JONES & BEACH ENGINEERS INC.

DRAINAGE ANALYSIS

EROSION AND SEDIMENT CONTROL PLAN

MEADOWBROOK VILLAGE

Tax Map 270 Lot 2 & 3, Tax Map 273 Lot 49
44 Meadowbrook Drive
Barrington, NH 03825

Prepared for:

21 Boylston Street, LLC
18 Brush Hill Road
Merrimac, MA 01860

Prepared by:
Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885
(603) 772-4746
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JBE Project No. 20747

1. EXECUTIVE SUMMARY

The purpose of this project is to construct an open space subdivision containing 11-lots on Town of Barrington Tax Map 270 Lot 2 & 3 and Tax Map 273 Lot 49. The proposed subdivision will contain 9.75 acres of developed space and 47.79 acres of open space with associated parking, drainage, and utilities. Two models were compiled, one for the area in its existing (pre-development) condition, and a second for its proposed (post-development) condition. The analysis was conducted using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. A summary of the existing and proposed conditions peak rates of runoff is as follows:

EXECUTIVE SUMMARY TABLE								
Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	6.99	6.67	18.17	17.72	28.36	26.48	38.36	34.41
Analysis Point #2	6.17	4.27	13.26	8.80	19.32	12.61	25.06	16.18

The drainage design intent for this site is to maintain the post-development peak flow to the pre-development peak flow conditions to the extent practicable and to effectively treat stormwater from the development of this project. This has been accomplished through the use of an infiltration basin to maintain the peak discharge and infiltrate stormwater.

In addition, the potential for increased erosion and sedimentation is handled by way of riprap inlet and outlet protection aprons. The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage system and will be observed during all stages of construction. Existing wetlands and abutting property owners will suffer minimal impact resultant from this development.

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2. DRAINAGE ANALYSIS

2.1 INTRODUCTION

The purpose of this project is to construct an open space subdivision containing 11-lots on Town of Barrington Tax Map 270 Lot 2 & 3 and Tax Map 273 Lot 49. The proposed subdivision will contain lots with houses, associated parking, drainage, and utilities. Each lot will be serviced by a private well and septic system.

2.2 METHODOLOGY

The existing and proposed watersheds were modeled utilizing HydroCad stormwater software, version 9.10. The watersheds were analyzed utilizing the SCS TR-20 methodology for hydrograph development and the TR-55 methodology for Time of Concentration (Tc) determination. The Dynamic-Storage-Indicating method for reach and pond routing was utilized. Type III, 24-hour hydrographs were developed for the 2-year, 10-year, 25-year, 50-year, and 100-year storm events, corresponding to rainfall events of 3.08", 4.66", 5.91", 7.06" and 8.46" respectively.

Existing topography and site features were obtained through aerial topography and on-ground topography completed by Jones & Beach Engineers. Existing soil conditions were derived from information obtained from the NRCS Web Soil Survey.

2.3 EXISTING CONDITIONS ANALYSIS

The study area consists of the subject property and upstream contributing area. The study area contains 22.73 acres including offsite contributing areas. The existing site features a single home accessed by a gravel driveway. The site is significantly forested with the exception of the existing house and gravel driveway. The existing site features a high point located in the central portion of the study area. The site drains away in all directions from this high point resulting in the Analysis Points as defined below.

The majority of the soils for this site are described as Hydrological Soils "D". Along the northeastern property line, there is a small portion described as Hydrological Soils "A". There is a section described as Hydrological Soils "D" soil along the western side of the study area abutting the wetland boundary. To the southern side of the study area, there is a section described as Hydrological Soils "C" abutting the wetland boundary and it continues to the area of Candlestick Lane

Two Analysis Points (AP's) were defined for this project. Analysis Points are described as below:

Analysis Point #1 is defined as the wetland boundary along the western edge of the developed area. All stormwater on the western side of the high point flows overland and drains to this point. Analysis Point #2 is defined as the wetland boundary to the eastern side of the developed area. All stormwater on the eastern side of the high point flows overland and drains to this point.

2.4 PROPOSED CONDITIONS ANALYSIS

The proposed site includes the construction of an 11-lot subdivision with houses, access drives, parking, drainage, and utilities.

The addition of the proposed impervious paved areas and buildings causes an increase in the curve number (C_n) and a decrease in the time of concentration (T_c), the net result being a potential increase in peak rates of runoff from the site. To mitigate the potential increase in the peak rate of runoff and to effectively treat the subsequent stormwater runoff, the following Best Management Practices (BMP's) have been employed at the Analysis Points as follows:

In post construction condition, the site is divided into 4 watersheds that drain to two Analysis Points. The proposed road that enters on the eastern side of the property and runs to the existing high point of the developed area divides the stormwater. Stormwater to the northeast that breaks at the high point along the proposed house locations flows overland to the northern side of the proposed road to a drainage ditch that runs alongside the road. The ditch terminates at the low point at station 1+75. A 24" corrugated plastic culvert (P2) conveys stormwater to the entrance of Infiltration Basin #1 (P1). Stormwater to the south of the proposed road that breaks at the high point along the proposed house locations drains to a ditch that runs along the road to the entrance of Infiltration Basin #1. Discharge from the basin then enters the existing wetland at Analysis Point #1. Stormwater to the north that breaks at the high point along the proposed house locations that is not collected by the drainage swale flows overland to the existing wetland at "AP-2". Stormwater to the west that breaks at the high point along the proposed house locations that is not collected by the drainage swale flows overland to the existing wetland at "AP-1".

2.5 CONCLUSION

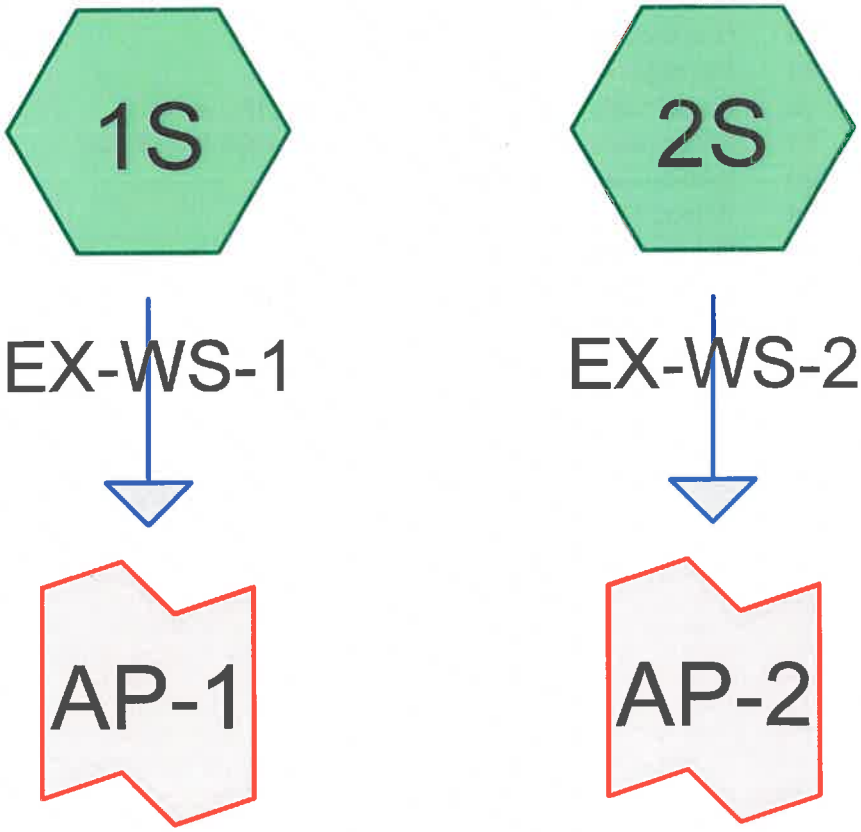
This proposed site development will have minimal adverse effect on abutting infrastructures or properties by way of stormwater runoff or siltation if properly constructed in accordance with this Drainage Analysis and approved project plan set. The post-construction peak rates of runoff for the site will be lower than the existing conditions for all analyzed storm events. Appropriate steps will be taken to control erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, detention ponds, and riprap outlet protection aprons. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced with regular inspections throughout the construction process.

Respectfully Submitted,
JONES & BEACH ENGINEERS, INC.

Barry W. Gier, PE
Vice-President

2.6 DRAINAGE CALCULATIONS

PRE-DEVELOPMENT CONDITIONS ANALYSIS



Subcat Reach Pond Link

Routing Diagram for 20747-EXIST-DRAINAGE
Prepared by Jones & Beach Engineers, Printed 8/9/2021
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.282	80	>75% Grass cover, Good, HSG D (1S, 2S)
0.006	96	Gravel surface, HSG B (1S)
0.236	96	Gravel surface, HSG D (1S, 2S)
0.104	98	Paved parking, HSG C (1S)
0.011	83	Paved roads w/open ditches, 50% imp, HSG A (2S)
0.331	93	Paved roads w/open ditches, 50% imp, HSG D (1S, 2S)
0.077	30	Woods, Good, HSG A (2S)
3.447	55	Woods, Good, HSG B (1S)
4.814	70	Woods, Good, HSG C (1S)
13.426	77	Woods, Good, HSG D (1S, 2S)
22.734	**73**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.088	HSG A	2S
3.453	HSG B	1S
4.918	HSG C	1S
14.275	HSG D	1S, 2S
0.000	Other	
22.734		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=649,560 sf 1.41% Impervious Runoff Depth>0.68"
Flow Length=716' Tc=26.3 min CN=70 Runoff=6.99 cfs 0.841 af

Subcatchment2S: EX-WS-2 Runoff Area=340,718 sf 0.82% Impervious Runoff Depth>1.02"
Flow Length=646' Tc=24.3 min CN=77 Runoff=6.17 cfs 0.668 af

Link AP-1: Analysis Point #1 Inflow=6.99 cfs 0.841 af
Primary=6.99 cfs 0.841 af

Link AP-2: Analysis Point #2 Inflow=6.17 cfs 0.668 af
Primary=6.17 cfs 0.668 af

Total Runoff Area = 22.734 ac Runoff Volume = 1.509 af Average Runoff Depth = 0.80"
98.79% Pervious = 22.459 ac 1.21% Impervious = 0.274 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=649,560 sf 1.41% Impervious Runoff Depth>1.63"
Flow Length=716' Tc=26.3 min CN=70 Runoff=18.17 cfs 2.024 af

Subcatchment2S: EX-WS-2 Runoff Area=340,718 sf 0.82% Impervious Runoff Depth>2.16"
Flow Length=646' Tc=24.3 min CN=77 Runoff=13.26 cfs 1.408 af

Link AP-1: Analysis Point #1 Inflow=18.17 cfs 2.024 af
Primary=18.17 cfs 2.024 af

Link AP-2: Analysis Point #2 Inflow=13.26 cfs 1.408 af
Primary=13.26 cfs 1.408 af

Total Runoff Area = 22.734 ac Runoff Volume = 3.432 af Average Runoff Depth = 1.81"
98.79% Pervious = 22.459 ac 1.21% Impervious = 0.274 ac

Summary for Subcatchment 1S: EX-WS-1

Runoff = 18.17 cfs @ 12.39 hrs, Volume= 2.024 af, Depth> 1.63"

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-YR Rainfall=4.66"

Area (sf)	CN	Description
271	96	Gravel surface, HSG B
150,142	55	Woods, Good, HSG B
4,510	98	Paved parking, HSG C
209,710	70	Woods, Good, HSG C
9,322	93	Paved roads w/open ditches, 50% imp, HSG D
9,872	80	>75% Grass cover, Good, HSG D
262,862	77	Woods, Good, HSG D
2,871	96	Gravel surface, HSG D
649,560	70	Weighted Average
640,389		98.59% Pervious Area
9,171		1.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	32	0.0625	0.10		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
0.3	34	0.0625	1.75		**Sheet Flow, ROAD** Smooth surfaces n= 0.011 P2= 3.20"
7.2	32	0.0312	0.07		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.20"
2.7	225	0.0755	1.37		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
10.6	393	0.0152	0.62		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
26.3	716	Total			

Summary for Subcatchment 2S: EX-WS-2

Runoff = 13.26 cfs @ 12.34 hrs, Volume= 1.408 af, Depth> 2.16"

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-YR Rainfall=4.66"

Area (sf)	CN	Description
3,354	30	Woods, Good, HSG A
468	83	Paved roads w/open ditches, 50% imp, HSG A
5,088	93	Paved roads w/open ditches, 50% imp, HSG D
2,396	80	>75% Grass cover, Good, HSG D
321,987	77	Woods, Good, HSG D
7,425	96	Gravel surface, HSG D
340,718	77	Weighted Average
337,940		99.18% Pervious Area
2,778		0.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	64	0.0150	0.10		**Sheet Flow, GRASS** Grass: Dense n= 0.240 P2= 3.20"
0.6	35	0.0150	0.99		**Sheet Flow, GRAVEL** Smooth surfaces n= 0.011 P2= 3.20"
3.9	128	0.0117	0.54		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
5.3	319	0.0407	1.01		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
3.3	100	0.0100	0.50		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
24.3	646	Total			

Summary for Link AP-1: Analysis Point #1

Inflow Area = 14.912 ac, 1.41% Impervious, Inflow Depth > 1.63" for 10-YR event
Inflow = 18.17 cfs @ 12.39 hrs, Volume= 2.024 af
Primary = 18.17 cfs @ 12.39 hrs, Volume= 2.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Link AP-2: Analysis Point #2

Inflow Area = 7.822 ac, 0.82% Impervious, Inflow Depth > 2.16" for 10-YR event
Inflow = 13.26 cfs @ 12.34 hrs, Volume= 1.408 af
Primary = 13.26 cfs @ 12.34 hrs, Volume= 1.408 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: EX-WS-1 Runoff Area=649,560 sf 1.41% Impervious Runoff Depth>2.51"
Flow Length=716' Tc=26.3 min CN=70 Runoff=28.36 cfs 3.121 af

Subcatchment2S: EX-WS-2 Runoff Area=340,718 sf 0.82% Impervious Runoff Depth>3.16"
Flow Length=646' Tc=24.3 min CN=77 Runoff=19.32 cfs 2.058 af

Link AP-1: Analysis Point #1 Inflow=28.36 cfs 3.121 af
Primary=28.36 cfs 3.121 af

Link AP-2: Analysis Point #2 Inflow=19.32 cfs 2.058 af
Primary=19.32 cfs 2.058 af

Total Runoff Area = 22.734 ac Runoff Volume = 5.178 af Average Runoff Depth = 2.73"
98.79% Pervious = 22.459 ac 1.21% Impervious = 0.274 ac

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: EX-WS-1 Runoff Area=649,560 sf 1.41% Impervious Runoff Depth>3.39"
Flow Length=716' Tc=26.3 min CN=70 Runoff=38.36 cfs 4.209 af

Subcatchment 2S: EX-WS-2 Runoff Area=340,718 sf 0.82% Impervious Runoff Depth>4.12"
Flow Length=646' Tc=24.3 min CN=77 Runoff=25.06 cfs 2.684 af

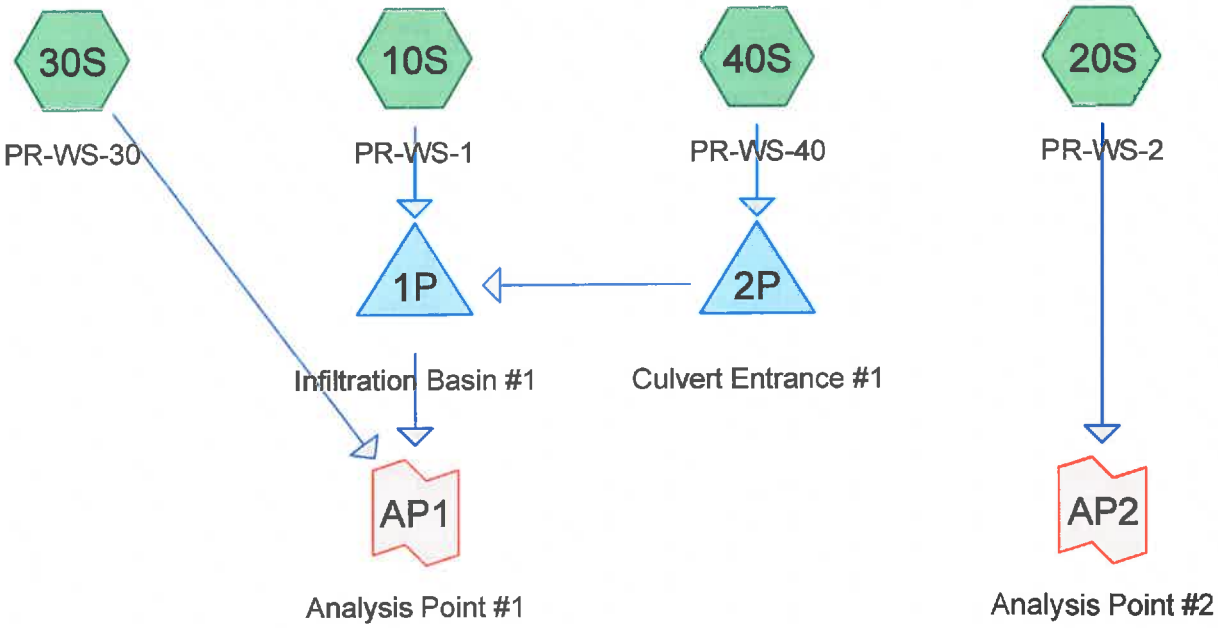
Link AP-1: Analysis Point #1 Inflow=38.36 cfs 4.209 af
Primary=38.36 cfs 4.209 af

Link AP-2: Analysis Point #2 Inflow=25.06 cfs 2.684 af
Primary=25.06 cfs 2.684 af

Total Runoff Area = 22.734 ac Runoff Volume = 6.894 af Average Runoff Depth = 3.64"
98.79% Pervious = 22.459 ac 1.21% Impervious = 0.274 ac

2.7 APPENDIX II

POST-DEVELOPMENT CONDITIONS ANALYSIS



Subcat Reach Pond Link

Routing Diagram for 20747-PROP-DRAINAGE
Prepared by Jones & Beach Engineers, Printed 8/23/2021
HydroCAD® 10.10-4a s/n 10589 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.003	39	>75% Grass cover, Good, HSG A (20S)
1.719	61	>75% Grass cover, Good, HSG B (10S, 30S, 40S)
1.004	74	>75% Grass cover, Good, HSG C (10S, 30S)
5.992	80	>75% Grass cover, Good, HSG D (10S, 20S, 30S, 40S)
0.011	83	Paved roads w/open ditches, 50% imp, HSG A (20S)
0.402	89	Paved roads w/open ditches, 50% imp, HSG B (10S, 30S, 40S)
0.099	92	Paved roads w/open ditches, 50% imp, HSG C (30S)
1.244	93	Paved roads w/open ditches, 50% imp, HSG D (10S, 20S, 30S, 40S)
0.073	30	Woods, Good, HSG A (20S)
1.332	55	Woods, Good, HSG B (30S)
3.814	70	Woods, Good, HSG C (10S, 30S)
7.040	77	Woods, Good, HSG D (10S, 20S, 30S)
22.734	**75**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.088	HSG A	20S
3.453	HSG B	10S, 30S, 40S
4.918	HSG C	10S, 30S
14.275	HSG D	10S, 20S, 30S, 40S
0.000	Other	
22.734		**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: PR-WS-1 Runoff Area=282,039 sf 5.12% Impervious Runoff Depth>1.08"
Flow Length=613' Tc=23.2 min CN=78 Runoff=5.53 cfs 0.584 af

Subcatchment20S: PR-WS-2 Runoff Area=209,570 sf 2.67% Impervious Runoff Depth>1.14"
Flow Length=631' Tc=24.3 min CN=79 Runoff=4.27 cfs 0.457 af

Subcatchment30S: PR-WS-30 Runoff Area=420,502 sf 1.96% Impervious Runoff Depth>0.68"
Flow Length=468' Tc=26.3 min CN=70 Runoff=4.54 cfs 0.544 af

Subcatchment40S: PR-WS-40 Runoff Area=78,167 sf 12.76% Impervious Runoff Depth>1.20"
Flow Length=557' Tc=16.6 min CN=80 Runoff=1.97 cfs 0.180 af

Pond 1P: Infiltration Basin #1 Peak Elev=175.80' Storage=12,170 cf Inflow=7.35 cfs 0.763 af
Discarded=0.02 cfs 0.010 af Primary=2.92 cfs 0.674 af Outflow=2.94 cfs 0.684 af

Pond 2P: Culvert Entrance #1 Peak Elev=178.14' Storage=121 cf Inflow=1.97 cfs 0.180 af
18.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=1.95 cfs 0.180 af

Link AP1: Analysis Point #1 Inflow=6.67 cfs 1.218 af
Primary=6.67 cfs 1.218 af

Link AP2: Analysis Point #2 Inflow=4.27 cfs 0.457 af
Primary=4.27 cfs 0.457 af

Total Runoff Area = 22.734 ac Runoff Volume = 1.764 af Average Runoff Depth = 0.93"
96.14% Pervious = 21.855 ac 3.86% Impervious = 0.878 ac

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: PR-WS-1 Runoff Area=282,039 sf 5.12% Impervious Runoff Depth>2.24"
Flow Length=613' Tc=23.2 min CN=78 Runoff=11.63 cfs 1.210 af

Subcatchment 20S: PR-WS-2 Runoff Area=209,570 sf 2.67% Impervious Runoff Depth>2.32"
Flow Length=631' Tc=24.3 min CN=79 Runoff=8.80 cfs 0.932 af

Subcatchment 30S: PR-WS-30 Runoff Area=420,502 sf 1.96% Impervious Runoff Depth>1.63"
Flow Length=468' Tc=26.3 min CN=70 Runoff=11.78 cfs 1.310 af

Subcatchment 40S: PR-WS-40 Runoff Area=78,167 sf 12.76% Impervious Runoff Depth>2.41"
Flow Length=557' Tc=16.6 min CN=80 Runoff=3.98 cfs 0.361 af

Pond 1P: Infiltration Basin #1 Peak Elev=176.44' Storage=23,423 cf Inflow=15.37 cfs 1.570 af
Discarded=0.02 cfs 0.013 af Primary=7.12 cfs 1.453 af Outflow=7.15 cfs 1.466 af

Pond 2P: Culvert Entrance #1 Peak Elev=178.48' Storage=287 cf Inflow=3.98 cfs 0.361 af
18.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=3.92 cfs 0.361 af

Link AP1: Analysis Point #1 Inflow=17.72 cfs 2.763 af
Primary=17.72 cfs 2.763 af

Link AP2: Analysis Point #2 Inflow=8.80 cfs 0.932 af
Primary=8.80 cfs 0.932 af

Total Runoff Area = 22.734 ac Runoff Volume = 3.812 af Average Runoff Depth = 2.01"
96.14% Pervious = 21.855 ac 3.86% Impervious = 0.878 ac

Summary for Subcatchment 10S: PR-WS-1

Runoff = 11.63 cfs @ 12.33 hrs, Volume= 1.210 af, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.66"

Area (sf)	CN	Description
6,116	89	Paved roads w/open ditches, 50% imp, HSG B
22,484	61	>75% Grass cover, Good, HSG B
38,780	74	>75% Grass cover, Good, HSG C
13,220	70	Woods, Good, HSG C
22,781	93	Paved roads w/open ditches, 50% imp, HSG D
100,513	80	>75% Grass cover, Good, HSG D
78,145	77	Woods, Good, HSG D
282,039	78	Weighted Average
267,591		94.88% Pervious Area
14,449		5.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	100	0.0150	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.08"
1.9	130	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	37	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.0	266	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	80	0.0125	1.68		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
23.2	613	Total			

Summary for Subcatchment 20S: PR-WS-2

Runoff = 8.80 cfs @ 12.34 hrs, Volume= 0.932 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.66"

Area (sf)	CN	Description
495	83	Paved roads w/open ditches, 50% imp, HSG A
147	39	>75% Grass cover, Good, HSG A
3,180	30	Woods, Good, HSG A
10,687	93	Paved roads w/open ditches, 50% imp, HSG D
98,727	80	>75% Grass cover, Good, HSG D
96,334	77	Woods, Good, HSG D
209,570	79	Weighted Average
203,979		97.33% Pervious Area
5,591		2.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0260	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.08"
11.2	531	0.0250	0.79		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
24.3	631	Total			

Summary for Subcatchment 30S: PR-WS-30

Runoff = 11.78 cfs @ 12.38 hrs, Volume= 1.310 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.66"

Area (sf)	CN	Description
7,064	89	Paved roads w/open ditches, 50% imp, HSG B
40,622	61	>75% Grass cover, Good, HSG B
58,024	55	Woods, Good, HSG B
4,327	92	Paved roads w/open ditches, 50% imp, HSG C
4,967	74	>75% Grass cover, Good, HSG C
152,928	70	Woods, Good, HSG C
5,108	93	Paved roads w/open ditches, 50% imp, HSG D
15,298	80	>75% Grass cover, Good, HSG D
132,164	77	Woods, Good, HSG D
420,502	70	Weighted Average
412,253		98.04% Pervious Area
8,250		1.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.08"
7.1	368	0.0300	0.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.3	468	Total			

Summary for Subcatchment 40S: PR-WS-40

Runoff = 3.98 cfs @ 12.23 hrs, Volume= 0.361 af, Depth> 2.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR Rainfall=4.66"

Area (sf)	CN	Description
4,335	89	Paved roads w/open ditches, 50% imp, HSG B
11,761	61	>75% Grass cover, Good, HSG B
15,617	93	Paved roads w/open ditches, 50% imp, HSG D
46,454	80	>75% Grass cover, Good, HSG D
78,167	80	Weighted Average
68,191		87.24% Pervious Area
9,976		12.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0200	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.08"
2.1	457	0.0600	3.67		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
16.6	557	Total			

Summary for Pond 1P: Infiltration Basin #1

Inflow Area = 8.269 ac, 6.78% Impervious, Inflow Depth > 2.28" for 10 YR event
Inflow = 15.37 cfs @ 12.30 hrs, Volume= 1.570 af
Outflow = 7.15 cfs @ 12.70 hrs, Volume= 1.466 af, Atten= 54%, Lag= 23.6 min
Discarded = 0.02 cfs @ 12.70 hrs, Volume= 0.013 af
Primary = 7.12 cfs @ 12.70 hrs, Volume= 1.453 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Peak Elev= 176.44' @ 12.70 hrs Surf.Area= 18,840 sf Storage= 23,423 cf

Plug-Flow detention time= 71.7 min calculated for 1.466 af (93% of inflow)
Center-of-Mass det. time= 49.2 min (854.5 - 805.3)

Volume	Invert	Avail.Storage	Storage Description
#1	175.00'	58,002 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
175.00	13,964	736.0	0	0	13,964
176.00	17,124	1,017.0	15,517	15,517	53,173
177.00	21,143	1,395.0	19,098	34,615	125,737
178.00	25,705	1,549.0	23,387	58,002	161,845

Device	Routing	Invert	Outlet Devices
#1	Discarded	175.00'	**0.030 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 173.50'
#2	Primary	177.50'	**4.0' long x 2.0' breadth EMERGENCY OVERFLOW** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#3	Device 5	177.50'	**4.0' long TOP OF WEIR PLATE** 2 End Contraction(s)
#4	Device 5	175.00'	**24.0" W x 12.0" H Vert. Orifice/Grate** C= 0.600

Limited to weir flow at low heads

#5	Primary	175.00'	**18.0" Round Culvert** L= 84.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 175.00' / 173.50' S= 0.0179 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Discarded OutFlow Max=0.02 cfs @ 12.70 hrs HW=176.44' (Free Discharge)
└**1=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=7.12 cfs @ 12.70 hrs HW=176.44' (Free Discharge)
└**2=EMERGENCY OVERFLOW** (Controls 0.00 cfs)
└**5=Culvert** (Inlet Controls 7.12 cfs @ 4.09 fps)
└**3=TOP OF WEIR PLATE** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Passes 7.12 cfs of 9.22 cfs potential flow)

Summary for Pond 2P: Culvert Entrance #1

Inflow Area =	1.794 ac, 12.76% Impervious, Inflow Depth > 2.41"	for 10 YR event		
Inflow =	3.98 cfs @ 12.23 hrs, Volume=	0.361 af		
Outflow =	3.92 cfs @ 12.26 hrs, Volume=	0.361 af, Atten= 1%, Lag= 1.7 min		
Primary =	3.92 cfs @ 12.26 hrs, Volume=	0.361 af		

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs
Peak Elev= 178.48' @ 12.26 hrs Surf.Area= 637 sf Storage= 287 cf

Plug-Flow detention time= 1.2 min calculated for 0.361 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (798.7 - 797.8)

Volume	Invert	Avail.Storage	Storage Description
#1	177.50'	760 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
177.50	50	80.0	0	0	50
178.00	278	155.0	74	74	1,454
179.00	1,201	373.0	686	760	10,617

Device	Routing	Invert	Outlet Devices
#1	Primary	177.50'	**18.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 177.50' / 177.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=3.91 cfs @ 12.26 hrs HW=178.48' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.91 cfs @ 4.57 fps)

Summary for Link AP1: Analysis Point #1

Inflow Area = 17.923 ac, 4.19% Impervious, Inflow Depth > 1.85" for 10 YR event
Inflow = 17.72 cfs @ 12.44 hrs, Volume= 2.763 af
Primary = 17.72 cfs @ 12.44 hrs, Volume= 2.763 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Summary for Link AP2: Analysis Point #2

Inflow Area = 4.811 ac, 2.67% Impervious, Inflow Depth > 2.32" for 10 YR event
Inflow = 8.80 cfs @ 12.34 hrs, Volume= 0.932 af
Primary = 8.80 cfs @ 12.34 hrs, Volume= 0.932 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.02 hrs

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: PR-WS-1 Runoff Area=282,039 sf 5.12% Impervious Runoff Depth>3.25"
Flow Length=613' Tc=23.2 min CN=78 Runoff=16.80 cfs 1.755 af

Subcatchment20S: PR-WS-2 Runoff Area=209,570 sf 2.67% Impervious Runoff Depth>3.35"
Flow Length=631' Tc=24.3 min CN=79 Runoff=12.61 cfs 1.342 af

Subcatchment30S: PR-WS-30 Runoff Area=420,502 sf 1.96% Impervious Runoff Depth>2.51"
Flow Length=468' Tc=26.3 min CN=70 Runoff=18.39 cfs 2.020 af

Subcatchment40S: PR-WS-40 Runoff Area=78,167 sf 12.76% Impervious Runoff Depth>3.46"
Flow Length=557' Tc=16.6 min CN=80 Runoff=5.65 cfs 0.517 af

Pond 1P: Infiltration Basin #1 Peak Elev=176.98' Storage=34,101 cf Inflow=22.15 cfs 2.271 af
Discarded=0.03 cfs 0.015 af Primary=9.42 cfs 2.136 af Outflow=9.45 cfs 2.150 af

Pond 2P: Culvert Entrance #1 Peak Elev=178.72' Storage=471 cf Inflow=5.65 cfs 0.517 af
18.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=5.52 cfs 0.516 af

Link AP1: Analysis Point #1 Inflow=26.48 cfs 4.155 af
Primary=26.48 cfs 4.155 af

Link AP2: Analysis Point #2 Inflow=12.61 cfs 1.342 af
Primary=12.61 cfs 1.342 af

Total Runoff Area = 22.734 ac Runoff Volume = 5.634 af Average Runoff Depth = 2.97"
96.14% Pervious = 21.855 ac 3.86% Impervious = 0.878 ac

Time span=5.00-20.00 hrs, dt=0.02 hrs, 751 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment10S: PR-WS-1 Runoff Area=282,039 sf 5.12% Impervious Runoff Depth>4.22"
Flow Length=613' Tc=23.2 min CN=78 Runoff=21.69 cfs 2.280 af

Subcatchment20S: PR-WS-2 Runoff Area=209,570 sf 2.67% Impervious Runoff Depth>4.33"
Flow Length=631' Tc=24.3 min CN=79 Runoff=16.18 cfs 1.736 af

Subcatchment30S: PR-WS-30 Runoff Area=420,502 sf 1.96% Impervious Runoff Depth>3.39"
Flow Length=468' Tc=26.3 min CN=70 Runoff=24.88 cfs 2.724 af

Subcatchment40S: PR-WS-40 Runoff Area=78,167 sf 12.76% Impervious Runoff Depth>4.45"
Flow Length=557' Tc=16.6 min CN=80 Runoff=7.22 cfs 0.665 af

Pond 1P: Infiltration Basin #1 Peak Elev=177.47' Storage=44,946 cf Inflow=28.53 cfs 2.945 af
Discarded=0.04 cfs 0.017 af Primary=11.15 cfs 2.793 af Outflow=11.18 cfs 2.810 af

Pond 2P: Culvert Entrance #1 Peak Elev=178.94' Storage=691 cf Inflow=7.22 cfs 0.665 af
18.0" Round Culvert n=0.012 L=50.0' S=0.0100 '/' Outflow=6.97 cfs 0.665 af

Link AP1: Analysis Point #1 Inflow=34.41 cfs 5.517 af
Primary=34.41 cfs 5.517 af

Link AP2: Analysis Point #2 Inflow=16.18 cfs 1.736 af
Primary=16.18 cfs 1.736 af

Total Runoff Area = 22.734 ac Runoff Volume = 7.405 af Average Runoff Depth = 3.91"
96.14% Pervious = 21.855 ac 3.86% Impervious = 0.878 ac

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.022 degrees West
Latitude	43.148 degrees North
Elevation	0 feet
Date/Time	Thu, 24 Jun 2021 10:28:05 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	1yr	0.70	0.98	1.20	1.54	1.98	2.57	2.80	1yr	2.28	2.69	3.10	3.82	4.39	1yr
2yr	0.32	0.49	0.61	0.80	1.01	1.28	2yr	0.87	1.16	1.49	1.89	2.41	3.08	3.42	2yr	2.73	3.29	3.79	4.51	5.14	2yr
5yr	0.37	0.57	0.72	0.96	1.23	1.58	5yr	1.06	1.44	1.85	2.37	3.03	3.90	4.38	5yr	3.45	4.21	4.82	5.70	6.45	5yr
10yr	0.40	0.63	0.80	1.09	1.42	1.85	10yr	1.23	1.69	2.17	2.81	3.62	4.66	5.28	10yr	4.13	5.08	5.79	6.81	7.67	10yr
25yr	0.47	0.74	0.94	1.30	1.73	2.28	25yr	1.49	2.09	2.70	3.51	4.56	5.91	6.77	25yr	5.23	6.51	7.38	8.62	9.65	25yr
50yr	0.52	0.83	1.07	1.49	2.01	2.68	50yr	1.74	2.46	3.19	4.17	5.44	7.06	8.18	50yr	6.25	7.87	8.87	10.31	11.49	50yr
100yr	0.59	0.95	1.22	1.72	2.34	3.14	100yr	2.02	2.90	3.76	4.95	6.48	8.46	9.88	100yr	7.48	9.50	10.66	12.34	13.68	100yr
200yr	0.65	1.06	1.37	1.97	2.73	3.70	200yr	2.35	3.41	4.45	5.89	7.74	10.12	11.94	200yr	8.96	11.48	12.82	14.77	16.29	200yr
500yr	0.77	1.26	1.64	2.39	3.34	4.58	500yr	2.88	4.24	5.54	7.39	9.77	12.85	15.34	500yr	11.37	14.75	16.36	18.75	20.55	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.36	0.44	0.60	0.73	0.90	1yr	0.63	0.88	0.93	1.26	1.54	1.98	2.49	1yr	1.75	2.40	2.89	3.36	3.94	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.18	2yr	0.86	1.15	1.36	1.82	2.34	2.99	3.31	2yr	2.65	3.18	3.66	4.39	5.01	2yr
5yr	0.35	0.54	0.67	0.92	1.16	1.40	5yr	1.01	1.37	1.61	2.14	2.77	3.59	3.99	5yr	3.17	3.83	4.42	5.35	5.95	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.60	10yr	1.14	1.56	1.81	2.44	3.12	4.09	4.58	10yr	3.62	4.41	5.09	6.21	6.76	10yr
25yr	0.44	0.67	0.83	1.19	1.56	1.91	25yr	1.35	1.86	2.12	2.84	3.66	4.85	5.49	25yr	4.29	5.28	6.13	7.55	8.42	25yr
50yr	0.49	0.74	0.92	1.32	1.78	2.18	50yr	1.54	2.13	2.37	3.20	4.12	5.51	6.27	50yr	4.88	6.03	7.06	8.75	9.69	50yr
100yr	0.54	0.82	1.03	1.49	2.04	2.50	100yr	1.76	2.45	2.66	3.59	4.62	6.25	7.15	100yr	5.53	6.88	8.14	10.15	11.13	100yr
200yr	0.61	0.91	1.15	1.67	2.33	2.86	200yr	2.01	2.79	2.97	4.03	5.19	7.07	8.98	200yr	6.26	8.63	9.39	11.77	12.80	200yr
500yr	0.71	1.05	1.36	1.97	2.80	3.44	500yr	2.42	3.36	3.47	4.69	6.08	8.29	10.90	500yr	7.34	10.48	11.36	14.34	15.35	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.88	1.08	1yr	0.76	1.05	1.23	1.72	2.19	2.79	3.08	1yr	2.47	2.96	3.38	4.10	4.77	1yr
2yr	0.33	0.50	0.62	0.84	1.04	1.24	2yr	0.90	1.22	1.47	1.94	2.48	3.21	3.56	2yr	2.85	3.42	3.94	4.65	5.30	2yr
5yr	0.39	0.61	0.75	1.03	1.31	1.58	5yr	1.13	1.54	1.84	2.46	3.15	4.22	4.78	5yr	3.74	4.60	5.25	6.06	6.95	5yr
10yr	0.46	0.71	0.87	1.22	1.58	1.91	10yr	1.36	1.87	2.22	2.99	3.78	5.23	6.00	10yr	4.63	5.77	6.54	7.43	8.54	10yr
25yr	0.56	0.85	1.06	1.51	1.99	2.47	25yr	1.72	2.41	2.85	3.87	4.84	6.96	8.13	25yr	6.16	7.82	8.73	9.76	10.82	25yr
50yr	0.65	0.99	1.23	1.77	2.38	2.98	50yr	2.05	2.91	3.46	4.71	5.84	8.64	10.25	50yr	7.65	9.86	10.90	11.98	13.22	50yr
100yr	0.76	1.14	1.43	2.07	2.84	3.60	100yr	2.45	3.52	4.19	5.73	7.06	10.73	12.92	100yr	9.50	12.42	13.58	14.73	16.16	100yr
200yr	0.88	1.32	1.68	2.43	3.39	4.37	200yr	2.92	4.27	5.09	6.99	8.53	13.37	15.17	200yr	11.84	14.58	16.92	18.09	19.79	200yr
500yr	1.08	1.61	2.07	3.00	4.27	5.61	500yr	3.68	5.49	6.56	9.10	10.96	17.93	20.36	500yr	15.87	19.57	22.64	23.80	25.89	500yr

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Northeast Regional Climate Center

Project Name:	MEADOWBROOK VILLAGE	JBE #:	20747
Town/City:	BARRINGTON, NH	Date:	6/30/2021

Rip Rap Outlet Protection Calculation

Outlet Designation:

Pipe Size (Do): 18 in. = 1.5 ft

Q10 (cfs): 25.48 cfs

Tailwater Elevation (TW): 0.25 (FT) if TW = 0, assume 3"/0.25'

Apron Length (La):

TW<Do YES La = 1.8Q/Do^1.5 + 7Do

La = 35.47 ft

TW>Do No La = 3.0Q/Do^1.5 + 7Do

La =

Apron Width (W_2)

TW<Do W_2 = 3Do + La

W_2 = 39.97 ft.

TW>Do W_2 = 3Do + .4La

W_2 = ft.

Rip-Rap Diameter (D_{50}):

D_{50}: D_{50} = 0.02Q^1.3/TW*Do

D_{50} = 3.59 ft. 43.08 in.

Use 3" minimum D_{50} ==> D50 = 43.08 in.

Rip-Rap Thickness (T):

T = 2.5*D_{50}

T = 107.691 in.

Apron Width (W_1):

W_1 = 3*Do

W_1 = 4.5 ft.

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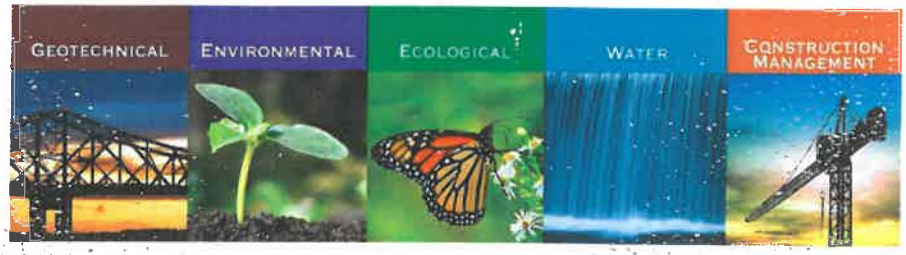

SITE-SPECIFIC SOIL MAPPING REPORT

44 Meadowbrook Drive
Tax Map 273, Lot 49
Tax Map 270, Lot 3
Barrington, New Hampshire

August 12, 2021
File No. 04.0191175.00

PREPARED FOR:
Jones & Beach Engineers, Inc.
Stratham, New Hampshire

GZA GeoEnvironmental, Inc.
5 Commerce Park North, Suite 201 | Bedford, NH 03110-6984
603-623-3600

30 Offices Nationwide
www.gza.com

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5 Commerce Park North
Suite 201
Bedford, NH 03110
T: 603.623.3600
F: 603.624.9463
www.gza.com

VIA EMAIL

August 12, 2021
File No. 04.0191175.00

Mr. Barry Gier
Jones & Beach Engineers, Inc.
65 Portsmouth Avenue, P.O. Box 219
Stratham, New Hampshire 03885

Re: Site-Specific Soil Mapping Report
44 Meadowbrook Drive
Tax Map 273, Lot 49 and Tax Map 270, Lot 3
Barrington, New Hampshire

Dear Mr. Gier:

This report presents the findings of a Site-Specific Soil Mapping survey conducted by GZA for Jones & Beach Engineers, Inc. (J&B) at property located at 44 Meadowbrook Drive in Barrington, New Hampshire (i.e., Tax Map 273, Lot 49 and Tax Map 270, Lot 3, the Site). Included in this report are the results of the field work completed in July 2021 to identify soil mapping units and develop a Site-Specific Soil Map for the Site.

Should you have any questions, please feel free to contact Conor Madison at 603-232-8784 or *conor.madison@gza.com*.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Conor Madison, CESSWI, CPESC
Assistant Project Manager

Deborah M. Zarta Gier, CNRP
Consultant/Reviewer

Tracy L. Tarr, CWS, CESSWI
Associate Principal

James Long, CWS, CSS
Soil Scientist

CEM/DMZ/TLT/JHL:jaf
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Attachment: Site-Specific Soil Mapping Report

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FIGURE

APPENDICES

1.0 INTRODUCTION

This report presents the findings of Site-Specific Soil Mapping conducted by GZA GeoEnvironmental, Inc. (GZA) for a portion of Tax Map 273, Lot 49 and Tax Map 270, Lot 3, located at 44 Meadowbrook Drive in Barrington, New Hampshire (Site) during July 2021. The Site consists of the majority of the aforementioned parcels, with the exception of the following areas:

- Approximately 0.7 acres in the most northern corner of Tax Map 270, Lot 3 that will be left undeveloped as part of proposed lot project layout and lot development plan; and
- Approximately 34 acres of the southern and western portion of Tax Map 273, Lot 49;
- In total, the Site is approximately 23 acres.

The Site contains one residential property in the northwestern portion of Tax Map 270, Lot 3 and the remainder of the Site is primarily forested with evidence of previous logging. It is bordered to the east by Meadowbrook Drive, to the south by Twin Mountain Road and Candlestick Lane, to the west by the remainder of Tax Map 273, Lot 49 and residential properties, and to the north by Caldwell Brook and residential properties associated with Old Concord Turnpike. In addition to Caldwell Brook, the Site contains forested wetlands along the southwestern portion of the Site and in the northeastern corner of the Site (see Wetland Delineation Report, prepared by GZA and dated February 24, 2021).

GZA understands the property owners of both parcels (Anthony and Janis Serra) are proposing to sell the properties and the Site is proposed to be subdivided into 11 residential lots (see **Figure 1 – Site Specific Soil Map**). GZA also understands a Site-Specific Soil Map is required to support the potential development of the Site and Alteration of Terrain permitting through the New Hampshire Department of Environmental Services, currently in preparation by J&B. This report is subject to the Limitations in **Appendix A**.

2.0 METHODOLOGY

The soil mapping of the Site was conducted in accordance with the standards set forth in the Society of Soil Scientists of Northern New England (SSSNNE) Publication No. 3 "Site-Specific Soil Mapping Standards for New Hampshire and Vermont, Version 7.0" dated July 2021 by New Hampshire Certified Soil Scientists (CSS) James H. Long (CSS #15). The Site-Specific Soil Mapping Standards are based on a universally recognized taxonomic system of soil classification and are supported by national soil mapping standards established by the USDA National Cooperative Soil Survey.

The soil survey has been prepared based on a combination of publicly available databases and Site-specific data collected by on-site observations. This report provides soil information including soil drainage classification, physical characteristics, and depth to bedrock (if encountered). Soil characteristics on the property were assessed through the evaluation of 25 machine excavated test pits evaluated on July 20, 2021 and through evaluation of hand-dug test pits conducted throughout the property on July 26, 2021. Hand-dug test pits were completed with a tile spade and soil auger and were dug to a minimum depth of 40 inches for the purpose of evaluating and identifying the soils' characteristics. Locations were selected when changes in slope, vegetation or soil surface were observed. When changes were noted from one hole to the next involving soil drainage or parent material, a soil boundary was placed on the map between the holes to reflect the transition between the soils as it occurs on the landscape. The slopes of the soil map units were measured in the field using a clinometer and augmented

by the topography shown on the Site Plan prepared by J&B, dated June 22, 2021. For the purposes of this report, GZA considered the minimum size delineation area of a Site-Specific Soil Survey map unit as 2,000 square feet, with the exception of poorly or very poorly drained soil areas that are jurisdictional wetlands, as derived from the *High Intensity Soil Mapping Standards for New Hampshire*, December 2017 by the Society of Soil Scientists of Northern New England. Jurisdictional wetlands do not have a minimum mapping size. Wetland delineations on the Site were previously conducted by GZA on November 13 and 23, 2020 (see Wetland Delineation Report, prepared by GZA and dated February 24, 2021).

GZA used the following resources during data collection to supplement on-site observations:

- Natural Resource Conservation Service (NRCS) Web Soil Survey;[1] and
- New Hampshire Statewide Geographic Information System Clearinghouse (NH GRANIT)[2] LiDAR- Based Bare Earth Hillshade of the Site.

The Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. The WSS data was used to gather information prior to field work to use as a baseline of soil units that may be observed during field investigations. Use of the online resource NH GRANIT LiDAR- Based Bare Earth Hillshade of the project area provided imagery to assist in soil unit delineation, to identify changes in topography to help identify ideal locations to dig auger holes and test pits and identify potential disturbed units.

The on-site investigation was conducted on July 20 and 26, 2021 using a base plan with a 1:50 scale and 2-foot topographic contours. In accordance with the Site-Specific Soil Mapping Standards, the identified individual soil map units were correlated to the New Hampshire State-Wide Numerical Soils Legend maintained by the New Hampshire State office of the NRCS. Soil characteristics for each of the units comply with the Range in Characteristics described in the Official Series Descriptions for each map unit. The human disturbed soil map units were labelled in accordance with the "Site-Specific Soil Mapping Standards for New Hampshire and Vermont, Version 7.0" dated July 2021 - *Disturbed Soil Mapping Unit Supplement for New Hampshire DES AoT Site Specific Soil Maps*. The disturbed soil map unit Denominators provide additional information on Drainage Class, Parent Material, Restrictive/Impervious Layers, Estimated Ksat, and Hydrologic Soil Group. In addition, GZA has provided High Intensity Soil Survey (HISS) soil unit correlations as required by the Town of Barrington.

3.0 RESULTS

3.1 SITE DESCRIPTION

Based on field observations, the Site is underlain by a stratified drift aquifer and sandy glaciofluvial deposits. A large portion of the Site proposed to be developed is mapped as sandy glaciofluvial deposits. Stratified sand and gravel deposits border a large wetland complex located in the northwest portion of the property. The sandy glaciofluvial deposits are very broad with uniform smooth surfaces resulting in large soil map units greater than 10 acres in size. Based on field observations, majority of the Site is undisturbed with the exception of two small, isolated excavations that are mapped as Soil Type 300 – Udipsamments soils (see Figure 1 – Site-Specific Soil Map).

[1] www.websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
[2] https://granitview.unh.edu/

3.2 SOIL MAP UNIT DESCRIPTIONS

Individual soil map units are summarized in **Table 1** – Soil Map Units below:

Soil ID (SSSM)	Soil Type	Soil ID (HISS)
12	Hinckley (excessively drained)	111
26	Windsor (excessively drained)	111
34	Wareham (poorly drained)	511
115	Scarboro (very poorly drained)	611
300/abaaa	Udipsamments (excessively drained)	161
313	Deerfield (moderately well drained)	311

Slope designations differ slightly between SSSM standards and HISS standards and are broken out below for conversion purposes in **Table 2**.

Slope Class	SSSM	HISS
A	0-3%	-
B	3-8%	0-8%
C	8-15%	8-15%
D	15-25%	15-25%
E	25-50%	25-35%
F	>50%	>35%

The individual soil map unit descriptions of the soils identified on the Site and summarized in **Table 1** are as follows.

12A – Hinckley (excessively drained), fine sandy loam, 0 to 3 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands in the northwest portion of Site proposed to be developed.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes greater than 3 percent and excessively drained Windsor soils. These inclusions make up as much as 10 percent of the map unit.

12B – Hinckley (excessively drained), fine sandy loam, 3 to 8 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands in the northwest portion of Site proposed to be developed.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand

about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 3 percent and greater than 8 percent excessively drained Windsor soils. These inclusions make up as much as 10 percent of the map unit.

12C – Hinckley (excessively drained), fine sandy loam, 8 to 15 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands in the northwest portion of Site proposed to be developed.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 8 percent and greater than 15 percent excessively drained Windsor soils. These inclusions make up as much as 10 percent of the map unit.

12E – Hinckley (excessively drained), fine sandy loam, 25 to 50 percent slopes

This map unit consists of excessively drained soils that formed in sandy glaciofluvial deposits. It occurs on the knolls in the undisturbed uplands in the northwest portion of Site proposed to be developed.

Typically, the surface layer is very dark brown to dark brown fine sandy loam about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, sand and gravelly coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown gravelly sand and gravelly coarse sand.

Included with this mapping are small areas of slopes less than 25 percent and greater than 50 percent excessively drained Windsor soils. These inclusions make up as much as 10 percent of the map unit.

26A – Windsor (excessively drained), loamy sand, 0 to 3 percent slopes

This map unit consists of very deep, excessively drained soils that formed in sandy glaciofluvial deposits. It occurs in the central and southern portion of the Site proposed to be developed.

Typically, the surface layer is very dark brown to dark brown loamy very fine sand about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, and coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown sand and coarse sand.

Included with this mapping are small areas of slopes greater than 3 percent; and moderately well drained Deerfield and Hinckley soils. These inclusions make up as much as 10 percent of the map unit.

26B – Windsor (excessively drained), loamy sand, 3 to 8 percent slopes

This map unit consists of very deep, excessively drained soils that formed in sandy glaciofluvial deposits. It occurs in the central and southern portion of the Site proposed to be developed.

Typically, the surface layer is very dark brown to dark brown loamy very fine sand about 4 inches thick. The subsoil is dark brown, strong brown, dark yellowish brown to yellowish brown loamy sand, and coarse sand about 24 inches thick. The substratum, to a depth of 40 inches or more, is yellowish brown, light yellowish gray, light olive brown sand and coarse sand.

Included with this mapping are small areas of slopes less than 3 percent and greater than 8 percent; and moderately well drained Deerfield and Hinckley soils. These inclusions make up as much as 10 percent of the map unit.

34A – Wareham (poorly drained) fine sandy loam, 0 to 3 percent slopes

This map unit consists of poorly drained soils that formed in sandy glaciofluvial deposits. It occurs in low lying areas within the mapping unit along the eastern and southern portion of the Site where development is proposed.

Typically, the surface layer is black fine sandy loam about 3 inches thick. The subsoil is light olive brown, grayish brown sand about 16 inches thick. The substratum, to a depth of 40 inches or more, is olive gray to dark gray gravelly sand and sand.

Included in this map unit may be some very poorly drained Scarboro soils and slopes greater than 3 percent. These inclusions may make up to 15 percent of the map unit.

115A – Scarboro (very poorly drained) fine sandy loam, 0 to 3 percent slopes

This map unit consists of very deep, very poorly drained soils that formed in sandy glaciofluvial deposits. It occurs in low lying areas within the mapping unit and along the eastern portion of the Site where development is proposed.

Typically, the surface layer is black mucky fine sandy loam about 6 inches thick. The subsoil is grayish brown and ranges in texture from loamy sand to sand about 8 inches thick. The substratum, to a depth of 65 inches or more, is grayish brown gravelly sand.

Included in this map unit may be some poorly drained Wareham soils and slopes greater than 3 percent. These inclusions may make up to 15 percent of the map unit.

300D – Udipsamments, sandy, 15 to 25 percent slopes

This map unit consists of somewhat excessively drained soils that formed in sandy glaciofluvial deposits. The soils range from fine sand, sand and their gravelly analogs. This map unit is located in two isolated areas in the northwestern portion of Site proposed to be developed.

Included with this mapping are small areas of slopes less than 15 and greater than 25 percent. These inclusions make up as much as 10 percent of the map unit.

313A – Deerfield loamy sand, 0 to 3 percent slopes

This map unit consists of moderately well drained soils that formed in sandy glaciofluvial deposits. It occurs in the western and southwestern portion of the Site proposed to be developed.

Typically, the surface layer is black, very dark brown to dark brown loamy fine sand about 4 inches thick. The subsoil is brown, strong brown, dark yellowish brown, yellowish brown to light olive brown fine sand and sand about 20 inches thick. The substratum, to a depth of 40 inches or more, is light brownish gray to light olive brown sand, and gravely sand.

Included with this mapping are small areas of slopes greater than 3 percent. These inclusions make up as much as 15 percent of the map unit.

313B – Deerfield loamy sand, 3 to 8 percent slopes

This map unit consists of moderately well drained soils that formed in sandy glaciofluvial deposits. It occurs in the western and southwestern portion of the Site proposed to be developed.

Typically, the surface layer is black, very dark brown to dark brown loamy fine sand about 4-inches thick. The subsoil is brown, strong brown, dark yellowish brown, yellowish brown to light olive brown fine sand and sand about 20 inches thick. The substratum, to a depth of 40 inches or more, is light brownish gray to light olive brown sand, and gravely sand.

Included with this mapping are small areas of slopes less than 3 percent and greater than 8 percent. These inclusions make up as much as 15 percent of the map unit.

3.3 HYDROLOGIC SOIL GROUP CORRELATION

In order to correlate the soil map units identified, as part of this soil survey, to the appropriate hydrologic soil group, we referenced the Society of Soil Scientists of Northern New England "Ksat Values for New Hampshire Soils, Special Publication No. 5, September 2009."[3] **Table 2** – Hydrologic Soil Group Correlation provides the correlation of the identified soil map units to the appropriate hydrologic soil group. Identification of correlating hydrologic soil group provides context for infiltration rates for stormwater management planning.

Soil ID (SSSM)	Soil Type	Soil ID (HISS)	Hydrologic Soil Group
12	Hinckley (excessively drained)	111	A
26	Windsor (excessively drained)	111	A
34	Wareham (poorly drained)	511	D
115	Scarboro (very poorly drained)	611	D
300/abaaa	Udipsamments (excessively drained)	161	A
313	Deerfield (moderately well drained)	311	B

[3] www.sssnne.org/publications.html

4.0 FINDINGS AND CONCLUSIONS

GZA has completed Site-Specific Soil Mapping of the Site in support of the proposed residential subdivision project permitting. The following is a summary of our findings and conclusions:

- The Site is primarily mapped as Soil Types 313 (Deerfield) and 26 (Windsor) which are considered sandy glaciofluvial deposits. Field observations indicate that these are broad deposits with uniform smooth surfaces resulting in large soil map units greater than five acres in size and are undisturbed.

- Very poorly drained soils (Scarboro) were identified along the eastern portion of the Site and are bordered by poorly drained soils (Wareham). GZA understands these wetlands are not proposed to be impacted as part of the Site development project.

- Based on field observations, two small, isolated excavated areas in the northwest portion of the Site proposed to be developed are mapped as Soil Type 300 – Udipsamments, which represents disturbed soil units. These areas represent small excavations that may have been used for fill for prior Site development related to the existing residence.

Figure 1 – Site Specific Soil Map


PT = 9+37.81
5+00
4+00
3+00
2+60.72
2+00
1+85.45
PT = 8+97.03
PC = 5+65.31
08°56'
N69°10'27"W
PT = 5+27
PC = 4+62.05
1086.58'
PT = 2+60.72
TP23
TP24
TP4
TP3
TP6
TP5
TP7
W
265

Appendix A – Natural Resource Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Jones & Beach Engineers, Inc. ("Client") for the stated purpose(s) and location(s) identified in the report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the data gathered and observations made during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

LIMITS TO OBSERVATIONS

4. Natural resource characteristics are inherently variable. Biological community composition and diversity can be affected by seasonal, annual or anthropogenic influences. In addition, soil conditions are reflective of subsurface geologic materials, the composition and distribution of which vary spatially.

5. The observations described in this report were made on the dates referenced and under the conditions stated therein. Conditions observed and reported by GZA reflect the conditions that could be reasonably observed based upon the visual observations of surface conditions and/or a limited observation of subsurface conditions at the specific time of observation. Such conditions are subject to environmental and circumstantial alteration and may not reflect conditions observable at another time.

6. The conclusions and recommendations contained in this report are based upon the data obtained from a limited number of surveys performed during the course of our work on the site, as described in the Report. There may be variations between these surveys and other past or future surveys due to inherent environmental and circumstantial variability.

RELIANCE ON INFORMATION FROM OTHERS

7. Preparation of this Report may have relied upon information made available by Federal, state and local authorities; and/or work products prepared by other professionals as specified in the report. Unless specifically stated, GZA did not attempt to independently verify the accuracy or completeness of that information.

COMPLIANCE WITH REGULATIONS AND CODES

8. GZA's services were performed to render an opinion on the presence and/or condition of natural resources as described in the Report. Standards used to identify or assess these resources as well as regulatory jurisdiction, if any, are stated in the Report. Standards for identification of jurisdictional resources and regulatory control over them may vary between governmental agencies at Federal, state and local levels and are subject to change over time which may affect the conclusions and findings of this report.

NEW INFORMATION

9. In the event that the Client or others authorized to use this report obtain information on environmental regulatory compliance issues at the site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this work, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

10. GZA recommends that we be retained to provide further investigation, if necessary, which would allow GZA to (1) observe compliance with the concepts and recommendations contained herein; (2) evaluate whether the manner of implementation creates a potential new finding; and (3) evaluate whether the manner of implementation affects or changes the conditions on which our opinions were made.

Appendix B – Disturbed Soil Mapping Unit Supplement for DES AOT

Supplemental Symbols
The five components of the Disturbed Soil Mapping Unit Supplement are as follows:

Symbol 1: Drainage Class
a - Excessively Drained
b - Somewhat Excessively Drained
c - Well Drained
d - Moderately Well Drained
e - Somewhat Poorly Drained
f - Poorly Drained
g - Very Poorly Drained
h - Not Determined

Symbol 2: Parent Material (of naturally formed soil only, if present)
a - No natural soil within 60"
b - Glaciofluvial Deposits (outwash/terraces of sand or sand and gravel)
c - Glacial Till Material (active ice)
d - Glaciolacustrine very fine sand and silt deposits (glacial lakes)
e - Loamy/sandy over Silt/Clay deposits
f - Marine Silt and Clay deposits (ocean waters)
g - Alluvial Deposits (floodplains)
h - Organic Materials-Fresh water Bogs, etc.
j - Organic Materials-Tidal Marsh

Symbol 3: Restrictive/Impervious Layers
a - None
b - Bouldery surface with more than 15% of the surface covered with boulders
c - Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as hard pan, platy structure or clayey texture with consistence of at least firm (i.e. more than 20 newtons). For other examples of soil characteristics that qualify for restrictive layers, see "Soil Manual for Site evaluations in NH" 2nd Ed., (page 3-17, figure 3-14)
d - Bedrock in the soil profile; 0-20 inches
e - Bedrock in the soil profile; 20-60 inches
f - Areas where depth to bedrock is so variable that a single soil type cannot be applied, will be mapped as a complex of soil types
g - Subject to Flooding
h – Man-made impervious surface including pavement, concrete, or built-up surfaces (i.e. buildings) with no morphological restrictive layer within control section

Symbol 4: Estimated Ksat* (most limiting layer excluding symbol 3h above).
a - High.
b - Moderate
c - Low
d - Not determined
*See "Guidelines for Ksat Class Placement" in Chapter 3 of the Soil Survey Manual, USDA

Symbol 5: Hydrologic Soil Group*
a - Group A
b - Group B
c - Group C
d - Group D
e - Not determined
*excluding man-made surface impervious/restrictive layers

Appendix C – Photographic Log

PHOTO LOG
44 Meadowbrook Drive Site Development
Barrington, New Hampshire

Photos Taken: July 20 and 26, 2021

Photograph No. 1: View of the recently cut area on Site by Test Pit 13. This portion of the Site is mapped as Soil Unit 26 (Windsor).

Photograph No. 2: View of steep slope located adjacent to the wetland stream area with the existing residential building in the background. The soils along the slope are mapped as Soil Unit 12 (Hinckley).

PHOTO LOG
44 Meadowbrook Drive Site Development
Barrington, New Hampshire

Photos Taken: July 20 and 26, 2021

Photograph No. 3: View of sandy glaciofluvial deposits in the western portion of the Site to be developed in Test Pit 9. This area is mapped as Soil Unit 313 (Deerfield).

Photograph No. 4: View of sandy stratified drift aquifer deposits in Test Pit 19 in the northern portion of the Site to be developed. This area is mapped as Soil Unit 26 (Windsor).

Appendix D – Test Pit Logs

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 1 **NOTES:** Soil Series: Deerfield

Depth (inches)	**Description**
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-22	10YR4/4 Dark yellowish brown, loamy sand, granular, friable
22-48	2.5Y5/4 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
48-84	2.5Y5/3 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	22	inches	Observed Water Table @	44	inches
Restrictive @	None	inches	Roots @	24	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		

Test Pit No. 2 **NOTES:** Soil Series: Deerfield

Depth (inches)	**Description**
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-16	7.5YR5/6 Strong brown, loamy sand, granular, friable
16-32	10YR5/6 Yellowish brown, sand, single grain, loose
32-84	2.5Y5/3 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	32	inches	Observed Water Table @	52	inches
Restrictive @	None	inches	Roots @	32	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		

JAMES H. LONG No. 15

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 3 **NOTES:** Soil Series: Deerfield

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-20	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
20-40	2.5Y5/4 Light olive brown, loamy sand, granular, friable
40-84	2.5Y5/3 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	40	inches	Observed Water Table @	84	inches
Restrictive @	None	inches	Roots @	40	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		

Test Pit No. 4 **NOTES:** Soil Series: Deerfield

Depth (inches)	Description
^0-16	10YR3/3 Dark brown, loamy very fine sand, granular, friable (fill)
16-24	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
24-34	10YR5/6 Yellowish brown, loamy sand, granular, friable
34-48	2.5Y5/4 Light olive brown, loamy sand, granular, friable
48-90	2.5Y5/3 Light olive brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	48	inches	Observed Water Table @	90	inches
Restrictive @	None	inches	Roots @	34	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		

JAMES H. LONG No. 15

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 5 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-20	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
20-40	2.5Y5/4 Light olive brown, loamy sand, granular, friable
40-60	2.5Y5/3 Light olive brown, sand, single grain, loose
60-108	2.5Y6/3 Light yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	60	inches	Observed Water Table @	108	inches
Restrictive @	None	inches	Roots @	28	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

Test Pit No. 6 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-20	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
20-36	2.5Y5/4 Light olive brown, loamy sand, granular, friable
36-48	2.5Y5/3 Light olive brown, sand, single grain, loose
48-120	2.5Y6/3 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	36	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

JAMES H. LONG No. 15

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 7 **NOTES:** Soil Series: Windsor

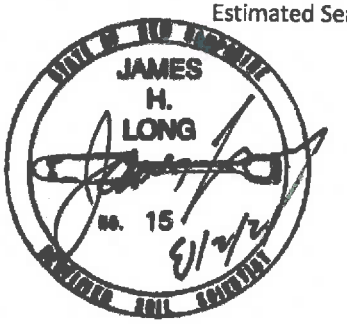
Depth (inches)	Description
2-0	Forest mat
0-6	10YR4/4 Dark yellowish brown, loamy very fine sand, granular, friable
6-18	10YR5/6 Yellowish brown, loamy sand, granular, friable
18-30	10YR5/4 Yellowish brown, loamy sand, granular, friable
30-96	2.5Y5/4 Light olive brown, sand, single grain, loose

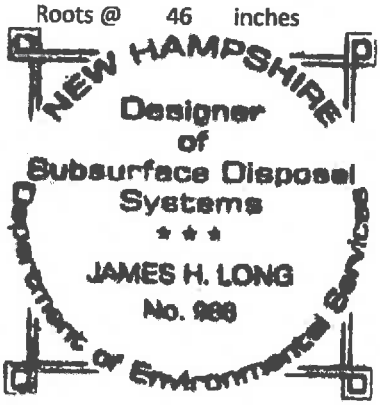
Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	96	inches	Roots @	36	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

Test Pit No. 8 **NOTES:** Soil Series: Deerfield. Perched water table.

Depth (inches)	Description
2-0	Forest mat
0-6	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
6-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-32	2.5Y6/4 Light yellowish brown, loamy sand, granular, friable
32-46	2.5Y5/4 Light olive brown, very fine sand, granular, friable, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features
46-108	2.5Y6/3 Light yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	32	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	46	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		





TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 9 **NOTES:** Soil Series: Deerfield

Depth (inches)	Description
2-0	Forest mat
0-6	10YR2/2 Very dark brown, loamy very fine sand, granular, friable
6-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-36	2.5Y6/4 Light yellowish brown, sand, single grain, loose
36-84	2.5Y6/3 Light yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	36	inches		Observed Water Table @	None	inches
Restrictive @	None	inches		Roots @	26	inches
Refusal @	84	Inches				
Percolation Rate =	2	Minutes / inch @	30			

Test Pit No. 10 **NOTES:** Soil Series: Deerfield

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-36	2.5Y6/4 Light yellowish brown, sand, single grain, loose
36-84	2.5Y6/3 Light yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	36	inches		Observed Water Table @	None	inches
Restrictive @	None	inches		Roots @	20	inches
Refusal @	84	Inches				
Percolation Rate =	2	Minutes / inch @	30			

JAMES H. LONG No. 15 10/2/21

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No.: 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 11 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-32	2.5Y6/4 Light yellowish brown, loamy sand, granular, friable
32-126	2.5Y6/3 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	40	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

Test Pit No. 12 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-4	10YR2/2 Very dark brown, loamy very fine sand, granular, friable
4-12	10YR5/6 Yellowish brown, loamy sand, granular, friable
12-22	2.5Y6/4 Light yellowish brown, sand, single grain, loose
22-112	2.5Y6/3 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	28	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

JAMES H. LONG No. 15 6/2/21

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 13 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR2/2 Very dark brown, loamy very fine sand, granular, friable
8-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-32	2.5Y6/4 Light yellowish brown, sand, single grain, loose
32-112	2.5Y6/3 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	24	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

Test Pit No. 14 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-6	10YR2/2 Very dark brown, loamy very fine sand, granular, friable
6-16	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
16-34	2.5Y5/6 Light olive brown, sand, single grain, loose
34-120	2.5Y5/3 Light olive brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	60	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

JAMES H. LONG No. 15

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 15 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
8-16	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
16-32	10YR5/4 Yellowish brown, sand, single grain, loose
32-96	2.5Y5/3 Light olive brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	36	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

Test Pit No. 16 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-10	10YR2/2 Very dark brown, loamy very fine sand, granular, friable
10-18	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
18-120	2.5Y5/4 Light olive brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	20	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

JAMES H. LONG No. 15 7/21/21

NEW HAMPSHIRE Designer of Subsurface Disposal Systems ★ ★ ★ JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 17 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/3 Dark brown, loamy very fine sand, granular, friable
8-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-36	2.5Y6/4 Light yellowish brown, sand, single grain, loose
36-84	2.5Y6/4 Light yellowish brown, fine sand, granular, friable
84-100	2.5Y6/4 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	20	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	32		

Test Pit No. 18 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable
6-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-26	2.5Y6/4 Light yellowish brown, coarse sand, single grain, loose
26-96	2.5Y6/4 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	20	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	32		

JAMES H. LONG No. 15 4/2/21

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 19 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-6	10YR3/3 Dark brown, loamy very fine sand, granular, friable
6-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-36	2.5Y5/4 Light olive brown, sand, single grain, loose
36-108	2.5Y6/4 Light yellowish brown, sand, single grain, loose

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	20	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

Test Pit No. 20 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-4	10YR3/3 Dark brown, loamy very fine sand, granular, friable
4-14	10YR5/6 Yellowish brown, loamy sand, granular, friable
14-36	2.5Y6/4 Light yellowish brown, fine sand, granular, friable
36-120	2.5Y6/3 Light yellowish brown, fine sand, granular, friable

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	20	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	30		

JAMES H. LONG LLS No. 15

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 21 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-4	10YR3/3 Dark brown, loamy very fine sand, granular, friable
4-14	10YR5/4 Yellowish brown, loamy sand, granular, friable
14-60	2.5Y5/4 Light olive brown, sand, single grain, loose
60-108	2.5Y5/3 Light olive brown, fine sand, granular, friable

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	24	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	32		

Test Pit No. 22 **NOTES:** Soil Series: Windsor

Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/3 Dark brown, loamy very fine sand, granular, friable
8-16	10YR5/6 Yellowish brown, loamy fine sand, granular, friable
16-120	2.5Y6/4 Light yellowish brown, fine sand, granular, friable

Estimated Seasonal High Water Table @	None to 60	inches	Observed Water Table @	None	inches
Restrictive @	None	inches	Roots @	24	inches
Refusal @	None	Inches			
Percolation Rate =	2	Minutes / inch @	32		

JAMES H. LONG No. 15 7/21/21

NEW HAMPSHIRE Designer of Subsurface Disposal Systems JAMES H. LONG No. 988 Department of Environmental Services

TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

Test Pit No. 23 **NOTES:** Soil Series: Deerfield

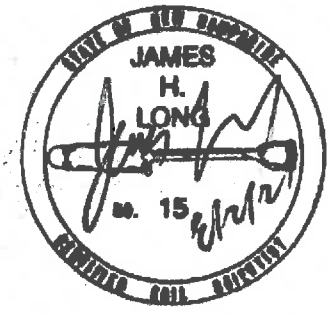
Depth (inches)	Description
2-0	Forest mat
0-8	10YR3/3 Dark brown, loamy very fine sand, granular, friable
8-32	2.5Y5/6 Light olive brown, loamy fine sand, granular, friable
32-96	2.5Y5/4 Light olive brown, very fine sand, granular, friable

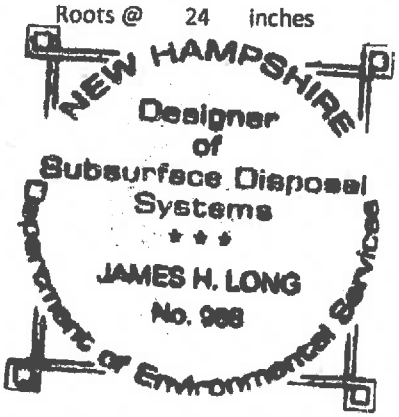
Estimated Seasonal High Water Table @	32	inches	Observed Water Table @	84	inches
Restrictive @	None	inches	Roots @	20	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		

Test Pit No. 24 **NOTES:** Soil Series: Deerfield

Depth (inches)	Description
2-0	Forest mat
0-10	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
10-22	7.5YR4/6 Strong brown, loamy fine sand, granular, friable
22-34	7.5YR4/4 Brown, loamy fine sand, granular, friable, with 5YR4/6 Yellowish red redox concentrations
34-60	10YR5/4 Yellowish brown, sand, single grain, loose, with 2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features

Estimated Seasonal High Water Table @	22	inches	Observed Water Table @	48	inches
Restrictive @	None	inches	Roots @	24	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		





TEST PIT EVALUATION REPORT
44 Meadowbrook Drive
Tax Map 273, Lot 49 & Tax Map 270, Lot 3
Barrington, New Hampshire

File No. 04.0191175.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Lindsey White **Date:** 7/20/21

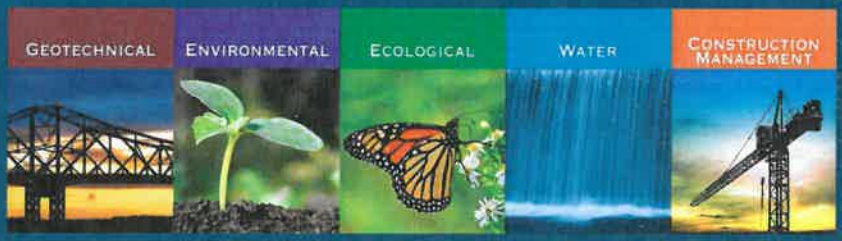
Test Pit No. 25 **NOTES:** Soil Series: Deerfield

Depth (inches)	Description
2-0	Forest mat
0-6	10YR3/2 Very dark grayish brown, loamy very fine sand, granular, friable
6-16	10YR5/6 Yellowish brown, loamy sand, granular, friable
16-28	2.5Y5/6 Light olive brown, sand, single grain, loose
28-84	2.5Y5/4 Light olive brown, fine sand, granular, friable

Estimated Seasonal High Water Table @	28	inches	Observed Water Table @	72	inches
Restrictive @	None	inches	Roots @	24	inches
Refusal @	None	Inches			
Percolation Rate =	4	Minutes / inch @	30		

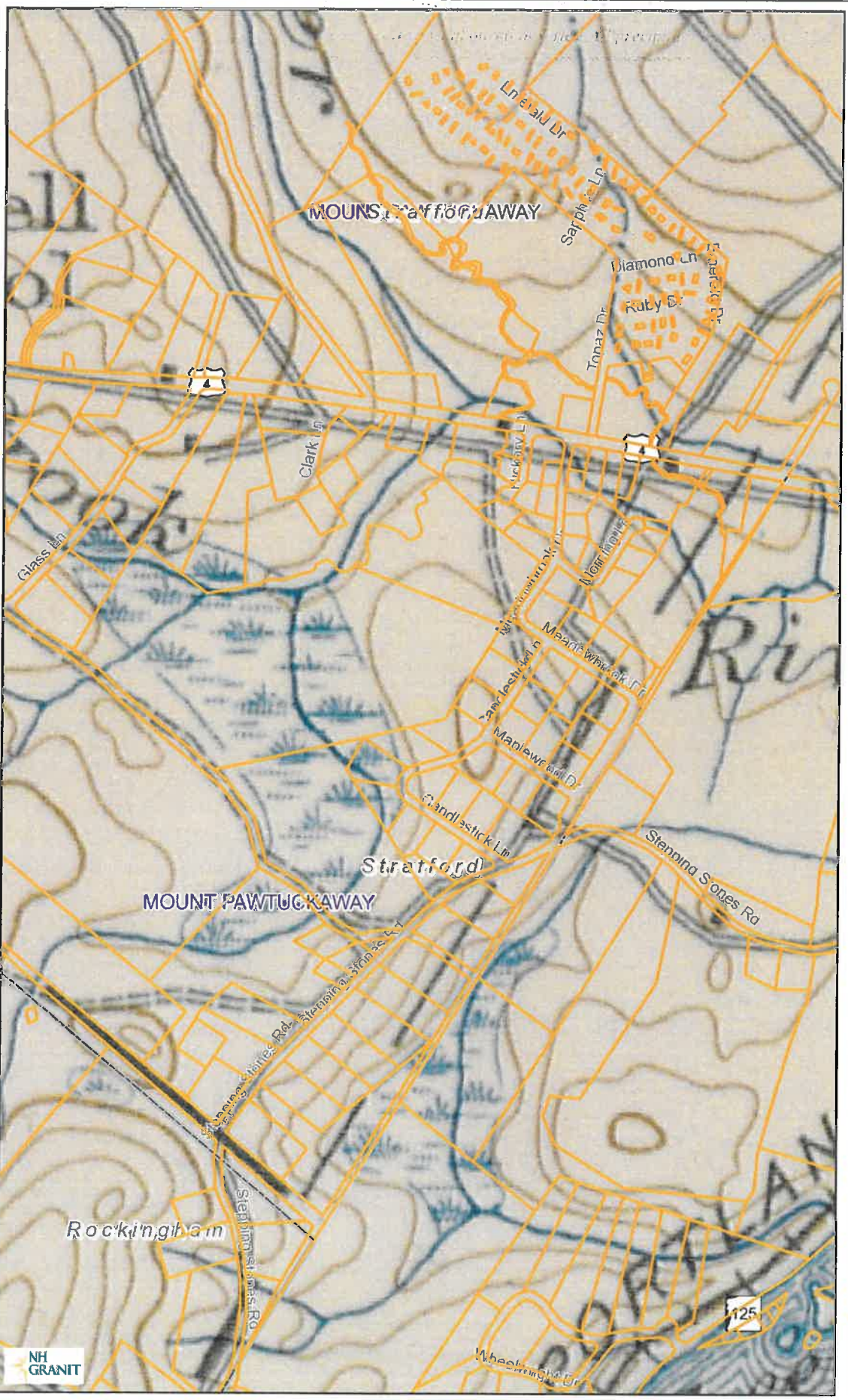
STATE OF NEW HAMPSHIRE JAMES H. LONG No. 15 7/21/21 LICENSED SOIL SCIENTIST

NEW HAMPSHIRE Designer of Subsurface Disposal Systems ★ ★ ★ JAMES H. LONG No. 988 Department of Environmental Services



GZA GeoEnvironmental, Inc.

USGS MAP



Legend

Parcels
- Parcel Polygons
- Attributes for Additional Lines

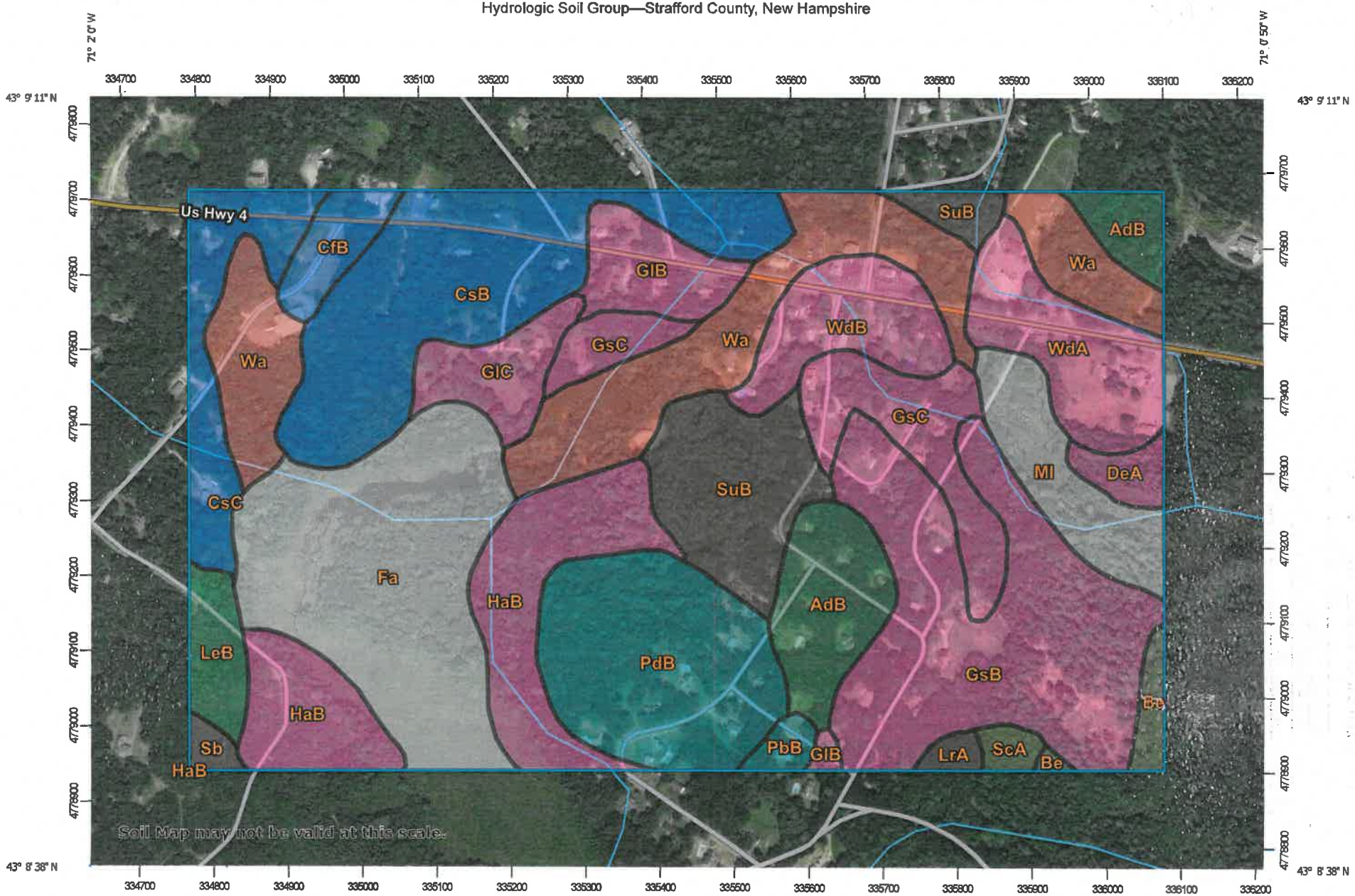
- 15-minute
- State
- County
- City/Town
- 1919

Map Scale
1: 10,000

Map Generated: 7/6/2021

Notes

Hydrologic Soil Group—Strafford County, New Hampshire



MAP LEGEND

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

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Strafford County, New Hampshire
Survey Area Data: Version 20, May 29, 2020

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

Date(s) aerial images were photographed: Aug 28, 2015—May 15, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AdB	Acton very stony fine sandy loam, 0 to 8 percent slopes	A/D	11.1	4.4%
Be	Biddeford silty clay loam	C/D	1.9	0.7%
CfB	Charlton fine sandy loam, 3 to 8 percent slopes	B	3.6	1.4%
CsB	Charlton fine sandy loam, 3 to 8 percent slopes, very stony	B	25.0	9.9%
CsC	Charlton fine sandy loam, 8 to 15 percent slopes, very stony	B	8.7	3.4%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	A	2.0	0.8%
Fa	Fresh water marsh		29.3	11.6%
GlB	Gloucester fine sandy loam, 3 to 8 percent slopes	A	6.3	2.5%
GlC	Gloucester fine sandy loam, 8 to 15 percent slopes	A	5.4	2.1%
GsB	Gloucester very stony fine sandy loam, 3 to 8 percent slopes	A	31.0	12.3%
GsC	Gloucester very stony fine sandy loam, 8 to 15 percent slopes	A	11.7	4.7%
HaB	Hinckley loamy sand, 3 to 8 percent slopes	A	19.4	7.7%
LeB	Leicester very stony fine sandy loam, 3 to 8 percent slopes	A/D	3.8	1.5%
LrA	Leicester-Ridgebury fine sandy loams, 0 to 3 percent slopes, very stony	B/D	0.9	0.4%
Ml	Mixed alluvial land, wet		8.1	3.2%
PbB	Paxton fine sandy loam, 3 to 8 percent slopes	C	1.3	0.5%
PdB	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	C	19.4	7.7%
Sb	Saugatuck loamy sand	B/D	1.0	0.4%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ScA	Scantic silt loam, 0 to 3 percent slopes	C/D	1.2	0.5%
SuB	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	B/D	13.6	5.4%
Wa	Whitman fine sandy loam, 0 to 3 percent slopes, very stony	D	28.1	11.2%
WdA	Windsor loamy sand, 0 to 3 percent slopes	A	10.5	4.2%
WdB	Windsor loamy sand, 3 to 8 percent slopes	A	8.5	3.4%
Totals for Area of Interest			**251.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

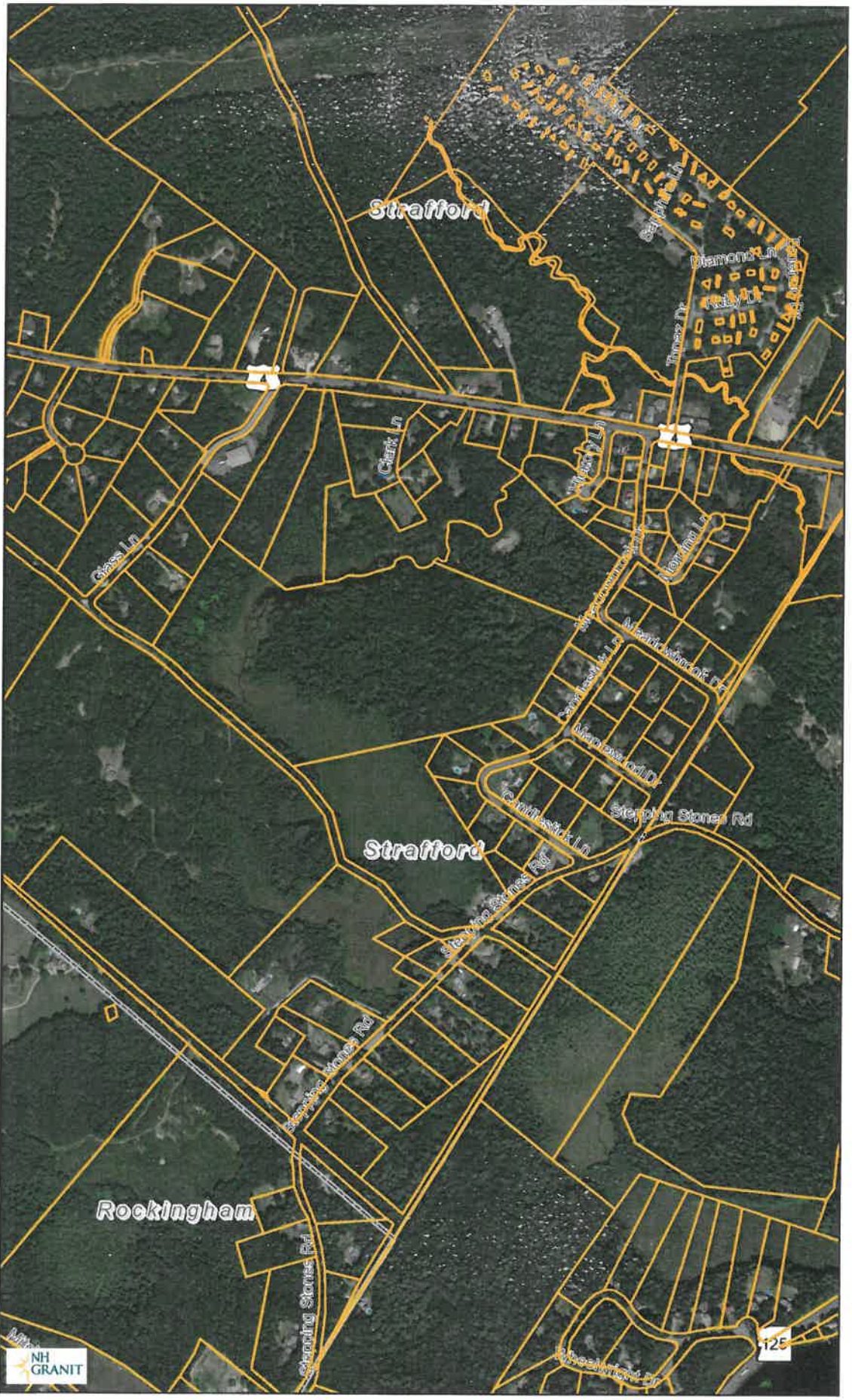
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

AERIAL MAP



Legend

Parcels
- Parcel Polygons
- Attributes for Additional Lines

State

County

City/Town

Map Scale
1: 10,000

Map Generated: 7/6/2021

Notes

LOOKING WEST FROM MEADOWBROOK ROAD

LOOKING EAST FROM EXISTING GRAVEL DRIVEWAY

EXISTING STREAM ON NORTHERN EDGE OF PROPERTY

WOODED AREA (TYPICAL)

JONES & BEACH
ENGINEERS INC.
85 Portsmouth Avenue, PO Box 219, Stratham, NH 03885
603.772.4746 - JonesandBeach.com

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

Prepared for:

MEADOWBROOK VILLAGE
Tax Map 270 Lot 2 & 3, Tax Map 273 Lot 49
44 Meadowbrook Drive
Barrington, NH 03825

7/6/2021
JBE Project No. 20747

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. The annual report and certification shall be submitted with three copies to the Town Planner by December 31st of each year.

B. General Inspection and Maintenance Requirements

1. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:

    a. Culverts
    b. Swales & Plunge Pools
    c. Vegetation and landscaping
    d. Parking lots and roadways
    e. Riprap inlet and outlet protection aprons
    f. Infiltration Basin
    g. Invasive Species

2. Maintenance of permanent measures shall follow the following schedule:

    a. Normal winter roadway and parking lot maintenance including plowing and snow removal.

    b. Road and parking lot sweeping at the end of every winter, preferably at the start of the spring rain season.

    c. **Inspection** of culvert inlets and outlets at least **once per month** during the rainy season (March to November). Any debris is to be removed and disposed of properly.

    d. **Annual inspection** of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately.

    e. **Annual inspection** of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in kind, if they are found to be dead or dying.

f. **Annual inspection** of catch basins and drain manholes to determine if they need to be cleaned. Catch basins are to be cleaned if the depth of deposits is greater than one-half the depth from the basin bottom to the invert of the lowest pipe or opening into or out of the basin. If a catch basin significantly exceeds the one-half depth standard during the inspection, then it should be cleaned more frequently. If woody debris or trash accumulates in a catch basin, then it should be cleaned on a weekly basis. Manholes should be cleaned of any material upon inspection. Catch basins and manholes can be cleaned either manually or by specially designed equipment including, but not limited to, bucket loaders and vacuum pumps. Before any materials can be disposed, it is necessary to perform a detailed chemical analysis to determine if the materials meet the EPA criteria for hazardous waste. This will help determine how the materials should be stored, treated, and disposed. Grease hoods are to be wiped clean and the rags disposed of properly. Debris obscuring the grate inlet should also be removed.

g. Permanent stone check dams should be **inspected annually** in order to ensure that they are in good condition. Any sediment accumulated behind them shall be removed if it is deeper than six inches.

h. Rock riprap should be **inspected annually** and after every major storm event in order to ensure that it has not been displaced, undermined, or otherwise damaged. Displaced rock should be replaced, or additional rock added in order to maintain the structure(s) in their undamaged state. Woody vegetation should not be allowed to become established in riprap areas, and/or any debris removed from the void spaces between the rocks. If the riprap is adjacent to a stream or other waterbody, the water should be kept clear of obstructions, debris, and sediment deposits.

i. **Infiltration Basin**: Infiltration Basins should be inspected twice annually and after every rainfall event of 2.5" or greater within a 24-hour period at a minimum. The infiltration basin areas designed to collect and infiltrate stormwater will need only minimal maintenance. Traffic over the basin areas should be kept to a minimum prior to construction to prevent compaction of the soil reducing infiltration.

   Basins shall be inspected for effectiveness at a minimum of twice annually. If basin has not completely drained 72-hours after a rainfall event, the existing clogged layer of soil shall be removed and replaced with new material as specified within the design plans.

j. **Invasive Species**: Inspection for invasive species growing in stormwater management practices shall occur bi-annually or more frequently during other routine inspections. If invasive species are encountered they should be removed

entirely and disposed of in a proper manner. If required, a contractor with the proper qualifications should be hired to remove invasive species.

See attached sample forms as a guideline.

Any inquiries in regards to the design, function, and/or maintenance of any one of the above mentioned facilities or tasks shall be directed to the project engineer:

Jones & Beach Engineers, Inc.
85 Portsmouth Avenue
P.O. Box 219
Stratham, NH 03885

T#: (603) 772-4746
F#: (603) 772-0227

Commitment to maintenance requirements

I agree to complete and/or observe all of the required maintenance practices and their respective schedules as outlined above.

_____

Signature

_____

Print Name

_____

Title

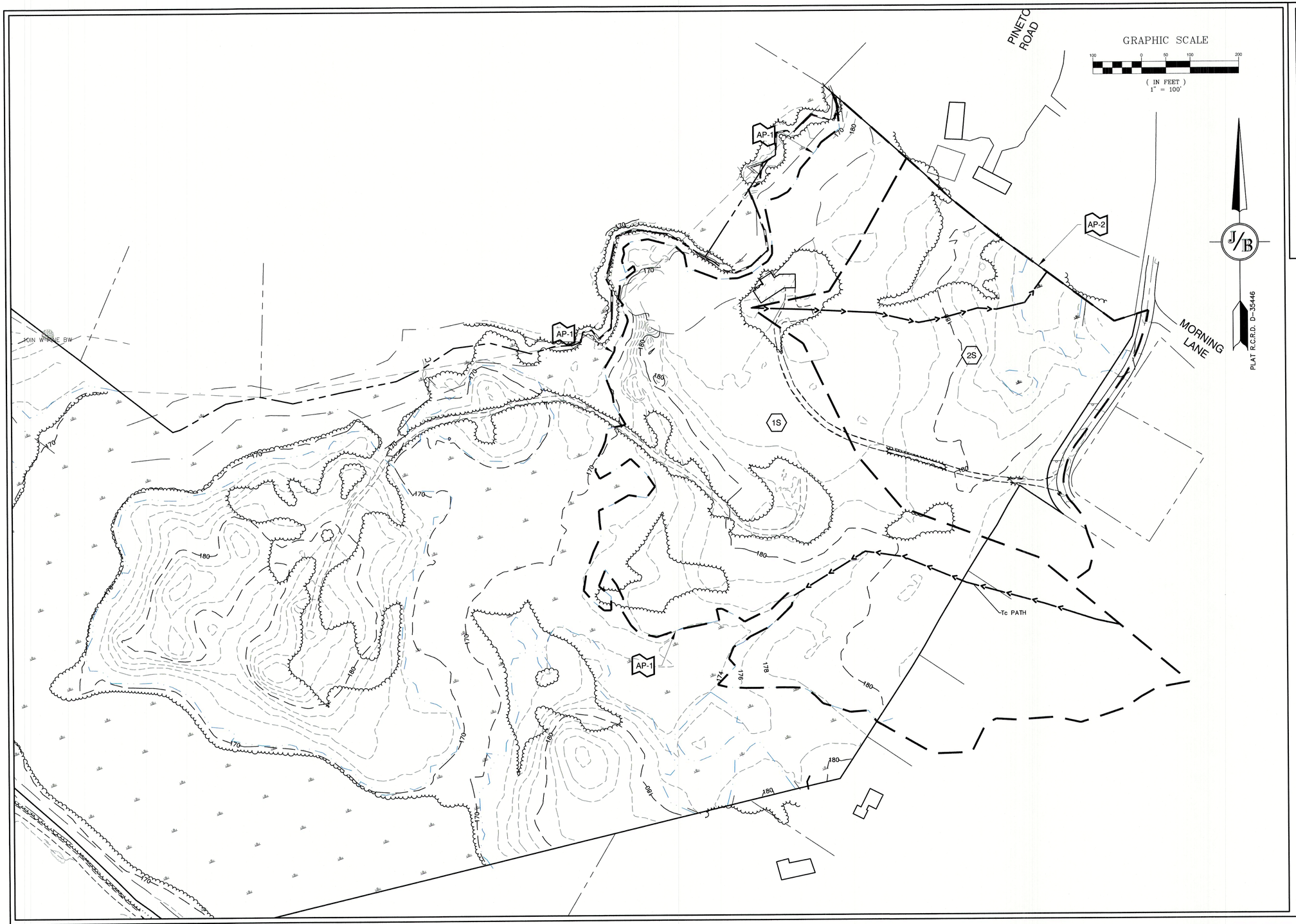
_____

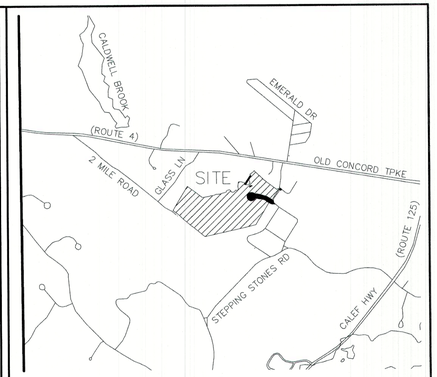
Date

Annual Operations and Maintenance Report

The future owners and assigns are responsible to perform the maintenance obligations or hire a Professional Engineer to review the site on an annual basis for maintenance and certification of the stormwater system. The Association shall keep receipts and records of all maintenance companies hired throughout the year to submit along with the following form. The annual report and certification shall be submitted with three copies to the Town Planner by December 31st of each year.

Construction Activity	Date of Inspection	Who Inspected	Findings of Inspector
Culverts			
Swales & Plunge Pools			
Vegetation and landscaping			
Parking lots and roadways			
Infiltration Basin			





LOCUS SCALE: 1"=2000'

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH (X)
- POND (X)
- TC PATH
- WETLANDS
- SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF BARRINGTON
TAX MAP 270, LOT 2 & 3
TAX MAP 273, LOT 49

APPLICANT/OWNER
ANTHONY L. & JANIS SERRA
44 MEADOWBROOK DR
BARRINGTON, NH 03825
BK 1236, PG 653

TOTAL LOT AREA
2,529,529 SQ. FT.
58.07 ACRES

Design: BWG	Draft: DFP
Checked: BWG	Scale: AS-NOTED
Drawing Name:	20747-WATERSHED.dwg

Date: 8/9/21
Project No.: 20747

REV.	DATE	REVISION	BY
0	---	ISSUED FOR REVIEW	---

Designed and Produced in NH
Jones & Beach Engineers, Inc.
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name: EXISTING WATERSHED PLAN
Project: TAX MAP 270 LOTS 2 & 3 AND TAX MAP 273 LOT 49 MEADOWBROOK DRIVE, BARRINGTON, NH
Owner of Record: ANTHONY L. & JANIS SERRA 44 MEADOWBROOK DR, BARRINGTON, NH

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 20747

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)
1" = 100'

J/B

PLAT R.C.R.D. D-35446

LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT (X)
- REACH (X)
- POND (X)
- TC PATH
- WETLANDS
- SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF BARRINGTON
TAX MAP 270, LOT 2 & 3
TAX MAP 273, LOT 49

APPLICANT/OWNER
ANTHONY L. & JANIS SERRA
44 MEADOWBROOK DR
BARRINGTON, NH 03825
BK 1236, PG 653

TOTAL LOT AREA
2,529,529 SQ. FT.
58.07 ACRES

F:\CADD\MASTER STANDARD\dwg\JB-LAYOUTS.dwg 3/12/2015 3:27:29 PM EDT

Design: BWG	Draft: DFP	Date: 8/9/21
Checked: BWG	Scale: AS-NOTED	Project No.: 20747
Drawing Name: 20747-WATERSHED.dwg		

REV.	DATE	REVISION	BY
0	---	ISSUED FOR REVIEW	---

Designed and Produced in NH

J/B Jones & Beach Engineers, Inc.

85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

Civil Engineering Services

603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	PROPOSED WATERSHED PLAN
Project:	TAX MAP 270 LOTS 2 & 3 AND TAX MAP 273 LOT 49 MEADOWBROOK DRIVE, BARRINGTON, NH
Owner of Record:	ANTHONY L. & JANIS SERRA 44 MEADOWBROOK DR, BARRINGTON, NH

DRAWING No.

W2

SHEET X OF 2
JBE PROJECT NO. **20747**