Eastland Partners Inc.
4 Charlesview Road Suite 4, Hopedale MA, 01747

August 26, 2020

Millbury Planning Board
Attn: Mr. Richard Gosselin, Chairman
127 Elm Street
Millbury, Massachusetts 01527

RE: ***Environmental Impact Statement***
Clearview – Open Space Community Definitive Plan
66 Park Hill Avenue, Millbury, MA

Dear Mr. Gosselin:

Pursuant to Section 5.3.4 of the Millbury Subdivision Rules and Regulations, this Environmental Impact Statement (EIS) was prepared by Clayton Williams, Director of Planning and Sustainability for Eastland Partners, Inc., with plans, data, and input provided by Peter Lavoie, MA Licensed Soil Evaluator from Turning Point Engineering; Brian Waterman, Wetlands Scientist from WDA Design Group; Bruce Wilson, MA Professional Land Surveyor; Andrew Baum, MA Professional Engineer (Civil); and Ali Khorasani, MA Professional Engineer (Civil/Transportation) from AK Associates.

1. **Topography, Graphic Drainage Analysis, Annual High-Water Mark, Existing Structures and Watershed Boundaries**
   - The existing topography varies greatly throughout the site. The developed portion of the site used currently used as a golf course is the highest part, sitting above the southern and eastern sides of the property. The enclosed plans illustrate 2-foot contour intervals and reveal existing slopes between 0-10% on 35.8% of site; 10-15% slopes on 53.7% of the site; and greater than 15% slopes on 10.5% of the site. Proposed grading within the existing developed area will lessen some of the existing steep slopes. All roadways are designed below the maximum centerline grade in stated within the Millbury Rules and Regulations with required leveling areas.
   - The graphic drainage analysis is provided herewith as Attachment 1. The attachment includes 11"x17" pre- and post-development watershed maps, and a street/catch basin drainage area map.
   - According to the most recent FEMA F.I.R.M. Map (panel #25027C0809E) provided as Attachment 2, no portion of the property falls within a Special Flood Hazard Zone and therefore is at minimal risk for flooding. Furthermore, there are no streams on the property that are subject to the MA Rivers Protection Act.
   - The property contains a clubhouse, maintenance/equipment building, and detached garage used in association with the operation of the golf course. In addition, the property contains a single-family residence which is occupied by the current owner of the property. All buildings are accessed from the same driveway off Park Hill Avenue.

2. **Vegetative Cover Analysis, Important Wildlife Habitats, Areas not to be Disturbed by Construction**
   - The property consists of varying areas of vegetative cover. Although the portion of the property currently used as a golf course contains numerous isolated deciduous and evergreen trees, it predominantly consists of various grass species that comprise different parts of the golf course. Many of the existing isolated trees within the golf course have removed limbs, rotten crotches or fungi diseases. This portion of the property occupied by the golf course is approximately 47.8 acres, which represents approximately 41% of the total property area. The remaining 69.9 acres consists of mature forest comprised of largely of deciduous tree species, with the exception of a 6.5± acre pond in the southeast portion of the property.
   - As part of the construction of the project approximately 48.5 acres of land will be disturbed, but only 6.3 acres of disturbance will be within the existing mature forest, which are the areas immediately adjacent to the existing golf course facility.
   - Upon completion of the project, 92.46 acres of land will be preserved as open space that will consist of more than 60 acres of existing mature forest and 28.56 acres of wetland resource areas all connected by over 12,600 feet of public walking trails. The open space land borders the Hayward Glenn Conservation Area providing a significant contiguous tract of open space land.
   - The property is <u>not</u> located within an Area of Critical Environmental Concern (ACEC) or within a mapped Priority Habitat of Rare Species or Estimated Habitat of Rare Wildlife according to the most recent edition of the Natural Heritage Atlas.

3. **USDA Soil Types, Approximate Ground Water Level and Subsurface Soil Tests**
   - Subsurface soil explorations were performed on the property by Peter Lavoie of Turning Point Engineering in April 2019. Explorations were performed using an excavator to dig deep holes in order to classify soil types and depths to seasonal high groundwater table. Locations of soil explorations are illustrated on the project plans. With the exception of DTH #1, groundwater was observed at a depth of 8 feet or more. Copies of the soil logs are provided herewith as Attachment 3.
   - The U.S. Natural Resources Conservation Service (NRCS) Maps indicate that soils with hydrologic soil group classification B, C and D are present on the site. The NRCS Soil Map is provided herewith as Attachment 4.

4. **Visual Analysis**
   - The property along with most of Park Hill Ave has sweeping views to the south and east. Scenic vistas are from the higher elevations of the property, mainly from within the existing golf course parking lot. These views will be preserved by using a terraced development pattern. Homes will be placed on one side of the road, using the existing topography and limiting the amount of earth moving necessary. The houses will have between 15 and 30 feet of elevation change between rows of units allowing scenic vistas to be provided from most units.
   - One visually prominent area, while not aesthetically pleasing, is The Shoppes at Blackstone retail plaza, which can be seen from most areas of the property when looking southwest.

5. Water and Hydrologic Features

- An existing Public Water Supply Well (ID #2186003-01G) is situated in the northwest portion of the property that is used to service the existing golf course. As part of the project development, water supplied by Aquarion Water Company will be extended to the project and this well will be decommissioned in accordance with Massachusetts DEP requirements. The property does not lie within any other Zone I or Zone II of a Public Water Supply or a known aquifer supply area.
- No untreated stormwater runoff is discharged to existing wetland resource areas.
- The stormwater basins are to designed to meet or exceed the standards of the MassDEP Stormwater Management Policy. Specifically, stormwater collected and conveyed to the stormwater basins is pre-treated and then portions are recharged to the groundwater while the remaining portion is discharged to existing wetland areas maintaining existing hydrology patterns.
- The proposed stormwater basins exceed minimum groundwater offset requirements.
- There are no direct wetland alterations proposed as part of the project, only work within existing buffer zones.

We hope this serves your needs at this time. Should you have any questions or require additional information, please contact our office.

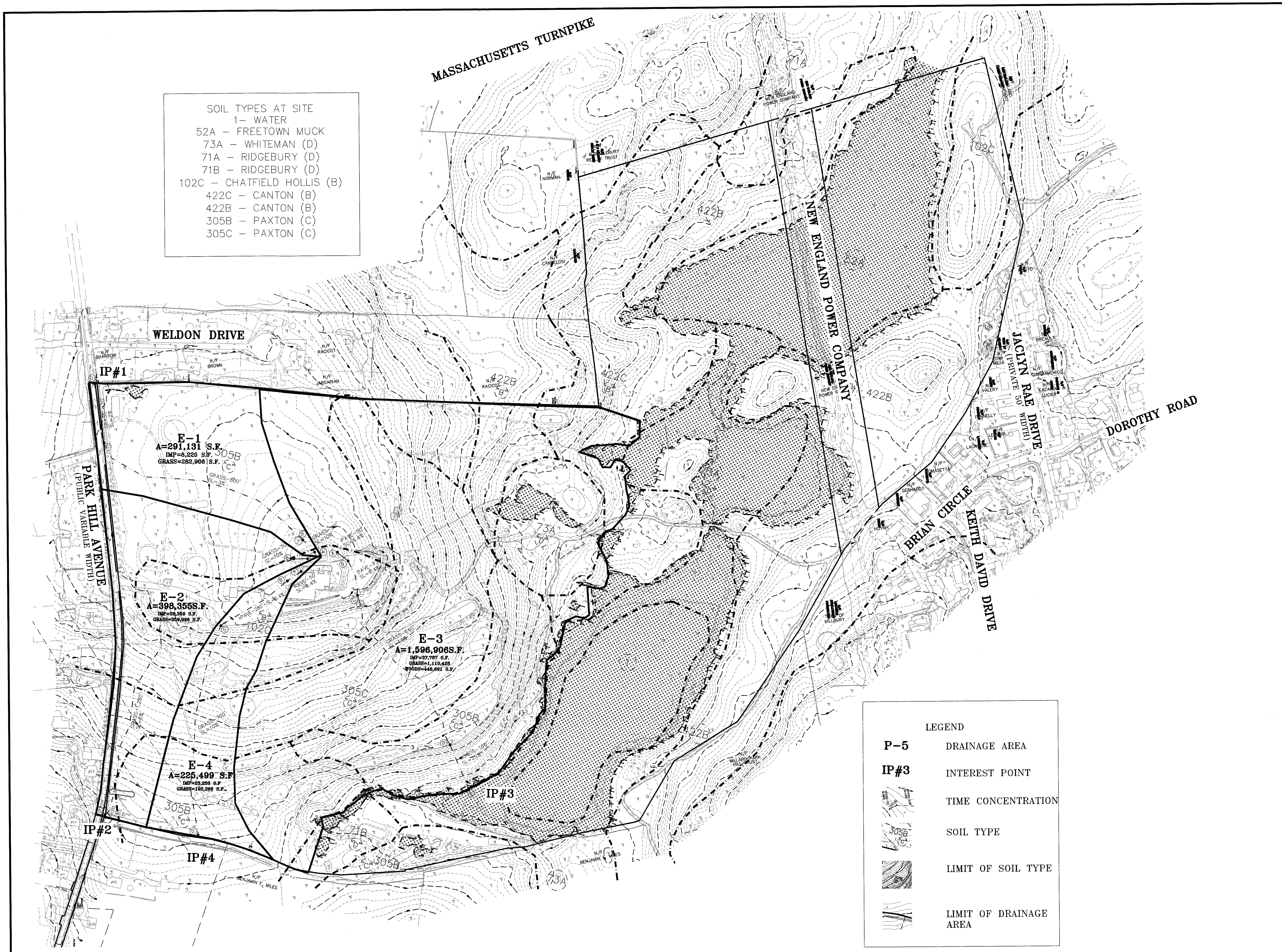
Sincerely,
Eastland Partners, Inc.

Logan Huffman
President

Attachments

C: Laurie Connors - Planning Director
Millbury Board of Health
Millbury Town Clerk
David Glenn, P.E. – Stantec

Attachment #1



TURNING POINT ENGINEERING

CIVIL SITE DESIGN

P.O. Box 969 • Milford, MA 01757
P:(508) 381-1515 F:(508) 647-0189
www.tpecivildesign.com

P.E.	P.L.S.
COMMONWEALTH OF MASSACHUSETTS ANDREW R. BAUM CIVIL ENGINEER NO. 47076 REGISTERED PROFESSIONAL ENGINEER	

APPROVAL UNDER SITE PLAN REVIEW.
MILLBURY PLANNING BOARD

BEING A MAJORITY

APPROVAL DATE:______________

ENDORSEMENT DATE:______________

PROJECT NAME

CLEARVIEW

OPEN SPACE COMMUNITY

66 PARK HILL AVENUE
MILLBURY, MASSACHUSETTS

PREPARED FOR

Eastland

Eastland Partners, Inc.
4 Charlesview Road, Suite 1
Hopedale, MA 01747

REVISIONS

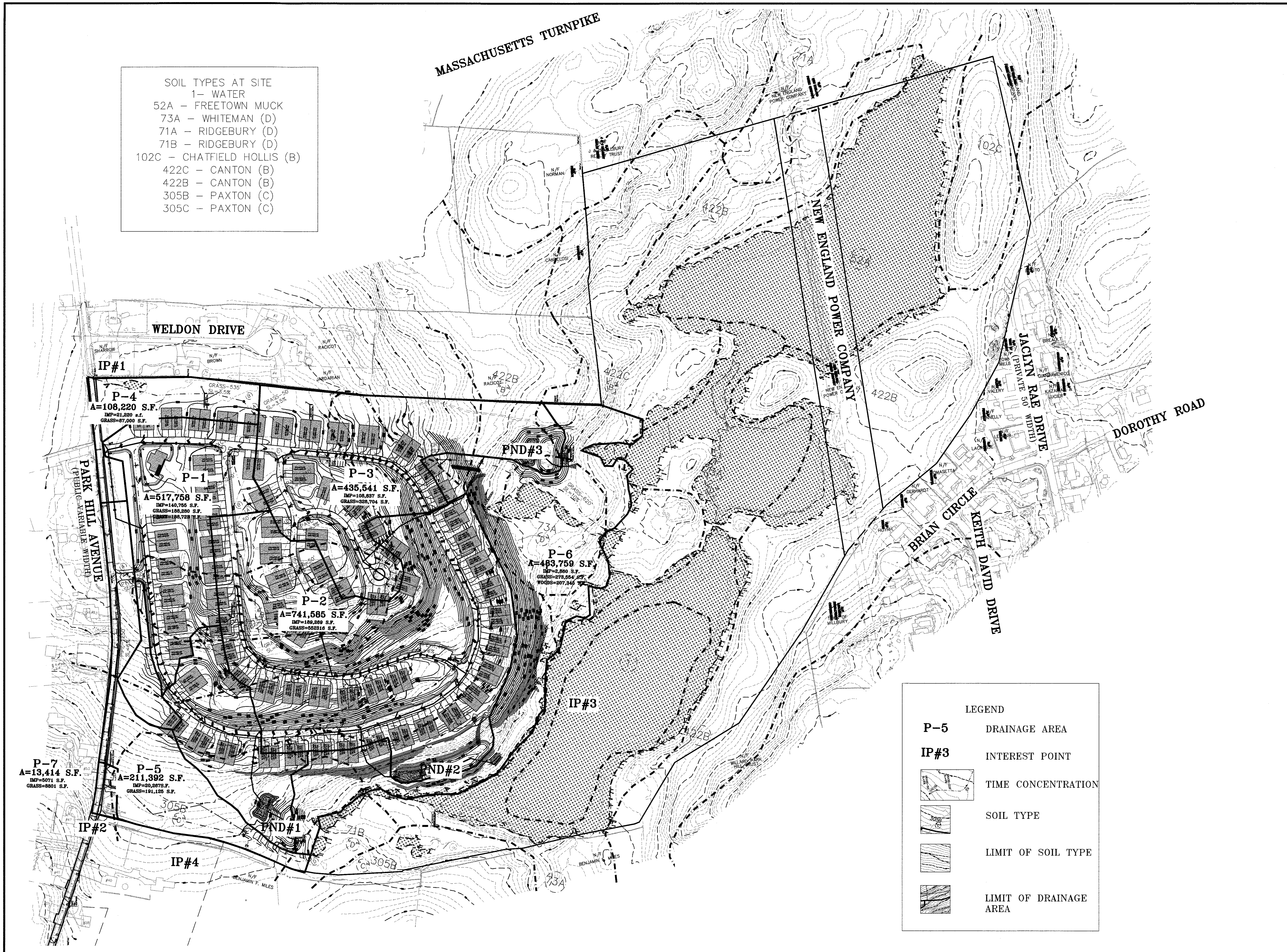
REV.	DATE	DESCRIPTION

PROJECT NO.	TPE-1014
DESIGN BY	PML
CHECKED BY	SJO
DATE	11/27/19
CAD FILE	H:\1014-MILLBURY-PR Base.dwg
PLAN NO.	

SHEET TITLE

PRE-DEVELOPMENT DRAINAGE AREA PLAN

SHEET 1 OF 1



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CLEARVIEW
OPEN SPACE COMMUNITY
66 PARK HILL AVENUE
MILLBURY, MASSACHUSETTS

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CAD FILE	H:\1014-MILLBURY-PR Base.dwg
PLAN NO.	

SHEET TITLE

POST-DEVELOPMENT
DRAINAGE AREA PLAN

SHEET 1 OF 1

P.E.

P.L.S.

APPROVAL UNDER SITE PLAN REVIEW.
MILLBURY PLANNING BOARD

BEING A MAJORITY

APPROVAL DATE: ____________

ENDORSEMENT DATE: ____________

PROJECT NAME

CLEARVIEW

OPEN SPACE COMMUNITY

66 PARK HILL AVENUE
MILLBURY, MASSACHUSETTS

PREPARED FOR

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CAD FILE	H:\1014-MILLBURY-PR Bose.dwg
PLAN NO.	

SHEET TITLE

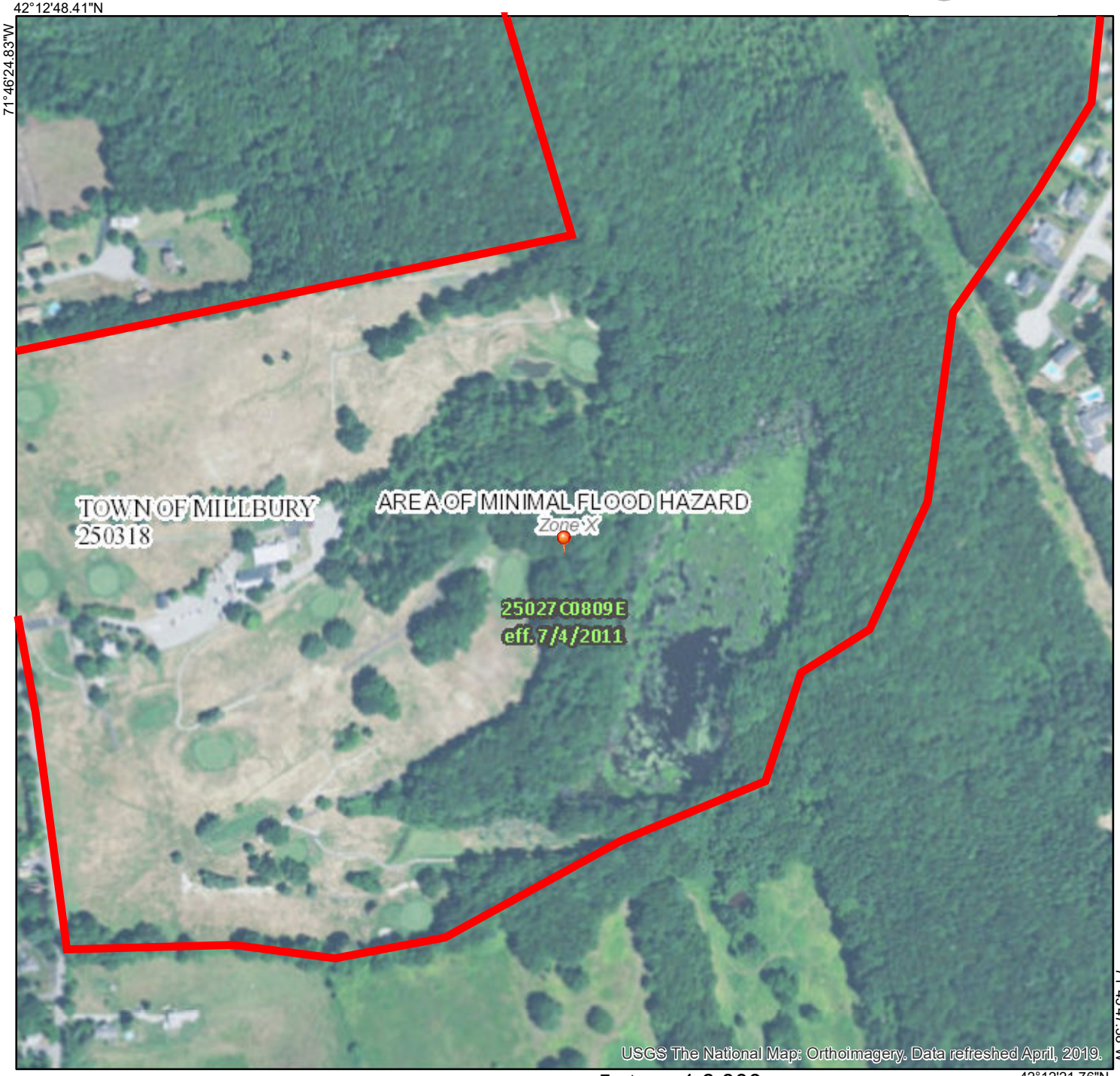
STREET DRAINAGE
AREA PLAN

SHEET 1 OF 1

Attachment #2

National Flood Hazard Layer FIRMette

FEMA



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/9/2020 at 4:59:12 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Attachment #3

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Clearview Estates
Owner Name

Park HIll Avenue
Street Address

Map/Lot #

MIllbury
City

Ma
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes: online (Source) (Soil Map Unit)

422B
Soil Name

none
Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published/Source) (Publication Scale) (Map Unit)

Geologic/Parent Material

Landform

4. Flood Rate Insurance Map

Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☒ Yes ☐ No

Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): April 2019 (Month/Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

7. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: Pond 4-1 | 4/4/19 (Date) | 1:00 (Time) | clear (Weather)

1. Location

Ground Elevation at Surface of Hole: 526.0 Location (identify on plan): See Plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | See Plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	n/a feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: n/a (Depth Weeping from Pit) n/a (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: none at 120.0 inches 516.0 elevation

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond4 dth#1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-4	A	10YR4/4	n/a			Sandy Loam					
4-12	B	10YR4/6	n/a			Sandy Loam					
12-120	C	5Y7/2	n/a			Med. Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond 4-2 | 4/4/19 (Date) | 2:00 (Time) | clear 60 (Weather)

1. Location

Ground Elevation at Surface of Hole: 521.00 Location (identify on plan): see plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | see plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	n/a feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: n/a (Depth Weeping from Pit) n/a (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: None at 120 inches 511.0 elevation

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond 4 - dth2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-4	A	10YR4/4	n/a			Sandy Loam					
4-12	B	10YR4/6	n/a			Sandy Loam					
12-120	C	5Y6/2	n/a			Med. Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☐ Depth to soil redoximorphic features (mottles)	A. _____ inches	B. _____ inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2.

Index Well Number	Reading Date	Index Well Level
Adjustment Factor	Adjusted Groundwater Level	

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?
      ☒ Yes ☐ No
   b. If yes, at what depth was it observed? Upper boundary: 4 inches Lower boundary: 120 inches

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	4/4/19 Date
Peter Lavoie SE#1332 Typed or Printed Name of Soil Evaluator / License #	4/97 Date of Soil Evaluator Exam
Name of Board of Health Witness	Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Clearview Estates
Owner Name

Park HIll Avenue
Street Address

Map/Lot #

MIIlbury
City

Ma
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes: online (Source) (Soil Map Unit)

305B
Soil Name

none
Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published/Source) (Publication Scale) (Map Unit)

Geologic/Parent Material

Landform

4. Flood Rate Insurance Map

Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☒ Yes ☐ No

Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): April 2019 (Month/Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

7. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: Pond 3-1 | 4/4/19 (Date) | 11:00 (Time) | clear (Weather)

1. Location

Ground Elevation at Surface of Hole: 510.0 | Location (identify on plan): See Plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | See Plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	n/a feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till | Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No | If yes: n/a (Depth Weeping from Pit) | n/a (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: none at 144" (inches) | 498.0 (elevation)

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond3 dth#1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-4	A	10YR4/4	n/a			Sandy Loam					
4-8	B	10YR4/6	n/a			Sandy Loam					
8-144	C	5Y7/2	n/a			Loamy Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond 3-2 | 4/4/19 (Date) | 12:30 (Time) | clear 60 (Weather)

1. Location

Ground Elevation at Surface of Hole: 508.00 Location (identify on plan): see plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | see plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	n/a feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till Unsuitable Materials Present: ☒ Yes ☐ No

If Yes: ☒ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

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Estimated Depth to High Groundwater: None at 144" (inches) 496.0 (elevation)

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond 3 - dth2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-4	A	10YR4/4	n/a			Sandy Loam		50			
4-12	B	10YR4/6	n/a			Sandy Loam					
12-144	C	5Y6/2	n/a			Loamy Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	A.	B.
☐ Depth observed standing water in observation hole	A. _____ inches	B. _____ inches
☐ Depth weeping from side of observation hole	A. _____ inches	B. _____ inches
☐ Depth to soil redoximorphic features (mottles)	A. _____ inches	B. _____ inches
☐ Groundwater adjustment (USGS methodology)	A. _____ inches	B. _____ inches

2. _____ Index Well Number _____ Reading Date _____ Index Well Level

_____ Adjustment Factor _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?
      ☒ Yes ☐ No
   b. If yes, at what depth was it observed? Upper boundary: 4 inches Lower boundary: 144 inches

Commonwealth of Massachusetts
City/Town of Millbury
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Peter Lavoie — Signature of Soil Evaluator

4/4/19 — Date

Peter Lavoie SE#1332 — Typed or Printed Name of Soil Evaluator / License #

4/97 — Date of Soil Evaluator Exam

Name of Board of Health Witness

Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

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City/Town of Millbury

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305C
Soil Name

none
Soil Limitations

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Geologic/Parent Material

Landform

4. Flood Rate Insurance Map

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Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): April 2019 (Month/Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

7. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (*minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: Pond 2-1 | 4/4/19 (Date) | 8:00 (Time) | clear (Weather)

1. Location

Ground Elevation at Surface of Hole: 520.0 Location (identify on plan): See Plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | See Plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	n/a feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: n/a (Depth Weeping from Pit) n/a (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: none at 96" (inches) 512.0 (elevation)

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond2 dth#1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	A	10YR4/4	n/a			Sandy Loam					
6-26	B	10YR4/6	n/a			Sandy Loam					
26-96	C	5Y7/2	n/a			Loamy Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond 2-2 | 4/4/19 (Date) | 8:30 (Time) | clear 60 (Weather)

1. Location

Ground Elevation at Surface of Hole: 522.00 Location (identify on plan): see plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | see plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	n/a feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till Unsuitable Materials Present: ☒ Yes ☐ No

If Yes: ☒ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 96" (Depth Weeping from Pit) | n/a (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: 96" inches | 514.0 elevation

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond2 - dth2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-60	A	10YR4/4	n/a			Sandy Loam		50			
60-72	B	10YR4/6	n/a			Sandy Loam					
72-120	C	5Y6/2	96"	10YR5/8	45	Loamy Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	A.	B.
☐ Depth observed standing water in observation hole	A. inches	B. inches
☐ Depth weeping from side of observation hole	A. inches	B. inches
☒ Depth to soil redoximorphic features (mottles)	A. none inches	B. 96 inches
☐ Groundwater adjustment (USGS methodology)	A. inches	B. inches

2. _____ Index Well Number; _____ Reading Date; _____ Index Well Level

_____ Adjustment Factor; _____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?
      ☒ Yes ☐ No
   b. If yes, at what depth was it observed? Upper boundary: 30 inches Lower boundary: 120 inches

Commonwealth of Massachusetts
City/Town of Millbury
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Peter Lavoie — Signature of Soil Evaluator

4/4/19 — Date

Peter Lavoie SE#1332 — Typed or Printed Name of Soil Evaluator / License #

4/97 — Date of Soil Evaluator Exam

Name of Board of Health Witness

Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Clearview Estates
Owner Name

Park HIll Avenue
Street Address

Map/Lot #

MIllbury
City

Ma
State

Zip Code

B. Site Information

1. (Check one) ☒ New Construction ☐ Upgrade ☐ Repair

2. Soil Survey Available? ☒ Yes ☐ No If yes: online (Source) (Soil Map Unit)

305C
Soil Name

none
Soil Limitations

3. Surficial Geological Report Available? ☐ Yes ☒ No If yes: (Year Published/Source) (Publication Scale) (Map Unit)

Geologic/Parent Material

Landform

4. Flood Rate Insurance Map

Above the 500-year flood boundary? ☒ Yes ☐ No Within the 100-year flood boundary? ☒ Yes ☐ No

Within the 500-year flood boundary? ☐ Yes ☒ No Within a velocity zone? ☐ Yes ☒ No

5. Wetland Area: Wetlands Conservancy Program Map (Map Unit) (Name)

6. Current Water Resource Conditions (USGS): April 2019 (Month/Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

7. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserved disposal area)*

Deep Observation Hole Number: Pond 1-1 | 4/4/19 (Date) | 8:00 (Time) | clear (Weather)

1. Location

   Ground Elevation at Surface of Hole: 564.0 | Location (identify on plan): See Plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

   grass (Vegetation) | ground moraine (Landform) | See Plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	92 feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till — Unsuitable Materials Present: ☐ Yes ☒ No

   If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No — If yes: 64 (Depth Weeping from Pit) | n/a (Depth Standing Water in Hole)

   Estimated Depth to High Groundwater: 60 inches | 559.00 elevation

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: Pond1 dth#1

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-8	A	10YR4/4	n/a			Sandy Loam					
8-30	B	10YR4/6	n/a			Sandy Loam					
30-84	C	5Y7/2	60"	10YR5/8	50	Loamy Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: 2 | 4/4/19 (Date) | 8:30 (Time) | clear 60 (Weather)

1. Location

Ground Elevation at Surface of Hole: 568.00 Location (identify on plan): see plan

2. Land Use: Golf Course (e.g., woodland, agricultural field, vacant lot, etc.) | some (Surface Stones) | 6 (Slope (%))

grass (Vegetation) | ground moraine (Landform) | see plan (Position on Landscape (attach sheet))

3. Distances from:

Open Water Body	n/a feet	Drainage Way	n/a feet	Possible Wet Area	n/a feet
Property Line	70 feet	Drinking Water Well	n/a feet	Other	feet

4. Parent Material: glacial till Unsuitable Materials Present: ☐ Yes ☒ No

If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Impervious Layer(s) ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: n/a (Depth Weeping from Pit) n/a (Depth Standing Water in Hole)

Estimated Depth to High Groundwater: none at 120 inches 558.00 elevation

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: 2

Depth (in.)	Soil Horizon/ Layer	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features (mottles)			Soil Texture (USDA)	Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles & Stones			
0-6	A	10YR4/4	n/a			Sandy Loam					
6-26	B	10YR4/6	n/a			Sandy Loam					
26-120	C	5Y6/2	n/a			Loamy Sand	45	45			

Additional Notes:

Commonwealth of Massachusetts
City/Town of Millbury

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

D. Determination of High Groundwater Elevation

1. Method Used:

	A.	B.
☐ Depth observed standing water in observation hole	A. ____ inches	B. ____ inches
☐ Depth weeping from side of observation hole	A. ____ inches	B. ____ inches
☒ Depth to soil redoximorphic features (mottles)	A. 60" inches	B. none inches
☐ Groundwater adjustment (USGS methodology)	A. ____ inches	B. ____ inches

2. ____ Index Well Number ____ Reading Date ____ Index Well Level

____ Adjustment Factor ____ Adjusted Groundwater Level

E. Depth of Pervious Material

1. Depth of Naturally Occurring Pervious Material
   a. Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system?
      ☒ Yes ☐ No
   b. If yes, at what depth was it observed? Upper boundary: 30 inches Lower boundary: 120 inches

Commonwealth of Massachusetts
City/Town of Millbury
Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

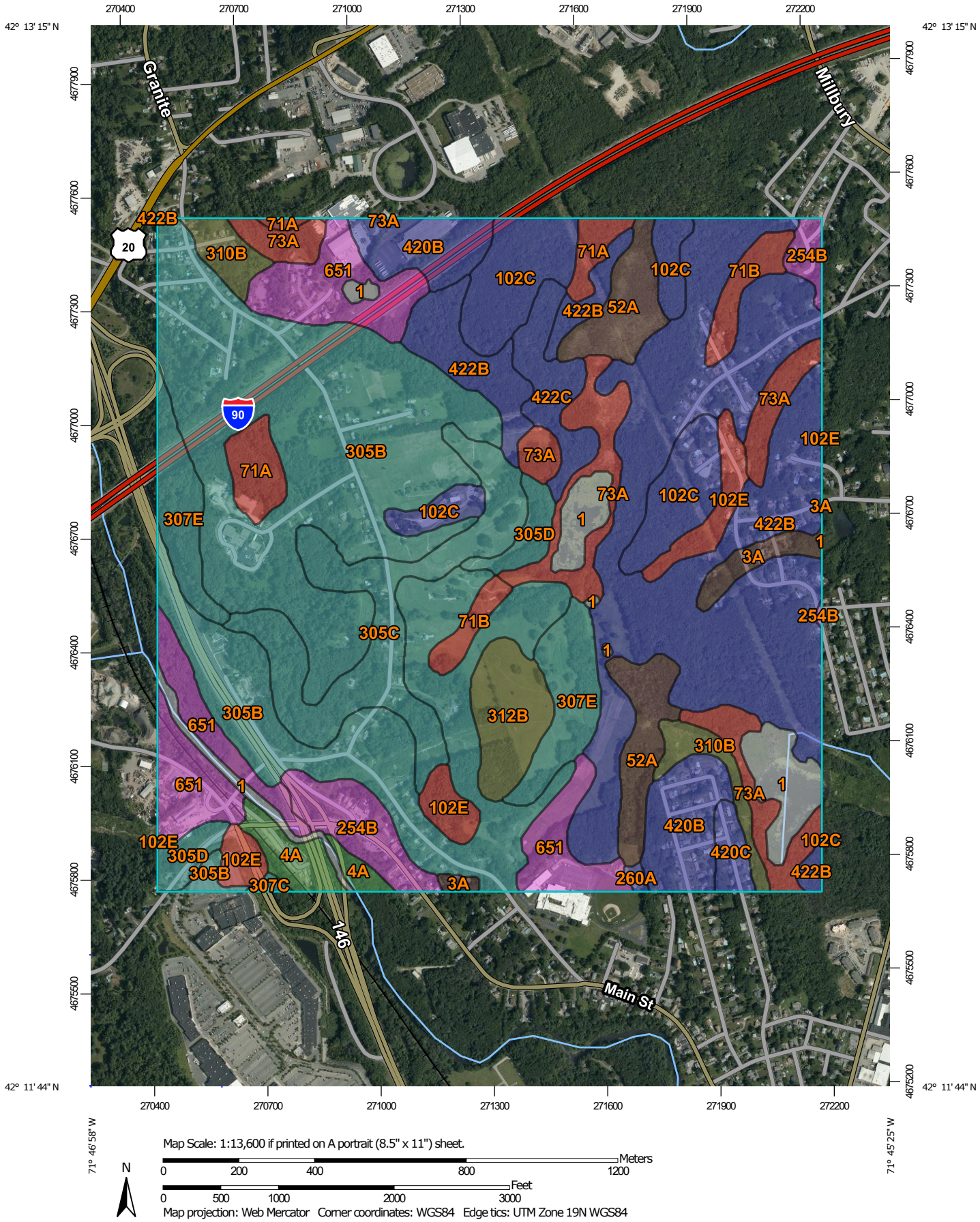
I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

	4/4/19
Signature of Soil Evaluator	Date
Peter Lavoie SE#1332	4/97
Typed or Printed Name of Soil Evaluator / License #	Date of Soil Evaluator Exam
Name of Board of Health Witness	Board of Health

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Attachment #4

Hydrologic Soil Group—Worcester County, Massachusetts, Southern Part
(Clearview - Millbury)



Map Scale: 1:13,600 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 12, Sep 12, 2019

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

Date(s) aerial images were photographed: Jul 26, 2019—Oct 5, 2019

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		22.8	2.9%
3A	Scarboro and Walpole soils, 0 to 3 percent slopes	B/D	6.7	0.9%
4A	Rippowam fine sandy loam, 0 to 3 percent slopes	A/D	9.9	1.3%
52A	Freetown muck, 0 to 1 percent slopes	B/D	26.0	3.4%
71A	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	D	12.9	1.7%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	11.3	1.5%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	38.0	4.9%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	41.3	5.3%
102E	Chatfield-Hollis-Rock outcrop complex, 15 to 35 percent slopes	D	16.4	2.1%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	17.8	2.3%
260A	Sudbury fine sandy loam, 0 to 3 percent slopes	B	0.8	0.1%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	206.4	26.6%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	44.4	5.7%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	C	10.6	1.4%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	C	0.8	0.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
307E	Paxton fine sandy loam, 15 to 35 percent slopes, extremely stony	C	28.4	3.7%
310B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	12.9	1.7%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	16.3	2.1%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	29.6	3.8%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	4.8	0.6%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	151.8	19.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	13.5	1.7%
651	Udorthents, smoothed	A	51.9	6.7%
Totals for Area of Interest			**775.7**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher