EXHIBIT 20
Received 10/11/16

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
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RECEIVED
OCT 11 2016
PLANNING BOARD
GRAFTON, MA

October 10, 2016

Grafton Memorial Municipal Center
30 Providence Road
Grafton, MA 01519

Re: 109 Adams Road, Grafton

Dear Commission Members:

During the Conservation Commission hearing on July 19, 2016 the Commission asked that the project undergo a peer review by Graves Engineering and JMM Wetland Consulting Services, LLC (JMM). The Graves Engineering review has been completed and on August 9, 2016, a site walk was conducted with James McManus, peer review consultant and Maria Mast, the Conservation Commission agent. Following this site walk, an email was sent out by Maria Mast requesting additional information prior to the completion of the JMM peer review followed by a letter from JMM requesting additional information before the peer review would be initiated. As such, this letter and attachments provide the requested information by the Conservation Commission and JMM.

The Commission's request has been provided below in italics followed by a detailed response for each request.

1) A comprehensive alternatives analysis must be submitted that explores all alternatives, including complete avoidance of the wetland crossing and wetland impacts as well as alternatives that reduce wetland impacts (ie. narrower road, eliminate sidewalks, bridge instead of culvert).

Response:
A detailed alternatives analysis is appended to this letter.

2) You should explore decentralizing the infiltration system and implementing more LID/green infrastructure on site (this is a requirement of our stormwater bylaw). Additional methods for infiltrating smaller storms throughout the site, prior to entering the stormwater basins, should be presented.

Response:
The Town of Grafton Stormwater Management Bylaw (Section 6) provides Stormwater Management Performance Standards

> "A. Minimum Performance Standards for compliance with Performance Standards of the Grafton Stormwater Management Bylaw, the applicant must meet all the standards of the

Massachusetts Department of Environmental Protection's Stormwater Management Standards and Handbook using current Best Management Practices (BMPs)."

The proposed project has been designed to fully comply with the Massachusetts Stormwater Management Standards with the Commission engaging Graves Engineering to review the design to ensure compliance. The details of this peer review and responses to comments are provided in a letter by McCarty Engineering.

In addition, the Stormwater Bylaw requires that Low Impact Development be encouraged as detailed below:

> B. Additional Design Criteria 1. Low Impact Development and Better Site Design . The use of non-structural LID Management practices and Better Site Design are encouraged to minimize reliance on structural management measures. The use of Better Site Design and or LID Management Practices may, if approved by the Conservation Commission, also allow for a reduction in the treatment volume, a reduction of applicable fees associated with the project, or other incentive approved by the Permitting Authority.

The project has included the use of rain gardens and has been redesigned to propose additional infiltration basins in an effort to decentralize the stormwater and promote infiltration. The proponent evaluated the possibility of utilizing additional LID measures. However, due to the slopes in the western portions of the site and the required off-sets required between wetlands and subsurface septic systems additional LID measures cannot meet the required slopes for grass swales and/or open drainage systems and off-set requirements. As required by the Stormwater Regulations LID measures are encouraged and have been utilized as site conditions allow. Where the LID cannot meet the siting requirements conventional stormwater sytems are proposed to fully comply with the Town of Grafton Stormwater Management Regulations.

3) *Demonstrate that no greater than 5000 square feet of wetlands will be impacted, including all associated tree clearing and construction access. Demonstrate that all Army Corps permitting requirements are being met, including vernal pool standards.*

Response:

The site plans propose impacts of 4,903 square feet of wetland fill to construct the proposed project. EcoTec and McCarty Engineering met with the Army Corps of Engineers regarding this project. The proponent is aware of the requirement to obtain Corps approval for this project and all required permits will be obtained.

4) Detailed plans of the wetland crossing, construction, phasing, and dewatering must be provided.

Response:

Detailed plans of the wetland crossing and replication area have been provided to the Conservation Commission.

5) Detailed wetland replication plan must be submitted.
Response:
A detailed Wetland Replication Protocol by EcoTec, Inc. dated July 19, 2016 is appended to this response letter. In addition, a wetland replication detail sheet has been added to the plan set and is attached to this submittal.

6) Provide additional information about the NHESP species on site, how the proposed project will impact species and habitat and what measures will be implemented to avoid harm.
Response:
On February 25, 2014, a MESA Review Checklist was submitted to the Natural Heritage and Endangered Species Program (NHESP) for the proposed project. The NHESP reviewed the proposed project and subsequently issued a finding that the project "as currently proposed, will not result in a prohibited 'take" on August 13, 2014. It is worth noting that this review occurred during the spring vernal pool season when the NHESP could evaluate any possible vernal pools under the appropriate conditions. Based upon the NHESP findings, no further filing is required under MESA. In addition, a complete copy of the Notice of Intent was submitted to the NHESP as required under the Wetlands Protection Act. On August 24, 2016, NHESP issued a finding that the proposed project "will not adversely affect the actual Resource Area Habitat of state-protected rare wildlife species" and again stated the same conclusion that the project will not result in a "take" under the MESA. As such, in accordance with 321CMR 10.18(4) the project "shall not be subject to further review under 321CMR 10.18."

The Wetlands Protection Act Regulations at 310CMR 10.59(1) specifically states that "the fact that a proposed project would alter a resource area that is located on an Estimated Habitat Map shall not be considered evidence in itself that such project is in fact within the habitat of a rare species." Furthermore, the NHESP determination letter stating that the project "will not adversely affect the actual Resource Area Habitat of state-protected rare wildlife species." "shall be presumed by the issuing authority to be correct." As such, the Commission must presume that the project will not result in impacts to actual resource area habitat for state-listed rare wildlife species and the project has undergone complete review by the NHESP and no further permitting is required.

Copies of these findings are appended to this letter.

7) What species of street trees are proposed?
Response:
The site plans have been revised to address this by including the street trees suggested by the Planning Department.

8) Provide operation and maintenance plan for rain gardens. Explain how the homeowners will be notified of the rain garden and taught how to maintain them.
Response:

An operations and maintenance plan has been provided and copies of the O&M Plan will be provided to each homeowner and additional infiltration basins are proposed to decentralize the stormwater system. The drainage easement will be included on the deed referencing the O&M Plan to ensure subsequent owners are made aware of the requirements.

9) Identify the location of stream on the plans that was mentioned during the hearing. Identify the riverfront area or demonstrate that the stream is intermittent.

Response:

The abutter's attorney asserted that the stream to the east of the site is a perennial stream with an associated Riverfront Area. This is not a correct statement and no supporting information was provided to support this claim. As detailed in the wetland resource evaluation dated December 10, 2013, the stream is clearly classified as an intermittent stream and located within the delineated BVW boundary to the east of the site as detailed in the report and cited below:

> "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 (i.e., Milford Quadrangle, dated 1982, attached) and observations made during the site inspection, a stream that is not shown on the USGS Map is located to the east of the site. The watershed area for this stream at the site was determined to be 0.18 square miles, which is less than 0.5 square miles (see attached watershed calculations). 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."

As detailed above with the supporting information found in EcoTec's wetland resource evaluation, Riverfront Area does not occur on the site.

10) Comments from the wetland peer reviewer and stormwater peer reviewer must be addressed. I have attached both to this email. At this time the wetland peer review is not complete as we are awaiting the submission of additional information.

Response:

Stormwater comments have been addressed by McCarty Engineering.

The following comments were provided by JMM, the Commission's peer review consultant for the proposed project and responses have been provided to address these comments.

JMM COMMENTS

11. A more detailed report discussing direct and indirect, short-term and long-term impacts to the regulated areas, which also addresses the Town by-law regarding setbacks to the regulated areas (i.e., wetland buffers). The report should include a

functions and values assessment.

Response:

The Grafton Conservation Commission has established performance standards in the Bylaw Regulations within subsection 5 of the performance standard section. The Commission has determined that activities in the jurisdictional resource abutting wetlands pose a significant risk to the health of such wetland resource areas. As such, with the exception of water dependent uses and access the Commission prohibits alteration within 25-feet of jurisdictional wetland resource areas. The proposed project has been designed to comply with this performance standard established by the Commission's regulations. In addition, the regulations regulate the locations for subsurface sewage disposal, prevent underground storage of gasoline, oils, fuels, and hazardous materials. The septic systems have been designed to keep the septic systems outside the 100-foot Buffer Zone and no underground storage of hazardous materials is proposed. The Commission can require additional undisturbed Buffers for projects involving steep slopes, highly erodible soils, extensive disturbed areas, or hydrologic conditions likely to promote significant erosion. The site contains well drained soils that are not highly erodible, limits disturbance, and the hydrologic conditions do not promote significant erosion. As such, the regulations do not allow the Commission to required additional undisturbed buffers. Regardless, the proponent has attempted to keep septic systems located along the roadway and minimized the areas of proposed lawn to minimize the disturbance within the 100-foot Buffer Zone.

The proposed replication area has been designed to fully comply with the Wetlands Protection Act regulations at 310CMR 10.55(4)1 through 7. As such, the proposed project fully complies with the performance standards.

12. A more robust alternatives analysis for both direct and indirect impacts to regulated areas.

Response:

A detailed alternatives analysis has been provided and is appended to this letter.

13. A robust analysis on potential mitigation opportunities at the site, including alternative locations, and a discussion of long-term wetland restoration and protection, throughout the site (e.g. invasives eradication/control).

Response:

The applicant is willing to work with the Conservation Commission and peer review consultant and adjust the wetland replication area to address any concern that the Commission has over the placement of the replication area. The original location depicted the wetland replication area contained within the open space parcel. Based upon concerns from the peer review consultant, the replication area has been relocated to be constructed within an upland peninsula located just easterly of the proposed crossing. This will require less excavation work, while providing the required replication. Other alternative locations were evaluated, but would require significant grading (similar to the original location) behind the proposed homes and were therefore dismissed. The relocation of the wetland replication area fully complys with the Wetlands Protection Act Regulations and Bylaw and Regulations.

14. More information is needed regarding listed species form the MA Natural Heritage, including targeted searches for the identified species and their primary habitats.
Response:
A detailed response has been made for the Conservation Commission's comment # 6 above and this issue has been addressed in advance of the filing of this Notice of Intent application.

JMM's preliminary review has identified the following issues and questions:
15. Our assessment of the quality and sensitivity of the wetland resources at the subject site indicates that a substantial undisturbed buffer is required to protect wetlands and their functions and values. The applicant should consider protecting considerably wider wetland buffers, in particular in Lots 12 through 15. Also, a method for shortterm (i.e. construction phase) and long-term protection of wetland buffers should be explored and proposed.
Response:
As noted above in the response to JJM's comment # 1 is provided above that addresses this comment. The proposed project utilized erosion control barriers and will adhere to the EPA Stormwater Pollution Prevention Plan (SWPPP) that will be completed in advance of the start of construction. In addition, the proponent will propose the use of signage and/or boulders along the limits of work in the Buffer areas to prevent future encroachment following completion of the project and complies with all Wetlands Protection Act regulations and Town of Grafton Wetlands Protection Bylaw setback requirements. This will protect wetland resource areas in the short and long-term.

16. Based on our review of the submitted plans it appears that primary and secondary direct wetland impacts associated with the proposed roadway crossing from Appaloosa Drive, are more than 4,903 square feet. If that is indeed the case, this proposal must also be submitted to the U.S. Army Corps of Engineers for review and approval.
Response:
As noted in the Conservation Commission response #3 above, the proponent has had an initial consultation with the Army Corps of Engineers and will secure all necessary permits.

17. JMM would request the applicant provide a detailed narrative and plan for the proposed wetland crossing, including dewatering activities.
Response:
A detail sheet has been added to the plan set to provide this requested detail.

The JMM peer review letter did not provide any discussion or update for the Conservation Commission regarding the site walk conducted on August 9, 2016. Therefore, EcoTec has included a brief summary to keep the Commission updated.

Wetland Resource Areas Evaluation:
On November 12, 2013, Scott Morrison of EcoTec, Inc. delineated the wetland resource areas on the site. A wetland resource area report has been provided describing those findings, with a copy of the report appended to this letter. On August 9, 2016, Scott Morrison of EcoTec, James McManus, peer review consultant, and Maria Mast, Grafton Conservation Commission agent conducted a site inspection to review the wetland delineation. No Bordering Vegetated Wetland (BVW) flags were adjusted during this inspection and therefore presumed to be accurate.

It should be noted that Mr. McManus asked that a small isolated depression containing hydric soils be delineated upgradient of wetland flag A44 and A45. This area is approximately 4 to 5 feet wide by 8-10 feet in length and clearly separated from the downgradient BVW. This area was delineated with flags Z (i.e., flags Z1 to Z4) to allow the area to be located in the field. This depression does not border a creek, stream, river, pond, or lake; accordingly, it would not be regulated as Bordering Vegetated Wetlands under the Act or Bylaw. Section 10.57(2)(b)1. Of the regulations states that "Isolated Land Subject to Flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area that at least once per year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches." Based upon field observations, the potential ponding area is too small to hold the requisite volume and depth of water to be regulated as Isolated Land Subject to Flooding under the Act. The Town of Grafton Wetlands Protection Bylaw regulates depressions that confine a volume of water of at least 500 cubic feet and to an average depth of at least 6 inches. Again, based upon field observations, this small depression cannot pond this volume or depth of water to be regulated under the Bylaw as Land Subject to Flooding. Accordingly, this area would not be subject to jurisdiction under the Act or Bylaw.

We expect that this letter and appendices address the Conservation Commission and JMM's concerns and will allow the peer review to proceed.

Please let me know if the Commission has any questions or concerns.

Sincerely,

Scott M. Morrison

Scott M. Morrison
Senior Environmental Scientist

17/E/GrafAppaloosaDrLetter2016.10.10

Attachments:
1. Alternatives Analysis by EcoTec dated October 10, 2016;
2. NHESP letter dated August 13, 2014;
3. NHESP letter dated August 24, 2016;
4. Wetland Resource Evaluation by EcoTec dated December 10, 2013;
5. Wetland Replication Protocol by EcoTec dated July 19, 2016; and
6. Revised Plans by McCarty Engineering

Alternatives Analysis by EcoTec dated October 10, 2016

EcoTec, Inc.

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ENVIRONMENTAL CONSULTING SERVICES
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WETLANDS PROTETION ACT AND BYLAW ALTERNATIVES ANALYSIS

Estates at Bull Meadow
109 Adams Road
Grafton, Massachusetts

Prepared For:

Bull Meadow, LLC
2 Rachel Road
Boylston, MA 01505

Prepared By:

Scott M. Morrison, PWS, RPSS
Sr. Environmental Scientist

October 10, 2016

PROJECT DESCRIPTION:
The Project Site is comprised of two parcels of land located off Appaloosa Drive and Bridle Ridge Drive in Grafton, Massachusetts. The parcels are shown on the Town of Grafton Assessor's Maps as Map 32 Parcel 5A, and a 9.33-acre portion of Map 32 Parcel 100. The site will be accessed via a Future Roadway Easement on Appaloosa Drive and an existing Town of Grafton right of way off Bridle Ridge Drive (Parcel X).

The proposed project is a residential subdivision consisting of fifteen (15) single family residential units and two (2) roadways. Paddock Ridge Drive will connect Appaloosa Drive to Bridle Ridge Drive and is approximately 1,676 feet in length, and Carriage House Lane will be a cul-de-sac roadway off of Paddock Ridge Drive and is approximately 489 feet in length to the center of cul-de-sac.

The total Project Area is 33.38 acres, comprised of approximately 21± acres of woodland area and the remaining 12± acres are bordering vegetated wetlands. The wetlands were flagged by EcoTec, Inc. of Worcester, MA, and were survey located as shown on the site plans. Soil testing was performed throughout the site and it was observed that the soils are primarily very well drained with seasonal high groundwater varying from six (6) to ten (10) feet deep. The soils on site are well suited for on-site sewage disposal systems and storm water management.

All of the proposed lots conform to the dimensional requirements of the R40 Zoning District. The lots range in size from the minimum required size of 0.92 Acres to the largest lot having an area of 2.69 acres. In addition to the 15 building lots, two open space Parcels are being created containing an area of 4.97 and 7.44 acres respectively for a total of 12.41 acres which is equal to 37.2% of the Project Area.

The existing 50-foot-wide drainage, trail and future road easement at the cul-de-sac on Appaloosa Drive was established during the subdivision approval process for North Grafton Estates – Phase II (2002) in order to provide access to this parcel for a third phase of development. Although the easement is of sufficient width to provide access to the parcel, the easement location terminates within twenty feet of a bordering vegetated wetland (BVW), making a wetland crossing unavoidable. In order to minimize the impact, a waiver is being requested from the Town of Grafton Subdivision Regulations to minimize the roadway cross section which will reduce the total area of wetland being impacted. As currently designed, 4,903 SF of BVW is being impacted, and 4,903 SF is proposed to be replicated on site.

ALTERNATIVES ANALYSIS:
This alternatives analysis has been prepared in accordance with the requirements under the Wetlands Protection Act Regulations and the Town of Grafton Wetlands Administration Bylaw and Regulations.

The Wetlands Protection Act regulations at 310CMR 10.53(3) state:
(3) Notwithstanding the provisions of 310 CMR 10.54 through 10.58 and 10.60, the issuing authority may issue an Order of Conditions and impose such conditions as will

contribute to the interests identified in M.G.L. c. 131, § 40 permitting the following limited projects (although no such project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59). In the exercise of this discretion, the issuing authority shall consider the magnitude of the alteration and the significance of the project site to the interests identified in M.G.L. c. 131, § 40, the availability of reasonable alternatives to the proposed activity, the extent to which adverse impacts are minimized, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40.

(e) The construction and maintenance of a new roadway or driveway of minimum legal and practical width acceptable to the planning board, where reasonable alternative means of access from a public way to an upland area of the same owner is unavailable. Such roadway or driveway shall be constructed in a manner which does not restrict the flow of water. Reasonable alternative means of access may include any previously or currently available alternatives such as realignment or reconfiguration of the project to conform to 310 CMR 10.54 to 310 CMR 10.58 or to otherwise minimize adverse impacts on resource areas. The issuing authority may require the applicant to utilize access over an adjacent parcel of land currently or formerly owned by the applicant, or in which the applicant has, or can obtain, an ownership interest. The applicant shall design the roadway or driveway according to the minimum length and width acceptable to the Planning Board, and shall present reasonable alternative means of access to the Board. The applicant shall provide replication of bordering vegetated wetlands and compensatory flood storage to the extent practicable. In the Certificate of Compliance, the issuing authority may continue a condition imposed in the Order of Conditions to prohibit further activities under 310 CMR 10.53(3)(e).

The Town of Grafton Wetlands Protection Bylaw Section C (1), which states:

In situations where the applicant demonstrates that there are no feasible alternatives that provide for fewer impacts on the wetlands resource values, the Commission may allow the loss, alteration, or temporary surface disturbance of up to a cumulative total of five thousand (5,000) square feet of wetlands and related surface and ground water resource areas when said areas are replaced, replicated, or restored in accordance with the following criteria:...

Similar to the Wetlands Protection Act regulations, the Bylaw contains a provision for access in the Town of Grafton Wetlands Protection Bylaw Section C (2), which states:

2. Notwithstanding other provisions of Section V, the Commission may permit the construction and maintenance of a new roadway or driveway of minimum legal and practical width acceptable to Planning Board dimensional standards, where an owner has no alternative means of access from an existing public or private way or across other property of the same owner from an existing public or private way, to any of the upland area on the property. Replication of altered wetlands resources may be required by the

Commission to minimize adverse impacts and to protect the interests identified in the By-Law.

In accordance, with the Wetlands Protection Act and the Town of Grafton Wetlands Protection Bylaw the following alternatives analysis has been prepared to evaluate numerous alternatives and conclude if the alternatives were feasible and can be incorporate into the project design. Alternatively, if alternatives are not feasible they are discussed in detail and dismissed as viable alternatives.

Project Alternatives:

No Build:
The No-build Alternative assumes that that the proposed development does not occur. This alternative fails to meet the project purpose of developing the site. Under this alternative, the project purpose would not be realized and the land would remain available for development as allowed under its residential zoning. Lastly, over twelve (12.41±) acres of land would not be protected open space.

Cul-de-sac with Three Residential Lots Alternative:
The three lot cul-de-sac alternative consists of the construction of a cul-de-sac roadway with three frontage lots. This conceptual alternative roadway would have a cul-de-sac roadway configuration off Bridle Ridge Drive with no wetland impacts. The cul-de-sac would need to be constructed to a maximum length of 500-feet as required by the Planning Board. Given the roadway length limitation prohibiting access beyond the 500-foot roadway, access to the developable portions of the eastern portions of the site is prohibited under this alternative. This alternative would not protect any open space and allow portions of the site to remain available for future development. However, because this limits development to 3 lots, this is not an economically equivalent alternative and prevents access to otherwise developable land. Therefore, on this basis this alternative has been dismissed.

Cul-de-sac with Fifteen (15) residential Lots:
The fifteen lot cul-de-sac alternative consists of the construction of a roadway off Bridle Ridge Drive with fifteen frontage lots. This conceptual alternative roadway would have a similar roadway configuration as the preferred alternative minus the connector to Appaloosa Drive, which eliminates the wetland impacts the roadway would require a 1,700± dead end roadway. Given that the Planning Board regulations prohibit cul-de-sacs exceeding 500-feet in length this alternative is prohibited by the Planning Board and therefore not a viable alternative.

Preferred Alternative:
The preferred alternative includes the creation of a fifteen (15) lot subdivision accessed by two (2) roadways. Paddock Ridge Drive is the main roadway that bisects the property with frontage for 10 residential lots. Carriage House Lane is a cul-de-sac roadway off of Paddock Ridge Drive that provides frontage for 5 lots. The loop roadway is required to access the developable portions of the site as required by the Planning Board. Each lot is

planned to contain a single family residence consistent with the adjacent neighborhood, paved driveway, septic system and associated grading of the site to facilitate the proposed improvements. The location of the houses on the lots allows the residences to have a useable front yard with adequate space to site a septic tank and leach field to service the residences. Hay bales and silt fence erosion control measures are proposed downgradient of the limit of disturbance on each lot to minimize the risk of siltation occurring within the resource areas and buffer zones. A portion of the development on six of the proposed lots is located within the 100-ft wetland buffer zone and will require permitting with the Grafton Conservation Commission.

Access to the proposed subdivision is being provided through Parcel X on Bridle Ridge Drive, an existing Town of Grafton Right of Way that was established as a future road and drainage easement for development of the subject property. Access is also proposed through the existing 50-foot wide drainage, trail and future road easement at the cul-de-sac on Appaloosa Drive as described above.

This alternative will permanently protect 12.41 acres of open space land located in the northern and eastern portions of the site which is connected to other protected lands in the area and allow access to developable portions of the property.

Evaluation of Site Access Alternatives:
EcoTec conducted a field evaluation to evaluate the possibility of accessing the site through adjacent lots to access the buildable upland in the central portion of the site with fewer impacts than proposed in the preferred alternative. As of the date of this analysis none of these parcels are on the market and are therefore not for sale. Nevertheless, this analysis has fully evaluated these alternatives.

Southern Access:
The Massachusetts Turnpike is located to the south of the site. Even if access were available from the south of the site a bridge over three (3) east bound and three (3) west bound lanes of traffic would be required. Therefore, this is not an economically viable site access alternative.

Northern and Eastern Access:
Access to the site from the north and east sides of the site were evaluated. There are sizeable wetlands located to the north and east of the site. Therefore, access from these directions (if available) would require significant wetland crossings that would exceed the proposed impacts off Appaloosa Drive. Therefore, based upon an increase in wetland impacts this is not a viable site access alternative.

Western Access:
Access locations from the west were evaluated. This area consists of existing single-family homes and stormwater management basin constructed during the initial phases of the development of the site. None of these homes are currently for sale. Even if one were available, this alternative would require purchasing a home, demolishing the home and

reconfiguring the stormwater management system. This would be a significant additional expense. Therefore, this is not an economically viable site access alternative.

Proposed Crossing (Methods) Alternatives:

Culvert Installation:
Installation of a small diameter culvert was considered. This would consist of the installation of one or multiple 12-24 inch culverts to convey water beneath the proposed roadway. Since there is no stream channel within the area of the proposed wetland crossing and minimal flow occurs at this location. Therefore, a small diameter culvert is permitable at this location. However, this culvert installation alternative was rejected because installation of a box culvert for wildlife passage was found to be a viable alternative. Therefore, upgrading of the culvert with an oversized box culvert is proposed to be utilized for the proposed project.

Bridging of Wetlands:
The project proponent has considered the possibility of bridging all or part of the wetlands at the proposed access road. The Massachusetts Department of Transportation ("MassDOT") uses a "rule of thumb" for determining rough estimates of bridge costs:

- Bridge cost:
  - up to 5,000 SF Area of Bridge: $450/SF
  - 5,000 to 10,000 SF Area of Bridge: $650/SF
- approach work = 10% of cost
- contingency = 35% of cost

Bridge Option 1: Total BVW span: 150-ft span x 40-ft width= 6,000 sf

Cost = $650 x 6,000 SF = $3.9M
+ $390,000 approach work
+ $1.365M contingency
$5.655M = TOTAL BRIDGE COST

Bridge Option 2: 100-foot span: 100-foot span x 40-foot width = 4,000 SF

Cost = $450 x 4,000 SF = $1.8M
+ $180,000 approach work
+ $630,000 contingency
$2.6M = TOTAL BRIDGE COST

Based upon this analysis, the applicant has concluded that spanning the wetland, more than as proposed through the use of the box culvert, is cost prohibitive and not feasible for this proposed project. In addition, the roadway at the proposed crossing location

curves to minimize wetland impacts. A bridge configuration would require that the roadway be straightened, which would increase the width of the wetland crossing. Given the topography of the area, the bridge deck would be just off the ground surface, which would shade a considerable portion of the wetland and prevent vegetation from growing. As such, there would be considerable impacts caused by shading, which would likely require stone or rip-rap stabilization beneath the bridge and a replication area to mitigate for the impacts to wetlands caused by the bridging and stabilization. As such, while this is a conceptually available alternative it will result in additional wetland impacts and is therefore not a reasonable or practicable alternative.

Preferred Crossing: The preferred project alternative includes one proposed crossing with an oversized box culvert within the bordering Vegetated Wetland. More than one crossing may be permitted in cases such as this one, in order to provide safe permittable access to otherwise unreachable significant upland areas under the control of the proponent, as contemplated by the Wetlands Protection Act Regulations and MassDEP Wetlands Policy 88-2. This proposed crossing has been designed to minimize the impacts to resource area and providing adequate replication. In addition, the proposed access road makes use of vertical retaining walls to minimize the footprint of the proposed roadway.

LIMITED PROJECT CROSSING:

The wetland crossings for the proposed project is proposed at 4,903 square feet of impact and do not need to qualify as a Limited Project to be approved under the Wetlands Protection Act regulations or the Town of Grafton Wetlands Protection Bylaw. Regardless, it meets the requirements to qualify as a Limited Project under the Wetlands Protection Act Regulations because there are no reasonable alternative means of access from a public way to an upland area of the same owner, which would be approved by the Planning Board. A detailed alternatives analysis is presented below to justify the proposed crossings. Section 310CMR 10.53 of the Wetlands Protection Act regulations states:

> (3) Notwithstanding the provisions of 310 CMR 10.54 through 10.58 and 10.60, the issuing authority may issue an Order of Conditions and impose such conditions as will contribute to the interests identified in M.G.L. c. 131, § 40 permitting the following limited projects (although no such project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59). In the exercise of this discretion, the issuing authority shall consider the magnitude of the alteration and the significance of the project site to the interests identified in M.G.L. c. 131, § 40, the availability of reasonable alternatives to the proposed activity, the extent to which adverse impacts are minimized, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40.

(e) The construction and maintenance of a new roadway or driveway of minimum legal and practical width acceptable to the planning board, where reasonable alternative means of access from a public way to an upland area of the same owner is unavailable. Such roadway or driveway shall be constructed in a manner which does not restrict the flow of water. Reasonable alternative means of access may include any previously or currently available alternatives such as realignment or reconfiguration of the project to conform to 310 CMR 10.54 to 310 CMR 10.58 or to otherwise minimize adverse impacts on resource areas. The issuing authority may require the applicant to utilize access over an adjacent parcel of land currently or formerly owned by the applicant, or in which the applicant has, or can obtain, an ownership interest. The applicant shall design the roadway or driveway according to the minimum length and width acceptable to the Planning Board, and shall present reasonable alternative means of access to the Board. The applicant shall provide replication of bordering vegetated wetlands and compensatory flood storage to the extent practicable. In the Certificate of Compliance, the issuing authority may continue a condition imposed in the Order of Conditions to prohibit further activities under 310 CMR 10.53(3)(e).

The wetland crossings for the proposed project is proposed at 4,903 square feet of impact and do not need to qualify under the access provision of the Bylaw. As detailed above there are no feasible alternative means and methods of access from a public way to an upland area of the same owner, which would be approved by the Planning Board due to roadway length restrictions, which prevent access to otherwise developable land.

Given that the Planning Board will require two means of access to the site for development of the upland portions of the site, the applicant will be requesting that the Planning Board waive the width requirements at the crossing to minimize impacts to wetland resource areas. As such, the crossing will be proposed to meet the minimum width and length acceptable to the Planning Board. Should the Planning Board reject the request to minimize the roadway width, which would increase the impacts to over the 5,000 square foot threshold, the applicant will request a waiver from the Bylaw requirements. The Commission has approved exceedances of the 5,000 square foot threshold in similar situations such as the Brookmeadow Subdivision in Grafton where the Planning Board required multiple access points and the project exceeds the 5,000 square foot threshold. Interestingly, EcoTec is not aware that the Conservation Commission requested an alternatives analysis nor did the project minimize wetland impacts for this analogous subdivision, which permitted 7,295 square feet of wetland fill.

NHESP letter dated August 13, 2014

EcoTec, Inc.

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

August 13, 2014

Gordon Lewis
Bull Meadow LLC
2 Rachel Road
Boylston MA 01515

RE: Project Location: off Appaloosa Drive, GRAFTON
Project Description: 18 Lot Residential Subdivision
NHESP File No.: 12-31264

Dear Applicant:

Thank you for submitting the MESA Project Review Checklist, site plans (dated 2/10/2012, revised 1/8/2014) and other required materials to the Natural Heritage and Endangered Species Program of the MA Division of Fisheries & Wildlife (the "Division") for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

Based on a review of the information that was provided and the information that is currently contained in our database, the Division has determined that this project, as currently proposed, **will not result in a prohibited "take"** of state-listed rare species. This determination is a final decision of the Division of Fisheries & Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Lauren Glorioso, Endangered Species Review Assistant, at (508) 389-6361.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

cc: Scott Morrison, EcoTec, Inc.
Jeffrey Simon, Massachusetts Department of Transportation

NHESP letter dated August 24, 2016

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Jack Buckley, *Director*

August 24, 2016

Gordon Lewis
Bull Meadow LLC
2 Rachel Road
Boylston MA 01515

Grafton Conservation Commission
30 Providence Rd.
Grafton MA 01519

RE:	Project Location:	109 Adams Road, off Appaloosa Drive, Grafton
	Project Description:	15 Unit Residential Subdivision
	DEP Wetlands File No.:	Not Issued
	NHESP File No.:	**12-31264**

Dear Applicant and Commissioners:

The Natural Heritage & Endangered Species Program of the MA Division of Fisheries and Wildlife (the "Division") has received and reviewed a Notice of Intent and revised plans (dated June 10, 2016) for the subject project in compliance with the rare wildlife species section of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.37) and the MA Endangered Species Act Regulations (321 CMR 10.18).

WETLANDS PROTECTION ACT (WPA)

Based on a review of the information that was provided and the information that is currently contained in our database, the Division has determined that this project, as currently proposed, **will not adversely affect** the actual Resource Area Habitat of state-protected rare wildlife species. Therefore, it is our opinion that this project meets the state-listed species performance standard for the issuance of an Order of Conditions.

Please note that this determination addresses only the matter of **rare** wildlife habitat and does not pertain to other wildlife habitat issues that may be pertinent to the proposed project.

MASSACHUSETTS ENDANGERED SPECIES ACT (MESA)

The Division finds that the revised plans do not change our previous determination that this project **will not result in a prohibited "take"** of state-listed rare species (Division letter dated August 13, 2014) and that previous determination stands. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. Any activity not included in the current filing and located within *Priority Habitat* may require an additional filing with the Division for review if not otherwise exempt. If no physical work is commenced on the above proposed project within five years from the date of issuance of our original letter or there is a material change in the plans that were submitted to the Division, updated information and/or plans must be sent to the Division for review prior to any work.

Please contact Eve Schlüter, Chief of Regulatory Review, at eve.schluter@state.ma.us or 508-389-6346 with any questions or comments.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

cc: Brian Marchetti, McCarty Engineering, Inc.
MA DEP Central Region

Wetland Resource Evaluation by EcoTec dated December 10, 2013

EcoTec, Inc.

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

December 10, 2013

Patrick McCarty, PE
McCarty Engineering
42 Jungle Road
Leominster, MA 01453

RE: Wetland Resource Evaluation, Appaloosa Drive, Grafton, Massachusetts

Dear Mr. McCarty:

On November 12, 2013, 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"); (2) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands); and (3) the Town of Grafton Wetlands Protection Bylaw. Scott Morrison, RPSS conducted the inspection.

The subject site consists of several lots located at the end of Appaloosa Drive owned by Bull Meadow, LLC and the Mass Turnpike Authority. The portions of the site inspected consist of the southern portions of the Bull Meadow LLC property and the northeasterly portion of the Mass Turnpike property as depicted on the Conceptual Subdivision Plan by McCarty Engineering, Inc. dated February 10, 2012. The upland portions of the site consist of undeveloped forest. Plant species observed include northern red oak (*Quercus rubra*), white oak (*Quercus alba*), eastern white pine (*Pinus strobus*), black cherry (*Prunus serotina*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), shag-bark hickory (*Carya ovata*), white ash (*Fraxinus americana*), black birch (*Betula lenta*), and sassafras (*Sassafras albidum*) trees and/or saplings; poison ivy (*Toxicodendron radicans*) and Virginia creeper (*Parthenocissus quinquefolia*) climbing woody vines; American witch-hazel (*Hamamelis virginiana*), highbush blueberry (*Vaccinium corymbosum*), mountain laurel (*Kalmia latifolia*), eastern red cedar (*Juniperus virginiana*), American hazel-nut (*Corylus americana*), and maple-leaf viburnum (*Viburnum acerifolium*) shrubs; and sheep-laurel (*Kalmia angustifolia*), lowbush blueberry (*Vaccinium angustifolium*), wild sarsaparilla (*Aralia nudicaulis*), tree clubmoss (*Lycopodium obscurum*), bracken fern (*Pteridium aquilinum*), hayscented fern (*Dennstaedtia punctilobula*), teaberry (*Gaultheria procumbens*), partridge-berry (*Mitchella repens*), feather false-Solomon's-seal (*Smilacina racemosa*), wild-lily-of-the-valley (*Maianthemum canadense*), striped pipsissewa (*Chimaphila maculata*), and Indian pipe (*Monotropa uniflora*) ground cover. 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 List of Plant Species that Occur in Wetlands: Massachusetts* (Fish and Wildlife Service, U.S. Department of the Interior, 1988). 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 A16 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 A1 to A77 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the northern portion of the site that is associated with an intermittent stream.
Start B1 to B11 Connect to D22	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the northeastern portion of the site that is associated with an intermittent stream.
Start C1 to C24 Stop	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the southeastern portion of the site that is associated with an n intermittent stream.
Start D1 to D22 Connect to B11	Blue Flags	Boundary of Bordering Vegetated Wetlands located in the eastern portion of the site that is associated with an intermittent stream.

Findings

Wetland A, B, C, & D consists of a shrub/forested swamp located in the northern and eastern portions of the site that is associated with an intermittent stream. Plant species observed include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), gray birch (*Betula populifolia*), swamp tupelo (*Nyssa sylvatica*), and American elm (*Ulmus americana*) trees and/or saplings; poison ivy (*Toxicodendron radicans*) and common greenbrier (*Smilax rotundifolia*) climbing woody vines; highbush blueberry (*Vaccinium corymbosum*), common winterberry (*Ilex verticillata*), arrow-wood (*Viburnum dentatum*), northern spicebush (*Lindera benzoin*), swamp rose (*Rosa palustris*), speckled alder (*Alnus rugosa*), silky dogwood (*Cornus amomum*), maleberry (*Lyonia ligustrina*), sweet pepper-bush (*Clethra alnifolia*), swamp azalea (*Rhododendron viscosum*), and American elderberry (*Sambucus canadensis*) shrubs; and sheep-

laurel (*Kalmia angustifolia*), bristly blackberry (*Rubus hispidus*), cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), sensitive fern (*Onoclea sensibilis*), skunk-cabbage (*Symplocarpus foetidus*), swamp Jack-in-the-pulpit (*Arisaema triphyllum*), Alaska goldthread (*Coptis trifolia*), spotted touch-me-not (*Impatiens capensis*), shining clubmoss (*Lycopodium lucidulum*), and sphagnum moss (*Sphagnum sp.*) ground cover. Evidence of wetland hydrology, including hydric soils, high groundwater, saturated soils, 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 and Bylaw.

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 determine if Bordering Land Subject to Flooding occurs 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.

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 (i.e., Milford Quadrangle, dated 1982, attached) and observations made during the site inspection, a stream that is not shown on the USGS Map is located to the east of the site. The watershed area for this stream at the site was determined to be 0.18 square miles, which is less than 0.5 square miles (see attached watershed calculations). 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, Grafton Quadrangle, valid from October 1, 2008, there are no Certified Vernal Pools on or in the immediate vicinity of the site. However, the site is located within an Estimated Habitat and a Priority Habitat. A copy of this map is attached. The Regulations at 310 CMR 10.59 state that projects proposed within an Estimated Habitat as indicated on the most recent map published by the Natural Heritage and Endangered

Species Program require a fully completed copy of any required Notice of Intent filed under the Act and Regulations (including all plans, reports, and other required materials) to be submitted to the Natural Heritage and Endangered Species Program no later than the date of filing with the issuing authority. In addition, in July 2005, the Massachusetts Endangered Species Act (M.G.L. Ch. 131A; "MESA") regulations (321 CMR 10.00 *et seq.*; the "MESA Regulations") were revised to provide formal review procedures for projects and activities proposed within a Priority Habitat. For nonexempt projects or activities proposed within a Priority Habitat, an additional filing beyond that required under 310 CMR 10.59 for a project proposed within an Estimated Habitat, or a consolidated filing that meets the requirements under 321 CMR 10.20 and 310 CMR 10.59, must be made with the Natural Heritage and Endangered Species Program to allow the project or activity to be reviewed under MESA or under MESA and the Act, respectively.

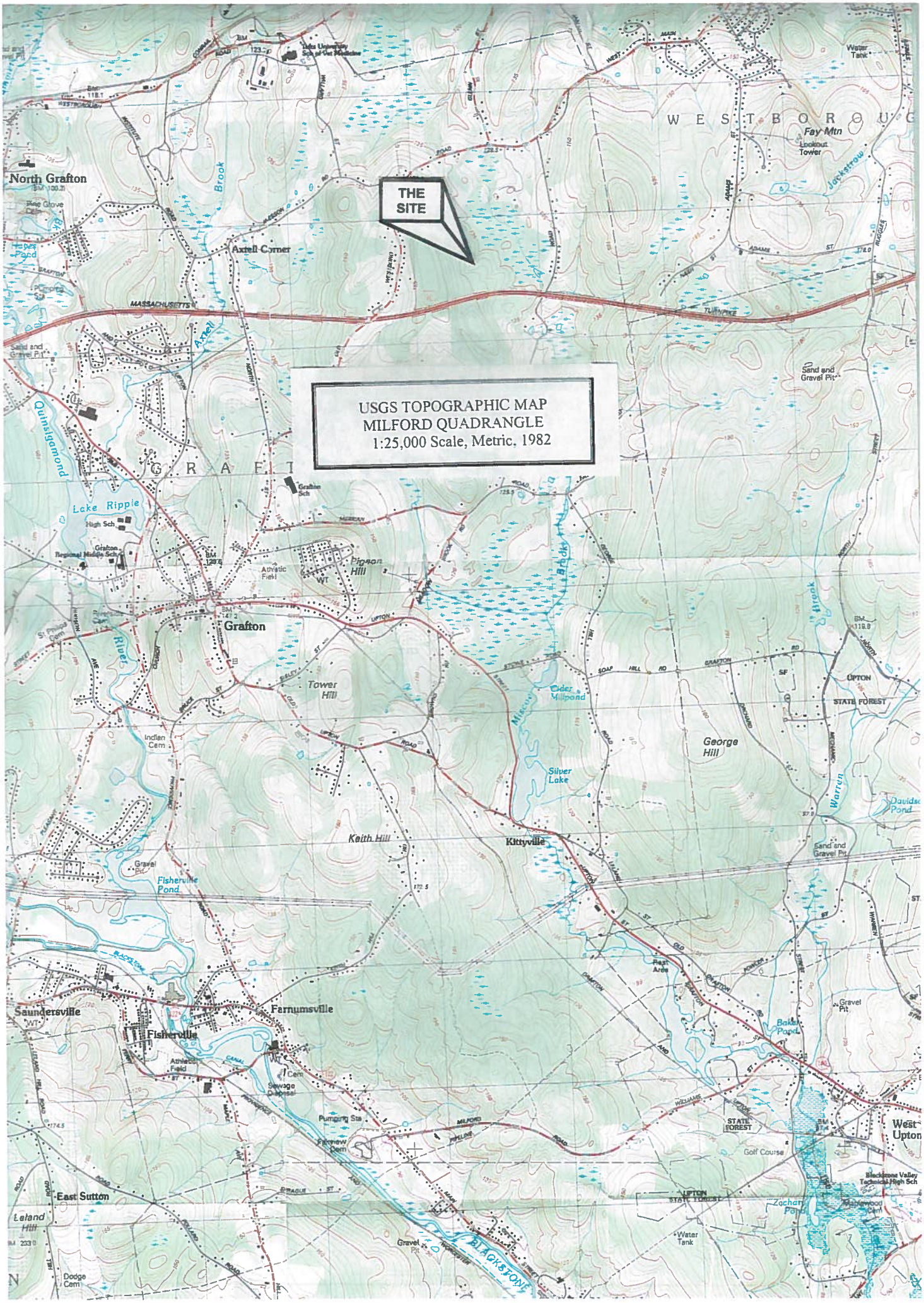
The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. A brief description of my experience and qualifications is attached. If you have any questions, please feel free to contact me at any time.

Cordially,
ECOTEC, INC.

Scott M. Morrison, RPSS
Senior Environmental Scientist

Attachments (6, 8 pages)

17/w/GrafAppaloosaDrReport


THE SITE
USGS TOPOGRAPHIC MAP
MILFORD QUADRANGLE
1:25,000 Scale, Metric, 1982
North Grafton
Axtell Corner
Grafton
Tower Hill
Keith Hill
Kittyville
George Hill
Silver Lake
Cider Millpond
Fisherville Pond
Saundersville
Fisherville
Farnumsville
East Sutton
West Upton
Lake Ripple
Quinsigamond
Fay Mtn
Lookout Tower
Sand and Gravel Pit
Golf Course
Water Tank
Pumping Sta
Sewage Disposal
Athletic Field
Indian Cem
Dodge Cem
Leland Hill
Zachary Pond
Baker Pond
Davidson Pond
Warren
Jackstraw
Brook
Axtell
Miscoe
Blackstone
Mapleswood Cem
Blackstone Valley Technical High Sch
Fairview Cem
Gravel Pit
Rest Area
Pigeon Hill
Athletic Field
Grafton Sch
High Sch
Regional Middle Sch
St Philips Cem
Hayes Pond
Pine Grove Cem
Sand and Gravel Pit
MASSACHUSETTS
TURNPIKE
UPTON
STATE FOREST
WESTBOROUG
GRAFT

Priority Habitats and Estimated Habitats - Effective October 1, 2008

Priority Habitats for use with the MA Endangered Species Act Regulations (321 CMR 10)

Estimated Habitats for use with the MA Wetlands Protection Act Regulations (310 CMR 10)

Produced by the Natural Heritage & Endangered Species Program *website: www.nhesp.org*

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Priority Habitat of Rare Species

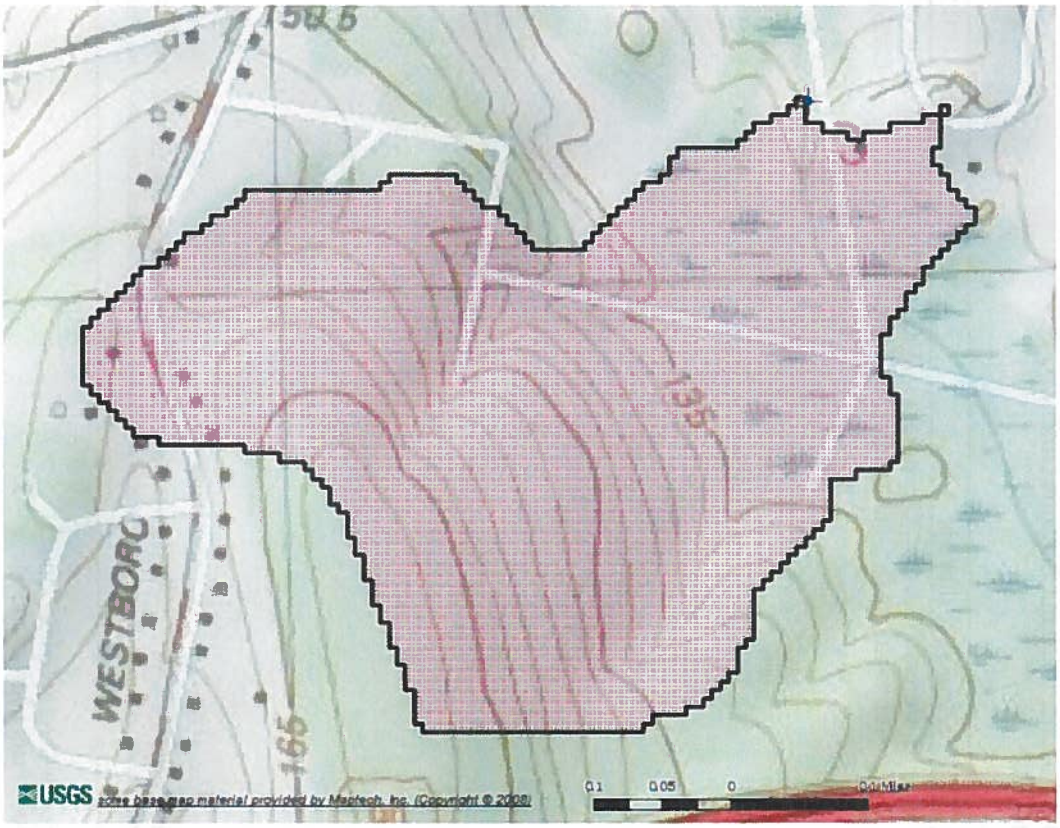
Priority Habitat of Rare Species and also Estimated Habitat of Rare Wildlife

Certified Vernal Pool (as of July 31, 2008)

N

0 0.5 1 2 Miles

Grafton Quad



Basin Characteristics Report

Date: Wed Nov 13 2013 07:48:59 Mountain Standard Time
NAD27 Latitude: 42.2362 (42 14 10)
NAD27 Longitude: -71.6587 (-71 39 31)
NAD83 Latitude: 42.2363 (42 14 11)
NAD83 Longitude: -71.6582 (-71 39 29)
ReachCode: 01070005005067
Measure: 88.77

Parameter	Value
X coordinate of the outlet in Massachusetts State Plane (meters)	186945.0
Y coordinate of the outlet in Massachusetts State Plane (meters)	887325.0
X coordinate of the centroid in Massachusetts State Plane (meters)	186656.1
Y coordinate of the centroid in Massachusetts State Plane (meters)	886970.7
Area in square miles	0.18

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

Applicant: Prepared by: EcoTec, Inc. Project location: Grafton, Appaloosa Drive 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: A-16 Date of Delineation: 11/12/13

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 *
Tree	red maple	*Acer rubrum*	40%	100%	yes	FAC*
Sapling	black cherry	*Prunus serotina*	20%	33%	yes	FACU
	black birch	*Betula lenta*	20%	33%	yes	FACU
	red oak	*Quercus rubra*	20%	33%	yes	FACU-
Shrub	hazelnut	*Corylus americana*	60%	100%	yes	FACU-
Ground Cover	cinnamon fern	*Osmunda cinnamomea*	30%	100%	yes	FACW*

*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: 2 Number of dominant non-wetland indicator plants: 4

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.

Grafton, Appaloosa Drive- Upland

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
A	0-6	10YR 3/2	
Bw	6-16	10YR 4/6	

Remarks: fine sandy loam

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	☐	☑
Wetland hydrology present:		
hydric soil present	☐	☑
other indicators of hydrology present	☐	☑
Sample location is in a BVW	☐	☑

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: Grafton, Apaloosa Drive 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: A-16 Date of Delineation: 11/12/13

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 *
Tree	red maple	*Acer rubrum*	40%	100%	yes	FAC*
Sapling	red maple	*Acer rubrum*	20%	100%	yes	FAC*
Shrub	arrow-wood	*Viburnum dentatum*	60%	75%	yes	FAC*
	highbush blueberry	*Vaccinium corymbosum*	20%	25%	yes	FACW-*
Ground Cover	uptight sedge	*Carex stricta*	60%	100%	yes	OBL*

*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: 5 Number of dominant non-wetland indicator plants: 0

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.

Grafton, Appaloosa Drive- Wetland

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
O	0-8		
A	8-16	10YR 2/1	
Bg	16-20	10YR 4/1	

Remarks: silt loam

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: surface
- ☐ 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	☑	☐
Wetland hydrology present:		
hydric soil present	☑	☐
other indicators of hydrology present	☑	☐
Sample location is in a BVW	☑	☐

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

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

Scott M. Morrison, RPSS, ASE
Senior Environmental Scientist

Scott Morrison is a Senior Environmental Scientist with EcoTec, Inc. Since joining EcoTec in 2000, Mr. Morrison's project experience include wetland resource evaluation, delineation, and permitting at the local, state, and federal levels; wildlife habitat evaluation; pond and stream evaluation; vernal pool evaluation, monitoring, and certification; wetland replacement, replication, and restoration area design, construction, and monitoring; soil evaluations to determine infiltration rates and seasonal high groundwater elevations for detention basin construction; environmental sampling and analysis tasks, including soil and groundwater sample collection and handling; and expert testimony preparation. He has conducted rare species habitat assessments for the eastern box turtle, wood turtle, Blanding's turtle, spotted turtle, and marbled salamander. He has participated in rare species studies for rare species including the marbled salamander, piping plover, eastern box turtle, and northern diamondback terrapin and developed mitigation strategies for the marbled salamander, spotted turtle, eastern box turtle and wood turtle. He has participated in visual preconstruction sweeps for the wood turtle and both preconstruction and research projects for the eastern box turtle. He has served as a consultant to municipalities, conservation commissions, engineering and survey firms. He has completed numerous wetland related projects including environmental impact assessments for proposed development, erosion control and environmental monitoring for subdivisions, commercial developments, golf courses and landfills. He has prepared Massachusetts Environmental Policy Act (MEPA) documentation, including Environmental Notification Forms (ENFs), Notice of Project Changes (NPCs), and Draft and Final Environmental Impact Reports (EIRs) including Green House Gas Assessments for various projects including subdivisions, commercial buildings, and dredging projects. Prior to joining EcoTec, Inc. Mr. Morrison worked for the Massachusetts Department of Environmental Management (currently the Department of Conservation and Recreation) where he was involved with the monitoring and protection of endangered species and rare old growth forest. He was an active member of the Spencer Conservation Commission from 1998 to 2000 where he provided oversight of proposed wetland replication projects and review of projects submitted for wetland permitting. His educational background includes courses in forestry, ecology, chemistry, soils, and natural resource policy. His prior research experience includes research on forest succession and field research on nesting piping plovers, an endangered coastal shore bird.

Education:

Graduate Soil Science Certificate Program
University of Massachusetts at Amherst, 2006
Bachelor of Science: Natural Resource Studies
University of Massachusetts at Amherst, 1998
Associate of Science: Business Administration
Quinsigamond Community College, 1996

Professional Affiliations:

Registered Professional Soil Scientist, Society of Soil Scientists of Southern New England (SSSSNE)
Massachusetts Association of Conservation Commissioners
Association of Massachusetts Wetland Scientists
Society of Wetland Scientists

Wetland Replication Protocol by EcoTec dated July 19, 2016

EcoTec, Inc.

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES
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BORDERING VEGETATED WETLAND REPLICATION CONSTRUCTION PROTOCOL:

ESTATES AT BULL MEADOW
NORTH GRAFTON, MA

JULY 19, 2016

1. The following protocol conforms to the general performance standards in the MA Wetlands Protection Act Regulations at 310 CMR 10.55(4)(b)

2. The wetland boundaries (i.e., downgradient edges of the wetland replication area) will be marked in the field.

3. Prior to the start of earth-moving activities in the replication area, an erosion control barrier of properly installed siltation fence (i.e., the bottom few inches of the siltation fence installed in a narrow, trench and the trench filled with soil around the siltation fence) will be installed along the wetland boundaries between the wetland and the wetland replication area. The wetland replication area will then be cleared and grubbed, with the exception of the trees that have been marked to be saved.

4. The proposed final grade for the replication area should approximate the elevation of the adjacent wetland areas (430+/-), as noted on the site plans. The replication area will be excavated to a depth of 12 inches below the proposed final grade. The excavation and planting work will be closely supervised by a qualified Wetland Scientist. Minor modifications to the proposed grading may be made in the field by the Wetland Scientist in response to observed subsurface hydrologic conditions. All excavated material will be disposed of away from all wetland resource areas.

5. Existing topsoil within the impact area will be excavated, stockpiled and kept moist by watering and/or covering or immediately transported to the replication area.

6. Relocated wetland topsoil will be supplemented with a 1:1 mixture of high quality, loamy topsoil and leaf mold compost, as necessary, to approximate 12 inches in thickness throughout the replication area. The substrate will be roughly graded to provide an appropriate microtopography. A minimum of 4 inches of loamy topsoil will be applied to the side-slopes of the wetland replication area. The side slopes should be stabilized as necessary to prevent erosion.

7. An erosion control barrier comprising only toed-in siltation fence will be properly installed between the completed replication area and the adjacent upland side slopes.

8. Planting will be done only during the beginning (April 15 through June) or end (September 1 to November 15) of the growing season. Planting in the mid-growing season is only acceptable if irrigation is provided. The plantings and seed mixture identified in the table below will be planted in the replication area unless the herbaceous layer can be transplanted into the replication area.

Planting Plan for Wetland Replication Area

SPECIES; SIZE; SPACING	NUMBER
Saplings; 6 to 8' height, container or balled, burlapped; 15' on center average	
Red Maple (*Acer rubrum*)	22
Shrubs; 2.5 to 3' in height, container; 6' on-center average spacing	138 total*
Highbush blueberry (*Vaccinium corymbosum*)	
Arrow-wood *(Viburnum dentatum*)	
Winterberry (*Ilex verticillata*)	
Silky dogwood (*Cornus amomum)*	
Herbaceous;	
New England Wetland Plants, New England Wetmix (or equivalent)	2.0 lbs.

* Depending upon availability from local nursery stock, at least three (3) of the listed species will be selected, with at least forty (40) specimens of each selected species planted, for a total

9. The replication area will be mulched with 1 to 2 inches of leaf compost or weed free straw to provide for temporary erosion control and moisture retention.

10. The side-slopes of the wetland replication area will be seeded with a grass/wildflower or conservation mixture designed to provide permanent cover. After seeding, the side-slopes will be mulched with a thin layer of straw to provide for temporary erosion control.

11. The replication areas will be inspected, by a qualified Wetland Scientist, at the end of each growing season for a minimum of two years or until such time as the required 75% of vegetative cover with wetland species has been established. Written results of these inspections will be submitted to the Conservation Commission.

12. After the wetland replication area has become vegetatively stabilized and following approval of the issuing authority, the siltation fence and all wooden stakes will be removed and disposed of properly.