



EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES

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Worcester, MA 01605-2629
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November 10, 2015

Robert Richard
Southwest Holdings USA, Inc.
6017 Pine Ridge Road, Suite 255
Naples, FL 34119-3956

RE: Wetland Resource Evaluation, Lot 1.2 Stafford St., Leicester, MA

Dear Mr. Richard:

On October 23, 2015, EcoTec, Inc. inspected the above-referenced property for the presence of wetland resources as defined by: (1) the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40; the “Act”) and its implementing regulations (310 CMR 10.00 *et seq.*; the “Regulations”); and (2) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands). Arthur Allen, CPSS, CWS conducted the inspection.

The subject site consists of a ±32-acre parcel located in the southeast corner of the intersection between Stafford Street and Auburn Street. The upland portions of the site are wooded and undeveloped with the exception of a gravel parking lot at Stafford Street in the northerly corner of the site. The parking lot has a drainage swale on the upgradient side. The drainage swale has some wetland vegetation within it. The swale was not delineated as a wetland because it only conveys stormwater and groundwater. In addition to the gravel parking lot the site has recently been heavily logged. The logging work caused ruts to form in the heavy glacial till soils. Some of the ruts have developed wetland vegetation. The ruts were not delineated because they are well removed from any waterbodies or waterways and do not pond any significant amount of water. The wetland resources observed on the site are described below.

Methodology

The site was inspected, and areas suspected to qualify as wetland resources were identified. The boundary of Bordering Vegetated Wetlands was delineated in the field in accordance with the definition set forth in the regulations at 310 CMR 10.55(2)(c). Section 10.55(2)(c) states that “The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.” The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy “*BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology*,” issued March 1, 1995; and (2) “*Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook*,” produced by the Massachusetts Department of Environmental Protection, dated March 1995. The plant taxonomy used in this report is based on the *National Wetland Plant List (Massachusetts 2012 Final State Wetland Plant List)*, ERDC/CRREL TR-12-11 (Lichvar, 2012). Federal wetlands were presumed to have boundaries conterminous with the delineated Bordering Vegetated Wetlands. One set of

DEP Bordering Vegetated Wetland Delineation Field Data Forms completed for observation plots located in the wetlands and uplands near flag A-8 is attached. The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the delineated wetland resources.

Flag Numbers	Flag Type	Wetland Types and Locations
Start A-1 to A-28 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located on east side of mapped intermittent stream in westerly portion of site. Flag A-1 at culvert outlet from Stafford Street.

Findings

Wetland A (i.e., flags A-1 to A-28) consists of a wooded swamp located in the westerly portion of the site that is associated with an intermittent stream. Plant species observed include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), green ash (*Fraxinus pensylvanica*), eastern hemlock (*Tsuga canadensis*), and American elm (*Ulmus americana*) trees, saplings, and/or shrubs; eastern poison-ivy (*Toxicodendron radicans*) climbing woody vines; highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), inkberry (*Ilex glabra*), southern arrow-wood (*Viburnum dentatum*), northern spicebush (*Lindera benzoin*), silky dogwood (*Cornus amomum*), maleberry (*Lyonia ligustrina*), clammy azalea (*Rhododendron viscosum*), Canadian service-berry (*Amelanchier canadensis*), and black elderberry (*Sambucus nigra*) shrubs; and sheep-laurel (*Kalmia angustifolia*), bristly dewberry (*Rubus hispidus*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda spectabilis*), interrupted fern (*Osmunda claytoniana*), sensitive fern (*Onoclea sensibilis*), subarctic lady fern (*Athyrium filix-femina*), eastern marsh fern (*Thelypteris palustris*), New York fern (*Parathelypteris noveboracensis*), Massachusetts/bog fern (*Parathelypteris simulata*), spinulose wood fern (*Dryopteris carthusiana*), skunk-cabbage (*Symplocarpus foetidus*), American False Hellebore (*Veratrum viride*), Jack-in-the-pulpit (*Arisaema triphyllum*), three-leaf goldthread (*Coptis trifolia*), maystar (*Trientalis borealis*), spotted touch-me-not (*Impatiens capensis*), Cardinal-flower (*Lobelia cardinalis*), yellow marsh-marigold (*Caltha palustris*), and sphagnum moss (*Sphagnum sp.*) ground cover. Evidence of wetland hydrology, including hydric soils, high groundwater, saturated soils, pore linings, evidence of flooding, and drainage patterns, was observed within the delineated wetland. This vegetated wetland borders an intermittent stream; accordingly, the vegetated wetlands would be regulated as Bordering Vegetated Wetlands and the intermittent stream would be regulated as Bank under the Act. A 100-foot Buffer Zone extends horizontally outward from the edge of Bordering Vegetated Wetlands under the Act.

Bordering Land Subject to Flooding is an area that floods due to a rise in floodwaters from a bordering waterway or water body. Where flood studies have been completed, the boundary of Bordering Land Subject to Flooding is based upon flood profile data prepared by the National Flood Insurance Program. Section 10.57(2)(a)3. states that “The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm.” The project engineer should

evaluate the most recent National Flood Insurance Program flood profile data to confirm that Bordering Land Subject to Flooding does not occur on the site. Bordering Land Subject to Flooding would occur in areas where the 100-year flood elevation is located outside of or upgradient of the delineated Bordering Vegetated Wetlands boundary. Bordering Land Subject to Flooding does not have a Buffer Zone under the Act. A copy of the most recent MA GIS flood zone map is attached to this report.

The Massachusetts Rivers Protection Act amended the Act to establish an additional wetland resource area: Riverfront Area. Based upon a review of the current USGS Map (attached) and observations made during the site inspection, a stream that is shown as intermittent on the USGS Map is located within Wetland A. The watershed area for this stream at the site was determined to be 0.44 square miles, which is less than 0.5 square miles (see attached StreamStats calculations and map). In addition the USGS StreamStats program indicates that the predicted flow rate is 0.0059 cubic feet per second which is less than 0.01 cubic feet per second at the 99% flow duration. As such, the stream would be designated intermittent under the Massachusetts Wetlands Protection Act regulations. Furthermore, based upon a review of the current USGS Map and observations made during the site inspection, there are no other mapped or unmapped streams located within 200 feet of the site. Accordingly, Riverfront Area would not occur on the site. Riverfront Area does not have a Buffer Zone under the Act.

The Regulations require that no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures set forth at 310 CMR 10.59. Based upon a review of the *Massachusetts Natural Heritage Atlas*, 13th edition, Priority Habitats and Estimated Habitats, valid from October 1, 2008, there are no Estimated Habitats [for use with the Act and Regulations (310 CMR 10.00 *et seq.*)], Priority Habitats [for use with Massachusetts Endangered Species Act (M.G.L. Ch. 131A; “MESA”) and MESA Regulations (321 CMR 10.00 *et seq.*)], or Certified Vernal Pools on or in the immediate vicinity of the site. A copy of this map is attached.

The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. A brief description of my experience and qualifications is attached. If you have any questions, please feel free to contact me at any time.

Cordially,
ECOTEC, INC.



Arthur Allen, CPSS, CWS, CESSWI, ASE
Vice President

Attachments (6, 11 pages)

AA/Wetland/Leicester1.2StaffordWetReport

QUALIFICATIONS

Arthur Allen, CPSS, CWS, CESSWI
Vice President
Soil & Wetland Scientist

Arthur Allen is the Vice President of EcoTec, Inc. and has been a senior environmental scientist there since 1995. His work with EcoTec has involved wetland delineation, wildlife habitat evaluation, environmental permitting (federal, state and local), environmental monitoring, expert testimony, peer reviews, contaminated site assessment and the description, mapping and interpretation of soils. His clients have included private landowners, developers, major corporations and regulatory agencies. Prior to joining EcoTec, Mr. Allen mapped and interpreted soils in Franklin County, MA for the U.S.D.A. Natural Resources Conservation Service (formerly Soil Conservation Service) and was a research soil scientist at Harvard University's Harvard Forest. Since 1994, Mr. Allen has assisted the Massachusetts Department of Environmental Protection and the Massachusetts Association of Conservation Commissions as an instructor in the interpretation of soils for wetland delineation and for the Title V Soil Evaluator program.

Mr. Allen has a civil service rating as a soil scientist, an undergraduate degree in Natural Resource Studies and a graduate certificate in Soil Studies. His work on the Franklin County soil survey involved interpretation of landscape-soil-water relationships, classifying soils and drainage, and determining use and limitation of the soil units that he delineated. As a soil scientist at the Harvard Forest, Mr. Allen was involved in identifying the legacies of historical land-use in modern soil and vegetation at a number of study sites across southern New England. He has a working knowledge of the chemical and physical properties of soil and water and how these properties interact with the plants that grow on a given site. While at Harvard Forest he authored and presented several papers describing his research results which were later published. In addition to his aforementioned experience, Mr. Allen was previously employed by the Trustees of Reservations as a land manager and by the Town of North Andover, MA as a conservation commission intern.

Education:

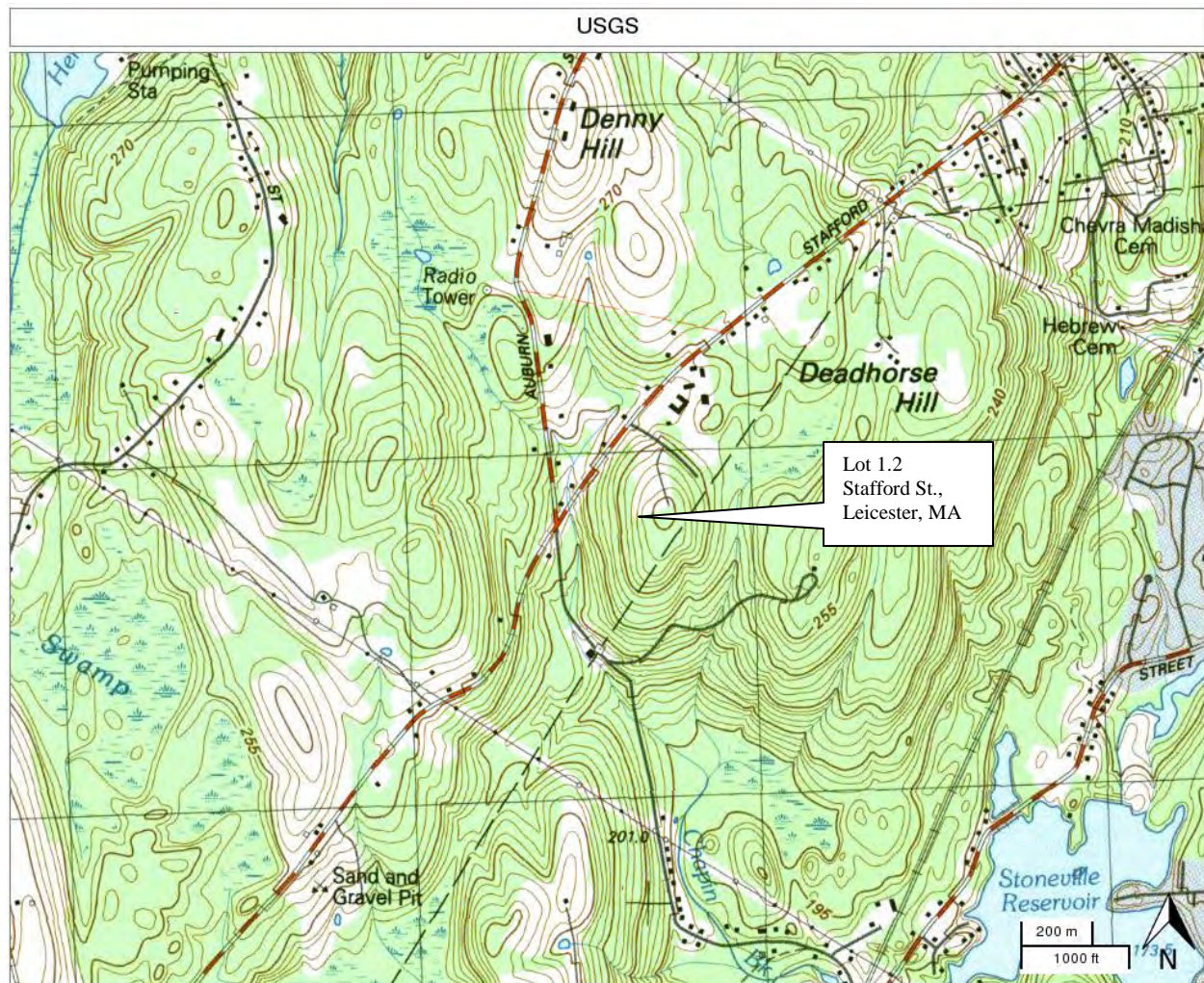
1993-Graduate Certificate in Soil Studies, University of New Hampshire
1982-Bachelor of Science in Natural Resource Studies, University of Massachusetts

Professional Affiliations:

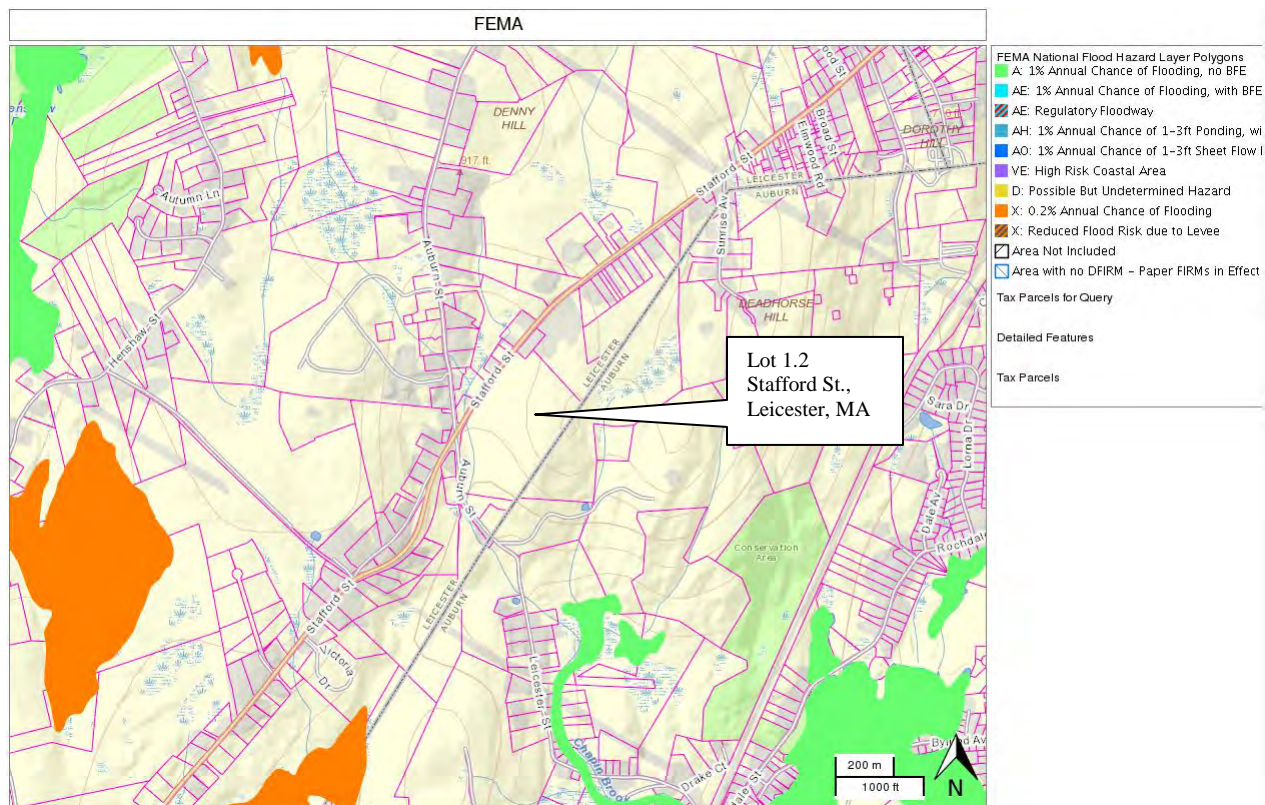
Certified Professional Soil Scientist (ARCPACS CPSS #22529)
New Hampshire Certified Wetland Scientist (#19)
Registered Professional Soil Scientist – Society of Soil Scientists of SNE [Board Member (2000-2006)]
Certified Erosion, Sediment & Stormwater Inspector (#965)
Approved Soil Evaluator (#13764)
Massachusetts Arborists Association-Certified Arborist (1982 – 1998)
New England Hydric Soils Technical Committee member
Massachusetts Association of Conservation Commissions member
Society of Wetland Scientists member

Refereed Publications:

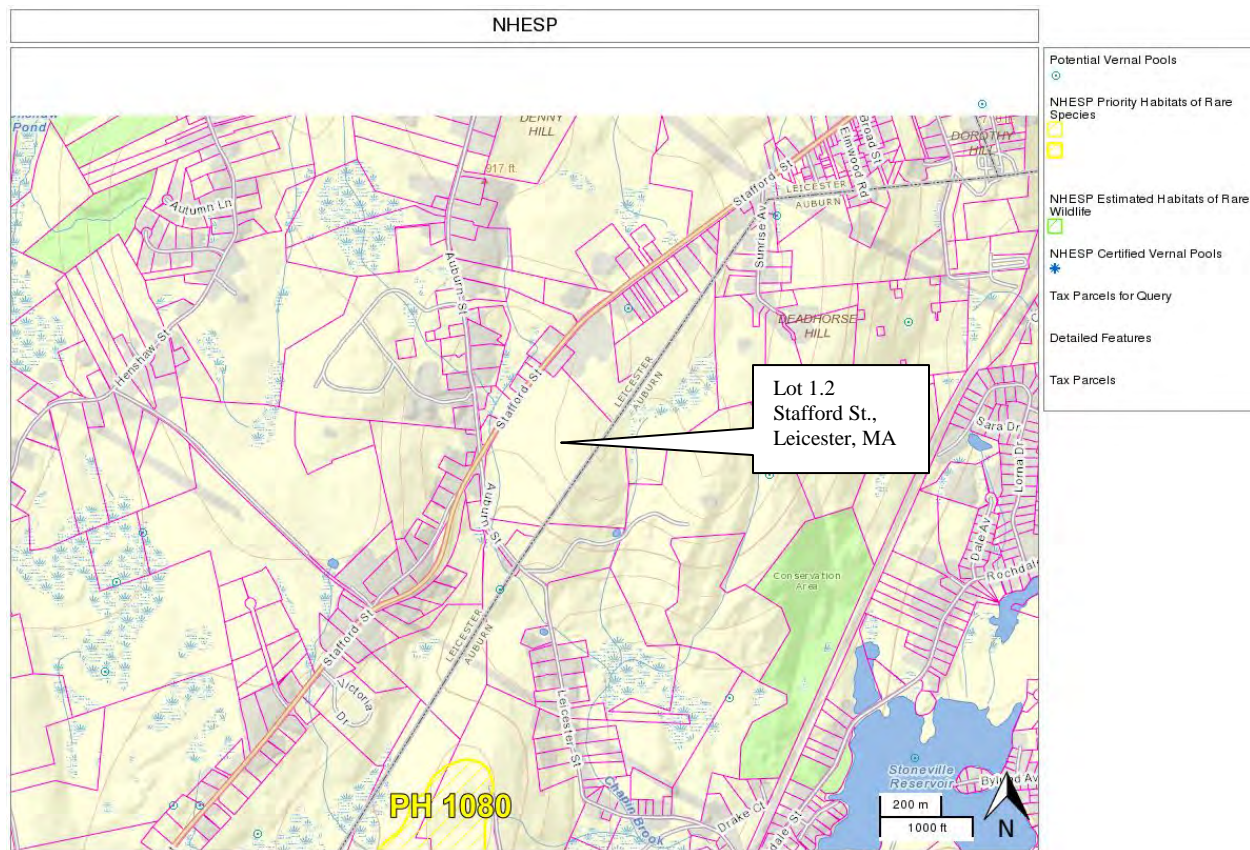
Soil Science and Survey at Harvard Forest. A.Allen. In: Soil Survey Horizons. Vol. 36, No. 4, 1995, pp. 133-142.
Controlling Site to Evaluate History: Vegetation Patterns of a New England Sand Plain. G.Motzkin, D.Foster, A.Allen, J.Harrold, & R.Boone. In: Ecological Monographs 66(3), 1996, pp. 345-365.
Vegetation Patterns in Heterogeneous Landscapes: The Importance of History and Environment. G.Motzkin, P.Wilson, D.R.Foster & A.Allen. In: Journal of Vegetation Science 10, 1999, pp. 903-920.



USGS PROJECT LOCUS – LEICESTER, MA



MA GIS FEMA FLOOD MAP



MA GIS RARE SPECIES & VERNAL POOL MAP

StreamStats Version 3 Beta

Flow Statistics Ungaged Site Report

Date: Tues Oct 27, 2015 9:50:26 AM GMT-4

Site Location: Massachusetts

NAD 1983 Latitude: 42.2161 (42 12 58)

NAD 1983 Longitude: -71.8772 (-71 52 38)

Drainage Area: 0.44 mi²

Low Flows Basin Characteristics			
100% Statewide Low Flow WRIR00 4135 (0.44 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.44 (below min value 1.61)	1.61	149
Mean Basin Slope from 250K DEM (percent)	5.644	0.32	24.6
Stratified Drift per Stream Length (square mile per mile)	0	0	1.29
Massachusetts Region (dimensionless)	0	0	1

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Probability of Perennial Flow Basin Characteristics			
100% Perennial Flow Probability (0.44 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.44	0.01	1.99
Percent Underlain By Sand And Gravel (percent)	0.00	0	100
Percent Forest (percent)	100.00	0	100
Massachusetts Region (dimensionless)	0	0	1

Bankfull Flows Basin Characteristics			
100% Bankfull Statewide SIR2013 5155 (0.44 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.44 (below min value 0.6)	0.6	329
Mean Basin Slope from 10m DEM (percent)	3.987	2.2	23.9

Warning: Some parameters are outside the suggested range. Estimates will be extrapolations with unknown errors.

Low Flows Statistics					
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval
					Min Max

D60	0.24	ft ³ /s				
D70	0.11	ft ³ /s				
D75	0.0776	ft ³ /s				
D80	0.0599	ft ³ /s				
D85	0.042	ft ³ /s				
D90	0.0278	ft ³ /s				
D95	0.0151	ft ³ /s				
D98	0.00873	ft ³ /s				
D99	0.0059	ft ³ /s				
M7D2Y	0.0152	ft ³ /s				
AUGD50	0.0419	ft ³ /s				
M7D10Y	0.00492	ft ³ /s				

<http://pubs.usgs.gov/wri/wri004135/> (<http://pubs.usgs.gov/wri/wri004135/>)

Ries, K.G., III, 2000, Methods for estimating low-flow statistics for Massachusetts streams: U.S. Geological Survey Water Resources Investigations Report 00-4135, 81 p.

Probability of Perennial Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PROBPEREN	0.42	dim	0.3		0.45	0.74

http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf (http://pubs.usgs.gov/sir/2006/5031/pdfs/SIR_2006-5031rev.pdf)

Bent, G.C., and Steeves, P.A., 2006, A revised logistic regression equation and an automated procedure for mapping the probability of a stream flowing perennially in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2006-5031, 107 p.

Bankfull Flows Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
BFWDTH	9.84	ft				
BFDPTH	0.69	ft				
BFAREA	6.72	ft ²				
BFFLOW	12.8	ft ³ /s				

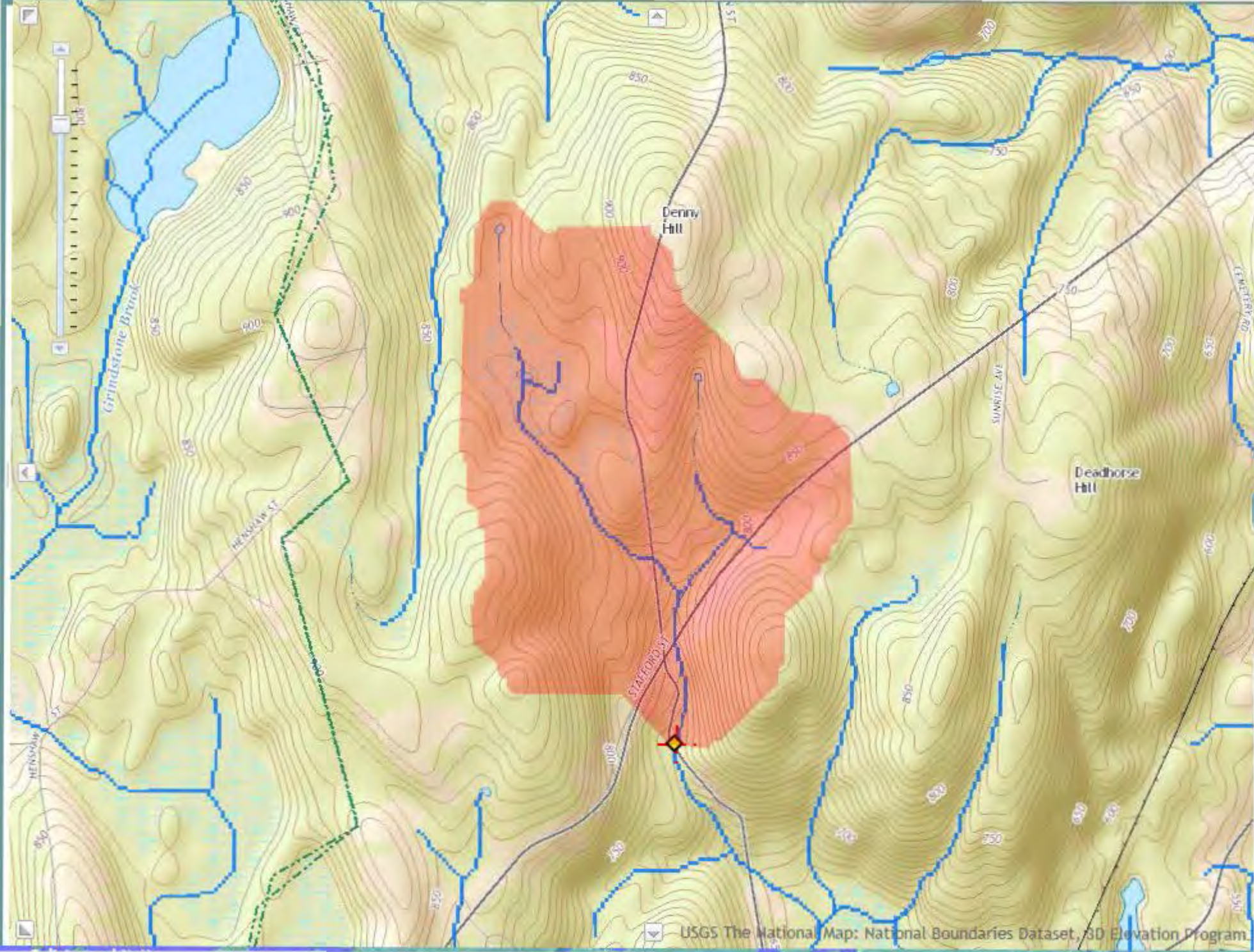
<http://pubs.usgs.gov/sir/2013/5155/> (<http://pubs.usgs.gov/sir/2013/5155/>)

Bent, G.C., and Waite, A.M., 2013, Equations for estimating bankfull channel geometry and discharge for streams in Massachusetts: U.S. Geological Survey Scientific Investigations Report 2013-5155, 62 p.

Accessibility FOIA Privacy Policies and Notices
 U.S. Department of the Interior | U.S. Geological Survey
 URL: http://streamstatsags.cr.usgs.gov/v3_beta/FTreport.htm
 Page Contact Information: StreamStats Help
 Page Last Modified: 08/24/2015 13:31:41 (Web1)

[StreamStats Status](#)





DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant:

Prepared by: EcoTec, Inc.

Project location: Lot 1.2 Stafford St., Leicester

DEP File # :

Check all that apply:

- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
☒ Vegetation and other indications of hydrology used to delineate BVW boundary: fill out Sections I and II
☐ Method other than dominance test used (attach additional information)

Section I. Vegetation		Observation Plot Number: WETLAND	Transect Number: TPW@A-8		Date of Delineation: 10/23/2015	
A. Sample Layer and Plant Species (by common/scientific name)			B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category *
Trees	Red Maple	<i>Acer rubrum</i>	50	50	Yes	FAC*
	White Pine	<i>Pinus strobus</i>	30	30	Yes	FACU
	Eastern Hemlock	<i>Tsuga canadensis</i>	20	20	Yes	FACU*
Sapling	none					
Shrub	Spicebush	<i>Lindera benzoin</i>	20	44.4	Yes	FACW*
	White Pine	<i>Pinus strobus</i>	5	11.2	No	FACU
	Eastern Hemlock	<i>Tsuga canadensis</i>	20	44.4	Yes	FACU*
Herb	Lady Fern	<i>Athyrium pycnocarpon</i>	25	50	Yes	FAC*
	Cinnamon Fern	<i>Osmunda cinnamomea</i>	20	40	Yes	FACW*
	Poison Ivy	<i>Toxicodendron radicans</i>	5	10	No	FAC*

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c. 131, s. 40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusions:

Number of dominant wetland indicator plants: 6 Number of dominant non-wetland indicator plants: 1
 Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? Yes

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

MA DEP; 3/95

Lot 1.2 Stafford St., Leicester; TPW@A8

Section II. Indicators of Hydrology

1. Soil Survey

Is there a published soil survey for this site? -

title/date: -
map number: -
soil type mapped: -
hydric soil inclusions: -

Are field observations consistent with soil survey? -

Remarks: -

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottle Color
Litter	2		
O	4-0		
A	0-12	2.5Y 2.5/1	
Bg	12-16	2.5Y 5/2	10% 7.5YR 4/6

Remarks: Stony fine sandy loams

3. Other:

Conclusion: Is soil Hydric? Yes

Other Indications of Hydrology: (check all that apply and describe)

- ☐ Site inundated: _____
- ☐ Depth to free water in observation hole: _____
- ☐ Depth to soil saturation in observation hole: _____
- ☐ Water marks: _____
- ☐ Drift lines: _____
- ☐ Sediment deposits: _____
- ☐ Drainage patterns in BVW: _____
- ☐ Oxidized rhizospheres: _____
- ☒ Water-stained leaves: _____
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other): _____
- ☐ Other: _____

Vegetation and Hydrology Conclusion

	yes	no
Number of wetland indicator plants ≥ number of non-wetland indicator plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wetland hydrology present:		
hydric soil present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
other indicators of hydrology present	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample location is in a BVW	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Submit this form with the Request for Determination of Applicability or Notice of Intent.

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant:

Prepared by: EcoTec, Inc.

Project location: Lot 1.2 Stafford St., Leicester

DEP File # :

Check all that apply:

- ☐ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
☒ Vegetation and other indications of hydrology used to delineate BVW boundary: fill out Sections I and II
☐ Method other than dominance test used (attach additional information)

Section I. Vegetation		Observation Plot Number: UPLAND	Transect Number: TPW@A-8		Date of Delineation: 10/23/2015	
A. Sample Layer and Plant Species (by common/scientific name)			B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category *
Trees	Red Oak	<i>Quercus rubra</i>	50	50	Yes	FACU
	White Pine	<i>Pinus strobus</i>	50	50	Yes	FACU
Sapling	Red Maple	<i>Acer rubrum</i>	10	100	Yes	FAC*
Shrub	Mountain Laurel	<i>Kalmia latifolia</i>	40	100	Yes	FACU
Herb	Hayscented Fern	<i>Dennstaedtia punctilobula</i>	20	57.1	Yes	NL
	Teaberry	<i>Gaultheria procumbens</i>	10	28.6	Yes	FACU
	Striped Pipsisewa	<i>Chimaphila maculata</i>	5	14.3	No	NL

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c. 131, s. 40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusions:

Number of dominant wetland indicator plants: 1 Number of dominant non-wetland indicator plants: 5
 Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? No

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent.

MA DEP; 3/95

Lot 1.2 Stafford St., Leicester; TPU@A8

Section II. Indicators of Hydrology

1. Soil Survey

Is there a published soil survey for this site? -

title/date: -
map number: -
soil type mapped: -
hydric soil inclusions: -

Are field observations consistent with soil survey? -

Remarks: -

2. Soil Description

Horizon	Depth (inches)	Matrix Color	Mottle Color
Litter	2		
O	2-0		
A	0-4	10YR 3/3	
Bw	4-13	10YR 4/6	

Remarks: Very stony fine sandy loams

3. Other:

Conclusion: Is soil Hydric? No

Other Indications of Hydrology: (check all that apply and describe)

- ☐ Site inundated: _____
- ☐ Depth to free water in observation hole: _____
- ☐ Depth to soil saturation in observation hole: _____
- ☐ Water marks: _____
- ☐ Drift lines: _____
- ☐ Sediment deposits: _____
- ☐ Drainage patterns in BVW: _____
- ☐ Oxidized rhizospheres: _____
- ☐ Water-stained leaves: _____
- ☐ Recorded data (stream, lake, or tidal gauge; aerial photo; other): _____
- ☐ Other: _____

Vegetation and Hydrology Conclusion

	yes	no
Number of wetland indicator plants ≥ number of non-wetland indicator plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wetland hydrology present:		
hydric soil present	<input type="checkbox"/>	<input checked="" type="checkbox"/>
other indicators of hydrology present	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample location is in a BVW	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Submit this form with the Request for Determination of Applicability or Notice of Intent.