LEC

WETLANDS WILDLIFE WATERWAYS

FINAL Wetland Restoration & Replication Plan

October 30, 2013

Property Owner
Kim Sieurin, Manager
Esterbrook Farm LLC
41 Esterbrook Road
Acton, Massachusetts 01720

Subject Property
41 Esterbrook Road
Acton, Massachusetts 01720

LEC Environmental Consultants, Inc.
384 Lowell Street, Suite 206
Wakefield, Massachusetts 01880
781-245-2500
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INTRODUCTION

On behalf of Kim Sieurin, Manager of Esterbrook Farm, LLC (the Farm), LEC Environmental Consultants, Inc., (LEC) has prepared this FINAL *Wetland Restoration & Replication Plan* for the restoration of approximately 73,700 square feet of freshwater wetland and the creation of 13,800 square feet of freshwater wetland (replication) at 41 Esterbrook Road in Acton, Massachusetts (Property ID F5-24). This *Wetland Restoration & Replication Plan* has been prepared in accordance with an Enforcement Order issued by the Acton Conservation Commission, subsequent enforcement conferences, and a Draft Consent Order. The Commission conducted a site walk on September 17, 2013, and following a September 18, 2013 Commission meeting to review the *Wetland Restoration & Replication Plan*, LEC met on September 25, 2013 with Tom Tidman, Acton Natural Resource Director and Amy Green, Commission Member in a working session to further discuss and review this plan in light of comments received from the Commission and neighbor during the Commission meeting.

Below is a brief History and General Site Description, followed by Wetland Delineation and Site Impacts, and a Wetland Restoration and Replication Methodology including analysis of the altered wetland and proposed sequence of work, planting plan, and monitoring schedule. The proposed Wetland Restoration and Replication Methodology has been guided by the principles outlined in the *Massachusetts Inland Wetland Replication Guidelines* (March 2002) and the *Army Corps of Engineers New England District Compensatory Mitigation Guidance* (7-20-10), making adjustments as site conditions and opportunities for wetland diversity warrant.

HISTORY AND GENERAL SITE DESCRIPTION

The Farm encompasses approximately 10 acres of land located north of Esterbrook Road that was purchased by Kim Sieurin in December 2007 from Robert and Mary Piro. The property contains the historic home of Major Ephraim Billings and an equestrian riding and boarding facility that includes a large barn, indoor riding ring, outdoor riding ring, and a number of paddocks. Based on our review of MassGIS and Google Earth aerial images, and a number of site investigations conducted in 2012 and 2013, a forested freshwater wetland and inland bank associated with an intermittent stream channel and several remnant drainage channels were located in the eastern and southeastern portions of the property. The intermittent stream also is located within a 50-foot wide drainage easement. Based on our conversations with the property owner, in June and July of 2012 the Farm began clearing vegetation within the eastern portion of the property to facilitate creating additional paddocks and pasture land for use by the equestrian facility and to facilitate historic flows within the intermittent stream. This clearing was conducted under the belief that such work was allowed under the agricultural exemptions contained in the wetland laws. The clearing came to the attention of the Commission, and on September 25, 2012 an Enforcement Order was issued to the Farm.

In response to the Enforcement Order and in coordination with Thomas Tidman, Acton Natural Resource Director, the stream channel, immediate side slopes, and western paddock areas were seeded and a single row of straw waddles were installed along the intermittent stream. LEC was subsequently retained by the Farm, and we have conducted a number site visits to evaluate existing conditions; reviewed historic information contained in the Commission's records; met with Tom Tidman and Bettina Abe, Acton Natural Resource Assistant, Maryann DiPinto of MassDEP, and Paul Sneeringer of the ACOE; and prepared the following FINAL Wetland Restoration and Replication Methodology. Benchmark Survey also was retained to re-establish the 1996 wetland delineation (discussed further in paragraph below), survey locate existing conditions, and provide assistance in preparing the attached Wetland Restoration & Replacement Plan (**Attachment E**).

Of particular assistance during our site evaluations and subsequent wetland restoration and replication design are records contained in the Commission's files for a Notice of Intent (NOI) Application (DEP File #: 85-535) filed on behalf of Robert A. and Mary S. Piro in November 1996 for the construction of two horse paddocks in the eastern portion of the property, referred to as the east and west paddock in relation to the intermittent stream. This NOI Application included a wetland narrative prepared by Oxbow Wetland Associates and a site plan prepared by Bill Boston Survey Inc. of West Groton, MA. The proposed site plan included a wetland delineation, proposed east and west paddock areas, and proposed wetland filling (2,325 square feet) and wetland replacement (2,497 square feet) to establish the east paddock. The Commission issued an Order of Conditions approving the project on December 11, 1996. The Piro's established the west paddock, but not the east paddock that involved wetland filling.

Lastly, through discussions with Thomas Tidman and Bettina Abe, we also concurred that this restoration effort provided the rare opportunity to diversify habitat cover types beyond what was present pre-alteration. As a result, our client authorized LEC to exercise discretion and to collaborate with the Conservation Staff to create several topographic depressions within the restored wetland and to create several different cover types utilizing both woody plants and woody/herbaceous seed mixtures.

WETLAND DELINEATION AND SITE IMPACTS

LEC conducted four independent and joint site investigations with regulatory staff to evaluate the extent of cleared vegetation, wetland impacts, and work activity conducted at the site. Based on our discussions with the Farm and corroborating field survey data depicted on the attached plans, the majority of the work conducted in the wetland and adjacent Buffer Zone consisted of cutting and stumping trees, and clearing brush and cleaning within the intermittent stream to facilitate historic flows. It appears that topography was only manipulated to smooth out the rough undulating grades resulting from the tree removal and to prepare the area for use as a paddock (see photos, **Attachment A**). LEC came to this conclusion based on conducting a number of soil borings throughout the impacted area, comparing grades immediately

adjacent to trees that were not removed, and comparing the November 1996 Piro plan with the Site Plans prepared by Benchmark Survey of the current, post-clearing existing conditions. Remarkably, the grades between these plans generally vary from 3-8 inches and in some instances, particularly within or along the perimeter of the wetland, the grades are actually at or slightly below the pre-alteration grades. Incidents of grade increases of up to one foot occur within the footprint of the proposed eastern paddock and in the southern and southeastern portions of the wetland, most notably eliminating a few remnant drainage ditches from when the land was in active agricultural use.

As noted above, Benchmark Survey re-established the 1996 wetland boundary in the field with wooden survey stakes and orange flagging. This boundary was reviewed in the field with the aforementioned regulatory staff on November 7, 2012 and determined by each agency to fairly represent the extent of wetlands within the footprint of disturbance. This boundary also is depicted on the attached Wetland Restoration and Replication Plan and used as the basis to calculate the extent of wetland impacts and proposed wetland restoration.

Based on our field evaluations, observations of remnant woody vegetation, and review of record data, the freshwater wetland contained a canopy dominated by red maple (*Acer rubrum*) with scattered individual eastern white pine (*Pinus strobus*) with a shrub layer containing highbush blueberry (*Vaccinium corymbosum*), winterberry holly (*Ilex verticillata*), European buckthorn (*Frangula alnus*), and Tartarian honeysuckle (*Lonicera tatarica*), with cinnamon fern (*Osmunda cinnamomea*), royal fern (*O. regalis*), and seedlings from the canopy and shrub layer in the ground cover.

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey, soils within the impact area are mapped as Scarboro mucky fine sandy loam and Ridgebury fine sandy loam. These two mapping units generally consist of very deep to deep, very poorly to poorly drained soils. The Scarboro unit is typically found in low flat areas or in depressions on glacial outwash plains and terraces. The Ridgebury unit is associated with upland depressions or drainage ways, typically mapped in long and narrow shapes as is the case with this site. A typical Scarboro pedon is characterized by a 0-3 inch dark grayish brown layer of decomposed organic material underlain by a 3-11 inch black mucky find sandy loam A_p horizon (topsoil) with an 11-21 inch substratum of grayish brown sand. A typical Ridgebury pedon is characterized by a 0-7 inch black fine sandy loam A_p horizon (topsoil) underlain by a 7-10 inch brown fine sandy loam (subsoil) with a 10-inch plus light brownish gray sandy loam C horizon (substratum). Our soil investigations on the site generally confirm this soil mapping.

WETLAND RESTORATION, REPLICATION, AND MITIGATION METHODOLOGY

LEC recommends a six-pronged approach to restoring approximately 73,700 square feet of the impacted wetland and creating 13,800 square feet of Wetland Replication, including establishing erosion controls, re-grading the impacted areas, re-vegetation, establishing permanent monuments, invasive species

management, and monitoring. Pending approval, it is our goal to complete all of the work (except monitoring and replanting, if necessary) this fall/early winter 2013 or spring 2014. All wetland restoration and replication work and buffer zone restoration will occur under the direct supervision of a qualified Wetland Scientist with at least 10 years of experience in wetland restoration/replication approved by the Conservation Director and/or Conservation Commission. We also have included a Construction Sequence in **Attachment B** to function as a guide for all parties during completion of this work. The first item on the sequence is a pre-construction meeting with the Contractor, the approved Wetland Scientist, and Commission Staff to review the requirements contained in this Wetland Restoration & Replication Plan to ensure all parties understand the purpose and goals of this work.

As a component of the restoration work, the Farm is proposing to replace the paddock fences that were removed west of the stream (western paddocks), complete the work previously authorized by the Commission in 1996, but never completed by the Piro's, to establish a paddock east of the intermittent stream (eastern paddock) , restoring all other disturbed areas beyond the paddocks.

Eastern Paddock

The eastern paddock work would consist of installing a post-and-rail type fence (likely PVC but perhaps wooden) to enclose the area. Access would be gained via the existing historic pathway located within an AT&T easement. A portion of this pathway also will be fenced to further limit access to the restored area and keep the trainers and the horses within the easement/pathway when accessing the Eastern Paddock. Along the northern and eastern limits of the paddock, the fence would be installed just inside the stone wall that demarcates the property boundary. The remainder of the fence line will be installed greater than 50-feet from the BVW, and concrete bounds would be installed to permanently demarcate the limits of the paddock (and the approved fence location) and the extent of permanently restored/replicated wetland and buffer zone. As shown on the attached plan (**Attachment E**), these concrete bounds would be set at each change in fence direction or approximately every 100 feet for a total of eight (8) bounds. Establishing this paddock involves allowing 1,661 square feet of the finger-like projection of remnant drainage ditch to remain filled. At the suggestion of Tom Tidman, a portion of this fill will be removed and backfilled with crushed stone and a perforated PVC pipe to ensure proper drainage across the paddock. The ground surface within the paddock would then be scarified and seeded with the locally sold "Concord Blend" grass seed. Based on soil conditions and at the discretion of the approved Wetland Scientist, approximately 3 inches of loam may be spread across the paddock to establish a more suitable growing medium for the grass seed mix.

Western Paddocks

The Western Paddock was divided into a series of smaller paddocks to allow for rotational grazing and/or segregating horses while at pasture. These post-and-rail fences will be reinstalled as shown on the attached plans. As shown on the plans, a sliver (2,895 square feet) of wetland is located within the

footprint of this paddock. While this was an existing condition at the time the farm was purchased by Ms. Sieurin in 2007 (see Affidavit, Attachment A), the proposed 13,800 square feet of wetland replacement will more than compensate for any impacts associated with the continued use of this paddock area. The western paddock was seeded in the fall of 2012 with "Concord Blend" grass seed and may only require incidental re-seeding. As shown on the attached plan (**Attachment E**), concrete bounds would be installed to permanently demarcate the eastern limits of this paddock. These concrete bounds would be set at each change in fence direction or approximately every 100 feet for a total of five (5) bounds.

Wetland Restoration and Replication

Approximately 73,700 square feet of the impacted wetland will be restored (62,411 square feet east of the stream and 11,289 square feet west of the stream), and approximately 13,800 square feet of wetland replication will be created east of the stream for a total post restoration of approximately 87,500 square feet of freshwater wetland (see spreadsheet in **Attachment A**). Additionally, approximately 1,190 linear feet of drainage channel was impacted and 820 linear feet will be restored. Prior to commencement of these activities, LEC will establish photographic stations at representative locations to document pre- and post-restoration conditions within the Wetland Restoration Areas for future compliance monitoring.

Erosion Controls

The existing single row of straw waddles will remain in place along the top of slope to the intermittent stream. These straw waddles will be maintained and additional waddles installed as needed throughout the restoration/replication process, with a particular emphasis on the areas of proposed re-grading and protection of downstream receiving waters. While these straw waddles may be temporarily moved during grading, they will be restored at the end of each day and remain in place until all areas are sufficiently stabilized and removal has been authorized by Conservation staff. Straw waddles will also be placed just down gradient of the eastern paddock fence line following regrading and seeding of the paddock. Straw matting may also be used within the re-graded stream channels to prevent erosion into the primary drainage channel.

Re-grading

Wetland Restoration

As noted above under site impacts, the majority of the work conducted in the wetland and adjacent Buffer Zone consisted of cutting and stumping of trees, clearing brush, and adjusting the grades to create a smooth paddock surface. The changes in topography within the wetland generally vary from 3-8 inches in grade, most notably eliminating a few remnant drainage ditches lingering from when the land was in active agricultural use. Therefore, as part of the restoration we are proposing to re-grade the southern and southeastern portions of the impacted areas to restore two drainage channel connections to the intermittent stream, create positive drainage from the southeastern portion of the

property, create three (3) topographic depressions within the restored wetland, and restore a third drainage channel that will direct off-site flows into the aforementioned topographic depressions (see Wetland Restoration and Replacement Plan in **Attachment E**).

During the September 18, 2013 Commission meeting, information was presented by a neighbor indicating that stumps may have been buried in the southeastern portion of the property. The Applicant has produced two receipts (see attachment A) from Assabet Mack Service, Inc. invoicing for trailer rentals and a surcharge for stump removal. Additionally, LEC conducted a site visit at the Farm on October 4, 2013 with the individual who supervised the work activity. The attached sketch plan (Attachment A) depicts the location where roots, brush, and 10-12 stumps were buried within upland portions of the Farm. According to 310 CMR 16.03 of the Solid Waste Regulations, disposal of stumps, trees, and brush at a single family home or farm is an allowed activity as long as the material was generated by the occupant or resident of the home or farm and disposed of on-site. Any stumps encountered within the footprint of proposed restoration or replication will either be used to provide breeding attachment sites within the proposed depressions or disposed in accordance with the law.

Grade stakes will be established in the field by Benchmark Survey to ensure appropriate elevations are achieved and all grading will be conducted under the supervision of the approved Wetland Scientist. Excess soil material will either be spread within the proposed eastern paddock or removed from the project site. Since no soil material was removed from the site, it is unlikely that any soil amendments will be required. However, soils will be evaluated by the approved Wetland Scientist at the time of re-grading and if necessary, the soil will be amended with leaf compost to create a proper growing medium for the proposed restoration.

Wetland Replication

Two areas of wetland replication are proposed east of the stream; the original 2,497 square feet of wetland replacement previously approved by the Commission in 1996, but never completed by the Piro's, has been enlarged to encompass 3,417 square feet and an additional area encompassing 10,389 square feet. The 3,417 square foot area will be graded to create one of the three proposed depressions, and the 10,389 square foot area will be graded to match the elevations within the adjacent wetland and to restore the drainage channel.

Re-vegetation

The extent and type of re-vegetation within the restored wetland and buffer zone was designed to allow the existing seed bank and remnant woody vegetation to aid in re-vegetation of disturbed areas and to create open water habitat with canopy shading, scattered patches of woody shrub species, and a variety of herbaceous seed mixes in an effort to create diversity in the species and cover types. Therefore, LEC has

prepared a planting plan (see **Attachment E**) depicting approximate locations and specifications for sapling trees, shrubs, and seed mixtures to be planted within the Wetland Restoration Area, Wetland Replication Area, and the Buffer Zone based on the expected hydrology following re-grading. Since it is our intent to diversify the habitat cover types and provide open water habitat within the three depressions during several months of the growing season, no woody plantings are proposed within the depressions. Additionally, tree falls, tree branches, roots or root wads will be placed within these depressions to provide appropriate egg mass attachment sites for amphibian breeding within the depressions.

LEC typically recommends planting a selection of native woody plant stock representative of those species within the adjacent or surrounding wetland systems. However, we also have included a few species that are not apparent within the adjacent system. Shrubs should measure 2 to 4 feet in height and be planted 5 to 8 feet apart (on center), while sapling trees should measure 4 to 6 feet in height and be planted at least 10 to 15 feet apart (on center). Trees and shrubs will not be planted on the side slopes or within open water habitat, but rather along the upland edge to provide eventual shading to the wetland and open water habitat. This Planting Plan will be refined, as necessary, by the approved Wetland Scientist during the restoration. Prior to installation, the approved Wetland Scientist will approve all species and quantities and establish the location for each plant. No landscape cultivars should be used. Below is a list of trees, shrubs, and seed mixes LEC recommends for use at this site. Following installation of all trees and shrubs, the area will be scarified with garden rakes and seeded with the mixes listed below and contained in **Attachment C**. Please also note that the Northeast Wetland Shrub/Herb Mix contains woody seeds for Buttonbush (*Cephalanthus occidentalis*), Arrowwood, Elderberry (*Sambucus canadensis*), and silky dogwood (*Cornus Amomum*).

Wetland Restoration/Replication

Sapling Trees:	**Shrubs:**
Red Maple (*Acer rubrum*) FAC	Speckled Alder (*Alnus rugosa*) FACW+
Black Willow (*Salix nigra*) FACW+	Winterberry Holly (*Ilex verticillata*) FACW+
	Highbush Blueberry (*Vaccinium corymbosum*) FACW
	Arrowwood (*Viburnum dentatum*) FACW-

Herbaceous:

Northeast Wetland Rush/Bulrush Mix, or equivalent, for the side slopes and open water draw down zone of the three depressions.

Northeast Wetland Shrub/Herb Mix, or equivalent, for the wetland restoration and replication areas.

Buffer Zone Restoration

Sapling Trees:	**Shrubs:**
Red Maple (*Acer rubrum*) FAC	Chokeberry (*Aronia melanocarpa*) FAC
Northern White Cedar (*Thuja occidentalis*)	Witch Hazel (*Hamamelis virginiana*) FAC-

Herbaceous:

Northeast Upland Native/Naturalized Wildflower Mix, or equivalent, for the restored Buffer Zone.

The above seed mixes are available from Southern Tier Consulting & Nursery. A detailed description of the seed mix is contained in **Attachment C**. An equivalent seed mix from an alternative source may be substituted with the consent of the approved Wetland Scientist; however based on our recent conversation with Southern Tier Consulting & Nursery on September 18, 2013, all three seed mixes are available and are best planted in the fall due the need for cold stratification for many of the seeds in the mix to germinate. Most seed mixtures will not germinate in saturated conditions; therefore, it is unlikely that a seed mixture will be applied to any inundated portions of the Wetland Restoration Area. For a fall seeding, each seed mix will be blended with 5-10 lbs. per acre of winter wheat or annual rye to help stabilize the area over the winter months.

Invasive Species Management

As described in the General Site Description, the area of alteration and adjacent upland and freshwater wetland contain European buckthorn and Tartarian honeysuckle, listed as Invasive and Likely Invasive, respectively, in the *NHESP Guide to Invasive Plants in Massachusetts*. European buckthorn (see Fact Sheet in **Attachment D**) spreads rapidly through its prolific production of seed which are spread by birds and can remain viable in the soil for 2 to 3 years. Once the plant becomes dominant, the dense shade it provides eliminates native tree seedlings, saplings, and ground layer species and disrupts natural regeneration and species diversity within the understory. Tartarian honeysuckle is a bushy plant that forms a dense shrub layer that also shades and disrupts the growth of native plant species. Bush honeysuckle are known to release toxic chemicals into the soil that prevent other plants from growing in the vicinity (see Fact Sheet in **Attachment D**).

It is not clear how prevalent either of these species were within the areas of alteration. Therefore, our initial recommended treatment for controlling these species within the restoration areas involves hand pulling of seedlings under the oversight of a qualified Wetland Scientist approved by the Commission. The initial phase of hand pulling will be conducted as part of our first monitoring inspection of the restored areas and detailed in our monitoring report. In each subsequent inspection, the area will be re-evaluated and additional hand removal of seedlings will occur, as necessary, and may continue throughout the subsequent years of monitoring. Depending on regrowth of either species from remnant root stock,

glyphosate may be applied using the cut stem technique in the fall when the plants are entering dormancy and the herbicide will be drawn down into the roots. Any herbicide application will be conducted by a Licensed Pesticide Applicator and the Commission will be notified prior to use.

Monitoring and Stewardship

The Wetland Restoration, Replication, and Buffer Zone Areas will be monitored and supervised by a qualified Wetland Scientist approved by the Commission to ensure success and compliance with the aforementioned procedures and guidelines. This hands-on supervision also will enable any necessary field adjustments or amendments during the work effort.

These areas also will be monitored twice annually for five growing seasons, by the approved Wetland Scientist to ensure compliance with 310 CMR 10.55 (4)(b). At a minimum, these reports will provide data on the species composition of plants within or immediately adjacent to these areas and their relative abundance, soil stabilization, hydrology, photo-documentation from the representative stations, flood control, wildlife habitat (including vernal pool habitat), and other functions performed by the Wetland Restoration, Replication, and Buffer Zone Areas. These reports also will provide documentation relative to our Invasive Species Management efforts.

Bi-Annual Compliance Reports will continue for five growing seasons (anticipated through the Fall 2018) with the ability to suspend the monitoring requirements in 2017 and 2018 after three growing seasons provided the Wetland Restoration and Replication Areas have been successfully established with a minimum of 75% cover of herbaceous vegetation and 75% survival of woody vegetation.

The Final Annual Compliance Report will include an As-Built plan showing one foot contours and limits of the restored/created wetlands and will request a Return to Compliance letter confirming compliance with this Wetland Restoration & Replication Plan and the Consent Order.

As is standard practice for maintenance and management within all the paddocks at Esterbrook Farm, manure will be removed from the paddocks on regular (typically daily) basis.

Attachment A

Site Photos

Impact-Restoration Calculations

Affidavit of Kim Sieurin

Stump Removal Receipts

Buried Stump Sketch Plan

Re-Seeded Western Paddock

10-12-12 Esterbrook Farm, Acton MA

Intermittent Stream (Western Paddock to the right)

10-12-12 Esterbrook Farm, Acton MA

Eastern Paddock/Altered Wetland

10-12-12 Esterbrook Farm, Acton MA

Eastern Paddock/Altered Wetland

10-12-12 Esterbrook Farm, Acton MA

Southeastern Property Boundary

Southeastern Property Boundary

Impact-Restoration Calculations

	Wetland Alteration	Permanent Wetland Impacts	Wetland Restoration	Wetland Replacement	Restored-Replicated Wetlands
East of Stream	12,950	1,661	11,289	0	11,289
West of Stream	64,450	2,895	62,411	13,806	76,217
Total	**77,400**	4,556	73,700	13,806	**87,506**

AFFIDAVIT OF KIM SIEURIN

I, Kim Sieurin, do hereby state the following:

1. My name is Kim Sieurin. I am the Manager of Esterbrook Farm, LLC located at 41 Esterbrook Road in Acton, Massachusetts.

2. Esterbrook Farm, LLC is the owner of the property, which was purchased from Robert and Mary Piro in December 2007.

3. At the time of purchase, the western paddocks had an eastern fence close to the drainage easement and stream. According to our research, the paddock fencing probably was installed sometime after the Conservation Commission approved the Piros' plan to create the east and west paddocks in December 1996.

4. In the Fall of 2012, Esterbrook Farm removed the fence in the western paddocks in order to grade and re-seed the area for grazing. It was seeded with Concord Blend grass seed.

5. Esterbrook Farm needs to restore the western paddocks fencing for rotational grazing and segregating horses at pasture.

Signed under seal and penalty of perjury.

Date: October 8, 2013

Kim Sieurin

ASSABET MACK SERVICE INC.

120 Lancaster Rd. • Shirley, MA 01464
978-425-6264

Kevin Carroll @

CUSTOMER Esterbrook Farm DATE 6-14-12

ADDRESS 41 Esterbrook Rd

JOB Acton

TRUCK # 42 TRAILER # DT-1 DRIVER BD

MACHINE MOVED:

FROM:

TO:

TRUCK RENTAL 2 hours Trailer	220.00
PERMITS	
TOLLS 3 Loads Stumps	450.00
ESCORTS	
TOTAL PRICE	1220.00

Amount due and payable in 30 days from date. Accounts that are overdue will be charged the maximum finance charge allowed by law. For non-payment, you are responsible for all legal cost of collection fees. Our responsibility ends with delivery at curb only. Any equipment crossing sidewalks or entering private property will be done solely at the purchasers or his agent's risk. I hereby accept the above terms and conditions.

SIGNATURE:

WHITE: CUSTOMER YELLOW: OFFICE PINK: DRIVER

ASSABET MACK SERVICE INC.

120 Lancaster Rd. • Shirley, MA 01464
978-425-6264

Kevin Carroll @

CUSTOMER Esterbrook Farm DATE 6-13-12

ADDRESS 41 Esterbrook Rd

JOB Acton

TRUCK # 42 TRAILER # DT-1 DRIVER BD

MACHINE MOVED:

FROM:

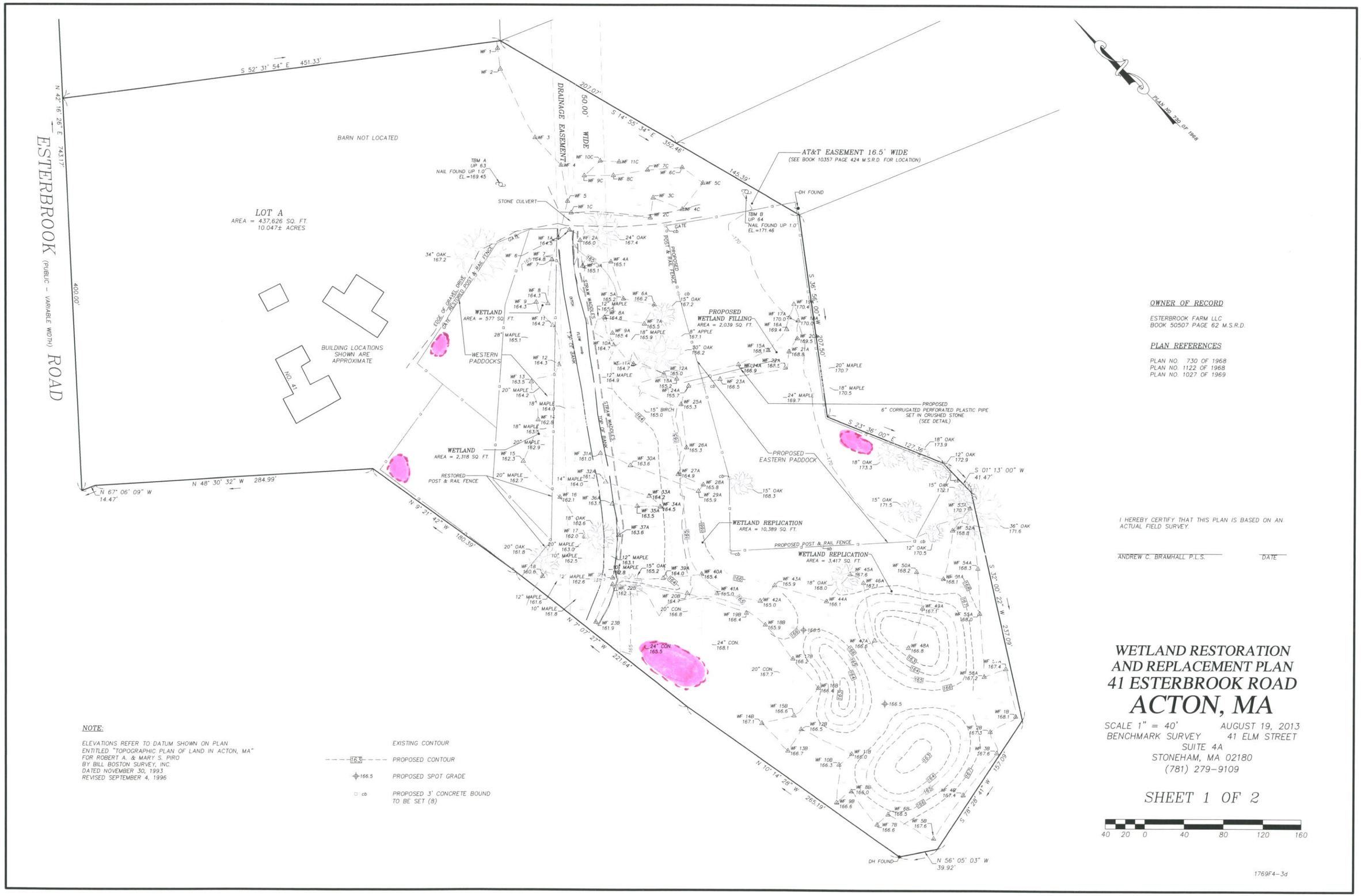
TO:

TRUCK RENTAL 8 hours Trailer Rental	880.00
PERMITS (4) Loads stumps @ 150.00	600.00
TOLLS	
ESCORTS	
TOTAL PRICE	$1480.00

Amount due and payable in 30 days from date. Accounts that are overdue will be charged the maximum finance charge allowed by law. For non-payment, you are responsible for all legal cost of collection fees. Our responsibility ends with delivery at curb only. Any equipment crossing sidewalks or entering private property will be done solely at the purchasers or his agent's risk. I hereby accept the above terms and conditions.

SIGNATURE:

WHITE: CUSTOMER YELLOW: OFFICE PINK: DRIVER



OWNER OF RECORD

ESTERBROOK FARM LLC
BOOK 50507 PAGE 62 M.S.R.D.

PLAN REFERENCES

PLAN NO. 730 OF 1968
PLAN NO. 1122 OF 1968
PLAN NO. 1027 OF 1969

I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY.

ANDREW C. BRAMHALL P.L.S. DATE

NOTE:

ELEVATIONS REFER TO DATUM SHOWN ON PLAN ENTITLED "TOPOGRAPHIC PLAN OF LAND IN ACTON, MA" FOR ROBERT A. & MARY S. PIRO BY BILL BOSTON SURVEY, INC. DATED NOVEMBER 30, 1993 REVISED SEPTEMBER 4, 1996

EXISTING CONTOUR
166.5 PROPOSED CONTOUR
166.5 PROPOSED SPOT GRADE
cb PROPOSED 3' CONCRETE BOUND TO BE SET (8)

WETLAND RESTORATION AND REPLACEMENT PLAN
41 ESTERBROOK ROAD
ACTON, MA

SCALE 1" = 40' AUGUST 19, 2013
BENCHMARK SURVEY 41 ELM STREET
SUITE 4A
STONEHAM, MA 02180
(781) 279-9109

SHEET 1 OF 2

40 20 0 40 80 120 160

1769F4-3d

Attachment B

Wetland Restoration/Replication Construction Sequence

FINAL Wetland Restoration/Replication Construction Sequence
October 30, 2013

1. Re-establish any missing wetland stakes and establish grade stakes and limits of wetland replication areas.

2. An on-site meeting will be conducted prior to commencement of work to review the wetland restoration/replication protocols, procedures, and construction sequence. This meeting will be attended by the approved Wetland Scientist, Contractor, key individuals carrying out the work, and Conservation Staff. As with all projects, this construction sequence may be modified as conditions may require. DEP and ACOE staff also will be invited to attend this meeting.

   A schedule for reporting to the Conservation Commission, DEP, and ACOE staff throughout the Restoration/Replication process will be established at this meeting. Typically, LEC reports daily or every several days throughout the process, depending on progress and information to report via email including photographs to any interested parties.

3. Mobilize excavation equipment.

4. All work must be conducted under the supervision of the approved Wetland Scientist.

5. Regrade the wetland and create wetland replacement areas as shown on the Wetland Restoration & Mitigation Plans prepared by Benchmark Survey dated August 19, 2013, last revised October 30, 2013 (sheets 1 and 2). Excess material may be stockpiled within the eastern paddock and if not reused for the wetland restoration and replication, may be used to adjust grades within the eastern paddock or removed from the site.

6. Straw waddles may be temporarily relocated to accommodate regrading, but must be replaced at the end of each work day to protect downstream receiving waters.

7. Soil material will be evaluated by the approved Wetland Scientist to determine if any soil amendments are necessary. If required, leaf compost will be incorporated as instructed by the approved Wetland Scientist to create a proper growing medium for the proposed restoration/replication.

8. Once regrading is completed, Commission Staff will be invited to visit the site and approve the final grades, the need for any soil amendments, and any plant substitutions due to availability.

9. The approved Wetland Scientist shall coordinate with the landscape crew for the proper planting layout, installation, and seeding within the Wetland Restoration/Replication Areas and the Buffer Zone.

10. Concrete bounds and the post and rail fence shall be installed as shown on the Wetland Restoration & Mitigation Plans prepared by Benchmark Survey dated August 19, 2013, last revised October 30, 2013 (sheets 1 and 2).

11. Seeding of the eastern paddock and installation of straw waddles along the downgradient perimeter of the paddock.

Attachment C

Northeast Wetland Rush/Bulrush Mix

Northeast Wetland Shrub/Herb Mix

Northeast Upland Native/Naturalized Wildflower Mix

Northeast Wetland Rush/Bulrush Mix

Code: STCMX-5

$225.00 Per Pound

1 pound will cover 43,560 sq. ft. @ 230+ seeds per sq. ft.

This mix is intended to aid in the development of a community at the upper edge of the littoral zone in ponded systems and to develop vegetation in draw down zones of wetlands. Rushes and bulrushes that grow in the early season drawdown zone and species that grow into the late season drawdown zone have been selected to aid in the development of a diverse and densely covered wetland. The seeds in this mix will not generally germinate under water, and is best sown in drawdown areas. The mix is produced using hand collected seed from western New York and northwestern Pennsylvania; only a limited amount of the seed mix is available. We recommend a seeding rate of 1 pound per acre as a supplement to plantings of bare root herbaceous plantings or near shore shrub and tree plantings.

Percent by No. of seeds (not weight)		Scientific Name	Common Name
37.3%	N	Juncus effusus	Soft Rush
34.4%	N	Scirpus atrovirens	Green Bulrush
26.9%	N	Scirpus cyperinus	Wool Grass
1.3%	N	Scirpus tabernaemontanii	Soft Stem Bulrush
0.1%	N	Scirpus pungens	Common Three Square

N: the species is native to the Northeast.

Southern Tier Consulting & Nursery

Inquiries: (585) 968-3120

Facsimile: (585) 968-3122

Orders: 800-848-7614

froghome@southerntierconsulting.com

Northeast Wetland Shrub/Herb Mix

Code: STCMX-10

$80.00 Per Pound

1 pound will cover 21,780 sq. ft. @ 5 seeds per sq. ft.

This mix is intended to add a shrub area and the plants that will grow in the shade of the shrubs. Species have been selected that will have good wildlife benefit. The mix is produced using hand collected seed from western New York and northwestern Pennsylvania; only a limited amount of the seed mix is available. We recommend a seeding rate of 2 pounds per acre and that no grasses be planted with it. Some of these seeds need cold stratification, and two need warm stratification followed by cold.

Percent by No. of seeds (not weight)		Scientific Name	Common Name
Shrub Portion			
6%	N	Cephalanthus occidentalis	Buttonbush
2.5%	N	Viburnum dentatum	Arrow Wood
2.5%	N	Sambucus canadensis	Elderberry
0.8%	N	Cornus amomum	Silky Dogwood
Herbaceous Portion			
40%	N	Verbena Hastata	Blue Vervain
17%	N	Eupatroium maculatum	Joe Pye Weed
17%	N	Scirpus polyphyllus	Many-leaved Bulrush
8%	N	Carex crinita	Fringed sedge
2.5%	N	Bidens cernua	Nodding Bur-marigold
1.8%	N	Ascelpias incarnata	Swamp Milkweed
0.7%	N	Iris versicolor	Blue Iris
0.7%	N	Aster umbellatus	Flat-top White Aster
0.5%	N	Carex intumescens	Bladder Sedge

N: the species is native to the Northeast.

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Northeast Upland Native/Naturalized Wildflower Mix

Code: STCMX-1

$50.00 Per Pound

1 pound will cover 1,900 sq. ft. @ 250+ seeds per sq. ft.

The primary difference between this and ordinary wildflower mixes now commonly used is that this contains only species native and/or fully naturalized in the northeast whereas the common mixes contain a number of species alien to the region. This mix will not flower profusely during the first growing season because it lacks the usual exotic annual weeds, but in later years it will produce a wildflower/grass meadow that appears common to the region. We recommend a seeding rate of 23 pounds per acre with 8 pounds of wildflowers and 15 pounds of grass seed.

Percent by No. of seeds (not weight)		Scientific Name	Common Name
Grass Portion (15 Pounds)			
28.1%		Festuca ovina	Sheep Fescue
26.0%	N	Panicum virgatum	Switchgrass
15.3%		Setaria italica	Foxtail Millet
12.8%		Anthoxanthum odoratum	Sweet Vernal Grass
11.1%		Lolium multiflorum	Annual Ryegrass
6.7%	N	Elymus canadensis	Wild Rye
Wildflower Portion (8 Pounds)			
47.5%	N	Achillea millefolium	Common Yarrow
9.1%		Rudbeckia hirta	Black Eyed Susan
7.5%		Chrysanthemum leucanthem.	Ox-Eye Daisy
7.4%	N	Verbena hastata	Blue Vervain
7.3%		Cichorium intybus	Cichory
6.8%		Lotus corniculatus	Birdsfoot Trefoil
5.0%		Hesperis matronalis	Dame's Rocket
2.2%		Daucus carota	Queen Anne's Lace
2.0%	N	Solidago canadensis	Canada Goldenrod
2.0%	N	Euthamia graminifolia	Grass Leaf Goldenrod
1.5%	N	Monarda fistulosa	Wild Bergamot
1.3%	N	Aster novae-angliae	New England Aster
0.4%	N	Asclepias syriaca	Common Milkweed

N: the species is native to the Northeast.

Attachment D

Fact Sheets

Weed of the Week

Exotic Bush Honeysuckles

- *Lonicera maackii* (Amur honeysuckle)
- *Lonicera morrowii* (Morrow's honeysuckle)
- *Lonicera tatarica* (Tartarian honeysuckle)

Figure 1- *Lonicera maackii* Amur honeysuckle

Figure 2- *Lonicera morrowii* Morrow's honeysuckle

Figure 3- *Lonicera tatarica* Tartarian honeysuckle

Native Origin: Eurasia (Japan, China, Korea, Manchuria, Turkey and southern Russia); introduced to US for use as ornamentals, for wildlife cover and for soil erosion control.

Description: Exotic bush honeysuckles are upright, generally deciduous shrubs that range from 6 to 15 feet in height. The 1-2 ½ inch, egg-shaped leaves are opposite along the stem and short-stalked. Older stems are often hollow. Pairs of fragrant, tubular flowers less than an inch long are borne along the stem in the leaf axils. Flower color varies from creamy white to pink or crimson in some varieties of Tartarian honeysuckle. The fruits are red to orange, many-seeded berries. Native bush honeysuckles may be confused with these exotic species and cultivars, so proper identification is necessary. Unlike the exotics, most of our native bush honeysuckles have solid stems. Plants reproduce by birds feed on the persistent fruits and widely disseminating seeds across the landscape. Vegetative sprouting also aids in the persistence of these exotic shrubs.

Habitat: : Exotic bush honeysuckles are relatively shade-intolerant and most often occur in forest edge, abandoned field, pasture, roadsides and other open, upland habitats. Woodlands, especially those that have been grazed or otherwise disturbed may also be invaded by exotic bush honeysuckles. Morrow's honeysuckle is capable of invading bogs, fens, lakeshores, sand plains and other uncommon habitat types.

Distribution: Amur, Tartarian, and Morrow's honeysuckle generally range from the central Great Plains to southern New England and south to Tennessee, North Carolina, and Georgia as shaded on the map.

Ecological Impacts: Exotic bush honeysuckles can rapidly invade and overtake a site, forming a dense shrub layer that crowds and shades out native plant species. They can alter habitats by decreasing light availability, by depleting soil moisture and nutrients, and possibly by releasing toxic chemicals that prevent other plant species from growing in the vicinity. Exotic bush honeysuckles may compete with native bush honeysuckles for pollinators, resulting in reduced seed set for native species. In addition, the fruits of exotic bush honeysuckles, while abundant and rich in carbohydrates, do not offer migrating birds the high-fat, nutrient-rich food sources needed for long flights, that are supplied by native plant species.

Control and Management: Control methods should be initiated prior to seed dispersal (late summer to early autumn) to minimize reinvasion of treated habitats.
Manual- Hand remove seedlings or small plants for light infestation; repeat yearly
Chemical- apply systemic herbicides
Burning- prescribed burning may be effective for exotic bush honeysuckles growing in open habitats.

References: www.nps.gov/plants/alien/map/loni1.htm, www.nps.gov/plants/alien/fact/loni1.htm, www.hort.uconn.edu/plants

Produced by the USDA Forest Service, Forest Health Staff, Newtown Square, PA.
Invasive Plants website: http://www.na.fs.fed.us/fhp/invasive_plants

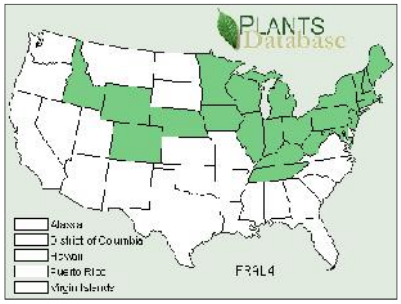
Glossy Buckthorn *Rhamnus frangula*,

syn. *Fragua alnus*

Common Names: glossy buckthorn, alder, tallhedge, columnar, fernleaf, fen buckthorn, European alder

Native Origin: Eurasia; introduced as ornamentals around 1849 to the Midwestern states

Description: A shrubby or small tree in the buckthorn family, (*Rhamnaceae*) growing to a height of 10-25 feet. Trunks grow up to 10 inches in diameter, and the bark is gray or brown with prominent, closely spaced lenticels. Simple, alternate leaves are ovate to elliptic with toothless margins. The papery, dark green leaves have a shiny upper surface and a dull, hairy or smooth lower surface. Pale yellow flowers have 5 petals, grow solitarily or in clusters of two to eight in the leaf axis, and bloom from May to first frost. Red to dark purple pea-size fruit ripen from July to September. Seeds remain viable in the soil for 2 to 3 years.



Habitat: It is located in a wide variety of habitats including nutrient-poor soils, full sun, and dense shade. It is found along forest edges, riverbanks, lakesides, marshy land, and wet soil but also drier areas.

Distribution: This species is reported from states shaded on Plants Database map. It is reported invasive in CT, IL, IN, MA, MD, ME, MI, MN, MS, NH, NJ, NY, OH, PA, RI, VA, VT, and WI.

Ecological Impacts: Glossy buckthorn grows at a rapid rate and is particularly aggressive plant in wet areas. It produces dense shade that eliminates native tree seedlings, saplings, and ground layer species. The ability of forest to regenerate and remain healthy can be severely limited as buckthorns multiply. Glossy buckthorn is a prolific producer of berries that attract birds that spread the seeds.

Control and Management:

- **Manual-** Pull plants before they begin to produce fruit and when soil is damp; use leveraging tool for large plants; girdling is successful if herbicides are applied to the girdled surface; controlled burning is effective when a large number of buckthorn seedlings are present; repeat burning maybe necessary to deplete seed bank; caution should be taken so the native plant community is not adversely affected
- **Chemical**- It can be effectively controlled using any of several readily available general use herbicides such as glyphosate or triclopyr. In areas of standing water, use herbicides approved for aquatic habitats. Apply herbicides in fall when plants are going dormant and chemicals are drawn down into the roots with natural sap flow. Follow label and state requirements.
- **Biocontrol and Natural Enemies**- Fifteen species of fungi and 20 arthropods have been recorded on the genus *Rhamnus*, but none attack glossy buckthorn. In Europe, researchers are conducting tests for the potential use of insects for biocontrol. Early release of insects in North America is targeted for 2007 and 2010.

References: www.forestimages.org, http://plants.usda.gov, www.nps.gov/plants/alien, www.fs.fed.us, Elizabeth J. Invasive Plants of the Upper Midwest, An Illustrated Guide to their Identification and Control, 2005 p. 35-41, Invasive Plants Established in the United States that are Found in Asia and their Associated Natural Enemies, USDA, FHTET 2005-15 Vol. 2, p. 92

Attachment E

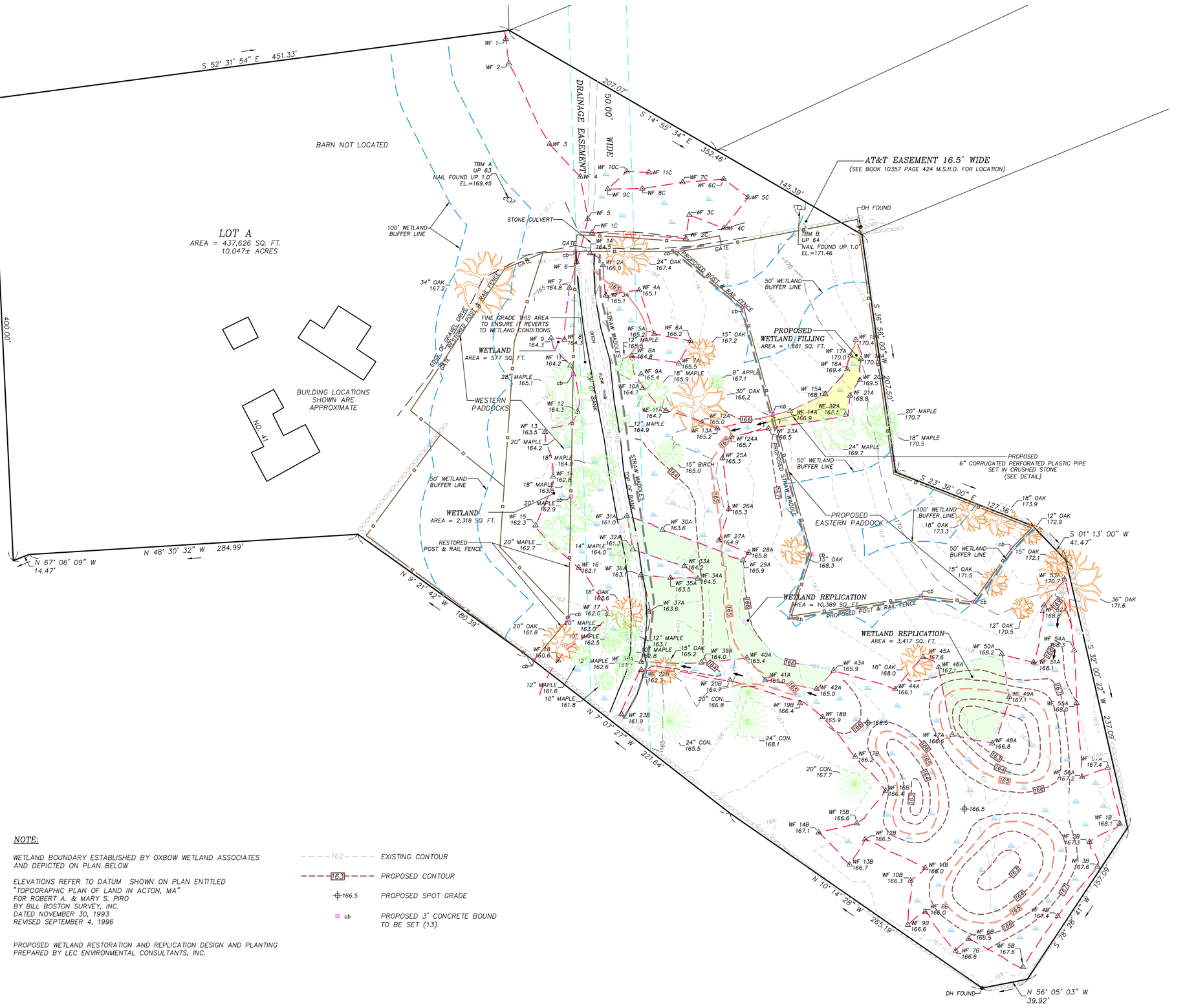
Wetland Restoration & Mitigation Plans

Prepared by Benchmark Survey

Dated August 19, 2013

Revised October 30, 2013

Sheets 1-2



OWNER OF RECORD

ESTERBROOK FARM LLC
BOOK 50507 PAGE 62 M.S.R.D.

PLAN REFERENCES

PLAN NO. 730 OF 1968
PLAN NO. 1122 OF 1968
PLAN NO. 1027 OF 1969

I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY.

ANDREW C. BRAMHALL P.L.S. DATE

NOTE:

WETLAND BOUNDARY ESTABLISHED BY OXBOW WETLAND ASSOCIATES AND DEPICTED ON PLAN BELOW

ELEVATIONS REFER TO DATUM SHOWN ON PLAN ENTITLED "TOPOGRAPHIC PLAN OF LAND IN ACTON, MA" FOR ROBERT A. & MARY S. PIRO BY BILL BOSTON SURVEY, INC. DATED NOVEMBER 30, 1993 REVISED SEPTEMBER 4, 1996

PROPOSED WETLAND RESTORATION AND REPLICATION DESIGN AND PLANTING PREPARED BY LEC ENVIRONMENTAL CONSULTANTS, INC.

162	EXISTING CONTOUR
163	PROPOSED CONTOUR
166.5	PROPOSED SPOT GRADE
cb	PROPOSED 3' CONCRETE BOUND TO BE SET (13)

WETLAND RESTORATION AND REPLACEMENT PLAN
41 ESTERBROOK ROAD
ACTON, MA

SCALE 1" = 40' OCTOBER 30, 2013
BENCHMARK SURVEY 41 ELM STREET
SUITE 4A
STONEHAM, MA 02180
(781) 279-9109

SHEET 1 OF 2

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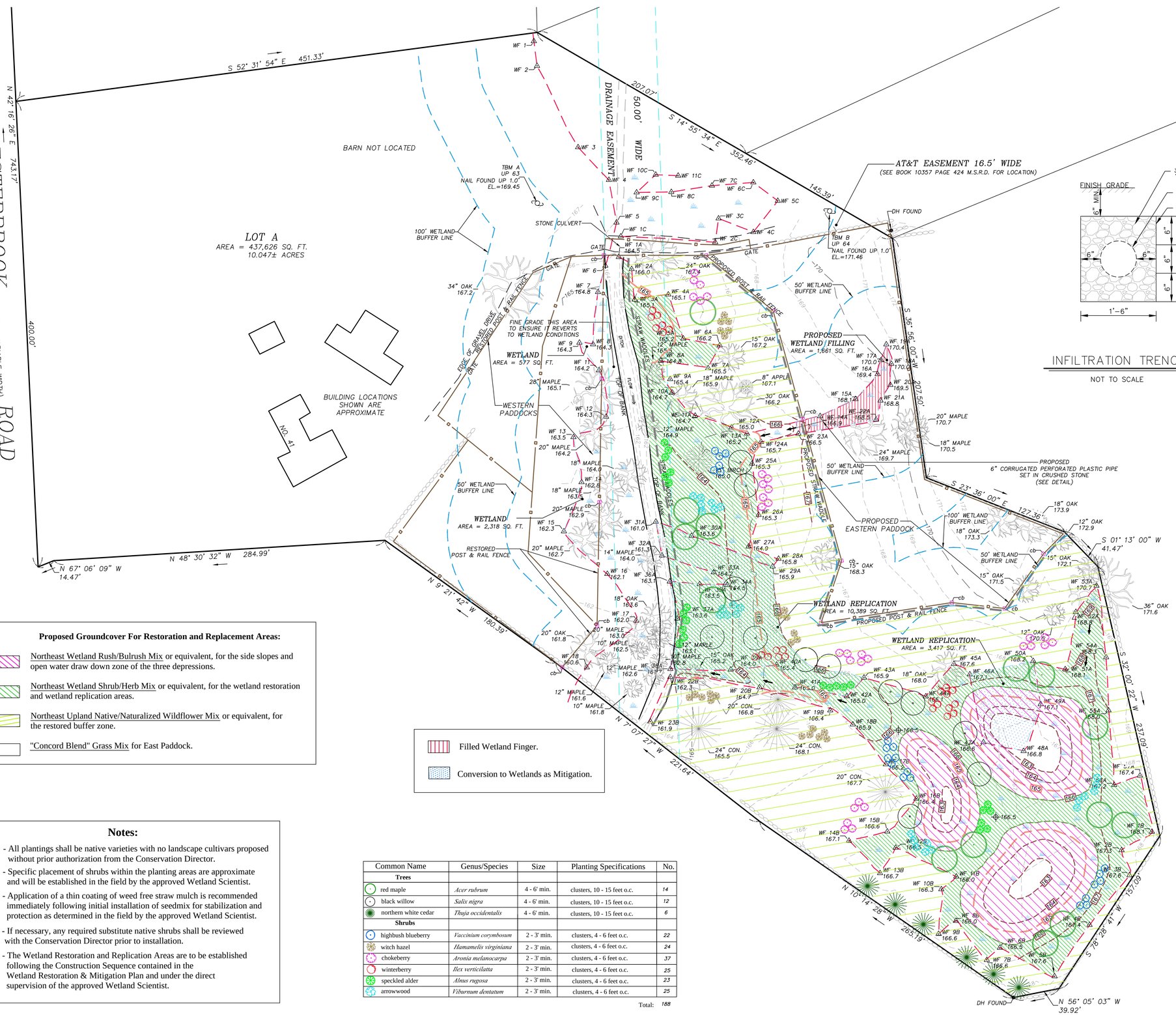

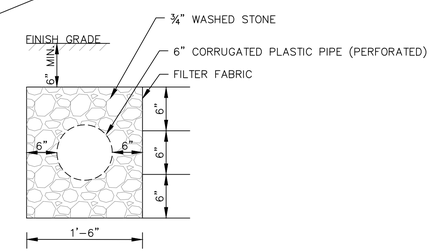

INFILTRATION TRENCH

NOT TO SCALE

OWNER OF RECORD

ESTERBROOK FARM LLC
BOOK 50507 PAGE 62 M.S.R.D.

PLAN REFERENCES

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I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY.

ANDREW C. BRAMHALL P.L.S. DATE

Proposed Groundcover For Restoration and Replacement Areas:

- Northeast Wetland Rush/Bulrush Mix or equivalent, for the side slopes and open water draw down zone of the three depressions.
- Northeast Wetland Shrub/Herb Mix or equivalent, for the wetland restoration and wetland replication areas.
- Northeast Upland Native/Naturalized Wildflower Mix or equivalent, for the restored buffer zone.
- "Concord Blend" Grass Mix for East Paddock.

- Filled Wetland Finger.
- Conversion to Wetlands as Mitigation.

Notes:

- All plantings shall be native varieties with no landscape cultivars proposed without prior authorization from the Conservation Director.
- Specific placement of shrubs within the planting areas are approximate and will be established in the field by the approved Wetland Scientist.
- Application of a thin coating of weed free straw mulch is recommended immediately following initial installation of seedmix for stabilization and protection as determined in the field by the approved Wetland Scientist.
- If necessary, any required substitute native shrubs shall be reviewed with the Conservation Director prior to installation.
- The Wetland Restoration and Replication Areas are to be established following the Construction Sequence contained in the Wetland Restoration & Mitigation Plan and under the direct supervision of the approved Wetland Scientist.

Common Name	Genus/Species	Size	Planting Specifications	No.
Trees				
red maple	*Acer rubrum*	4 - 6' min.	clusters, 10 - 15 feet o.c.	14
black willow	*Salix nigra*	4 - 6' min.	clusters, 10 - 15 feet o.c.	12
northern white cedar	*Thuja occidentalis*	4 - 6' min.	clusters, 10 - 15 feet o.c.	6
Shrubs				
highbush blueberry	*Vaccinium corymbosum*	2 - 3' min.	clusters, 4 - 6 feet o.c.	22
witch hazel	*Hamamelis virginiana*	2 - 3' min.	clusters, 4 - 6 feet o.c.	24
chokeberry	*Aronia melanocarpa*	2 - 3' min.	clusters, 4 - 6 feet o.c.	37
winterberry	*Ilex verticillatta*	2 - 3' min.	clusters, 4 - 6 feet o.c.	25
speckled alder	*Alnus rugosa*	2 - 3' min.	clusters, 4 - 6 feet o.c.	23
arrowwood	*Viburnum dentatum*	2 - 3' min.	clusters, 4 - 6 feet o.c.	25
			Total:	188

WETLAND RESTORATION AND REPLACEMENT PLAN
41 ESTERBROOK ROAD
ACTON, MA

SCALE 1" = 40' OCTOBER 30, 2013
BENCHMARK SURVEY 41 ELM STREET
SUITE 4A
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(781) 279-9109

SHEET 2 OF 2

40 20 0 40 80 120 160

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