Pervious	0.354	0.03

*From Table 3-1 of appendix F.

BMP Load = (0.217 x 1.96) + (0.354 x 0.03) = 0.435 lbs P/yr

Proposed BMP's

Infiltration System #1

BMP Volume _{ft3} (see HydroCAD) = 0.03 acre-ft = 1,306.8 ft³

 $\begin{array}{ll} \text{BMP}_{\text{inches of runoff}} &= \text{BMP}_{\text{Volume}} \ (\text{ft}^3)/\text{IA x 12 in/ft x 1 acre/43,560 ft}^2 \\ &= 1,306.8 \ \text{ft}^3/0.145 \ \text{acre x 12 in/ft x 1 acre/43,560 ft}^2 \\ &= 2.48 \ \text{in}. \end{array}$

Infiltration System #2

BMP Volume $_{ft3}$ (see HydroCAD) = 0.02 acre-ft = 871.20 ft³

 $\begin{array}{ll} \text{BMP}_{\text{inches of runoff}} &= \text{BMP}_{\text{Volume}} \ (\text{ft}^3)/\text{IA x 12 in/ft x 1 acre/43,560 ft}^2 \\ &= 871.20 \ \text{ft}^3/0.093 \ \text{acre x 12 in/ft x 1 acre/43,560 ft}^2 \\ &= 2.58 \ \text{in.} \end{array}$

120 Norwood Ave Newton, MA

In accordance with BMP Curves for Soil Infiltration Rate: Infiltration Basin the BMP will have a 100% load reduction Efficiency for soils with an infiltration rate of 8.27 in/hr. and at least 2.0 inches of runoff.



120 Norwood Ave - Existing

120 Norwood Ave - Existing

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Area Listing (selected nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.354	39	>75% Grass cover, Good, HSG A (1)
0.087	98	Exist. Drive (1)
0.027	98	Exist. Passageway (1)
0.027	98	Exist. Walks & Patios (1)
0.077	98	Existing Buildings & Decks (1)
0.572	61	TOTAL AREA

	120	Norwood Ave	e - Existing
120 Norwood Ave - Existing	Type III 24-hr	2-Year Rail	nfall=3.16"
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Summary for Subcatchment 1: Existing Site

Runoff = 0.17 cfs (a) 12.13 hrs, Volume= 0.018 af, Depth>	0.37"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.16"

	Area (sf)	CN	Description
	15,424	39	>75% Grass cover, Good, HSG A
*	3,800	98	Exist. Drive
*	1,160	98	Exist. Passageway
*	1,163	98	Exist. Walks & Patios
*	3,350	98	Existing Buildings & Decks
	24,897	61	Weighted Average
	15,424		61.95% Pervious Area
	9,473		38.05% Impervious Area
(r	Tc Length nin) (feet)	Slor (ft/	be Velocity Capacity Description ft) (ft/sec) (cfs)



Direct Entry, Direct Entry

Subcatchment 1: Existing Site



	120	Norwood Ave	e - Existing
120 Norwood Ave - Existing	Type III 24-hr	2-Year Rail	nfall=3.16"
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Summary for Pond 1P: Offsite

Inflow A	rea =	0.572 ac, 3	8.05% Impervious	, Inflow Depth >	0.37"	for 2-Year event
Inflow	=	0.17 cfs @	12.13 hrs, Volum	e= 0.018	af	
Primary	=	0.17 cfs @	12.13 hrs, Volum	e= 0.018	af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite

	120) Norwood Ave	- Existing
120 Norwood Ave - Existing	Type III 24-hr	10-Year Rain	fall=4.77"
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Summary for Subcatchment 1: Existing Site

Runoff	=	0.73 cfs @	12.10 hrs,	Volume=	0.053 af,	Depth>	1.11"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.77"

	Area (sf)	CN	Description
	15,424	39	>75% Grass cover, Good, HSG A
*	3,800	98	Exist. Drive
*	1,160	98	Exist. Passageway
*	1,163	98	Exist. Walks & Patios
*	3,350	98	Existing Buildings & Decks
	24,897	61	Weighted Average
	15,424		61.95% Pervious Area
	9,473		38.05% Impervious Area
		~	
,	Tc Length	Slop	e Velocity Capacity Description
(m	in) (feet)	(ft/1	t) (ft/sec) (cfs)



Direct Entry, Direct Entry





120 Norwood Ave - Existing Type III 24-hr 10-Year Rainfall=4.77		120) Norwood Ave	e - Existing
	120 Norwood Ave - Existing	Type III 24-hr	10-Year Raiı	nfall=4.77"
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Summary for Pond 1P: Offsite

Inflow A	Area	=	0.572 ac, 3	38.05% Impe	ervious,	Inflow De	pth >	1.11"	for 10-`	Year event
Inflow		=	0.73 cfs @	12.10 hrs,	Volume	= (0.053 a	ıf		
Primary	у	=	0.73 cfs @	12.10 hrs,	Volume	=	0.053 a	ıf, Atte	n= 0%,	Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite

	120 Norwood Ave - Existin
120 Norwood Ave - Existing	Type III 24-hr 25-Year Rainfall=6.0
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Summary for Subcatchment 1: Existing Site

Runoff	=	1.27 cfs @	12.10 hrs,	Volume=	0.088 af,	Depth> 1.85"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.03"

	Area (sf)	CN	Description	
	15,424	39	>75% Grass cover, Good, HSG A	
*	3,800	98	Exist. Drive	
*	1,160	98	Exist. Passageway	
*	1,163	98	Exist. Walks & Patios	
*	3,350	98	Existing Buildings & Decks	
	24,897	61	Weighted Average	
	15,424		61.95% Pervious Area	
	9,473		38.05% Impervious Area	
		.		
	Tc Length	Slop	be Velocity Capacity Description	
(m	in) (feet)	(ft/1	it) (ft/sec) (cfs)	

6.0

Direct Entry, Direct Entry

Subcatchment 1: Existing Site



	120 Norwood Ave - Existing
120 Norwood Ave - Existing	Type III 24-hr 25-Year Rainfall=6.03
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Summary for Pond 1P: Offsite

Inflow A	rea =	0.572 ac, 38	8.05% Impervious,	Inflow Depth > 1.	85" for 25-Year event
Inflow	=	1.27 cfs @	12.10 hrs, Volume	= 0.088 af	
Primary	=	1.27 cfs @	12.10 hrs, Volume	e= 0.088 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite

	120	Norwood Ave	e - Existing
120 Norwood Ave - Existing	Type III 24-hr	Custom Raii	nfall=8.78'
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Summary for Subcatchment 1: Existing Site

Runofi = $2.65 \text{ crs} (a)$ 12.10 nrs, volume= 0.179 ar , Deptn> 3	Runoff =	= 2.65 cfs (a)	12.10 hrs,	Volume=	0.179 af,	Depth>	3.75"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr Custom Rainfall=8.78"

	Area (sf)	CN	Description						
	15,424	39	>75% Grass cover, Good, HSG A						
*	3,800	98	Exist. Drive						
*	1,160	98	xist. Passageway						
*	1,163	98	xist. Walks & Patios						
*	3,350	98	Existing Buildings & Decks						
	24,897	61	Weighted Average						
	15,424		61.95% Pervious Area						
	9,473	38.05% Impervious Area							
	To Longth	Clar	Valasity Conseity Description						
1	IC Length	Siop	be velocity Capacity Description						
(m	in) (teet)	(11/1	1) (T/Sec) (CTS)	_					

6.0

Direct Entry, Direct Entry

Subcatchment 1: Existing Site



	120	Norwood Ave	e - Existing
120 Norwood Ave - Existing	Type III 24-hr	Custom Rail	nfall=8.78"
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Summary for Pond 1P: Offsite

Inflow Are	ea =	0.572 ac, 38.05% Impervious, Inflow Depth > 3.75" for Custom event	
Inflow	=	2.65 cfs @ 12.10 hrs, Volume=	
Primary	=	2.65 cfs @ 12.10 hrs, Volume= 0.179 af, Atten= 0%, Lag= 0.0 mir	n

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite



120 Norwood Ave - : Proposed

120 Norwood Ave - Proposed	
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Area Listing (selected nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.283	39	>75% Grass cover, Good, HSG A (1)
0.027	98	Existing Passageway Drive (1)
0.107	98	Prop. Building (2, 3)
0.131	98	Prop. Driveway (2, 3)
0.024	98	Prop. Patios (1)
0.572	69	TOTAL AREA

120 Norwood Ave - Proposed Type III 24	4-hr 2-Year Rainfall=3.16'
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Summary for Subcatchment 1: Remaining Site

RUNUIN – $0.00 \text{ CIS}(\omega)$ 14.02 m/s, volume – 0.002 al , Depti – 0	Runoff =	0.00 cfs @	14.62 hrs,	Volume=	0.002 af,	Depth>	0.06"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.16"

	Area (sf)	CN	Description				
	12,326	39	>75% Gras	s cover, Go	bod, HSG A		
*	1,040	98	Prop. Patio	s			
*	1,160	98	Existing Pa	ssageway l	Drive		
	14,526	48	Weighted A	verage			
	12,326	326 84.85% Pervious Area					
	2,200		15.15% lm	pervious Ar			
T (miı	rc Length n) (feet)	Slop (ft/f	e Velocity t) (ft/sec)	Capacity (cfs)	Description		
6	.0				Direct Entry, Direct Entry		

Subcatchment 1: Remaining Site



120 Norwood Ave - Proposed	120 No Type III 24-hr	orwood Ave - :Proposed 2-Year Rainfall=3.16"
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Summary for Subcatchment 2: Area #2

Runoff	=	0.43 cfs @	12.09 hrs,	Volume=	0.033 af,	Depth> 2.74"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.16"

	Ar	rea (sf)	CN	Descript	ion										
*		4,000	98	Prop. Dr	iveway										
*		2,324	98	Prop. Bu	uilding										
		6,324	98	Weighte	d Avera	age									
		6,324		100.00%	6 Imper	vious A	Area								
	Та	Longth	Clan		ity Ca	nacity	Deser	ntion							
	(min)	(feet)	Siop (ft/ft	t) (ft/se	ny Ca No)	(cfs)	Desch	puon							
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					Sı	ubcato	chmen	t 2: A	rea	#2					
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	0.49		L		·	L						. 	 		
	0.46						3 cfs		 		 	-			Runoff
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120 Norwood Ave - Proposed	120 No Type III 24-hr	orwood Ave - 2-Year Rain	Proposed
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Summary for Subcatchment 3: Area #2

Runoff	=	0.28 cfs @	12.09 hrs,	Volume=	0.021 af,	Depth> 2.74"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 2-Year Rainfall=3.16"

	A	rea (sf)	CN	Des	criptio	n											
*		1,723	98	Prop	o. Driv	eway											
*		2,324	98	Prop	o. Build	ding											
		4,047	98	Wei	ghted	Avera	ge										
		4,047		100	.00% I	mperv	vious /	Area									
	Тс	Length	Slop	e V	elocity	, Cap	oacity	De	scrip	tion							
(r	nin)	(feet)	(ft/f	ť) ((ft/sec)		(cfs)										
	6.0							Dir	ect l	Entry	y,						
						Su	bcat	chm	ent	3: A	Area	#2					
							Hydro	ograpl	h								
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	0.24	/ /			<u> </u>		+		+ _	4 					-J. I	0	
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120 Norwood Ave - Proposed	120 No Type III 24-hr	orwood Ave - :Proposed 2-Year Rainfall=3.16"
Prepared by HP	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Printed 7/29/2022
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Summary for Pond #1: Leaching Galley's

Inflow Ar	ea =	0.145 ac,100.0	00% Im	npervious, Inflow Depth > 2.74" for 2-Year event					
Inflow	=	0.43 cfs @ 12	2.09 hrs	rs, Volume= 0.033 af					
Outflow	=	0.10 cfs @ 11	1.75 hrs	rs, Volume= 0.033 af, Atten= 78%, Lag= 0.0 min					
Discarde	d =	0.10 cfs @ 11	1.75 hrs	rs, Volume= 0.033 af					
Seconda	ry =	0.00 cfs @ 5	5.00 hrs	rs, Volume= 0.000 af					
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs									
Peak Ele	v= 49.05' (2) 12.49 hrs S	Surf.Are	ea= 0.012 ac Storage= 0.008 af					
Plug-Flov	Plug-Flow detention time= 17.9 min calculated for 0.033 af (100% of inflow)								
Center-o	f-Mass det	. time= 17.7 mi	in (756	6.4 - 738.7)					
Volumo	le cor	h Avail Store		Starage Description					
volume	Inver	Avall.Stora	ige Si	storage Description					
#1	48.00	' 0.006	5 af 7 .	′.83'W x 65.00'L x 3.33'H Gravel					
			0.	0.039 af Overall - 0.023 af Embedded = 0.016 af x 40.0% Voids					
#2	48.50	' 0.023	8 af 5 .	5.68'W x 10.50'L x 2.83'H Leaching Galleyx 6 Inside #1					
		0.030) af To	otal Available Storage					
Device	Pouting	Invert	Outlat	at Devices					
Device	Routing		Outlet						
#1	Discarded	48.00'	8.270) in/hr Exfiltration over Surface area					
#2	Secondary	/ 50.50'	6.0" V	Vert. Orifice C= 0.600					
Discarde Η1=Exf	Discarded OutFlow Max=0.10 cfs @ 11.75 hrs HW=48.04' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)								
Seconda		$M_{OV} = 0.00$ of		00 brs $HW = 18.00'$ (Free Discharge)					

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=48.00' (Free Discharge) 2=Orifice (Controls 0.00 cfs)

120 Norwood Ave - Proposed120 Norwood Ave - :Proposed120 Norwood Ave - ProposedType III 24-hr2-Year Rainfall=3.16"Prepared by HPPrinted7/29/2022HydroCAD® 10.00-24 s/n 08768 © 2018 HydroCAD Software Solutions LLCPage 7



Pond #1: Leaching Galley's

	120 Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr 2-Year Rainfall=3.16
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Summary for Pond #2: Leaching Galley's

Inflow Ar	rea =	0.093 ac,100.0	00% Imp	pervious, Inflow Depth > 2.74" for 2-Year event
Inflow	=	0.28 cfs @ 12	2.09 hrs	, Volume= 0.021 af
Outflow	. =	0.07 cfs @ 1	1.75 hrs	, Volume= 0.021 af, Atten= 76%, Lag= 0.0 min
Discarde	ed =	0.07 cfs @ 11	1.75 hrs	, Volume= 0.021 af
Seconda	ary =	0.00 cfs @ _ 5	5.00 hrs	, Volume= 0.000 af
		we at la a d' Time a	0	
Routing	by Stor-Ind		Span=	5.00-20.00 nrs, dt= 0.05 nrs
Peak Ele	ev= 48.98 (2912.47 nrs S	ourr.Area	a=0.008 ac Storage= 0.005 at
	w dotoption	timo-150 mi	n coloul	ated for 0.021 of $(100\% \text{ of inflow})$
Contor o	w determior	timo = 15.9 mi	n caicui n (754	
Center-0	n-mass det	. ume- 15.7 mi	n (754.	5 - 7 50.7)
Volume	Inver	t Avail.Stora	ige Sto	orage Description
#1	48.00	' 0.004	af 7.8	83'W x 44.00'L x 3.33'H Gravel
			0.0	026 af Overall - 0.015 af Embedded = 0.011 af x 40.0% Voids
#2	48.50	' 0.015	5 af 5.6	68'W x 10.50'L x 2.83'H Leaching Galleyx 4 Inside #1
		0.020) af To	tal Available Storage
Device	Routing	Invert	Outlet	Devices
#1	Discarded	48.00'	8.270 i	in/hr Exfiltration over Surface area
#2	Secondary	/ 50.50'	6.0" V	ert. Orifice C= 0.600
	-			
Discard	ed OutFlov	v Max=0.07 cfs	s @ 11.	75 hrs HW=48.04' (Free Discharge)
T—1=Ex	filtration (E	Exfiltration Con	ntrols 0.0	07 cfs)
<u> </u>				

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=48.00' (Free Discharge) —2=Orifice (Controls 0.00 cfs)

120 Norwood Ave - Proposed120 Norwood Ave - :Proposed120 Norwood Ave - ProposedType III 24-hr2-Year Rainfall=3.16"Prepared by HPPrinted 7/29/2022HydroCAD® 10.00-24 s/n 08768 © 2018 HydroCAD Software Solutions LLCPage 9



Pond #2: Leaching Galley's

	120 Norwood Ave - :Proposed
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	-

Summary for Pond 1P: Offsite

Inflow Area	a =	0.333 ac, 1	5.15% Impervic	ous, Inflow Dep	oth > 0.06"	for 2-Year event
Inflow	=	0.00 cfs @	14.62 hrs, Volu	ume= C).002 af	
Primary	=	0.00 cfs @	14.62 hrs, Volu	ume= C	0.002 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite

	120 N	lorwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	10-Year Rail	nfall=4.77"
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Summary for Subcatchment 1: Remaining Site

	Runoff	=	0.09 cfs @	12.17 hrs,	Volume=	0.012 af,	Depth>	0.43"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.77"

	Area (sf)	CN	Description					
	12,326	39	>75% Grass	s cover, Go	od, HSG A			
*	1,040	98	Prop. Patios	Prop. Patios				
*	1,160	98	Existing Pas	Existing Passageway Drive				
	14,526	48	Weighted A	verage				
	12,326		84.85% Pervious Area					
	2,200		15.15% Imp	15.15% Impervious Area				
	Tc Length	Slop	be Velocity	Capacity	Description			
<u>(m</u>	in) (feet)	(ft/	ft) (ft/sec)	(cfs)				
					— ••••••••••••••••••••••••••••••••••••			



Direct Entry, Direct Entry

Subcatchment 1: Remaining Site



	120 Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr 10-Year Rainfall=4.77"
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Summary for Subcatchment 2: Area #2

Runoff	=	0.66 cfs @	12.09 hrs,	Volume=	0.051 af,	Depth> 4.21"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.77"

	Ai	rea (sf)	CN	Descri	otion										
*		4,000	98	Prop. [Drivev	vay									
		2,324	98	Prop. E		ig Varada									
		0,324 6,324	90	100 00	.eu A\ % Im	verage perviou	ls Are	a							
		0,021		100.00	70 mm		0740	a							
	Тс	Length	Slop	e Velo	ocity	Capac	ity [Descri	ption						
	(min)	(feet)	(ft/f	t) (ft/s	sec)	(C1	is)		F a t a						
	6.0						L	Jirect	Entry	,					
						Subc	atch	ment	t 2: A	rea	#2				
						Ну	/drogr	aph							
	0.7-		,	 	 - <u> </u>		0.66 cfs			' 	'	, , 	, , 		
	0.65		 	 	 				 	 +	 -	Тур	e III	24-hr	
	0.6			 	 		[10	-Ye	ar R	ain	fall=	4.77"	_
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	120 Norwood Ave - :Proposed
120 Norwood Ave - Proposed	Type III 24-hr 10-Year Rainfall=4.77'
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Summary for Subcatchment 3: Area #2

Runoff	=	0.42 cfs @	12.09 hrs,	Volume=	0.033 af, Depth	า> 4.21"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 10-Year Rainfall=4.77"

	Area (st)	CN	Description							
	1,723	98	Prop. Drive	way						
	2,324	98	Prop. Build	ing						
	4,047	98	Weighted A	verage						
	4,047		100.00% In	npervious A	Area					
Тс	Length	Slope	e Velocity	Capacity	Descr	iption				
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)						
6.0					Direct	t Entry,				
						-				
				Subcate	chmen	t 3: Ar	ea #2			
				Hydro	ograph					
							+			_
0.4	6 []						<u> </u>		·	Runoff
0.4	4	<u>-</u>			12 cfs		<u>+</u>		· _i	-
0.4	2						+	l ype l	ll 24-hr	-
0.3	8				1	10-\	(ear-	Rainfal	I=4-77"	_
0.3	6-(-
0.3	4	<u>-</u>				Rι	Inoff	Area=4	,047 st	-
0.	3					Runo	ff	lume=0	033 af	_
6 0.2	8	L	$- \begin{array}{c} - \\ 1 \end{array} \\ - \\ - \\ - \end{array} \\ - \\ - \\ - \\ - \\ - \\ -$							-
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<u>8</u> 0.2	2							Tc=6	6 0 min	_
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	120 Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr 10-Year Rainfall=4.77"
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Summary for Pond #1: Leaching Galley's

Inflow Ar Inflow Outflow Discarde Seconda	rea = = = ed = ary =	0.145 ac,100.0 0.66 cfs @ 12 0.10 cfs @ 11 0.10 cfs @ 11 0.00 cfs @ 5	00% Impervious, Inflow Depth > 4.21" for 10-Year event 2.09 hrs, Volume= 0.051 af 1.65 hrs, Volume= 0.051 af, Atten= 85%, Lag= 0.0 min 1.65 hrs, Volume= 0.051 af 5.00 hrs, Volume= 0.000 af						
Routing Peak Ele	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 49.84' @ 12.59 hrs Surf.Area= 0.012 ac Storage= 0.015 af								
Plug-Flo Center-o	Plug-Flow detention time= 41.6 min calculated for 0.051 af (100% of inflow) Center-of-Mass det. time= 41.2 min (776.6 - 735.4)								
Volume	Inver	t Avail.Stora	age Storage Description						
#1	48.00	0.006	af 7.83'W x 65.00'L x 3.33'H Gravel						
#2	48.50	0.023	3 af 5.68'W x 10.50'L x 2.83'H Leaching Gallev x 6 Inside #1						
		0.030	af Total Available Storage						
Device	Routing	Invert	Outlet Devices						
#1 #2	Discarded Secondary	48.00' y 50.50'	8.270 in/hr Exfiltration over Surface area 6.0" Vert. Orifice C= 0.600						
Discarded OutFlow Max=0.10 cfs @ 11.65 hrs HW=48.04' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)									
Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=48.00' (Free Discharge)									

 120 Norwood Ave - Proposed
 120 Norwood Ave - :Proposed

 120 Norwood Ave - Proposed
 Type III 24-hr
 10-Year Rainfall=4.77"

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Pond #1: Leaching Galley's

	120 Norwood Ave - :Proposed
120 Norwood Ave - Proposed	Type III 24-hr 10-Year Rainfall=4.77"
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Summary for Pond #2: Leaching Galley's

Inflow Ar Inflow Outflow Discarde Seconda	rea = = = ed = nry =	0.093 ac,100.009 0.42 cfs @ 12.09 0.07 cfs @ 11.69 0.07 cfs @ 11.69 0.00 cfs @ 5.00	% Impervious, Inflow Depth > 4.21" for 10-Year event 9 hrs, Volume= 0.033 af 5 hrs, Volume= 0.033 af, Atten= 84%, Lag= 0.0 min 5 hrs, Volume= 0.033 af 0 hrs, Volume= 0.000 af						
Routing Peak Ele	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 49.72' @ 12.57 hrs Surf.Area= 0.008 ac Storage= 0.009 af								
Plug-Flov Center-o	Plug-Flow detention time= 37.3 min calculated for 0.032 af (100% of inflow) Center-of-Mass det. time= 36.9 min(772.3 - 735.4)								
Volume	Inver	t Avail.Storage	Storage Description						
#1 #2	48.00	' 0.004 af	7.83'W x 44.00'L x 3.33'H Gravel 0.026 af Overall - 0.015 af Embedded = 0.011 af x 40.0% Voids						
<u> #Z</u>	46.50	0.015 al	5.68 W X 10.50 L X 2.83 H Leaching Galleyx 4 Inside #1						
Device	Routing	0.020 af Invert O	Total Available Storage utlet Devices						
#1	Discarded	48 00' 8	270 in/hr Exfiltration over Surface area						
#2	Secondari	, 50.50' 6	0" Vort Orifico C= 0.600						
#∠ Secondary 50.50 6.0 vert. Office C= 0.600 Discarded OutFlow Max=0.07 cfs @ 11.65 hrs HW=48.04' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.07 cfs)									

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=48.00' (Free Discharge) —2=Orifice (Controls 0.00 cfs)

120 Norwood Ave - Proposed120 Norwood Ave - :Proposed120 Norwood Ave - ProposedType III 24-hr10-Year Rainfall=4.77"Prepared by HPPrinted7/29/2022HydroCAD® 10.00-24 s/n 08768 © 2018 HydroCAD Software Solutions LLCPage 17



Pond #2: Leaching Galley's

	120 Norwood Ave - :Proposed
120 Norwood Ave - Proposed	Type III 24-hr 10-Year Rainfall=4.77
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	-

Summary for Pond 1P: Offsite

Inflow A	rea =	0.333 ac, 1	5.15% Impervious,	Inflow Depth >	0.43"	for 10-Year event
Inflow	=	0.09 cfs @	12.17 hrs, Volume	= 0.012	af	
Primary	=	0.09 cfs @	12.17 hrs, Volume	= 0.012	af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite

	120 N	lorwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	25-Year Raiı	nfall=6.03"
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Summary for Subcatchment 1: Remaining Site

12.121101 - 0.23 cis(w) 12.12111s, volume - 0.023 al, Deput 0.3	Runoff	=	0.29 cfs @	12.12 hrs,	Volume=	0.025 af,	Depth>	0.90"
---	--------	---	------------	------------	---------	-----------	--------	-------

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.03"

	Area (sf)	CN	Description							
	12,326	39	>75% Grass	s cover, Go	od, HSG A					
*	1,040	98	Prop. Patios	6						
*	1,160	98	Existing Pas	ssageway [Drive					
	14,526	48	Weighted A	verage						
	12,326		84.85% Pervious Area							
	2,200		15.15% Imp	15.15% Impervious Area						
	Tc Length	Slop	be Velocity	Capacity	Description					
(m	<u>iin) (feet)</u>	(ft/	ft) (ft/sec)	(cfs)						



Direct Entry, Direct Entry

Subcatchment 1: Remaining Site



	120 No	orwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	25-Year Raıı	nfall=6.03"
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			-

Summary for Subcatchment 2: Area #2

Runoff	=	0.84 cfs @	12.09 hrs,	Volume=	0.065 af,	Depth> 5.36"
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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.03"

	A	rea (sf)	CN	Descriptic	on							
*		4,000	98	Prop. Driv	/eway							
*		2,324	98	Prop. Buil	lding							
		6,324	98	Weighted	Average							
		6,324		100.00%	Impervious	s Area						
	-		0		<u> </u>							
,		Length	Siope		y Capaci	ty Desc	ription					
((leet)	וועונ) (II/Sec	(CIS	S) Diroc	t Entr					
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					Subca	atchmer	nt 2: A	rea #	2			
					Hyd	drograph						
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	0.7		 I	·			F	Runo	ff Are	a=6.32	24 sf	
	0.6-			·			Dun	off V	alum		25-of-	
7	0.55);ai	
30,	0.5 ق					/	+	Run	off De	epth>5	5.36"	
1	<u>0.45</u>			+ -				+ -	-- T	c=6.0	min	
-	0.4-						+	+-			1-00	
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	0.05- 0-		/////						<u> </u>			
	0	5 6	7	8 9	10 11	12 13	14	15	16 17	18	19 20	
						inne (nours)					

	120 Norwood Ave - :Prop	bosed
120 Norwood Ave - Proposed	Type III 24-hr 25-Year Rainfall=	6.03"
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		ye z

Summary for Subcatchment 3: Area #2

Runoff	=	0.54 cfs @	12.09 hrs,	Volume=	0.041 af, D	epth> 5.36"
--------	---	------------	------------	---------	-------------	-------------

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 25-Year Rainfall=6.03"

<u> </u>	rea (sf)	CN	De	escript	ion										
	1,723	98	Pr	op. Dr	ivew	ay									
	2,324	98	Pr	ор. Ві	uildin	g									
	4,047	98	W	eighte	d Av	erage									
	4,047		10	0.00%	6 Imp	erviou	ls A	rea							
Тс	Longth	Slor	n 0	Veloc	ity	Canad	sity	Descr	intion						
nin)	(feet)	(ft/	ft)	(ft/se	ec)	Capat (C	fs)	Desci	ιριιοπ						
6.0	(1001)	(14)		(1400	/0/	(,	Direc	t Enti	٠v.					
										,					
					:	Subc	atc	hmer	t 3: /	Area	#2				
						н	vdro	araph							
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0.0		 		 +		 		 	 	 	 +	 -	 +	 -	 +
0.55	-* 					 	0.54		 	 		Tvr	he II	24	-hr
0.5						1						- · Jr Dolw	fo II		211
0.45		<u>-</u> - 							Z ;)- I E	ar-i	Kair	пан	-0.0	J.S
0.4		 		 		 ·		/	 	Run	off	Are	a=4	,047	′ sf
0.4	· · · · · · · · · ·	 -		 +		 			Ru	hoff	Vol	um	e=0.	041	af
0.35		 L _		 		 		1	- L	Du	nof	f-Do	nth	5 3	26"
0.3						1		K	1	nu			pui	-0.0	
0.25		<u> </u> - 				-' 			<u> </u> 	' 	 		C=6	.0 n	nin
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0	5 6	í 7	8	ŕ 9	10	<u>-</u> 11	آ ، ، ، آ 12	2 13	<u>-</u>	15	ŕ 16	ŕ 17	<u>ŕ</u> 18	<u>ŕ-</u> 19	20

	120 Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr 25-Year Rainfall=6.03"
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Summary for Pond #1: Leaching Galley's

Inflow Ar Inflow Outflow Discarde Seconda	rea = = = ed = ary =	0.145 ac,100.0 0.84 cfs @ 12 0.10 cfs @ 11 0.10 cfs @ 11 0.00 cfs @ 5	00% Impervious, Inflow Depth > 5.36" for 25-Year event 2.09 hrs, Volume= 0.065 af 1.55 hrs, Volume= 0.065 af, Atten= 88%, Lag= 0.0 min 1.55 hrs, Volume= 0.065 af 5.00 hrs, Volume= 0.000 af					
Routing Peak Ele	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs							
Plug-Flo	Plug-Flow detention time= 64.4 min calculated for 0.065 af (100% of inflow)							
Center-0	n-iviass uel	. ume- 03.9 mi	iii (790.1 - 754.1)					
Volume	Inver	t Avail.Stora	age Storage Description					
#1	48.00	0.006	∂ af 7.83'W x 65.00'L x 3.33'H Gravel					
			0.039 af Overall - 0.023 af Embedded = 0.016 af x 40.0% Voids					
#2	48.50	0.023	3 af 5.68'W x 10.50'L x 2.83'H Leaching Galleyx 6 Inside #1					
		0.030	af Total Available Storage					
Device	Routing	Invert	Outlet Devices					
#1	Discarded	48.00'	8.270 in/hr Exfiltration over Surface area					
#2	Secondary	y 50.50'	6.0" Vert. Orifice C= 0.600					
Discarded OutFlow Max=0.10 cfs @ 11.55 hrs HW=48.04' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)								
Seconda 1-2=Ori	Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=48.00' (Free Discharge)							

120 Norwood Ave - Proposed120 Norwood Ave - :Proposed120 Norwood Ave - ProposedType III 24-hr25-Year Rainfall=6.03"Prepared by HPPrinted7/29/2022HydroCAD® 10.00-24 s/n 08768 © 2018 HydroCAD Software Solutions LLCPage 23



Pond #1: Leaching Galley's

	120 Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr 25-Year Rainfall=6.03"
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Summary for Pond #2: Leaching Galley's

Inflow Are Inflow Outflow	ea = = =	0.093 ac,100.0 0.54 cfs @ 12 0 07 cfs @ 11	00% lmp 2.09 hrs 60 hrs	pervious, Inflow D , Volume= Volume=	epth > 5.36" 0.041 af 0.041 af Atte	for 25-Year event		
Discardeo Secondar	d =	0.07 cfs @ 11 0.00 cfs @ 5	.60 hrs 5.00 hrs	, Volume= , Volume=	0.041 af 0.000 af			
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 50.33' @ 12.66 hrs Surf.Area= 0.008 ac Storage= 0.013 af								
Plug-Flov Center-of	v detention -Mass det.	i time= 57.9 mi . time= 57.6 mi	n calcul n (791.	ated for 0.041 af (8 - 734.1)	100% of inflow	()		
Volume	Inver	t Avail.Stora	ge Sto	orage Description				
#1	48.00	' 0.004	af 7.8	33'W x 44.00'L x 3	3.33'H Gravel			
			0.0)26 af Overall - 0.	015 af Embedd	led = 0.011 af x 40.0% Voids		
#2	48.50	0.015	af 5.6	38'W x 10.50'L x 3	2.83'H Leachir	ng Galleyx 4 Inside #1		
		0.020	af To	tal Available Stora	age			
Device	Routing	Invert	Outlet	Devices				
#1	Discarded	48.00'	8.270 i	n/hr Exfiltration	over Surface a	area		
#2	Secondary	/ 50.50'	6.0" V	ert. Orifice C= 0	.600			
Discarde 1=Exf	d OutFlov iltration (E	v Max=0.07 cfs Exfiltration Con	s @ 11.0 trols 0.0	60 hrs HW=48.04)7 cfs)	' (Free Discha	arge)		

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=48.00' (Free Discharge) —2=Orifice (Controls 0.00 cfs)

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Pond #2: Leaching Galley's

	120 N	Vorwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	25-Year Rail	nfall=6.03"
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Summary for Pond 1P: Offsite

Inflow Area	a =	0.333 ac, 1	5.15% Impervi	ous, Inflow D	epth >	0.90"	for 25-Year event
Inflow	=	0.29 cfs @	12.12 hrs, Vo	lume=	0.025 a	af	
Primary	=	0.29 cfs @	12.12 hrs, Vo	lume=	0.025 a	af, Atte	n= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite

	120	Norwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	100-Year Rail	nfall=8.62"
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Summary for Subcatchment 1: Remaining Site

Runoff =	0.85 cfs @	12.10 hrs,	Volume=	0.061 af,	Depth>	2.18"
----------	------------	------------	---------	-----------	--------	-------

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.62"

_	Area (sf)	CN	Description				
	12,326	39	>75% Grass cover, Good, HSG A				
*	1,040	98	Prop. Patios				
*	1,160	98	Existing Passageway Drive				
	14,526	48	Weighted Average				
	12,326		84.85% Pervious Area				
	2,200		15.15% Impervious Area				
(r	Tc Length nin) (feet)	Slop (ft/	be Velocity Capacity Description ft) (ft/sec) (cfs)				



Direct Entry, Direct Entry

Subcatchment 1: Remaining Site



	120	Norwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	100-Year Raiı	nfall=8.62"
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Summary for Subcatchment 2: Area #2

Runoff	=	1.20 cfs @	12.09 hrs,	Volume=	0.093 af, E	Depth> 7.71"
--------	---	------------	------------	---------	-------------	--------------

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.62"

A	rea (sf)	CN E	escription								
*	4,000	98 F	rop. Drive	way							
*	2,324	98 F	rop. Build	ing							
	6,324	98 V	Veighted A	verage							
	6,324	1	00.00% In	npervious A	\rea						
-				.	_						
IC (min)	Length	Slope	Velocity	Capacity	Descr	ription					
(min)	(leet)	(11/11)	(II/sec)	(CIS)		4 🗖 4					
6.0					Direc	t Entr	y,				
				Subcate	hmon	t 2.	۵rpp	#2			
				Subcatt	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	11 2.7	AI Ca	π ∠			
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-							i	i i	Type III	24-hr	
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						Rur	າoff	Volu	ume=0.	093 af	
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3 3							ITUI				
РЦ –									Tc=6	.0 min	
		l I					i i	i i		CN=98	
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5	6	/ 8	9 10	11 12 Tim	13 ie (hours)	14	15	16	17 18	19 20	

	120	Norwood Ave -	:Proposed
120 Norwood Ave - Proposed	Type III 24-hr	100-Year Raiı	nfall=8.62"
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Summary for Subcatchment 3: Area #2

Runoff	=	0.77 cfs @	12.09 hrs,	Volume=	0.060 af,	Depth>	7.71"	

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Type III 24-hr 100-Year Rainfall=8.62"

	A	rea (sf)	CN	Description								
*		1,723	98	Prop. Drive	way							
		2,324	98 98	Weighted A	Ing							
		4,047	50	100.00% In	npervious A	Area						
	Tc (min)	Length (feet)	Slope (ft/ft	e Velocity) (ft/sec)	Capacity (cfs)	Descri	ption					
	6.0					Direct	Entry,					
					Subcate	chmen	t 3: Are	ea #2				
					Hydro	ograph						
	0.85-		· L				· 	± 	+ !			Runoff
	0.8		 		+ 0.7	7 cfs	·	 ++	 <u>-</u>			
	0.75	/	·				· ·	+ 	I ype I	II 24-h	nr	
	0.7-	,	·			L	100-\	rear F	Rainfal	I=8.62		
	0.6		·				Ru	inoff /	Area=4	1,047 s	sf	
	0.55	/					Runo	ff Vol	ume=0).060 a	af	
	(s) 0.5		·				 R	unoff	Dept	า>7_71	n	
	8 0.45						· / _ - `			6 0 mi	n	
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					1 10	ne (nours)						

	120	Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr	100-Year Rainfall=8.62"
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Summary for Pond #1: Leaching Galley's

Inflow A	rea =	0.145 ac,100.0	00% Impervious, Inflow Depth > 7.71" for 100-Year event			
Intiow	=	1.20 cts @ 12	2.09 nrs, volume= 0.093 af			
Outflow	=	0.51 cfs @ 12	2.29 hrs, Volume= 0.093 af, Atten= 58%, Lag= 12.1 min			
Discarde	ed =	0.10 cfs @ 11	I.20 hrs, Volume= 0.079 af			
Seconda	ary =	0.41 cfs @ 12	2.29 hrs, Volume= 0.014 af			
Routing Peak Ele	by Stor-Ind ev= 50.94' (method, Time ② 12.29 hrs S	Span= 5.00-20.00 hrs, dt= 0.05 hrs surf.Area= 0.012 ac Storage= 0.026 af			
Plua-Flo	w detention	ı time= 61.5 miı	n calculated for 0.093 af (100% of inflow)			
Center-c	of-Mass det.	time= 61.0 mi	n (793.8 - 732.8)			
Volume	Inver	t Avail.Stora	ge Storage Description			
#1	48.00	' 0.006	af 7.83'W x 65.00'L x 3.33'H Gravel			
			0.039 af Overall - 0.023 af Embedded = 0.016 af x 40.0% Voids			
#2	48.50	0.023	af 5.68'W x 10.50'L x 2.83'H Leaching Galleyx 6 Inside #1			
		0.030	af Total Available Storage			
Device	Routing	Invert	Outlet Devices			
#1	Discarded	48.00'	8.270 in/hr Exfiltration over Surface area			
#2	Secondary	/ 50.50'	6.0" Vert. Orifice C= 0.600			
Discarded OutFlow Max=0.10 cfs @ 11.20 hrs HW=48.04' (Free Discharge) 1=Exfiltration (Exfiltration Controls 0.10 cfs)						
Secondary OutFlow Max=0.41 cfs @ 12.29 hrs HW=50.94' (Free Discharge)						

 120 Norwood Ave - Proposed
 120 Norwood Ave - :Proposed

 120 Norwood Ave - Proposed *Type III 24-hr* 100-Year Rainfall=8.62"

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Pond #1: Leaching Galley's

	120	Norwood Ave - : Proposed
120 Norwood Ave - Proposed	Type III 24-hr	100-Year Rainfall=8.62"
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Summary for Pond #2: Leaching Galley's

Inflow Ar	rea =	0.093 ac,100.0	00% Imp	pervious, Inflow D	epth > 7.7°	1" for 100-	Year event		
Inflow	=	0.77 cfs @ 12	2.09 hrs,	Volume=	0.060 af				
Outflow	=	0.33 cfs @ 12	2.29 hrs,	Volume=	0.060 af, <i>i</i>	Atten= 58%,	Lag= 12.4 min		
Discarde	ed =	0.07 cfs @ 11	1.25 hrs,	Volume=	0.052 af				
Seconda	ary =	0.26 cfs @ 12	2.29 hrs,	Volume=	0.008 af				
Routing	by Stor-Ind	method, Time	Span=	5.00-20.00 hrs, dt	= 0.05 hrs				
Peak Ele	ev= 50.82' @) 12.29 hrs S	Surf.Area	a= 0.008 ac Stora	ige= 0.017 a	af			
Plug-Flo	w detention	time=61.0 mi	n calcula	ated for 0.059 af (100% of infl	ow)			
Center-o	of-Mass det.	time= 60.5 mi	n (793.4	4 - 732.8)		,			
Volumo	Invor	Avail Store	ao Sta	rado Docorintion					
volume	Inven					-			
#1	48.00	' 0.004	af 7.8	33'W x 44.00'L x 3	3.33'H Grav	el			
			0.0)26 af Overall - 0.0)15 af Embe	edded = 0.01	1 af x 40.0% Voids		
#2	48.50	' 0.015	5 af 5.6	68'W x 10.50'L x 2	.83'H Leac	hing Galleyx	4 Inside #1		
		0.020) af To	tal Available Stora	ge				
Device	Routing	Invert	Outlet	Devices					
<u></u>	Discorded	40.00	0 070 :	n/hr Exfiltration					
#1	Discarded	48.00	8.2/01		over Surfac	ce area			
#2	Secondary	/ 50.50	6.0" Ve	ert. Orifice $C=0$.600				
Discard 1=Ex	ed OutFlov filtration (E	v Max=0.07 cfs Exfiltration Con	s @ 11.2 itrols 0.0	25 hrs HW=48.04)7 cfs)	(Free Dis	charge)			
Sacand		Way-0.26 of	Fa @ 12						

Secondary OutFlow Max=0.26 cfs @ 12.29 hrs HW=50.82' (Free Discharge) -2=Orifice (Orifice Controls 0.26 cfs @ 1.93 fps)

 120 Norwood Ave - Proposed
 120 Norwood Ave - :Proposed

 120 Norwood Ave - Proposed *Type III 24-hr* 100-Year Rainfall=8.62"

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Pond #2: Leaching Galley's

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Summary for Pond 1P: Offsite

Inflow A	vrea =	0.333 ac, 15.15% Impervious, Infl	ow Depth > 2.97"	for 100-Year event
Inflow	=	1.16 cfs @ 12.27 hrs, Volume=	0.082 af	
Primary		1.16 cfs @ 12.27 hrs, Volume=	0.082 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Pond 1P: Offsite



Conservation Service

USDA

Web Soil Survey National Cooperative Soil Survey

	MAP L	EGEND		MAP INFORMATION
Area of Int Soils	erest (AOI) Area of Interest (AOI) Soil Map Unit Polygons Soil Map Unit Lines	8 Ø ∲	Spoil Area Stony Spot Very Stony Spot Wet Spot Other	The soil surveys that comprise your AOI were mapped at 1:25,000. Warning: Soil Map may not be valid at this scale. Enlargement of maps beyond the scale of mapping can can misunderstanding of the detail of mapping and accuracy of
Special (1)	Soil Map Unit Points Point Features Blowout	•• Water Fea	Special Line Features	contrasting soils that could have been shown at a more det scale.
×	Borrow Pit Clay Spot Closed Depression	Transport	Streams and Canals tation Rails	measurements. Source of Map: Natural Resources Conservation Service Web Soil Survey URL:
× *	Gravel Pit Gravelly Spot	~ ~	Interstate Highways US Routes Major Roads	Coordinate System: Web Mercator (EPSG:3857) Maps from the Web Soil Survey are based on the Web Mer projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such a
© ۸ ب	Lanonii Lava Flow Marsh or swamp	Backgrou	Local Roads Ind Aerial Photography	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 c of the version date(s) listed below.
* 0 0	Mine or Quarry Miscellaneous Water Perennial Water			Soil Survey Area: Middlesex County, Massachusetts Survey Area Data: Version 21, Sep 2, 2021 Soil map units are labeled (as space allows) for map scale: 1:50.000 or larger.
+	Rock Outcrop Saline Spot Sandy Spot			Date(s) aerial images were photographed: Sep 25, 2020- 2020
⊕	Severely Eroded Spot Sinkhole Slide or Slin			compiled and digitized probably differs from the backgroun imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
P Ø	Sodic Spot			



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	0.6	100.0%
Totals for Area of Interest		0.6	100.0%

OPERATION & MAINTENANCE PLAN

STORMWATER MANAGEMENT FACILITIES PROPOSED CONDOMINIUM DEVELOPMENT 120 NORWOOD AVE NEWTON, MASSACHUSETTS

June 29, 2022

VERNE T. PORTER JR., PLS LAND SURVEYORS – CIVIL ENGINEERS 354 ELLIOT STREET NEWTON, MA 02464

OPERATION & MAINTENANCE PLAN STORMWATER MANAGEMENT FACILITIES PROPOSED CONDOMINIUM DEVELOPMENT 120 NORWOOD AVE NEWTON, MA

The proposed project includes stormwater runoff controls associated with the construction of a new 4-unit condominium development and driveways. The major components associated with maintenance needs are the proposed leaching gallies that will handle runoff from the proposed building and proposed driveway. These will need to be cleaned periodically as noted below. Cleaning of this structures shall be done by the property owner or by a specialty contractor with hydraulic cleaning ability. The following outlines the major maintenance issues associated with the project:

Leaching Galley/Cleaning:

The proposed leaching gallies should be inspected monthly during the first year, and then every third year following the 1-year inspection.

The leaching gallies are equipped with a frame and cover. After removal of the cover, a stadia rod should be used to measure the depth of sediment. If the depth of sediment is in excess of 3", then the sediment should be removed.

Catch Basin Inspection/Cleaning:

Have all catchbasins cleaned out completely twice annually during April and October, if required.

Drain Manhole Inspection/Cleaning:

Have all drain manholes cleaned out completely twice annually during April and October, if required.

Trench Drain Inspection/Cleaning:

Have all trench drains cleaned out completely twice annually during April and October, if required.

Street Sweeping

Have the driveway swept bi-annually in April and October.

MAINTENANCE RESPONSIBILITIES

The maintenance of the Drainage System is the responsibility of the Property Owners. The actual work can be accomplished by the Owner or can be subcontracted to a company that specializes in the cleaning of storm drainage facilities. Inspections should be performed by independent individual such as the design engineer or other experienced individual in the field.

Construction period pollution control

Erosion and sedimentation control measures will be implemented prior to and during construction activities to minimize impacts from land disturbance activities. Erosion and sedimentation control measures implemented on the site will include, at a minimum, dust control measures, the installation of silt fence barriers on the up-gradient side of resource areas, and catch basin inlet protection. Controls may also include temporary sedimentation basins and diversion swales and temporary seeding. The erosion and sedimentation controls will be inspected at the end of the day if precipitation is forecast, and after each rainfall event of 0.5 inches or more. Should construction occur during winter months, seasonally appropriate stabilization measure will be utilized.

Below is a summary of the minimum construction period pollution control requirements. These topics are presented as a means of demonstrating understanding of pollution control but are not meant to supplant preparation of the SWPPP. Please refer to the SWPPP for complete construction activity details.

a. Dust Control

Mitigation measures will be implemented to control fugitive dust during construction activities. Dust control measure may include seeding, wet suppression, application of soil stabilization agents, or other measures to control dust generated by construction activities. The Contractor shall confirm with state and local regulations to see if the use of calcium chloride for dust suppression is allowed.

b. Erosion Control Barriers

Prior to any ground disturbance, erosion control barriers will be installed at the limit of work at down-gradient positions on the site. The barriers will consist of silt fence and staked hay bales and will be entrenched in the soil to prevent underflow.

c. Catch Basin/Trench Drain Inlet Protection

All existing and newly installed catch basins or trench drains shall be protected during construction with a filter insert system. These sedimentation control measures will be regularly maintained until the drainage area tributary to the catch basin has been stabilized.

d. Temporary Sedimentation Basins and Diversion Swales

If necessary, temporary sedimentation basins will be constructed to prevent transport of fine-grained sediment into wetland resource areas and other off-site areas. These temporary basins will be located where appropriate, as determined by the contractor. Temporary diversion swales or berms may be used to convey runoff from construction areas to temporary or previously constructed basins.

e. <u>Temporary Seeding</u>

Temporary seeding will be used where vegetative cover is required for less than one year on disturbed soil areas. Such areas will be seeded if the soils will be exposed without construction activity for more than 30 days. Rapidly growing annual grasses, such as annual rye grass, oats, perennial rye grass or winter rye will be uniformly applied. Depending on the slope, the soil may be covered with a layer of straw mulch, an erosion control blanket, or a bonded fiber matrix.

f. <u>Permanent Seeding</u>

Upon completion of the final grading, any areas not covered by pavement, other forms of stabilization, including landscaping, will be seeded with rapidly growing annual rye grass/red fescue seed mix.

120 Norwood Ave Newton, MA

STORMWATER MANAGEMENT REPORT PROPOSED CONDOMINIUM DEVELOPMENT 120 NORWOOD AVE NEWTON, MASSACHUSETTS

INSPECTION REPORT:	
Inspection Firm:	
Inspectors Name:	Date:
Components Inspected:	
Signed:	
SYSTEM MAINTENANCE:	
Maintenance Firm:	Date:
Leaching Gallies Inspected: YesNoComments:	
Leaching Gallies Cleaned: YesNoComments:	
Catchbasins Inspected: YesNoComments:	
Catchbasins Cleaned: Yes No Comments:	
Manhole Inspected: Yes No Comments:	
Manhole Cleaned: Yes No Comments:	
Trench Drain Inspected: Yes No Comments:	
Trench Drain Cleaned: YesNoComments:	

120 Norwood Ave Newton, MA

Estimate of Material Removed:

Other Comments:

Signed:

Middlesex County, Massachusetts

626B—Merrimac-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyr9 Elevation: 0 to 820 feet Mean annual precipitation: 36 to 71 inches Mean annual air temperature: 39 to 55 degrees F Frost-free period: 140 to 250 days Farmland classification: Not prime farmland

Map Unit Composition

Merrimac and similar soils: 45 percent Urban land: 40 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Outwash plains, outwash terraces, moraines, eskers, kames

Landform position (two-dimensional): Backslope, footslope, summit, shoulder

Landform position (three-dimensional): Side slope, crest, riser, tread

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam Bw1 - 10 to 22 inches: fine sandy loam Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand 2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)

USDA

Sodium adsorption ratio, maximum: 1.0 Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 2e Hydrologic Soil Group: A Ecological site: F144AY022MA - Dry Outwash Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 8 Hydrologic Soil Group: D Hydric soil rating: Unranked

Minor Components

Hinckley

Percent of map unit: 5 percent Landform: Deltas, kames, eskers, outwash plains Landform position (two-dimensional): Summit, shoulder, backslope Landform position (three-dimensional): Nose slope, crest, head slope, side slope, rise Down-slope shape: Convex Across-slope shape: Convex, linear Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent Landform: Deltas, terraces, outwash plains Landform position (two-dimensional): Footslope Landform position (three-dimensional): Tread, dip Down-slope shape: Concave Across-slope shape: Linear Hydric soil rating: No

Windsor

Percent of map unit: 5 percent Landform: Outwash terraces, dunes, outwash plains, deltas Landform position (three-dimensional): Tread, riser Down-slope shape: Linear, convex

USDA

Across-slope shape: Linear, convex Hydric soil rating: No

Data Source Information

Soil Survey Area: Middlesex County, Massachusetts Survey Area Data: Version 21, Sep 2, 2021





	#392-22
120 Norwood Ave	AVC) AVC) H MR-53.74 H H-72.73
Newton, Massachus	setts
Pre Development Catchmen	t Area Plan
VERNE T. PORTER Jr Land Surveyors — Civil 354 Elliot Street Newton, Mass	23, 2022 ., PLS Engineers achusetts 02464 Project: 22008
	Checked By: V. Porter Jr.
Sheet_1_of_2_	Drawn By: R. Jardine Jr.



PROJECT PERCOLATION RESULTS DESCRIPTION: 120 NORLOWD ACT DEPTH: TIME: LOCATION: NEWTON 12" REMARKS :____ 11" * TEST PIT NO. . 🖘 10" DATE: 2-17-22 • 9" SUNNY WEATHER:___ AVERAGE > Zmin /m 8" GROUND EL: RATE: 71 ENGINEER: VERUE DOTE 6" Excav.Bbuild Remar SOIL DESCRIPTION DEPTH . Effort Count No. -0 "---6" STAD LOAM ! 1!-18 Longing Strep 2', 31" MEDIUM SAUD -4 -51-5! RUST LINE 5,5 ASSUMED SHEW -6'--71. COARSE SANLA -81. - 9'- ∇ OBSTRUED WATTER 9.5' -10'-CDAPSE SAND W/ STONE I'man Ż -11'-H -12 OTTOM EXCAUATION -13 -14'-**REMARKS:** LEGEND PROPORTIONS ABBREVIATIONS EXCAVATION TEST PIT PLAN F-fine USED EFFORT Boulder Count M-medium Trace (TR)- 0 -10% C-coarse Size Range Easy Е Little(LI.)-10-20% F/M-fine to med. |Moderate Classification М F/C-fine to coar Difficult Some (SO) -20-35% 6"-18" ----'A D V-very Groundwater Gl 18"-30" -----B GR-grav

81	÷.,	

TEST PIT FIELD LOG----#392-22 PERCOLATION RESULTS PROJECT DESCRIPTION: 120 NORWOOD A LE DEPTH: TIME: LOCATION: NENTON 12" REMARKS :____ : 11" * . -TEST PIT NO. 10" DATE: 2-17-22 - 9" SUNNY 500 AVERAGE > ZIMIN/MCA WEATHER:___ 8" GROUND EL: -7" ENGINEER: NERIUE WETE P 6" Excav.Boultil Remar SOIL DESCRIPTION ्य। इ.स. DEPTH -Effort Count No. -0'--12" SAND LOAM ^ي ا Fill 2' 31 MEDIUM SAND -4' -5" V RUST LINE G.D ASSUME SHOW 61 7% COARSE SAND -8'-- 9.'-A 0.00 OBSERVER WATER 9.75 -10'-COARSE GAMES W/STONE NOCUODA AUTE -11'-BOTTOM EXCALATION -12 5 -13'-8.8 --14'--**REMARKS:**

and the second sec	I FGEND	PROPORTIONS	ABBREVIATIONS	EXCAVATION
TEST PIT PLAN	Boulder Count Size Range Classification 6"-18"A 18"-30"B	<u>USED</u> Trace (TR)- 0 -10% Little(LI.)-10-20% Some (SO) -20-35%	F-fine M-medium C-coarse F/M-fine to med. F/C-fine to coar V-very GR-gray	<u>EFFORT</u> Easy E Moderate M Difficult D Groundwater Gl

 $_{2,2}$ is

TEST PIT FIELD LOG --- #392-22 PROJECT PERCOLATION RESULTS DESCRIPTION: 120 NORWOOD AL DEPTH: TIME: LOCATION: NEwotan 12" **REMARKS**:__ : 11" * . = TEST PIT NO. 3 10" DATE: 2-17-22 - 9" SUNNY 500 AVERAGE - Zomia / INCH WEATHER: 8" GROUND EL: 7" ENGINEER: NERVE PORTRA 6" · Excav.Bouildi Remar SOIL DESCRIPTION DEPTH -. . Effort Count No. -0 ---12 SANDY LOANY 11-... Fibli-87 2' 3" MEDUM SAND -4 -5*- ∇ ! RUSTLINE ASSUME SHGW -6'--71-A. -8'-OBSEAUED WATER V -9.'-120 40+ . ١. -10'--11 !---12 5 -13'-NOEWOOD AVE ÷ 8, REMARKS;

LEGEND Image: Test pit plan Boulder Count Size Range Classification 6"-18" 18"-30"	PROPORTIONS USED Trace (TR)- 0 -10% Little(LI.)-10-20% Some (SO) -20-35%	ABBREVIATIONS F-fine M-medium C-coarse F/M-fine to med. F/C-fine to coar V-very GR-gray	EXCAVATION EFFORT Easy E Moderate M Difficult D Groundwater G
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Sec. 3.