

JONES & BEACH ENGINEERS INC.

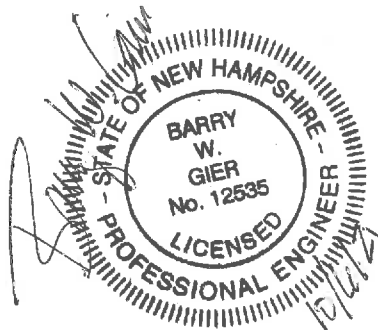
DRAINAGE ANALYSIS

EROSION AND SEDIMENT CONTROL PLAN

PPM TOWNHOMES
Tax Map 3, Lot 37-3 & 37-1
Spaulding Road
Fremont, NH 03044

Prepared for:

PPM Fremont Holding, LLC
326 Main Street
Fremont, NH 03044



Prepared by:
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October 6, 2021
JBE Project No. 20631

1. EXECUTIVE SUMMARY

The purpose of this project is to construct a 4-unit residential development on Town of Hillsborough Tax Map 3, Lot 37-3, Lot 37-1. The proposed development will contain one 10,000 sq.ft. building 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	2.06	1.40	6.15	5.15	9.99	8.87	13.83	12.98
Analysis Point #2	1.01	1.01	2.10	2.10	3.02	3.02	3.88	3.88
Total	3.07	2.41	8.25	7.25	13.01	11.89	17.71	16.82

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 vegetated swales and 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 a 4-unit residential development on Town of Fremont Tax Map 3, Lot 37-3, Lot 37-1. The proposed development will contain one 10,000 sq.ft. building with associated parking, drainage, and utilities. This project will be serviced by two on-site wells and two on-site septic systems.

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, and 50-year storm events, corresponding to rainfall events of 3.08", 4.69", 5.96", and 7.14" 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 5.99 acres including offsite contributing areas. The existing site is currently undeveloped with the exception of a gravel driveway and parking area. The existing site features a high point located at the eastern corner of the subject parcel. The site drains to the southwest from this high point. A high point near the center of the subject parcel breaks stormwater and a smaller section of the site abutting Spaulding Road drains to an existing culvert. The Analysis Points are defined below.

The majority of the soils for this site are described as Hydrological Soils "C". A section of soils along Spaulding Rd. are described as Hydrological Soils "B". A smaller section of soils central to the site are described as Hydrological Soils "D". Additionally, portions of the site are covered with exposed ledge.

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

Analysis Point #1 is defined as the existing property line to the south of the subject parcel. Stormwater to this Analysis Point flows overland from the high point at the eastern corner.

Analysis Point #2 is defined as the existing culvert near the existing access driveway. Stormwater bounded by Spaulding Rd. and the high point central to subject parcel drains to this point.

2.4 PROPOSED CONDITIONS ANALYSIS

The purpose of this project is to construct a 4-unit residential development on Town of Fremont Tax Map 3, Lot 37-3, Lot 37-1. The proposed development will contain one 10,000 sq.ft. building with associated 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:

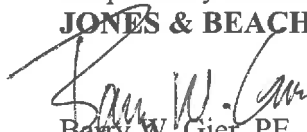
The access driveway to the site is crowned and ditches line both sides. North of the driveway, the vegetated swale continues to the rear of the proposed building and flows to Infiltration Basin #1. To the west, the vegetated swale follows the perimeter of the parking area and later connects with the swale to the rear of the proposed building. Both swales collect runoff from the proposed building and associated parking and drain to Infiltration Basin #1. Infiltration Basin #1 is released by Outlet Structure #1 and flows to Analysis Point #1. There is a portion of the site that is down grade of Infiltration Basin #1 and this stormwater flows directly to Analysis Point #1.

The portion of the site that drains to Analysis Point #2 remains unchanged.

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, vegetated swales, infiltration basins 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

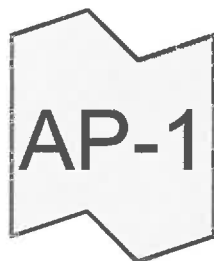
2.6 DRAINAGE CALCUALTIONS

PRE-DEVELOPMENT CONDITIONS ANALYSIS

- 2.6.1 2-Year 24-Hour Summary Analysis
- 2.6.2 10-Year 24-Hour Complete Analysis
- 2.6.3 25-Year 24-Hour Summary Analysis
- 2.6.4 50-Year 24-Hour Summary Analysis



EX-WS-1



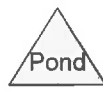
Analysis Point 1



EX-WS-1



Analysis Point 2



Routing Diagram for 20631-EXIST-DRAINAGE

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20631-EXIST-DRAINAGE

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.758	61	>75% Grass cover, Good, HSG B (1S)
1.489	74	>75% Grass cover, Good, HSG C (1S, 2S)
0.171	80	>75% Grass cover, Good, HSG D (1S)
0.164	98	Paved roads w/curbs & sewers, HSG B (1S)
0.405	98	Paved roads w/curbs & sewers, HSG C (1S, 2S)
5.988	68	TOTAL AREA

20631-EXIST-DRAINAGE

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.922	HSG B	1S
1.895	HSG C	1S, 2S
0.171	HSG D	1S
0.000	Other	
5.988		TOTAL AREA

20631-EXIST-DRAINAGE

Type III 24-hr 2-Year Rainfall=3.08"

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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=224,843 sf 7.80% Impervious Runoff Depth>0.55"
Flow Length=714' Tc=19.9 min CN=67 Runoff=2.06 cfs 0.238 af

Subcatchment 2S: EX-WS-1

Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>1.15"
Flow Length=383' Tc=10.3 min CN=79 Runoff=1.01 cfs 0.079 af

Link AP-1: Analysis Point 1

Inflow=2.06 cfs 0.238 af
Primary=2.06 cfs 0.238 af

Link AP-2: Analysis Point 2

Inflow=1.01 cfs 0.079 af
Primary=1.01 cfs 0.079 af

Total Runoff Area = 5.988 ac Runoff Volume = 0.317 af Average Runoff Depth = 0.64"
90.49% Pervious = 5.419 ac 9.51% Impervious = 0.569 ac

20631-EXIST-DRAINAGE*Type III 24-hr 10-Year Rainfall=4.69"*

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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-1Runoff Area=224,843 sf 7.80% Impervious Runoff Depth>1.44"
Flow Length=714' Tc=19.9 min CN=67 Runoff=6.15 cfs 0.621 af**Subcatchment 2S: EX-WS-1**Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>2.36"
Flow Length=383' Tc=10.3 min CN=79 Runoff=2.10 cfs 0.162 af**Link AP-1: Analysis Point 1**Inflow=6.15 cfs 0.621 af
Primary=6.15 cfs 0.621 af**Link AP-2: Analysis Point 2**Inflow=2.10 cfs 0.162 af
Primary=2.10 cfs 0.162 af**Total Runoff Area = 5.988 ac Runoff Volume = 0.784 af Average Runoff Depth = 1.57"**
90.49% Pervious = 5.419 ac 9.51% Impervious = 0.569 ac

20631-EXIST-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.69"

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Summary for Subcatchment 1S: EX-WS-1

Runoff = 6.15 cfs @ 12.30 hrs, Volume= 0.621 af, Depth> 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.69"

Area (sf)	CN	Description
7,143	98	Paved roads w/curbs & sewers, HSG B
163,716	61	>75% Grass cover, Good, HSG B
10,405	98	Paved roads w/curbs & sewers, HSG C
36,141	74	>75% Grass cover, Good, HSG C
7,438	80	>75% Grass cover, Good, HSG D
224,843	67	Weighted Average
207,295		92.20% Pervious Area
17,548		7.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	100	0.0700	0.19		Sheet Flow, Grass: Dense n= 0.240 P2= 3.08"
0.4	42	0.0700	1.85		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.2	188	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.8	132	0.0300	1.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
5.7	252	0.0110	0.73		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
19.9	714	Total			

Summary for Subcatchment 2S: EX-WS-1

Runoff = 2.10 cfs @ 12.15 hrs, Volume= 0.162 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.69"

Area (sf)	CN	Description
7,244	98	Paved roads w/curbs & sewers, HSG C
28,738	74	>75% Grass cover, Good, HSG C
35,982	79	Weighted Average
28,738		79.87% Pervious Area
7,244		20.13% Impervious Area

20631-EXIST-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.69"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0300	1.26		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.08"
6.5	69	0.0700	0.18		Sheet Flow, RD SHOULDER Grass: Dense n= 0.240 P2= 3.08"
0.6	78	0.1100	2.32		Shallow Concentrated Flow, GRASS Short Grass Pasture Kv= 7.0 fps
2.8	205	0.0300	1.21		Shallow Concentrated Flow, GRASS Short Grass Pasture Kv= 7.0 fps
10.3	383	Total			

Summary for Link AP-1: Analysis Point 1

Inflow Area = 5.162 ac, 7.80% Impervious, Inflow Depth > 1.44" for 10-Year event
 Inflow = 6.15 cfs @ 12.30 hrs, Volume= 0.621 af
 Primary = 6.15 cfs @ 12.30 hrs, Volume= 0.621 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 = 0.826 ac, 20.13% Impervious, Inflow Depth > 2.36" for 10-Year event
 Inflow = 2.10 cfs @ 12.15 hrs, Volume= 0.162 af
 Primary = 2.10 cfs @ 12.15 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

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

20631-EXIST-DRAINAGE*Type III 24-hr 25-Year Rainfall=5.96"*

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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-1Runoff Area=224,843 sf 7.80% Impervious Runoff Depth>2.29"
Flow Length=714' Tc=19.9 min CN=67 Runoff=9.99 cfs 0.986 af**Subcatchment 2S: EX-WS-1**Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>3.41"
Flow Length=383' Tc=10.3 min CN=79 Runoff=3.02 cfs 0.235 af**Link AP-1: Analysis Point 1**Inflow=9.99 cfs 0.986 af
Primary=9.99 cfs 0.986 af**Link AP-2: Analysis Point 2**Inflow=3.02 cfs 0.235 af
Primary=3.02 cfs 0.235 af**Total Runoff Area = 5.988 ac Runoff Volume = 1.221 af Average Runoff Depth = 2.45"**
90.49% Pervious = 5.419 ac 9.51% Impervious = 0.569 ac

20631-EXIST-DRAINAGE*Type III 24-hr 50-Year Rainfall=7.14"*

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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=224,843 sf 7.80% Impervious Runoff Depth>3.15"
Flow Length=714' Tc=19.9 min CN=67 Runoff=13.83 cfs 1.356 af

Subcatchment2S: EX-WS-1

Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>4.42"
Flow Length=383' Tc=10.3 min CN=79 Runoff=3.88 cfs 0.304 af

Link AP-1: Analysis Point 1

Inflow=13.83 cfs 1.356 af
Primary=13.83 cfs 1.356 af

Link AP-2: Analysis Point 2

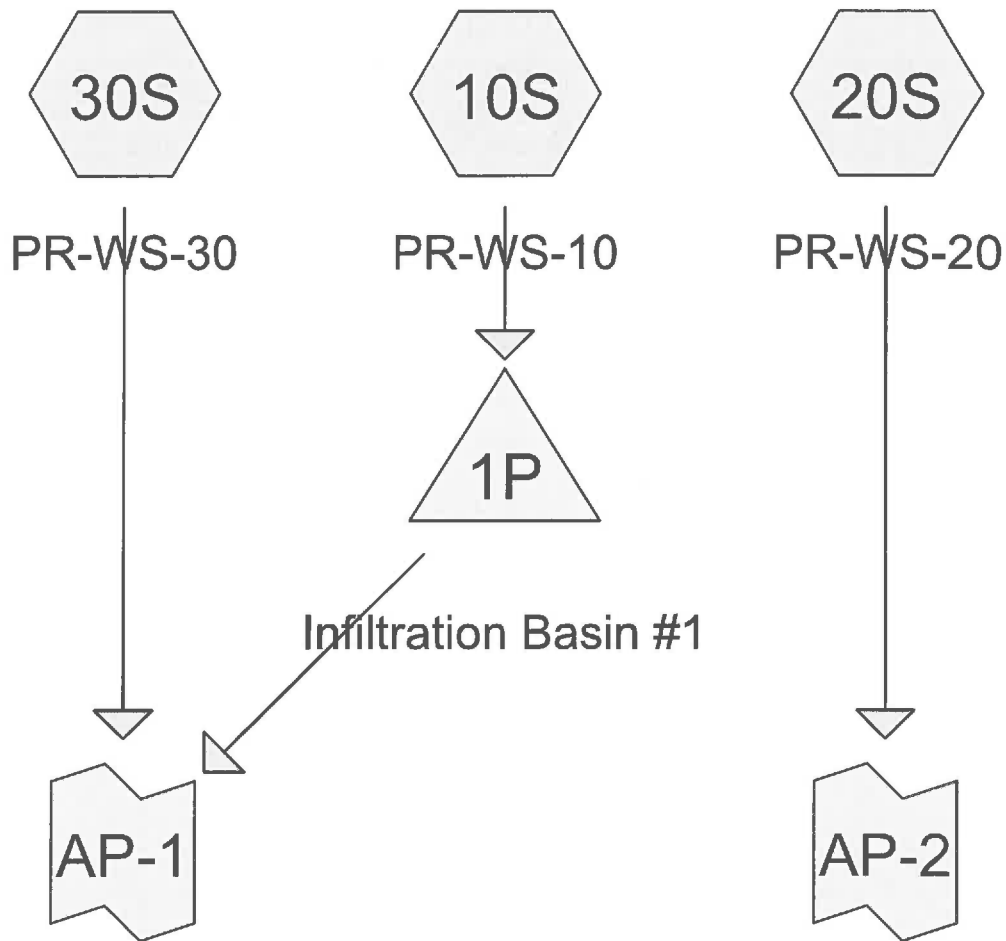
Inflow=3.88 cfs 0.304 af
Primary=3.88 cfs 0.304 af

Total Runoff Area = 5.988 ac Runoff Volume = 1.661 af Average Runoff Depth = 3.33"
90.49% Pervious = 5.419 ac 9.51% Impervious = 0.569 ac

2.7 APPENDIX II

POST-DEVELOPMENT CONDITIONS ANALYSIS

- 2.7.1 2-Year 24-Hour Summary Analysis
- 2.7.2 10-Year 24-Hour Complete Analysis
- 2.7.3 25-Year 24-Hour Summary Analysis
- 2.7.4 50-Year 24-Hour Summary Analysis



Analysis Point 1

Analysis Point 2



Routing Diagram for 20631-PROP-DRAINAGE

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20631-PROP-DRAINAGE

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.254	61	>75% Grass cover, Good, HSG B (10S, 30S)
1.438	74	>75% Grass cover, Good, HSG C (10S, 20S, 30S)
0.171	80	>75% Grass cover, Good, HSG D (10S)
0.669	98	Paved parking, HSG B (10S)
0.290	98	Paved parking, HSG C (10S, 30S)
0.166	98	Paved roads w/curbs & sewers, HSG C (20S)
5.988	72	TOTAL AREA

20631-PROP-DRAINAGE

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
3.922	HSG B	10S, 30S
1.895	HSG C	10S, 20S, 30S
0.171	HSG D	10S
0.000	Other	
5.988		TOTAL AREA

20631-PROP-DRAINAGE*Type III 24-hr 2-Year Rainfall=3.08"*

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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 10S: PR-WS-10

Runoff Area=199,507 sf 20.82% Impervious Runoff Depth>0.77"
Flow Length=914' Tc=13.4 min CN=72 Runoff=3.27 cfs 0.295 af

Subcatchment 20S: PR-WS-20

Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>1.15"
Flow Length=383' Tc=10.3 min CN=79 Runoff=1.01 cfs 0.079 af

Subcatchment 30S: PR-WS-30

Runoff Area=25,336 sf 0.87% Impervious Runoff Depth>0.37"
Flow Length=157' Slope=0.0120 '/' Tc=12.9 min CN=62 Runoff=0.15 cfs 0.018 af

Pond 1P: Infiltration Basin #1

Peak Elev=165.46' Storage=1,855 cf Inflow=3.27 cfs 0.295 af
Discarded=0.79 cfs 0.222 af Primary=1.27 cfs 0.072 af Outflow=2.07 cfs 0.295 af

Link AP-1: Analysis Point 1

Inflow=1.40 cfs 0.090 af
Primary=1.40 cfs 0.090 af

Link AP-2: Analysis Point 2

Inflow=1.01 cfs 0.079 af
Primary=1.01 cfs 0.079 af

Total Runoff Area = 5.988 ac Runoff Volume = 0.392 af Average Runoff Depth = 0.79"
81.21% Pervious = 4.863 ac 18.79% Impervious = 1.125 ac

20631-PROP-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.69"

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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 10S: PR-WS-10 Runoff Area=199,507 sf 20.82% Impervious Runoff Depth>1.80"
Flow Length=914' Tc=13.4 min CN=72 Runoff=8.10 cfs 0.688 af

Subcatchment 20S: PR-WS-20 Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>2.36"
Flow Length=383' Tc=10.3 min CN=79 Runoff=2.10 cfs 0.162 af

Subcatchment 30S: PR-WS-30 Runoff Area=25,336 sf 0.87% Impervious Runoff Depth>1.13"
Flow Length=157' Slope=0.0120 '/' Tc=12.9 min CN=62 Runoff=0.61 cfs 0.055 af

Pond 1P: Infiltration Basin #1 Peak Elev=165.75' Storage=4,537 cf Inflow=8.10 cfs 0.688 af
Discarded=1.07 cfs 0.381 af Primary=4.69 cfs 0.307 af Outflow=5.76 cfs 0.688 af

Link AP-1: Analysis Point 1 Inflow=5.15 cfs 0.362 af
Primary=5.15 cfs 0.362 af

Link AP-2: Analysis Point 2 Inflow=2.10 cfs 0.162 af
Primary=2.10 cfs 0.162 af

Total Runoff Area = 5.988 ac Runoff Volume = 0.905 af Average Runoff Depth = 1.81"
81.21% Pervious = 4.863 ac 18.79% Impervious = 1.125 ac

20631-PROP-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.69"

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Summary for Subcatchment 10S: PR-WS-10

Runoff = 8.10 cfs @ 12.20 hrs, Volume= 0.688 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.69"

Area (sf)	CN	Description
29,127	98	Paved parking, HSG B
117,837	61	>75% Grass cover, Good, HSG B
12,412	98	Paved parking, HSG C
32,693	74	>75% Grass cover, Good, HSG C
7,438	80	>75% Grass cover, Good, HSG D
199,507	72	Weighted Average
157,968		79.18% Pervious Area
41,539		20.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	100	0.0600	0.26		Sheet Flow, grass sheet Grass: Short n= 0.150 P2= 3.08"
0.2	72	0.1250	5.30		Shallow Concentrated Flow, driveway swale Grassed Waterway Kv= 15.0 fps
0.5	103	0.0600	3.67		Shallow Concentrated Flow, driveway swale Grassed Waterway Kv= 15.0 fps
5.0	447	0.0100	1.50		Shallow Concentrated Flow, parking lot swale Grassed Waterway Kv= 15.0 fps
0.7	123	0.0400	3.00		Shallow Concentrated Flow, GRASS SWALE Grassed Waterway Kv= 15.0 fps
0.6	69	0.0160	1.90		Shallow Concentrated Flow, GRASS SWALE Grassed Waterway Kv= 15.0 fps
13.4	914	Total			

Summary for Subcatchment 20S: PR-WS-20

Runoff = 2.10 cfs @ 12.15 hrs, Volume= 0.162 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.69"

Area (sf)	CN	Description
7,244	98	Paved roads w/curbs & sewers, HSG C
28,738	74	>75% Grass cover, Good, HSG C
35,982	79	Weighted Average
28,738		79.87% Pervious Area
7,244		20.13% Impervious Area

20631-PROP-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.69"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	31	0.0300	1.26		Sheet Flow, ROAD Smooth surfaces n= 0.011 P2= 3.08"
6.5	69	0.0700	0.18		Sheet Flow, RD SHOULDER Grass: Dense n= 0.240 P2= 3.08"
0.6	78	0.1100	2.32		Shallow Concentrated Flow, GRASS Short Grass Pasture Kv= 7.0 fps
2.8	205	0.0300	1.21		Shallow Concentrated Flow, GRASS Short Grass Pasture Kv= 7.0 fps
10.3	383	Total			

Summary for Subcatchment 30S: PR-WS-30

Runoff = 0.61 cfs @ 12.20 hrs, Volume= 0.055 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.69"

Area (sf)	CN	Description
23,894	61	>75% Grass cover, Good, HSG B
220	98	Paved parking, HSG C
1,222	74	>75% Grass cover, Good, HSG C
25,336	62	Weighted Average
25,116		99.13% Pervious Area
220		0.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0120	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.08"
0.6	57	0.0120	1.64		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
12.9	157	Total			

Summary for Pond 1P: Infiltration Basin #1

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=40)

Inflow Area = 4.580 ac, 20.82% Impervious, Inflow Depth > 1.80" for 10-Year event
 Inflow = 8.10 cfs @ 12.20 hrs, Volume= 0.688 af
 Outflow = 5.76 cfs @ 12.36 hrs, Volume= 0.688 af, Atten= 29%, Lag= 9.9 min
 Discarded = 1.07 cfs @ 12.36 hrs, Volume= 0.381 af
 Primary = 4.69 cfs @ 12.36 hrs, Volume= 0.307 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 165.75' @ 12.36 hrs Surf.Area= 9,399 sf Storage= 4,537 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 9.8 min (821.6 - 811.8)

20631-PROP-DRAINAGE

Type III 24-hr 10-Year Rainfall=4.69"

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Volume	Invert	Avail.Storage	Storage Description
#1	165.25'	9,394 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)
165.25	8,611	511.4	0	0	8,611
165.75	9,393	520.8	4,500	4,500	9,425
166.25	10,189	530.2	4,894	9,394	10,254

Device	Routing	Invert	Outlet Devices
#1	Discarded	165.25'	3.000 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 164.50'
#2	Primary	166.00'	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	Primary	165.25'	4.0' long Sharp-Crested Vee/Trap Weir Cv= 2.62 (C= 3.28)

Discarded OutFlow Max=1.07 cfs @ 12.36 hrs HW=165.75' (Free Discharge)

1=Exfiltration (Controls 1.07 cfs)

Primary OutFlow Max=4.67 cfs @ 12.36 hrs HW=165.75' TW=0.00' (Dynamic Tailwater)

2=EMERGENCY OVERFLOW (Controls 0.00 cfs)

3=Sharp-Crested Vee/Trap Weir (Weir Controls 4.67 cfs @ 2.32 fps)

Summary for Link AP-1: Analysis Point 1

Inflow Area = 5.162 ac, 18.57% Impervious, Inflow Depth > 0.84" for 10-Year event
 Inflow = 5.15 cfs @ 12.35 hrs, Volume= 0.362 af
 Primary = 5.15 cfs @ 12.35 hrs, Volume= 0.362 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 = 0.826 ac, 20.13% Impervious, Inflow Depth > 2.36" for 10-Year event
 Inflow = 2.10 cfs @ 12.15 hrs, Volume= 0.162 af
 Primary = 2.10 cfs @ 12.15 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

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

20631-PROP-DRAINAGE*Type III 24-hr 25-Year Rainfall=5.96"*

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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

Subcatchment10S: PR-WS-10

Runoff Area=199,507 sf 20.82% Impervious Runoff Depth>2.74"
Flow Length=914' Tc=13.4 min CN=72 Runoff=12.40 cfs 1.046 af

Subcatchment20S: PR-WS-20

Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>3.41"
Flow Length=383' Tc=10.3 min CN=79 Runoff=3.02 cfs 0.235 af

Subcatchment30S: PR-WS-30

Runoff Area=25,336 sf 0.87% Impervious Runoff Depth>1.88"
Flow Length=157' Slope=0.0120 '/' Tc=12.9 min CN=62 Runoff=1.06 cfs 0.091 af

Pond 1P: Infiltration Basin #1

Peak Elev=165.97' Storage=6,613 cf Inflow=12.40 cfs 1.046 af
Discarded=1.28 cfs 0.486 af Primary=8.02 cfs 0.560 af Outflow=9.30 cfs 1.046 af

Link AP-1: Analysis Point 1

Inflow=8.87 cfs 0.651 af
Primary=8.87 cfs 0.651 af

Link AP-2: Analysis Point 2

Inflow=3.02 cfs 0.235 af
Primary=3.02 cfs 0.235 af

Total Runoff Area = 5.988 ac Runoff Volume = 1.372 af Average Runoff Depth = 2.75"
81.21% Pervious = 4.863 ac 18.79% Impervious = 1.125 ac

20631-PROP-DRAINAGE*Type III 24-hr 50-Year Rainfall=7.14"*

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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 10S: PR-WS-10

Runoff Area=199,507 sf 20.82% Impervious Runoff Depth>3.67"
Flow Length=914' Tc=13.4 min CN=72 Runoff=16.60 cfs 1.402 af

Subcatchment 20S: PR-WS-20

Runoff Area=35,982 sf 20.13% Impervious Runoff Depth>4.42"
Flow Length=383' Tc=10.3 min CN=79 Runoff=3.88 cfs 0.304 af

Subcatchment 30S: PR-WS-30

Runoff Area=25,336 sf 0.87% Impervious Runoff Depth>2.67"
Flow Length=157' Slope=0.0120 '/' Tc=12.9 min CN=62 Runoff=1.54 cfs 0.129 af

Pond 1P: Infiltration Basin #1

Peak Elev=166.15' Storage=8,374 cf Inflow=16.60 cfs 1.402 af
Discarded=1.46 cfs 0.572 af Primary=11.75 cfs 0.830 af Outflow=13.21 cfs 1.402 af

Link AP-1: Analysis Point 1

Inflow=12.98 cfs 0.959 af
Primary=12.98 cfs 0.959 af

Link AP-2: Analysis Point 2

Inflow=3.88 cfs 0.304 af
Primary=3.88 cfs 0.304 af

Total Runoff Area = 5.988 ac Runoff Volume = 1.835 af Average Runoff Depth = 3.68"
81.21% Pervious = 4.863 ac 18.79% Impervious = 1.125 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	71.137 degrees West
Latitude	42.991 degrees North
Elevation	0 feet
Date/Time	Thu, 03 Jun 2021 10:50:14 -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	0.66	0.82	1.04	1yr	0.71	0.99	1.21	1.55	1.99	2.58	2.77	1yr	2.28	2.66	3.08	3.77	4.37	1yr
2yr	0.32	0.50	0.62	0.81	1.02	1.29	2yr	0.88	1.18	1.50	1.91	2.42	3.08	3.42	2yr	2.73	3.29	3.80	4.51	5.15	2yr
5yr	0.38	0.59	0.74	0.99	1.26	1.62	5yr	1.09	1.47	1.89	2.41	3.07	3.91	4.40	5yr	3.46	4.23	4.84	5.75	6.50	5yr
10yr	0.42	0.66	0.84	1.14	1.48	1.92	10yr	1.28	1.73	2.25	2.88	3.68	4.69	5.31	10yr	4.15	5.11	5.82	6.92	7.76	10yr
25yr	0.49	0.79	1.00	1.38	1.83	2.39	25yr	1.58	2.16	2.82	3.64	4.67	5.96	6.83	25yr	5.27	6.56	7.41	8.85	9.82	25yr
50yr	0.56	0.90	1.15	1.60	2.15	2.84	50yr	1.86	2.56	3.37	4.35	5.59	7.14	8.26	50yr	6.32	7.94	8.91	10.66	11.75	50yr
100yr	0.63	1.02	1.31	1.86	2.54	3.38	100yr	2.19	3.03	4.02	5.22	6.71	8.57	10.00	100yr	7.58	9.61	10.71	12.85	14.06	100yr
200yr	0.72	1.17	1.51	2.17	2.99	4.01	200yr	2.58	3.59	4.79	6.24	8.03	10.28	12.10	200yr	9.10	11.64	12.87	15.51	16.83	200yr
500yr	0.85	1.40	1.82	2.65	3.71	5.04	500yr	3.21	4.50	6.04	7.90	10.21	13.09	15.59	500yr	11.58	14.99	16.43	19.90	21.38	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	1yr	0.62	0.86	1.01	1.29	1.56	2.10	2.54	1yr	1.86	2.45	2.83	3.43	3.90	1yr
2yr	0.31	0.48	0.60	0.81	1.00	1.18	2yr	0.86	1.15	1.35	1.79	2.29	2.97	3.27	2yr	2.63	3.14	3.65	4.30	4.91	2yr
5yr	0.36	0.55	0.68	0.93	1.19	1.41	5yr	1.03	1.38	1.60	2.09	2.68	3.55	3.89	5yr	3.14	3.74	4.31	5.38	5.84	5yr
10yr	0.39	0.61	0.75	1.05	1.36	1.61	10yr	1.17	1.57	1.81	2.36	3.01	4.03	4.40	10yr	3.56	4.23	4.87	6.28	6.57	10yr
25yr	0.45	0.69	0.86	1.23	1.62	1.91	25yr	1.39	1.87	2.12	2.74	3.51	4.73	5.18	25yr	4.18	4.98	5.76	7.71	8.52	25yr
50yr	0.50	0.77	0.95	1.37	1.85	2.19	50yr	1.59	2.14	2.38	3.07	3.94	5.32	5.82	50yr	4.71	5.60	6.53	9.01	9.83	50yr
100yr	0.57	0.86	1.07	1.55	2.12	2.50	100yr	1.83	2.45	2.68	3.44	4.42	5.68	6.54	100yr	5.03	6.29	7.43	10.55	11.33	100yr
200yr	0.63	0.95	1.21	1.75	2.44	2.85	200yr	2.10	2.79	3.02	3.86	4.96	6.29	7.13	200yr	5.56	8.78	8.45	12.36	13.08	200yr
500yr	0.74	1.10	1.42	2.06	2.93	3.41	500yr	2.53	3.34	3.53	4.48	5.80	7.15	8.15	500yr	6.33	10.72	10.05	15.26	15.79	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.45	0.54	0.73	0.90	1.08	1yr	0.78	1.05	1.25	1.67	2.11	2.84	3.17	1yr	2.52	3.05	3.50	4.06	4.88	1yr
2yr	0.33	0.51	0.63	0.86	1.05	1.26	2yr	0.91	1.23	1.45	1.91	2.44	3.28	3.64	2yr	2.90	3.50	4.02	4.75	5.49	2yr
5yr	0.41	0.63	0.78	1.07	1.36	1.61	5yr	1.17	1.57	1.85	2.42	3.09	4.29	4.98	5yr	3.80	4.78	5.43	6.15	7.22	5yr
10yr	0.48	0.74	0.92	1.29	1.67	1.96	10yr	1.44	1.92	2.24	2.93	3.71	5.35	6.34	10yr	4.74	6.10	6.84	7.61	9.06	10yr
25yr	0.61	0.93	1.15	1.65	2.17	2.55	25yr	1.87	2.49	2.91	3.76	4.72	7.17	8.79	25yr	6.34	8.45	9.27	10.11	11.15	25yr
50yr	0.72	1.09	1.36	1.96	2.64	3.11	50yr	2.28	3.04	3.53	4.55	5.68	8.95	11.28	50yr	7.92	10.85	11.68	12.53	13.70	50yr
100yr	0.86	1.30	1.63	2.35	3.23	3.79	100yr	2.78	3.70	4.30	5.52	6.84	11.53	14.46	100yr	10.20	13.91	14.71	15.55	16.87	100yr
200yr	1.02	1.54	1.95	2.82	3.93	4.63	200yr	3.39	4.52	5.25	6.69	8.23	14.51	15.58	200yr	12.84	14.98	18.51	19.30	20.79	200yr
500yr	1.29	1.92	2.47	3.59	5.11	6.02	500yr	4.41	5.89	6.82	8.65	10.53	19.70	21.01	500yr	17.43	20.20	25.09	25.68	27.45	500yr

Project Name: PPM TOWNHOMES JBE #: 20631
 Town/City: Fremont, NH Date: 9/14/2021
Rip Rap Outlet Protection Calculation

Outlet Designation: RIP RAP #34 (PRETX UNIT #2)
 Pipe Size (Do): 36 in. = 3 ft
 Q10 (cfs): 4.66 cfs
 Tailwater Elevation (TW): 0.25 (FT) if TW = 0, assume 3"/0.25'

Apron Length (La):

TW < Do YES $La = 1.8Q/Do^{1.5} + 7Do$
 $La = 22.61$ ft

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

Apron Width (W₂):

TW < Do $W_2 = 3Do + La$
 $W_2 = 31.61$ ft.

TW > Do $W_2 = 3Do + .4La$
 $W_2 =$ ft.

Rip-Rap Diameter (D₅₀):

D₅₀: $D_{50} = 0.02Q^{1.3}/TW*Do$
 $D_{50} = 0.20$ ft. 2.37 in.
 Use 3" minimum D₅₀ ==> D50 = 3 in.

Rip-Rap Thickness (T):

$T = 2.5*D_{50}$
 $T = 7.5$ in.

Apron Width (W₁):

$W_1 = 3*Do$
 $W_1 = 9$ ft.



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www.gza.com



Via Email

January 6, 2021

File No. 04.0191032.00

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

Re: Site-Specific Soil Mapping Report
Spaulding Road, Tax Map 3, Lot 37-3
Fremont, New Hampshire

Dear Mr. Gier:

This letter report presents the findings of a Site-Specific Soil Mapping survey conducted on the above-referenced property (Site) by GZA GeoEnvironmental, Inc. (GZA) on December 14, 2020. The subject property is located off of Spaulding Road approximately 355 feet south of the intersection of Spaulding Road and Frost Lane in Fremont, New Hampshire and is identified by the Town as Tax Map 3, Lot 373 (Site). The Site is bordered to the east by Spaulding Road, to the south by commercial property, to the west by undeveloped forest area, and to the north by residential property. The Site is approximately 5.32 acres (see attached plan Concept #1, Spaulding Road, Fremont, NH, dated 9/29/20).

The Site is currently on open and cleared lot consisting predominantly of shrubland. GZA completed wetland delineation on August 13, 2020 and did not observe any jurisdictional wetland systems (see Wetland Delineation Report dated September 9, 2020). We understand that a five-building complex is proposed on the Site and that soil mapping is required to support lot design, road layout, and anticipated Alteration of Terrain permitting for the redevelopment of the Site. This report is subject to the Limitations in **Appendix A**.

The Site-Specific Soil Mapping survey was conducted by New Hampshire Certified Soil Scientist, James H. Long, (CSS #15) in accordance with the *New Hampshire Supplement of the Site-Specific Soil Mapping Standard for New Hampshire and Vermont*, Version 4.0, February 2011, published by the Society of Soil Scientists of Northern New England. Soil map units identified on the Site were classified using the *New Hampshire State-Wide Numerical Soils Legend*, United States Department of Agriculture (USDA) Natural Resource Conservation Service, Issue No. 10, January 2011. The Site-Specific 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. This map has



been prepared to be consistent with soil mapping requirements outlined in RSA 485 A:17 and New Hampshire Department of Environmental Services (DES) Env-Wq 1500, Alteration of Terrain (AoT) rules. Site-Specific Soil Mapping boundaries were sketched by GZA on the plan titled "Concept #1," dated September 29, 2020 (See **Appendix B**).

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 test pits conducted throughout the property on December 14, 2020 (see **Appendix C**). Tile spade and hand auger probe observations were also evaluated to fill in gaps in areas that were not test pitted. Slope phases were measured by the topography shown on the Plan, which depicts the area of the Site mapped at a scale of 1-inch equals 30 feet and provides topographic information at a contour interval of 2 feet.

Soil parent materials encountered consist of disturbed cut and fill material, excavated material, and man-made material. The disturbed soil units identified during the soil survey are briefly described below. Soil characteristics for each of these units comply with the Disturbed Soil Mapping Unit Supplement for DES AoT (**Appendix D**). The table below provides a description of each Soil Map Unit identified on the Site during the field soil survey:

MAP UNIT NO.	SOIL TAXONOMIC NAME	DESCRIPTION
199B/haade	Fill Material 3-8% slope	This map unit represents areas that have been filled with large boulders, broken ledge, as well as fill material. These soils have an undetermined drainage class, no natural soil within 60 inches, no restrictive layers, an undetermined KSat value, and an undetermined hydrologic soil group. Slopes range from 3-8%.
199C/haade	Fill Material 8-15% slope	This map unit represents areas that have been filled with large boulders, broken ledge, as well as fill material. These soils have an undetermined drainage class, no natural soil within 60 inches, no restrictive layers, an undetermined KSat value, and an undetermined hydrologic soil group. Slopes range from 8-15%.
199E/haade	Fill Material 25-50% slope	This map unit represents areas that have been filled with large boulders, broken ledge, as well as fill material. These soils have an undetermined drainage class, no natural soil within 60 inches, no restrictive layers, an undetermined KSat value, and an undetermined hydrologic soil group. Slopes range from 25-50%.
299A/daabb	Udorthents, smoothed 0-3% slope	This map unit represents an area that has been filled. These soils are moderately well drained, no natural soil within 60 inches, no restrictive layers, has a moderate KSat value and are in Hydrologic Soil Group B. Slopes range from 0-3%.
299B/daabb	Udorthents, smoothed 3-8% slope	This map unit represents an area that has been filled. These soils are moderately well drained, no natural soil within 60 inches, no restrictive layers, has a moderate KSat value and are in Hydrologic Soil Group B. Slopes range from 3-8%.
299B/dbabb	Udorthents, smoothed 3-8% slope	This map unit represents an area that has been filled. These soils are moderately well drained, consist of glacial fluvial deposits, has no restrictive layers, has a moderate KSat value and are in Hydrologic Soil Group B. Slopes range from 3-8%.
299B/eafcd	Udorthents, smoothed 3-8% slope	This map unit represents an area that has been filled. These soils are somewhat poorly drained, no natural soil within 60 inches, has variable depths to bedrock, has a low KSat value, and are in Hydrologic Soil Group D. Slopes range from 3-8%.
299C/dbaab	Udorthents, smoothed 8-15% slope	This map unit represents an area that has been filled. These soils are moderately well drained, consist of glacial fluvial deposits, has no restrictive layers, has a high KSat value and are in Hydrologic Soil Group B. Slopes range from 8-15%.
350A/dbaab	Udipsamments 0-3% slope	This map unit represents an area that has been excavated. These soils are moderately well drained, consist of glacial fluvial deposits, has no restrictive layers, has a high KSat value and are in Hydrologic Soil Group B. Slopes range from 0-3%.
350C/dbaab	Udipsamments 8-15% slope	This map unit represents an area that has been excavated. These soils are moderately well drained, consist of glacial fluvial deposits, has no restrictive layers, has a high KSat value and are in Hydrologic Soil Group B. Slopes range from 8-15%.



MAP UNIT NO.	SOIL TAXONOMIC NAME	DESCRIPTION
500B/dcccc	Udorthents, loamy 3-8% slope	This map unit represents an area that has been excavated. These soils are moderately well drained, consist of glacial till material and a mineral restrictive layer within 40 inches, has a low KSat value and are in Hydrologic Soil Group C. Slopes range from 3-8%.
500C/dcccc	Udorthents, loamy 8-15% slope	This map unit represents an area that has been excavated. These soils are moderately well drained, consist of glacial till material and a mineral restrictive layer within 40 inches, has a low KSat value and are in Hydrologic Soil Group C. Slopes range from 8-15%.
500D/dcccc	Udorthents, loamy 15-25% slope	This map unit represents an area that has been excavated. These soils are moderately well drained, consist of glacial till material and a mineral restrictive layer within 40 inches, has a low KSat value and are in Hydrologic Soil Group C. Slopes range from 15-25%.
<u>550C/hcdde</u> Rk	Udorthents, Bedrock 8-15%	This map unit represents an area that has been excavated. These soils have an undetermined drainage class, consist of glacial till material, bedrock within the first 20 inches, an undetermined KSat value, and has an undetermined hydrologic soil group. Slopes range from 8-15%.
<u>550D/hcdde</u> Rk	Udorthents, Bedrock 15-25%	This map unit represents an area that has been excavated. These soils have an undetermined drainage class, consist of glacial till material, bedrock within the first 20 inches, an undetermined KSat value, and has an undetermined hydrologic soil group. Slopes range from 15-25%.
<u>550E/hcdde</u> Rk	Udorthents, Bedrock 25-50%	This map unit represents an area that has been excavated. These soils have an undetermined drainage class, consist of glacial till material, bedrock within the first 20 inches, an undetermined KSat value, and has an undetermined hydrologic soil group. Slopes range from 25-50%.
<u>550F/hcdde</u> Rk	Udorthents, Bedrock >50%	This map unit represents an area that has been excavated. These soils have an undetermined drainage class, consist of glacial till material, bedrock within the first 20 inches, an undetermined KSat value, and has an undetermined hydrologic soil group. Slopes range is greater than 50%.

GZA trusts this letter report meets your current planning needs. Once you have reviewed the report, please let us know if you require additional information. Please do not hesitate to contact Mr. James Long at 603-235-6993 if you have any questions.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Lindsey White, Apprentice Soil Scientist
Assistant Project Manager

James H. Long, CPSS, CSS, CWS
Senior Technical Specialist

Tracy L. Torr, CWS, CESSWI
Associate Principal

LEW/TLT/JHL

P:\04\Jobs\0191000s\04.0191032.00\Work\Soil Mapping Report\FINAL 04.0190859.00 East Kingston Ewald Subd. S5SM Report 122019.docx

Attachments: Appendix A – Natural Resource Limitations
Appendix B – Site-Specific Soil Map
Appendix C – Test Pit Logs
Appendix D – Disturbed Soil Mapping Unit Supplement for DES AoT

Appendix A – Natural Resource Limitations



NATURAL RESOURCE SURVEY AND ASSESSMENT LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) has prepared this report on behalf of, and for the exclusive use of Jones and 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.

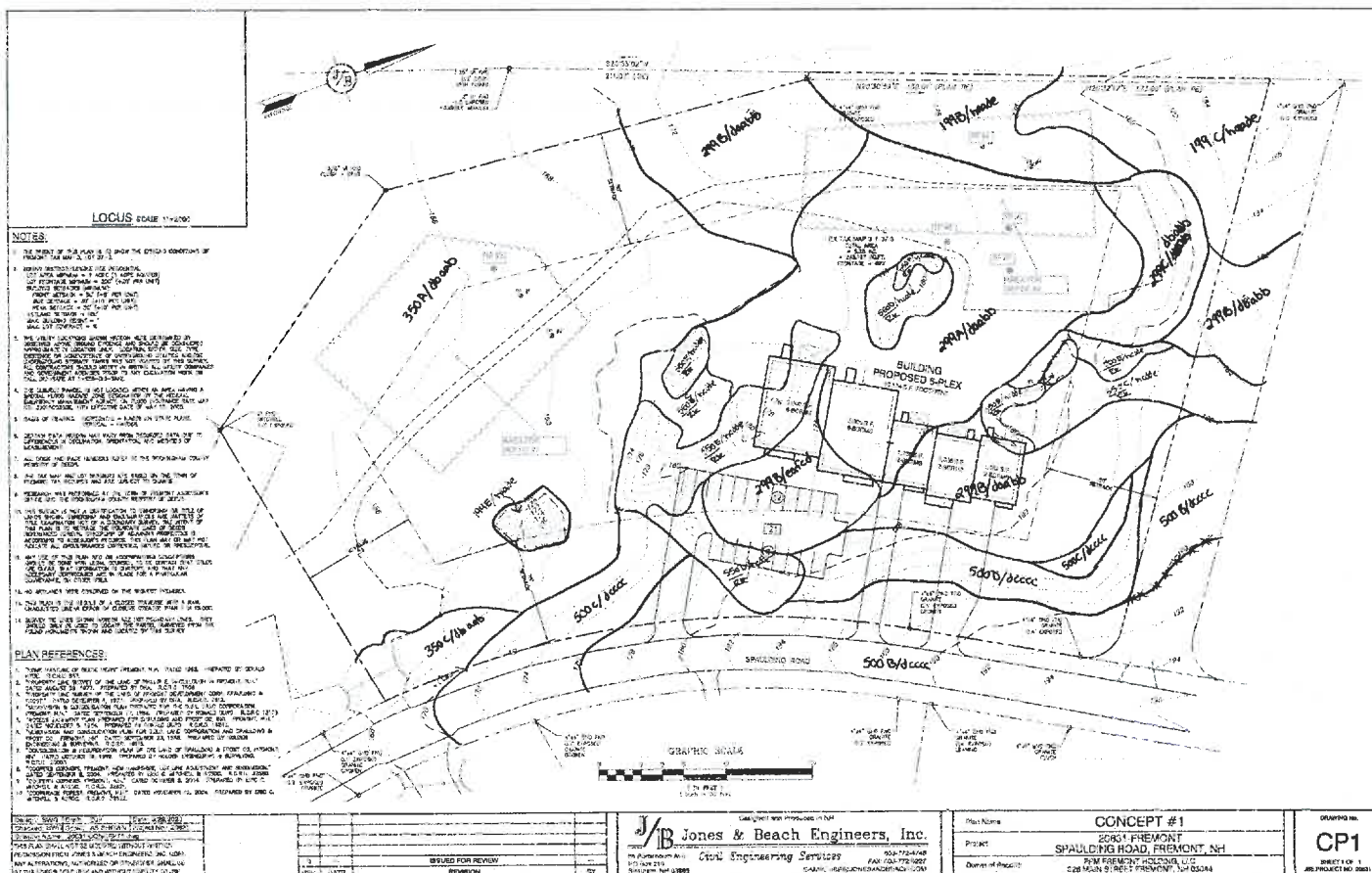
New Information

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 – Site Specific Soil Map



Appendix C – Test Pit Logs



TEST PIT EVALUATION REPORT
Spaulding Road, Tax Map 3, Lot 37-3
Fremont, New Hampshire

File No. 04.0191123.00

Evaluated by: James H. Long, CSS Designer: 988 Witnessed by: Larry Miner Date: 12/14/20

Test Pit No. 1

NOTES:

Depth (inches)	Description		
^0-4	10YR3/3 Dark brown, very fine sandy loam, granular, friable (fill)		
^4-16	2.5Y4/4 Olive brown, loamy sand, granular, friable (fill)		
^16-32	10YR4/4 Dark yellowish brown, gravelly loamy sand, single grain, loose (fill)		
32-88	2.5Y5/3 Light olive brown, course gravelly loamy sand, single grain, loose		
	2.5Y6/1 Gray and 7.5YR4/6 Strong brown redoximorphic features		
Estimated Seasonal High Water Table @	32 inches	Observed Water Table @	76 inches
Restrictive @	none inches	Roots @	12 inches
Refusal @	none inches		
Percolation Rate =	2 Minutes / Inch @ 26		

Test Pit No. 2

NOTES: Possible bedrock at 32 inches at east end of test pit.

Depth (inches)	Description		
^0-4	10YR3/3 Dark brown, very fine sandy loam, granular, friable (fill)		
^4-16	2.5Y4/4 Olive brown, loamy sand, granular, friable (fill)		
^16-32	10YR4/4 Dark yellowish brown, gravelly loamy sand, single grain, loose (fill)		
32-76	2.5Y5/3 Light olive brown, course gravelly loamy sand, single grain, loose		
	2.5Y6/1 Gray and 7.5YR4/6 Strong brown redoximorphic features		
Estimated Seasonal High Water Table @	32 inches	Observed Water Table @	76 inches
Restrictive @	none inches	Roots @	12 inches
Refusal @	none inches		
Percolation Rate =	2 Minutes / Inch @ 26		



TEST PIT EVALUATION REPORT
Spaulding Road, Tax Map 3, Lot 37-3
Fremont, New Hampshire

File No. 04.0191123.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Larry Miner **Date:** 12/14/20

Test Pit No. 3

NOTES:

Depth (inches)	Description			
^0-4	10YR3/3 Dark brown, very fine sandy loam, granular, friable (fill)			
^4-20	2.5Y4/4 Olive brown, gravelly loamy sand, granular, friable (fill)			
^20-42	2.5Y5/4 Light olive brown, course gravelly loamy sand, single grain, loose (fill)			
42-46	2.5Y2.5/1 Black, loamy very fine sand, granular, friable			
46-54	10YR4/4 Dark yellowish brown, fine sandy loam, granular, friable			
54-60	10YR5/4 Yellowish brown, fine sandy loam, granular, friable			
60-72	2.5Y6/3 Light yellowish brown, gravelly course sand, single grain, loose			
	2.5Y6/1 Gray and 7.5YR4/6 Strong brown redoximorphic features			
Estimated Seasonal High Water Table @	60 inches	Observed Water Table @	none	inches
Restrictive @	none	inches	Roots @	54 inches
Refusal @	none	inches		
Percolation Rate =	2	Minutes / Inch @ 42		

Test Pit No. 4 (Failed)

NOTES: Unsuitable due to large buried boulders with fill on top.

Depth (inches)	Description				
Estimated Seasonal High Water Table @	N/A	inches	Observed Water Table @	N/A	inches
Restrictive @	N/A	inches	Roots @	N/A	inches
Refusal @	N/A	inches			
Percolation Rate =	N/A	Minutes / Inch @ ____			



TEST PIT EVALUATION REPORT
Spaulding Road, Tax Map 3, Lot 37-3
Fremont, New Hampshire

File No. 04.0191123.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Larry Miner **Date:** 12/14/20

Test Pit No. 5

NOTES:

Depth (inches)	Description		
^0-2	10YR3/3 Dark brown, very fine sandy loam, granular, friable (fill)		
^2-26	2.5Y5/3 Light olive brown, very fine sand, granular, friable (fill)		
^26-60	2.5Y5/3 Light olive brown, very fine sand, granular, friable (fill)		
	2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features		
Estimated Seasonal High Water Table @	26 inches	Observed Water Table @	52 inches
Restrictive @	none inches	Roots @	20 inches
Refusal @	60 inches		
Percolation Rate =	10 Minutes / Inch @ 24		

Test Pit No. 6

NOTES:

Depth (inches)	Description		
^0-2	10YR3/3 Dark brown, very fine sandy loam, granular, friable (fill)		
^2-30	2.5Y5/3 Light olive brown, very fine sand, granular, friable (fill)		
^30-66	2.5Y5/3 Light olive brown, very fine sand, granular, friable (fill)		
	2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features		
Estimated Seasonal High Water Table @	36 inches	Observed Water Table @	60 inches
Restrictive @	none inches	Roots @	16 inches
Refusal @	66 inches		
Percolation Rate =	8 Minutes / Inch @ 24		



TEST PIT EVALUATION REPORT
Spaulding Road, Tax Map 3, Lot 37-3
Fremont, New Hampshire

File No. 04.0191123.00

Evaluated by: James H. Long, CSS **Designer:** 988 **Witnessed by:** Larry Miner **Date:** 12/14/20

Test Pit No. 7

NOTES:

Depth (inches)	Description		
0-32	2.5Y5/3 Light olive brown, gravelly loamy sand, granular, friable (fill)		
32-46	2.5Y6/3 Light yellowish brown, loamy sand, massive, firm		
	2.5Y6/2 Light brownish gray and 7.5YR4/6 Strong brown redoximorphic features		
Estimated Seasonal High Water Table @	32 inches	Observed Water Table @	26 inches
Restrictive @	32 inches	Roots @	12 inches
Refusal @	46 inches		
Percolation Rate =	12 Minutes / Inch @ 24		

Appendix D – 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
- i- Organic Materials-Tidal Marsh

Symbol 3: Restrictive/Impervious Layers

- a-None
- b-Bouldery surface with more than 15% of the surface covered with boulders
- c-Mineral restrictive layer(s) are present in the soil profile less than 40 inches below the soil surface such as 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



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www.gza.com



VIA EMAIL

September 9, 2020
File No. 04.0191123.00

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

Re: Wetland Delineation Report
Jones & Beach Site Development
Spaulding Road, Tax Map 3, Lot 37-3
Fremont, New Hampshire

Dear Mr. Gier:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide this letter report detailing the completion of wetland delineation field work at the parcel identified as Tax Map 3, Lot 37-3, located off Spaulding Road in Fremont, New Hampshire (i.e. Site). The Site is approximately 5.32 acres and is located approximately 355 feet south of the intersection of Spaulding Road and Frost Lane in Fremont, New Hampshire. It is bordered to the east by Spaulding Road, to the south by a commercial property, to the west by undeveloped forest, and to the north by residential property. GZA understands the Site is a prior sand and gravel operation where sand/gravel material was removed and resulted in exposed ledge outcrops and high-water tables. The delineation field work was performed by Mr. James Long, State of New Hampshire Certified Wetland Scientist (#007) and Certified Soil Scientist (#015), on August 13, 2020. This report is subject to the attached **Limitations (see Appendix A)**.

The purpose of the work completed was to evaluate and locate the boundaries of wetlands on the Site. GZA understands that the data from the wetland delineation will be used in permit applications for the construction of the proposed Spaulding Road, Fremont Site Development.

The wetland delineation was conducted in accordance with the 1987 Corps of Engineers *Corps of Engineers Wetlands Delineation Manual*¹, using the *Routine Determination Method*; in conjunction with the *Regional Supplement*² to the *Corps of Engineers Wetland Delineation Manual*, the National Plant List: 2016 wetlands rakings³, *Field Indicators of*

¹ U.S. Army Corps of Engineers, Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

² U.S. Army Corps of Engineers, 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar, C.V. Noble and J.F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, Mississippi; U.S. Army Engineer Research and Development Center.

³ Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Plant List: 2016 wetland rakings*. Phytoneuron 2016-30: 1-17.



Hydric Soils in the United States Version 8.1,⁴ and *Field Indicators for Identifying Hydric Soils in New England*.⁵ Observed wetlands were classified in accordance with the *Classification of Wetlands and Deepwater Habitats of the United States*.⁶

The presence of potential vernal pools was evaluated in accordance with *Identification and Documentation of Vernal Pools in New Hampshire*, Third Edition, 2016, New Hampshire Fish and Game Department, Nongame and Endangered Wildlife Program. Vernal pool areas exist as confined basins and exhibit vernal pool criteria as outlined in the New Hampshire Code of Administrative Rules, Env-Wt 101.75, 101.86, and 101.106.

The Site consists predominantly of early successional habitat, with exposed ledge outcrops (see Photo Log, **Appendix B**). No wetlands or potential vernal pools were observed on Site during the wetland delineation. Vegetation in excavated areas throughout the site included birdsfoot trefoil (*Lotus corniculatus*), goldenrod (*Solidago spp.*), purple loosestrife (*Lythrum salicaria*), tall scouring-rush (*Equisetum hyemale*), blunt broom sedge (*Carex tribuloides*), umbrella-sedge (*Cyperus strigosus*), common rush (*Juncus effusus*), Canada rush (*Juncus canadensis*), boneset thoroughwort (*Eupatorium perfoliatum*), hollow joe-pye weed (*Eutrochium fistulosum*), sweet fern (*Comptonia peregrina*), Queen Anne's lace (*Daucus carota*), broad-leaved cattail (*Typha latifolia*), willow (*Salix spp.*), gray birch (*Betula populifolia*), and autumn olive (*Elaeagnus umbellata*).

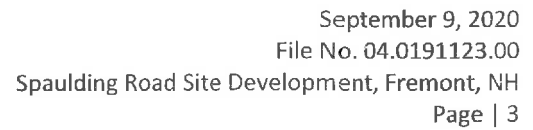
GZA identified one previous gravel pit excavation area with hydrophytic vegetation in the northeastern portion of the Site. This excavation area was reviewed for hydrology, hydric soil criteria and hydrophytic vegetation (see Wetland Determination data sheet, **Appendix C**). Dominant plants observed in the excavation area include willow, birdsfoot trefoil and tall scouring-rush. GZA concluded that although hydrophytic vegetation and a high groundwater table are present, the areas observed do not meet current hydric soils criteria, and therefore the assessed area is not a jurisdictional wetland. The hydrophytic plant communities observed on Site are what GZA believes to be the result of prior excavation of sand and gravel to groundwater table. This evidence can be seen in historic aerial photographs (see **Appendix D**). The gravel pit operation was not visible on the 2003 aerial, but is clearly present on the 2008 aerial. After discussions during the August 13, 2020 field work with the landowner, Tom Nisbet, GZA understands Mr. Nisbet was required by the town to add fill to low-lying areas as part of gravel pit reclamation on the site. Further, GZA notes the Site was delineated as part of the October 8, 2004 Site Plan labeled Coopers Corner, Tax Map 3, Lots 37 & 37-1, prepared by Eric C. Mitchell & Associates Inc (highlighted in yellow on figure). Wetlands were identified near Route 107 but not on the Site, which supports the assumption that hydrology was not present until excavation for gravel pit operation (see **Appendix E**).

Please feel free to contact the undersigned if you have any questions regarding this Wetland Delineation Report.

⁴ United States Department of Agriculture, Natural Resource Conservation Service, 2018. *Field Indicators of Hydric Soils in the United States*, Version 8.2. L.M. Vasilas, G.W. Hurt, and J.F. Berkowitz (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

⁵ New England Hydric Soils Technical Committee. 2017 Version 4. *Field Indicators for Identifying Hydric Soils in New England*, New England Interstate Water Pollution Control Commission, Lowell, Massachusetts.

⁶ Federal Geographic Data Committee. 2013. *Classification of Wetlands and Deepwater Habitats of the United States*. FGDC-STD-004-2013. Federal Geographic Data Committee and U.S. Fish and Wildlife Service.



GZA GEOENVIRONMENTAL, INC.

Lindsey White

Lindsey White
Assistant Project Manager


Try 1—

Tracy L. Tarr, CWS, CESSWI
Associate Principal

LEW/TLT/DMZ/JHL

Debrah H. Janta C.

Deborah M. Zarta Gier, CNRP
Consultant / Reviewer


James Long, CWS, CSS
Field Lead

Attachments: Appendix A – Limitations
Appendix B – Photo Log
Appendix C – Wetland Determination Data Form
Appendix D – Historic Aerial Overlays
Appendix E – Coopers Corner Site Plan

Appendix A – Limitations



USE OF REPORT

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NEW INFORMATION

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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 – Photo Log

PHOTO LOG
Spaulding Road, Fremont Site Development
Fremont, New Hampshire

Photos Taken: August 13, 2020



Photograph No. 1: Looking westerly into the Site from Spaulding Road.



Photograph No. 2: Looking northwesterly at an existing access road from Spaulding Road in the southwestern portion of the Site.

PHOTO LOG
Spaulding Road, Fremont Site Development
Fremont, New Hampshire

Photos Taken: August 13, 2020



Photograph No. 3: Looking into a low-lying area in the center of the site containing broad-leaved cattail, purple loosestrife, and gray birch. This area has been previously excavated and hydric soils were not observed.



Photograph No. 4: Looking easterly at dense vegetation near the northern portion of the Site.

PHOTO LOG
Spaulding Road, Fremont Site Development
Fremont, New Hampshire

Photos Taken: August 13, 2020



Photograph No. 5: Looking northerly toward the center of the Site at exposed ledge and existing gravel piles.



Photograph No. 6: looking northwesterly into dense vegetation from Spaulding Road.

Appendix C – Wetland Determination Data Form

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Spaulding Road Tax Map 3, Lots 37-3 City/County: Fremont Sampling Date: August 13, 2020
 Applicant/Owner: PPM Fremont Holdings, LLC, Attn: Thomas Nisbet State: NH Sampling Point: 1A
 Investigator(s): GZA GeoEnvironmental, Inc. Section, Township, Range: _____
 Landform (hill/slope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): 3-15%
 Subregion (LRR or MLRA): _____ Lat: 42.991323 N Long: -71.137556 W Datum: _____
 Soil Map Unit Name: 799 Urban land-Canton complex NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>		If yes, optional Wetland Site ID: _____	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Remarks: (Explain alternative procedures here or in a separate report.) Community type: <u>Select from list</u> The site is an old sand and gravel operation with exposed ledge outcrops. The site has been excavated near or at groundwater table, allowing for the growth of hydrophytic vegetation.					

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Areas show signs of high water table due to excavation of material.			

VEGETATION – Use scientific names of plants.

 Sampling Point: 1A

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>N/A</u>				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____																		
3. _____																		
4. _____																		
5. _____																		
6. _____																		
7. _____																		
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species _____</td> <td>x 1 = <u>1</u></td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> </table> Prevalence Index = B/A = _____	Total % Cover of:	Multiply by:	OBL species _____	x 1 = <u>1</u>	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____	(A) _____ (B) _____
Total % Cover of:	Multiply by:																	
OBL species _____	x 1 = <u>1</u>																	
FACW species _____	x 2 = _____																	
FAC species _____	x 3 = _____																	
FACU species _____	x 4 = _____																	
UPL species _____	x 5 = _____																	
Column Totals: _____	(A) _____ (B) _____																	
_____ = Total Cover																		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																		
1. <u>Willow (Salix Spp.)</u>	<u>25</u>	<u>Yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)														
2. <u>Quaking aspen (Populus tremuloides)</u>	<u>5</u>	<u>No</u>	<u>FACU</u>															
3. _____																		
4. _____																		
5. _____																		
6. _____																		
7. _____																		
_____ = Total Cover																		
<u>30</u> = Total Cover																		
Herb Stratum (Plot size: <u>5'</u>)																		
1. <u>Birdsfoot trefoil (Lotus corniculatus)</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Tall scouring-rush (Equisetum hyemale)</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>															
3. <u>Purple loosestrife (Lythrum salicaria)</u>	<u>10</u>	<u>No</u>	<u>FACW</u>															
4. <u>Blunt broom sedge (carex tribuloides)</u>	<u>5</u>	<u>No</u>	<u>FACW</u>															
5. <u>Bebb willow (Salix bebbiana)</u>	<u>10</u>	<u>No</u>	<u>FACW</u>															
6. <u>Boneset thoroughwort (Eupatorium perfoliatum)</u>	<u>5</u>	<u>No</u>	<u>FACW</u>															
7. _____																		
_____ = Total Cover																		
<u>60</u> = Total Cover																		
Woody Vine Stratum (Plot size: _____)																		
1. <u>N/A</u>				Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.														
2. _____																		
3. _____																		
4. _____																		
_____ = Total Cover																		
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																		

Remarks: (Include photo numbers here or on a separate sheet.)

No trees present. Area is an old sand and gravel pit with regenerating growth.

SOIL

Sampling Point: 1A

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- | | |
|---|--|
| <input type="checkbox"/> Histoso! (A1) | <input type="checkbox"/> Polyvalue Below Surface (S8) (LRR R, MLRA 149B) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Thin Dark Surface (S9) (LRR R, MLRA 149B) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (LRR K, L) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input type="checkbox"/> Stratified Layers (A5) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Redox Depressions (F8) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | |
| <input type="checkbox"/> Sandy Redox (S5) | |
| <input type="checkbox"/> Stripped Matrix (S6) | |
| <input type="checkbox"/> Dark Surface (S7) (LRR R, MLRA 149B) | |

Indicators for Problematic Hydric Soils³

- | | |
|--------------------------|--|
| <input type="checkbox"/> | 2 cm Muck (A10) (LRR K, L, MLRA 149B) |
| <input type="checkbox"/> | Coast Prairie Redox (A16) (LRR K, L, R) |
| <input type="checkbox"/> | 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) |
| <input type="checkbox"/> | Dark Surface (S7) (LRR K, L) |
| <input type="checkbox"/> | Polyvalue Below Surface (S8) (LRR K, L) |
| <input type="checkbox"/> | Thin Dark Surface (S9) (LRR K, L) |
| <input type="checkbox"/> | Iron-Manganese Masses (F12) (LRR K, L, R) |
| <input type="checkbox"/> | Piedmont Floodplain Soils (F19) (MLRA 149B) |
| <input type="checkbox"/> | Mesic Spodic (TA6) (MLRA 144A, 145, 149B) |
| <input type="checkbox"/> | Red Parent Material (F21) |
| <input type="checkbox"/> | Very Shallow Dark Surface (TF12) |
| <input type="checkbox"/> | Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☒

Remarks:

Typical conditions are not present on site. Sand and gravel have been excavated from the site at or near groundwater table.

Appendix D – Historic Aerial Overlays

2003 Aerial



Legend

- Polygons
- State
- County
- City/Town

Map Scale

1: 3,247

© NH GRANIT, www.granit.unh.edu

Map Generated: 8/14/2020



Notes



2008 Aerial



Legend

- Polygons
- State
- County
- City/Town

Map Scale

1: 3,247

© NH GRANIT, www.granit.unh.edu

Map Generated: 8/14/2020



Notes



2011 Aerial



Legend

-  Polygons
-  State
-  County
-  City/Town

Map Scale

1: 3,247

© NH GRANIT, www.granit.unh.edu

Map Generated: 8/14/2020



Notes



[illegible]

Soil Map—Rockingham County, New Hampshire

MAP LEGEND

Area of Interest (AOI)			Spoil Area
	Area of Interest (AOI)		Stony Spot
Soils			Very Stony Spot
	Soil Map Unit Polygons		Wet Spot
	Soil Map Unit Lines		Other
	Soil Map Unit Points		Special Line Features
Special Point Features		Water Features	
	Blowout		Streams and Canals
	Borrow Pit	Transportation	
	Clay Spot		Rails
	Closed Depression		Interstate Highways
	Gravel Pit		US Routes
	Gravelly Spot		Major Roads
	Landfill		Local Roads
	Lava Flow	Background	
	Marsh or swamp		Aerial Photography
	Mine or Quarry		
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 22, May 23, 2020

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

Date(s) aerial images were photographed: Mar 30, 2011—Sep 15, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12B	Hinckley loamy sand, 3 to 8 percent slopes	357.5	17.7%
12C	Hinckley loamy sand, 8 to 15 percent slopes	414.4	20.5%
43B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	92.8	4.6%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	106.0	5.3%
43D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	72.3	3.6%
66B	Paxton fine sandy loam, 3 to 8 percent slopes	14.3	0.7%
67C	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	40.6	2.0%
67D	Paxton fine sandy loam, 15 to 25 percent slopes, very stony	7.8	0.4%
97	Freetown and Natchaug mucky peats, ponded, 0 to 2 percent slopes	52.8	2.6%
115	Scarboro muck, coastal lowland, 0 to 3 percent slopes	3.7	0.2%
140B	Chatfield-Hollis-Canton complex, 0 to 8 percent slopes, rocky	143.3	7.1%
140C	Chatfield-Hollis-Canton complex, 8 to 15 percent slopes, rocky	99.6	4.9%
140D	Chatfield-Hollis-Canton complex, 15 to 35 percent slopes, rocky	26.0	1.3%
295	Freetown mucky peat, 0 to 2 percent slopes	110.4	5.5%
298	Pits, sand and gravel	24.1	1.2%
299	Udorthents, smoothed	17.0	0.8%
313A	Deerfield loamy fine sand, 0 to 3 percent slopes	24.0	1.2%
313B	Deerfield loamy fine sand, 3 to 8 percent slopes	53.7	2.7%
314A	Pipestone sand, 0 to 5 percent slopes	133.2	6.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
395	Swansea mucky peat, 0 to 2 percent slopes	65.6	3.2%
447B	Scituate-Newfields complex, 3 to 8 percent slopes, very stony	56.0	2.8%
546A	Walpole very fine sandy loam, 0 to 5 percent slopes	8.2	0.4%
547A	Walpole very fine sandy loam, 0 to 3 percent slopes, very stony	7.6	0.4%
547B	Walpole very fine sandy loam, 3 to 8 percent slopes, very stony	4.3	0.2%
599	Urban land-Hoosic complex, 3 to 15 percent slopes	11.0	0.5%
799	Urban land-Canton complex, 3 to 15 percent slopes	51.0	2.5%
W	Water	21.8	1.1%
Totals for Area of Interest		2,019.2	100.0%



Aerial Photo of Site

Fremont, NH

1 inch = 275 Feet



October 5, 2021

www.cai-tech.com



Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.



FRONT OF PROPERTY FROM EXISTING DRIVEWAY LOOKING NORTH



VIEW FROM SPAULDING RD.

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

Prepared for:

**PPM Fremont Holding, LLC
Tax Map 3, Lot 37-3 & 37-1
Spalding Road
Fremont, NH 03044**

**October 6, 2021
JBE Project No. 20631**

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. The PPM Fremont Holding LLC, 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 owner 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

- a. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include, but are not limited to, the following:
 - a. Swales & Plunge Pools
 - b. Vegetation and landscaping
 - c. Parking lots and roadways
 - d. Riprap inlet and outlet protection aprons
- b. 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 by residents or contractor.
 - 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. 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.
 - g. Rock riprap should be **inspected annually** 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.



Winter maintenance:

- Sanding for winter traction is prohibited. Deicing is permitted (NaCl, MgCl₂, or equivalent). Reduced salt application is possible and can be a cost savings for winter maintenance. Nontoxic, organic deicers, applied either as blended, magnesium chloride-based liquid products or as pretreated salt, are preferable.
- Plowing is allowed, blade should be set approximately 1" above road surface. Ice and light snow accumulation are generally not as problematic as for standard asphalt. Snow will accumulate during heavier storms and should be plowed. (more than usual, about an inch).

Routine maintenance:

- Asphalt seal coating is absolutely forbidden. Surface seal coating is not reversible.
- The pavement surface should be vacuumed 2 or 3 times per year, and at any additional times sediment is spilled, eroded, or tracked onto the surface.
- Planted areas adjacent to pervious pavement should be well maintained to prevent soil washout onto the pavement. If any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once.
- Immediately clean any soil deposited on pavement. Superficial dirt does not necessarily clog the pavement voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, trucks or other heavy vehicles should be prevented from tracking or spilling dirt onto the pavement.
- Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface. Contractor to laydown tarps, plywood or removable item and take care not to track material onto unprotected pavement.
- Repairs: potholes of less than 50 square feet can be patched by any means suitable with standard pavement or a pervious mix is preferred. For areas greater than 50 sq. ft. is in need of repair, approval of patch type should be sought from a qualified engineer. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.
- Written and verbal communication to the porous pavement's future owner should make clear the pavement's special purpose and special maintenance requirements such as those listed here.
- A permanent sign should be added at the entrance and end of the porous asphalt area to inform residents and maintenance staff of the special nature and purpose of the pavement, and its special maintenance requirements.

Signage should read as follows:

POROUS ASPHALT PAVEMENT
FOR STORM WATER MANAGEMENT

MAINTENANCE REQUIREMENTS:

PLOW WITH SLIGHTLY RAISED BLADE ONLY
SANDING OF SURFACE PROHIBITED
DEICING PERMITTED (NaCl, MgCl₂ OR EQUIVALENT)
SEAL-COATING PROHIBITED
CLEANING BY PRESSURIZED AIR OR WATER PROHIBITED
DRY VACUUM SEMIANNUALLY

h. Treatment Swales:

Inspect annually for erosion, sediment accumulation, vegetation loss, and presence of invasive species. Perform periodic mowing; frequency depends on location and type of grass. Do not cut shorter than Water Quality Flow depth (maximum 4-inches). Remove debris and accumulated sediment, based on inspection. Repair eroded areas, remove invasive species and dead vegetation, and reseed with applicable grass mix as warranted by inspection.

i. Vegetated Buffers:

Inspect buffer at least annually for signs of erosion, sediment buildup, or vegetation loss. If a meadow buffer, provide periodic mowing as needed to maintain a healthy stand of herbaceous vegetation. If a forested buffer, then the buffer should be maintained in an undisturbed condition, unless erosion occurs. If erosion of the buffer (forested or meadow) occurs, eroded areas should be repaired and replanted with vegetation similar to the remaining buffer. Corrective action should include eliminating the source of the erosion problem, and may require retrofit with a level spreader. Remove debris and accumulated sediment, based on inspection.

- n. Detention ponds should require little maintenance, but should be inspected frequently during the first year of operation, and annually thereafter. Every five years, the services of a professional engineer should be retained to perform a thorough inspection of all the aspects of the pond and its infrastructure. Any debris and sediment accumulations should be removed from the outlet structure(s) and emergency spillway(s) and disposed of properly. Inspect outlet structure for deterioration and or clogging. Detention pond berms should be mowed at least once annually so as to prevent the establishment of woody vegetation – trees should *never* be allowed to grow on a detention pond berm, as they may destabilize the structure and increase the potential for failure. Areas showing signs of erosion or *thin or dying vegetation* should be repaired immediately by whatever means necessary, *with the exception of fertilizer*. Rodent burrows are to be repaired immediately and the suspect animals apprehended with non-lethal traps if the problem persists.

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

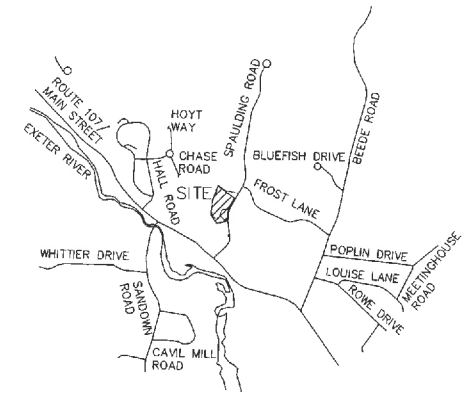
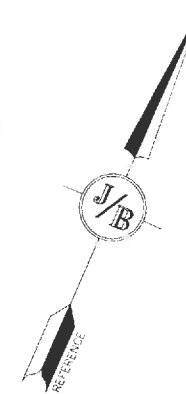
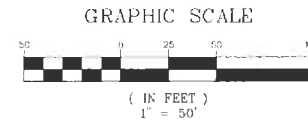
Annual Operations and Maintenance Report

The PPM Fremont Holding, LLC, 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 owner 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
Catch basins and drain manholes			
Culverts			
Swales & Plunge Pools			
Vegetation and landscaping			
Parking lots and roadways			



Rain Gardens (Bio-retention systems)			
Porous Pavement			
Stormtech Underground Detention System			
Eco-Paver Areas			
Plunge Pools			
Roof Drains			



LEGEND

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

PROJECT PARCEL
TOWN OF FREMONT
TAX MAP 3, BLOCK 37, LOT 3

APPLICANT/OWNER
PPM FREMONT HOLDINGS, LLC
326 MAIN STREET, UNIT 11
FREMONT, NH 03044
BK 5059, PG 1628

TOTAL LOT AREA
233,197 SQ. FT.
5.35 ACRES

Design: BWG Draft: DFP Date: 10/6/2021
Checked: BWG Scale: AS SHOWN Project No.: 20631
Drawing Name: 20631-WATERSHED.dwg
THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM JONES & BEACH ENGINEERS, INC. (JBE). ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO JBE.

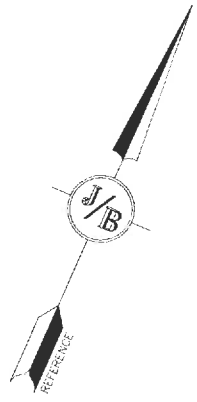
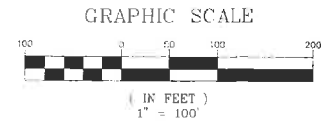
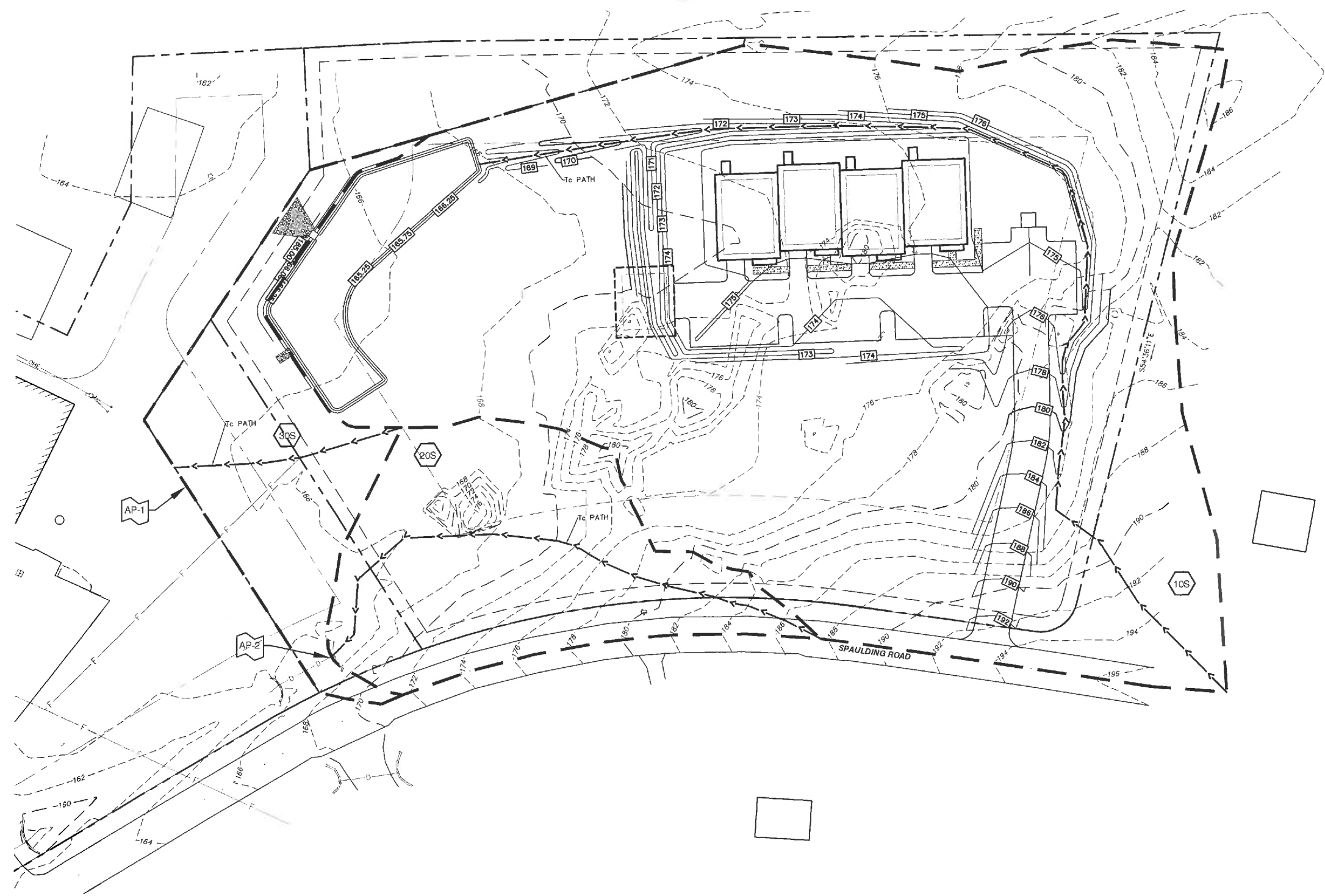
REV.	DATE	REVISION	BY
0	10/6/2021	ISSUED FOR REVIEW	BGW

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: EXISTING WATERSHED PLAN
Project: PPM TOWNHOMES SPAULDING ROAD, FREMONT, NH
Owner of Record: PPM FREMONT HOLDING, LLC 326 MAIN STREET, FREMONT, NH 03044

DRAWING No.
W1
SHEET 1 OF 2
JBE PROJECT NO. 20631

E:\CADD\MASTER STANDARD\dwg\J-B-LAYOUTS.dwg 3/12/2015 3:27:20 PM EDT



LEGEND

- SUBCATCHMENT BOUNDARY ———
- SUBCATCHMENT X
- REACH X
- POND X
- TC PATH ———>
- WETLANDS - - - - -
- HISS SOILS
- FLOW ARROW ———>


PROJECT PARCEL
TOWN OF FREMONT
TAX MAP 3, BLOCK 37, LOT 3

APPLICANT/OWNER
PPM FREMONT HOLDINGS, LLC
326 MAIN STREET, UNIT 11
FREMONT, NH 03044
BK 5059, PG 1628

TOTAL LOT AREA
233,197 SQ. FT.
5.35 ACRES

Design: BWG Draft: DFP Date: 10/6/2021
Checked: BWG Scale: AS SHOWN Project No.: 20631
Drawing Name: 20631-WATERSHED.dwg
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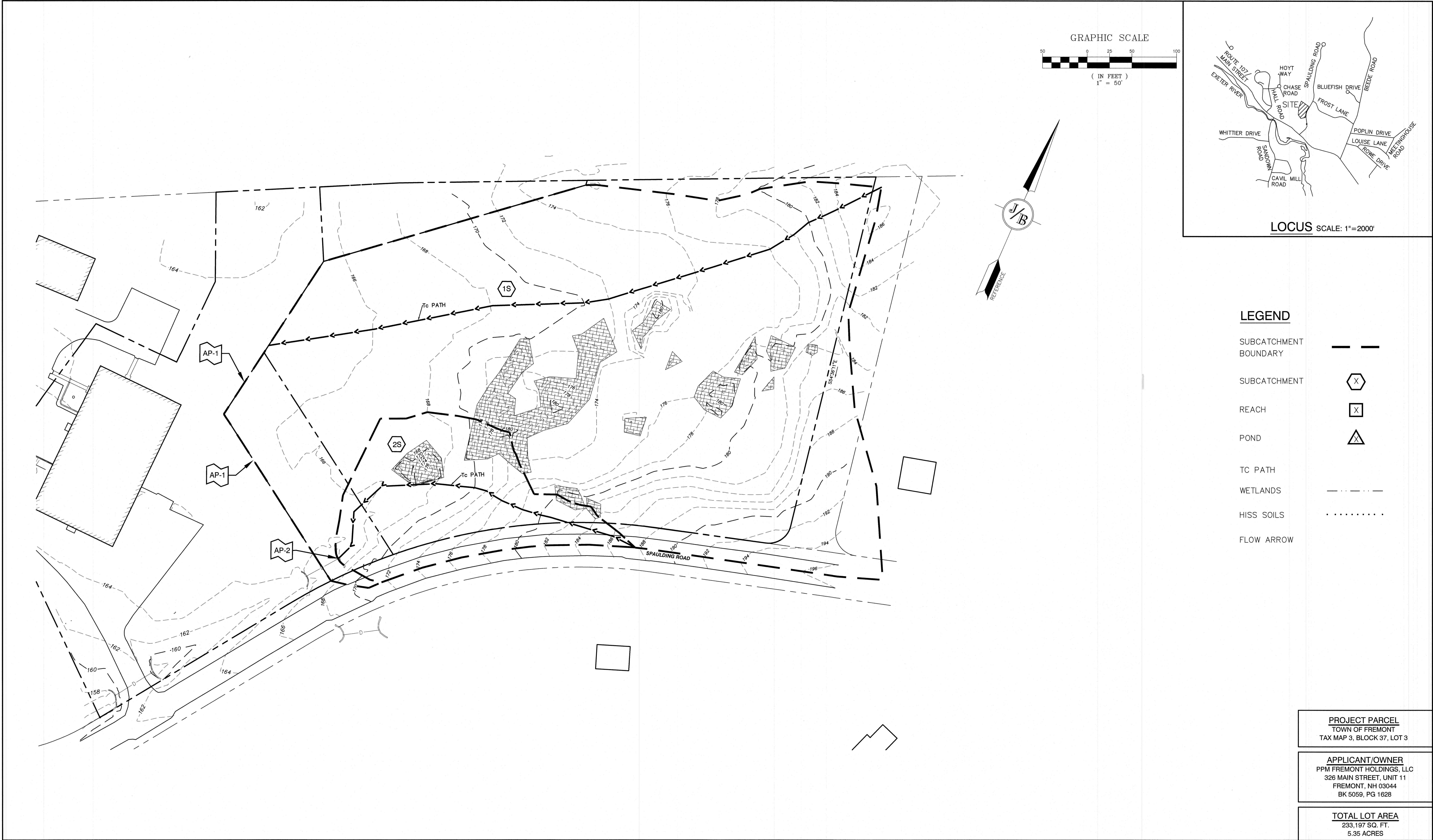
REV.	DATE	REVISION	BY
0	10/6/2021	ISSUED FOR REVIEW	BGW

**Jones & Beach Engineers, Inc.**
85 Portsmouth Ave.
PO Box 219
Stratham, NH 03885

Designed and Produced in NH
Civil Engineering Services
603-772-4746
FAX: 603-772-0227
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	PROPOSED WATERSHED PLAN
Project:	PPM TOWNHOMES SPAULDING ROAD, FREMONT, NH
Owner of Record:	PPM FREMONT HOLDING, LLC 326 MAIN STREET, FREMONT, NH 03044

DRAWING No.
W2
SHEET 2 OF 2
JBE PROJECT NO. 20631



Design: BWG Draft: DFP Date: 10/6/2021
Checked: BWG Scale: AS SHOWN Project No.: 20631
Drawing Name: 20631-WATERSHED.dwg
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0	10/6/2021	ISSUED FOR REVIEW	BGW
REV.	DATE	REVISION	BY

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Civil Engineering Services

Plan Name:	EXISTING WATERSHED PLAN
Project:	PPM TOWNHOMES SPAULDING ROAD, FREMONT, NH
Owner of Record:	PPM FREMONT HOLDING, LLC 326 MAIN STREET, FREMONT, NH 03044

DRAWING No.

W1

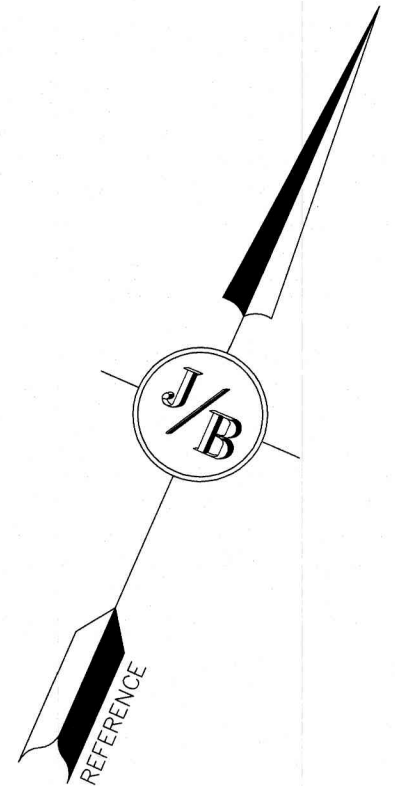
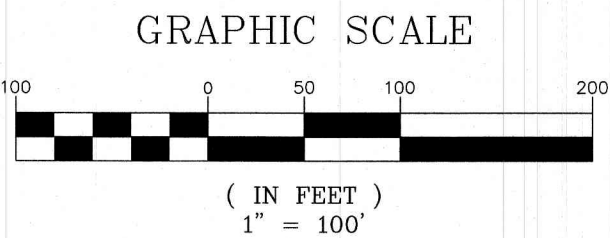
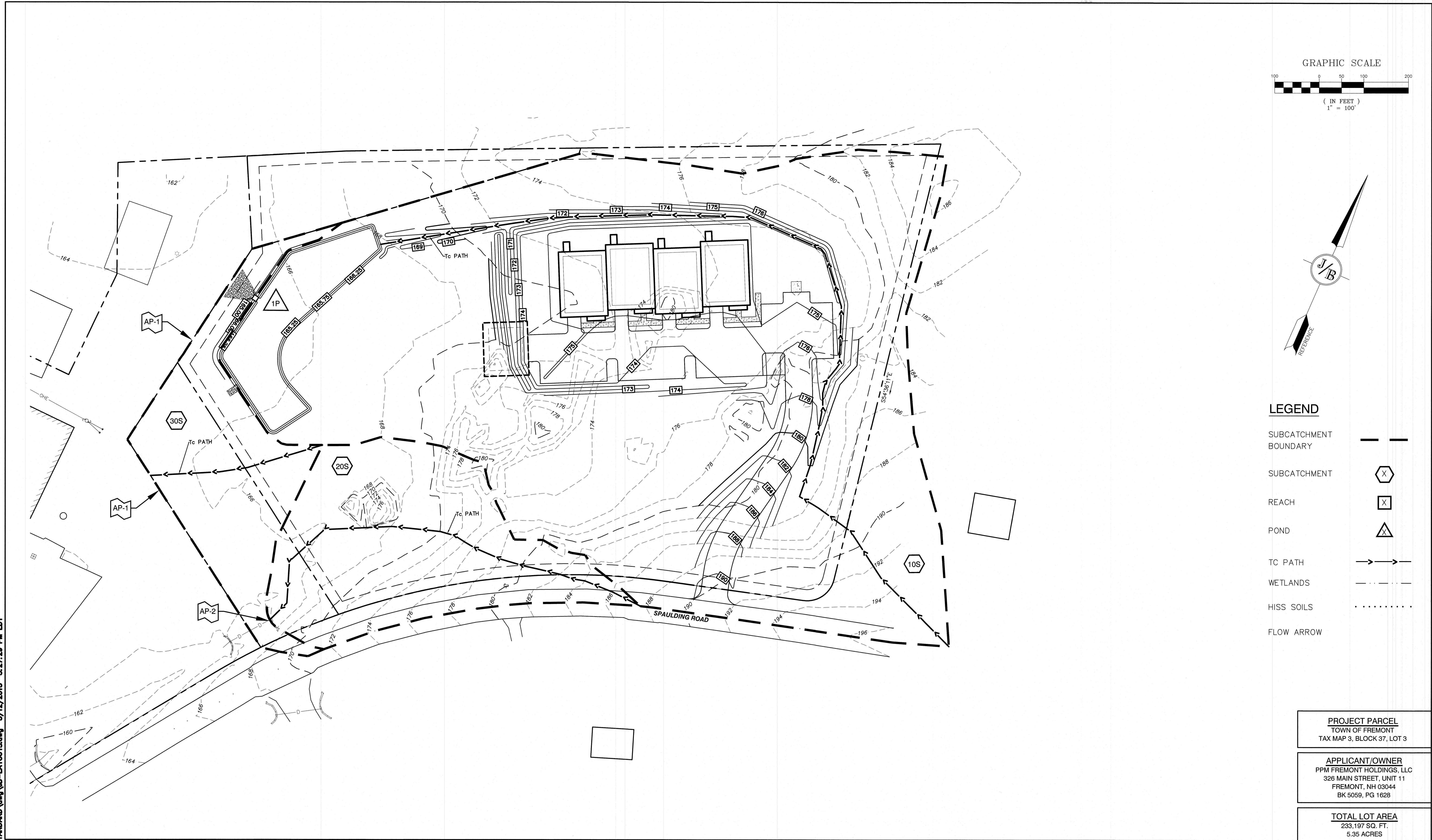
SHEET 1 OF 2
JBE PROJECT NO. 20631

PROJECT PARCEL
TOWN OF FREMONT
TAX MAP 3, BLOCK 37, LOT 3

APPLICANT/OWNER
PPM FREMONT HOLDINGS, LLC
326 MAIN STREET, UNIT 11
FREMONT, NH 03044
BK 5059, PG 1628

TOTAL LOT AREA
233,197 SQ. FT.
5.35 ACRES

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LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW

PROJECT PARCEL
TOWN OF FREMONT
TAX MAP 3, BLOCK 37, LOT 3

APPLICANT/OWNER
PPM FREMONT HOLDINGS, LLC
326 MAIN STREET, UNIT 11
FREMONT, NH 03044
BK 5059, PG 1628

TOTAL LOT AREA
233,197 SQ. FT.
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Design: BWG Draft: DFP Date: 10/6/2021
Checked: BWG Scale: AS SHOWN Project No.: 20631
Drawing Name: 20631-WATERSHED.dwg

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Stratham, NH 03885

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

Plan Name: **PROPOSED WATERSHED PLAN**

Project: **PPM TOWNHOMES
SPAULDING ROAD, FREMONT, NH**

Owner of Record: **PPM FREMONT HOLDING, LLC
326 MAIN STREET, FREMONT, NH 03044**

DRAWING No.
W2

SHEET 2 OF 2
JBE PROJECT NO. 20631