

GOLF COURSE IMPROVEMENTS PROJECT
NASHAWTUC COUNTRY CLUB

Notice of Intent

TOWN OF SUDBURY
CONSERVATION COMMISSION
JUNE 2018

Prepared for:
Nashawtuc Country Club
1361 Sudbury Road
Sudbury, MA 01742

BSC Project No. 89513.04

Prepared by:



33 Waldo Street
Worcester, MA 01608

June 29, 2018

Town of Sudbury Conservation Commission
Attn: Deborah Dineen, Conservation Coordinator
DPW Building
275 Old Lancaster Road
Sudbury, MA 01776

**RE: Notice of Intent—Golf Course Improvements Project
Nashawtuc Country Club, Concord and Sudbury, Massachusetts**

Dear Members of the Sudbury Conservation Commission:

On behalf of the Nashawtuc Country Club, BSC Group, Inc. is filing the attached Notice of Intent (NOI) under the Massachusetts Wetlands Protection Act and the Town of Sudbury Wetlands Bylaw for proposed improvements to the golf course. These improvements include renovation of some of the tees and greens, modifications to existing bunkers, construction of new bunkers, reconfiguration of two man-made ponds, and installation of a replacement irrigation system. The Nashawtuc Country Club received an Order of Resource Area Delineation from the Conservation Commission on June 22, 2017 affirming the resource area boundaries on the site. All the enclosed materials reflect the agreed-upon boundaries.

Enclosed is one copy of the NOI (WPA Form 3). The enclosed copy contains:

- Mapping (at 11"X17") showing the location of the resource areas, buffer zones, and the proposed work;
- Wetland fee transmittal form and copies of the checks;
- A project narrative describing the existing conditions, proposed project, impacts of the project, and proposed mitigation/restoration;
- USGS location map;
- FEMA FIRMs for the area (2);
- NHESP mapping for the area;
- Certified abutters list, abutters notice, and affidavit of service.

Also enclosed is a check made payable to the Town of Sudbury for the filing fees under the Wetlands Protection Act (\$387.50). As required under the Act abutters within 100 feet of the property line in Sudbury have been notified by certified mail/return receipt, a copy of the NOI has been sent to the MADEP Northeast Regional Office and the State's share of the filing fee (\$362.50) has been submitted to the DEP lockbox. The filing has also been sent to the NHESP for their review. A similar filing has been made in Concord at the same time as this filing for all project elements in the Town of Concord. All abutters in Concord have been notified of the Sudbury filing in addition to the filing in Concord.

Engineers

Environmental
Scientists

Custom Software
Developers

Landscape
Architects

Planners

Surveyors



We have also submitted a filing with the Sudbury ZBA for work in the floodplain in Sudbury. It is important to note that all proposed floodplain fill in Sudbury has been compensated with additional floodplain storage in Sudbury. We are not relying on compensatory storage in Concord for the work proposed in Sudbury.

The Sudbury Wetlands Bylaw and Regulations require additional fees for:

- Resource Restoration and Enhancement Projects
- Subdivision Roadways
- Drainage Structures
- Disturbed Adjacent Upland Resources for Commercial & Industrial Projects

Since none of these categories apply to the current project the Club understands that the Commission may require compensation for peer review and/or staff time. The Club is willing to pay reasonable review fees and looks forward to discussing this with the Commission at the first hearing.

In addition to the enclosed paper copy we have submitted an electronic version of the complete filing as required by your regulations. If you should need additional paper copies of the NOI please let me know. On behalf of the Nashawtuc Country Club we ask that you schedule this matter for discussion at your next available meeting. If you have any questions, please feel free to contact me at 617-896-4519 or by email at mtoohill@bscgroup.com.

Sincerely,

A handwritten signature in black ink, appearing to read "m. toohill".

Michael J. Toohill, PWS, CE, CERP
Senior Environmental Scientist and Associate

Encl.: NOI Package
Filing Fee Check

cc: Richard Shultz and Troy Noble; Nashawtuc Country Club
Bryce Swanson; Rees Jones, Inc.
Mass. DEP, NERO BRP WW
Mass. Natural Heritage and Endangered Species Program

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Sudbury, Massachusetts
Notice of Intent

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WPA Form 3

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

NOTICE OF INTENT FORM
COPY OF FILING FEE CHECKS



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury

City/Town

Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

0 Concord Road

a. Street Address

Sudbury

b. City/Town

01776

c. Zip Code

Latitude and Longitude:

42.414123

d. Latitude

-71.368316

e. Longitude

D13

f. Assessors Map/Plat Number

0300

g. Parcel /Lot Number

2. Applicant:

a. First Name

Nashawtuc Country Club attn: Richard Shultz, GM

b. Last Name

c. Organization

1861 Sudbury Road

d. Street Address

Concord

e. City/Town

MA

f. State

01742

g. Zip Code

(978) 610-2700

h. Phone Number

i. Fax Number

rshultz@nashawtuc.com

j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name

b. Last Name

c. Organization

d. Street Address

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email address

4. Representative (if any):

Michael

a. First Name

Toohill

b. Last Name

BSC Group, Inc.

c. Company

33 Waldo Street

d. Street Address

Worcester

e. City/Town

MA

f. State

01608

g. Zip Code

(617) 896-4519

h. Phone Number

(508) 792-4509

i. Fax Number

mttoohill@bscgroup.com

j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

\$750

a. Total Fee Paid

\$362.50

b. State Fee Paid

\$387.50

c. City/Town Fee Paid



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Bureau of Resource Protection - Wetlands

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A. General Information (continued)

6. General Project Description:

Golf course improvements including renovation of tees and greens, modifications to existing bunkers, construction of new bunkers, reconfiguration of two man-made ponds, and installation of a replacement irrigation system.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

- | | |
|---|---|
| 1. <input type="checkbox"/> Single Family Home | 2. <input type="checkbox"/> Residential Subdivision |
| 3. <input checked="" type="checkbox"/> Commercial/Industrial | 4. <input type="checkbox"/> Dock/Pier |
| 5. <input type="checkbox"/> Utilities | 6. <input type="checkbox"/> Coastal engineering Structure |
| 7. <input type="checkbox"/> Agriculture (e.g., cranberries, forestry) | 8. <input type="checkbox"/> Transportation |
| 9. <input type="checkbox"/> Other | |

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☐ Yes ☒ No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR 10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Middlesex South

a. County

9697

c. Book

b. Certificate # (if registered land)

4

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|--|-------------------------------|
| a. <input checked="" type="checkbox"/> Bank | 1,212 1. linear feet | 1,168 2. linear feet |
| b. <input checked="" type="checkbox"/> Bordering Vegetated Wetland | 508 1. square feet | 0 2. square feet |
| c. <input checked="" type="checkbox"/> Land Under Waterbodies and Waterways | 28,451 1. square feet 3. cubic yards dredged | 35,527 2. square feet |

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|---|
| d. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding | See attachment E. 1. square feet 3. cubic feet of flood storage lost | See attachment E. 2. square feet 4. cubic feet replaced |
| e. <input type="checkbox"/> Isolated Land Subject to Flooding | 1. square feet 2. cubic feet of flood storage lost | 3. cubic feet replaced |
| f. <input checked="" type="checkbox"/> Riverfront Area | Cold Brook, Sudbury River (Inland) 1. Name of Waterway (if available) - specify coastal or inland | |

2. Width of Riverfront Area (check one):

- ☐ 25 ft. - Designated Densely Developed Areas only
- ☐ 100 ft. - New agricultural projects only
- ☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 1,063,850
square feet

4. Proposed alteration of the Riverfront Area:

| | | |
|--|--|--|
| <u>179,426</u> a. total square feet | <u>66,472</u> b. square feet within 100 ft. | <u>112,954</u> c. square feet between 100 ft. and 200 ft. |
|--|--|--|

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

| Resource Area | Size of Proposed Alteration | Proposed Replacement (if any) |
|---|---|--|
| a. <input type="checkbox"/> Designated Port Areas | Indicate size under Land Under the Ocean, below | |
| b. <input type="checkbox"/> Land Under the Ocean | 1. square feet 2. cubic yards dredged | |
| c. <input type="checkbox"/> Barrier Beach | Indicate size under Coastal Beaches and/or Coastal Dunes below | |
| d. <input type="checkbox"/> Coastal Beaches | 1. square feet | 2. cubic yards beach nourishment |
| e. <input type="checkbox"/> Coastal Dunes | 1. square feet | 2. cubic yards dune nourishment |
| | Size of Proposed Alteration | Proposed Replacement (if any) |
| f. <input type="checkbox"/> Coastal Banks | 1. linear feet | |
| g. <input type="checkbox"/> Rocky Intertidal Shores | 1. square feet | |
| h. <input type="checkbox"/> Salt Marshes | 1. square feet | 2. sq ft restoration, rehab., creation |
| i. <input type="checkbox"/> Land Under Salt Ponds | 1. square feet 2. cubic yards dredged | |
| j. <input type="checkbox"/> Land Containing Shellfish | 1. square feet | |
| k. <input type="checkbox"/> Fish Runs | Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged | |
| l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage | 1. square feet | |
| 4. <input type="checkbox"/> Restoration/Enhancement | If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here. | |

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings



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C. Other Applicable Standards and Requirements

- ☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Notice of Intent – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. ☒ Yes ☐ No

If yes, include proof of mailing or hand delivery of NOI to:

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

MassGIS 2018

b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

- c. Submit Supplemental Information for Endangered Species Review*

1. ☒ Percentage/acreage of property to be altered:

(a) within wetland Resource Area 0.89 acres
percentage/acreage

(b) outside Resource Area 0 acres
percentage/acreage

2. ☒ Assessor's Map or right-of-way plan of site

2. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) ☒ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☒ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/>). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



Massachusetts Department of Environmental Protection
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C. Other Applicable Standards and Requirements (cont'd)

- (c) ☒ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/ mesa/ mesa_fee_schedule.htm).
Make check payable to "Commonwealth of Massachusetts - NHESP" and **mail to NHESP** at above address

Projects altering 10 or more acres of land, also submit:

- (d) ☐ Vegetation cover type map of site
- (e) ☐ Project plans showing Priority & Estimated Habitat boundaries
- (f) OR Check One of the Following
1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/ mesa/ mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)
2. ☐ Separate MESA review ongoing. a. NHESP Tracking # _____ b. Date submitted to NHESP _____
3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.
3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?
- a. ☒ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
1213 Purchase Street – 3rd Floor
New Bedford, MA 02740-6694
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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Document Transaction Number

Sudbury

City/Town

Online Users:

Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

C. Other Applicable Standards and Requirements (cont'd)

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?
- a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
- b. ACEC
5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
- a. ☐ Yes ☒ No
6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?
- a. ☐ Yes ☒ No
7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
- a. ☐ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
 2. ☐ A portion of the site constitutes redevelopment
 3. ☐ Proprietary BMPs are included in the Stormwater Management System.
- b. ☒ No. Check why the project is exempt:
1. ☐ Single-family house
 2. ☐ Emergency road repair
 3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

- ☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.



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D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Golf Course Improvements Project-Grading Plan

a. Plan Title

BSC Group, Inc.

Dominic Rinaldi, P.E.

b. Prepared By

c. Signed and Stamped by

6-25-2018

1" = 30'

d. Final Revision Date

e. Scale

Field-Delineated Resources Map

f. Additional Plan or Document Title

g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.
6. ☒ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
8. ☒ Attach NOI Wetland Fee Transmittal Form
9. ☐ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

29354

6-27-2018

2. Municipal Check Number

3. Check date

29348

6-27-2018

4. State Check Number

5. Check date

BSC Companies

6. Payor name on check: First Name

7. Payor name on check: Last Name



Massachusetts Department of Environmental Protection
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WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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F. Signatures and Submittal Requirements



1. Signature of Applicant

6.28.18

2. Date

3. Signature of Property Owner (if different)

4. Date

6/28/18

5. Signature of Representative (if any)

6. Date



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
NOI Wetland Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Applicant Information

1. Location of Project:

0 Concord Road

a. Street Address

29348

c. Check number

Sudbury

b. City/Town

\$362.50

d. Fee amount

2. Applicant Mailing Address:

a. First Name

Nashawtuc Country Club

c. Organization

1861 Sudbury Road

d. Mailing Address

Concord

e. City/Town

(978) 610-2700

h. Phone Number

i. Fax Number

MA

f. State

01742

g. Zip Code

tnoble@nashawtuc.com

j. Email Address

3. Property Owner (if different):

a. First Name

b. Last Name

c. Organization

d. Mailing Address

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email Address

B. Fees

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

| Step 1/Type of Activity | Step 2/Number of Activities | Step 3/Individual Activity Fee | Step 4/Subtotal Activity Fee |
|--|--|---|---|
| Category 2J | 1 | \$500 | \$500 |
| Category 2J (+50% for work in Riverfront Area) | | \$250 | \$250 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Step 5/Total Project Fee: | | | \$750 |

Step 6/Fee Payments:

| | |
|---------------------------------|--------------------------------------|
| Total Project Fee: | <u>\$750.00</u> |
| | a. Total Fee from Step 5 |
| State share of filing Fee: | <u>\$362.50</u> |
| | b. 1/2 Total Fee less \$12.50 |
| City/Town share of filling Fee: | <u>\$387.50</u> |
| | c. 1/2 Total Fee plus \$12.50 |

C. Submittal Requirements

- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

BSC COMPANIES, INC.803 SUMMER STREET
BOSTON, MA 02127Boston, MA 02110
easternbank.com
1-800-EASTERN

Check No. 29348

53-179/113

PAY
TO THE
ORDER
OF

Three Hundred Sixty Two and 50/100 Dollars

Commonwealth of Massachusetts
PO BOX 4062
BOSTON, MA 02111

DATE

6/27/2018

AMOUNT

\$362.50

TWO SIGNATURES REQUIRED OVER \$2,000

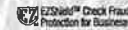
NOT VALID AFTER 180 DAYS

AUTHORIZED SIGNATURE



⑈029348⑈ ⑆011301798⑆ 0600659197⑈

Security features. Details on back.

BSC COMPANIES, INC.803 SUMMER STREET
BOSTON, MA 02127Boston, MA 02110
easternbank.com
1-800-EASTERN29354
Check No. 29354

53-179/113

PAY
TO THE
ORDER
OF

Three Hundred Eighty Seven and 50/100 Dollars

Town of Sudbury

DATE

6/27/2018

AMOUNT

\$387.50

TWO SIGNATURES REQUIRED OVER \$2,000

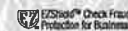
NOT VALID AFTER 180 DAYS

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Security features. Details on back.

BSC COMPANIES, INC.803 SUMMER STREET
BOSTON, MA 02127Boston, MA 02110
easternbank.com
1-800-EASTERN29346
Check No. 29346

53-179/113

PAY
TO THE
ORDER
OF

Three Hundred and 00/100 Dollars

Commonwealth of MA - NHESP
MA Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

DATE

6/27/2018

AMOUNT

\$300.00

TWO SIGNATURES REQUIRED OVER \$2,000

NOT VALID AFTER 180 DAYS

AUTHORIZED SIGNATURE



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Security features. Details on back.

Attachment A

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

PROJECT NARRATIVE
TABLE 1: IMPACT SUMMARY TABLE

NOTICE OF INTENT NARRATIVE

1.0 INTRODUCTION

This Notice of Intent (NOI) is being submitted to the Sudbury Conservation Commission by BSC Group, Inc. (BSC) on behalf of the Nashawtuc Country Club (NCC) for proposed work within the parts of the golf course that lie within the Town of Sudbury. A similar filing is being made in Concord for the remainder of the course that lies within that Town. This NOI is being submitted under the Massachusetts Wetland Protection Act (MGL 131 Section 40; and its implementing Regulations 310 CMR 10.00 et seq.) and the Town of Sudbury Wetlands Bylaw (Article XXII; and its implementing Rules and Regulations).

The project involves golf course improvements, including renovation of tees and greens, modifications to existing bunkers, construction of new bunkers, installation of a replacement irrigation system, and reshaping two man-made ponds on the course. Most of the proposed work will be carried out on the various existing turf surfaces of the golf course, portions of which are located within Bordering Vegetated Wetlands (BVW), Inland Bank, 100-foot Buffer Zone to BVW and Inland Bank, Land Under Water, 200-foot Riverfront Area, Bordering Land Subject to Flooding (BLSF), and locally-regulated Adjacent Upland Resource Areas, which is the subject of this NOI. NHESP Priority and Estimated Habitat is also present within a portion of the site and the NOI has been sent to them for review and comment.

Overall, the Project has been designed to avoid and minimize impacts to jurisdictional resource areas and buffer zones, and construction Best Management Practices (BMPs) such as erosion and sediment controls will be utilized during construction. In areas where impacts are unavoidable, appropriate mitigation is being proposed, as discussed further in this narrative. In areas where work proposed in BLSF, the net result is an increase in the floodplain storage. Work in the Riverfront Area is limited to areas already part of the golf course; therefore, there will be no loss of function of Riverfront Area. In areas where work is proposed within LUWW, BVW, and Bank, impacts will be fully mitigated through replication at a ratio of 1:1 or greater. Therefore, NCC is requesting the Sudbury Conservation Commission to issue an Order of Conditions to allow the Project to proceed as described herein.

2.0 EXISTING CONDITIONS AND LOCATION OF THE ACTION

The Nashawtuc Country Club is a privately owned and operated recreational facility on approximately 243 acres in both Concord (139.5 acres) and Sudbury (103.6 acres), Massachusetts. Most of the site is an 18-hole championship golf course, which opened in the 1960's. Narrow bands of trees, mostly white pine and red oak, exist between the fairways/greens to physically separate each hole. Paved golf cart paths run throughout the course. The club's clubhouse and other member amenities, including an outdoor swimming pool, tennis and paddle ball courts, golf cart building, and parking areas, are in the northeastern corner of the site and accessed from Nashawtuc Country Club Road. Extending west from Sudbury Road (opposite the country club road entrance) is a paved road that leads to the golf course maintenance facility. Hayfields and a composting/bulk products area are located in the northwestern corner of the site near Route 117. The 243-acre site can be generally characterized as a level to gently sloping outwash plain situated between, and elevated above, the Sudbury River/Great Meadows National Wildlife Refuge to the east and Cold Brook/Pantry Brook State Wildlife Management Area to the west and south.

NCC maintains the golf course within its historical footprint. NCC has agreed, through past Orders of Conditions, only to maintain and repair the existing systems and to bring any proposed expansion or changes in use to the Sudbury Conservation Commission when the work is within defined jurisdictional areas.

Since the proposed golf course improvements are beyond the level of work that could be considered “routine maintenance” NCC has filed this permit application for the improvements proposed in this Notice of Intent.

2.1 WETLAND RESOURCE AREAS

Portions of the site within the Project area contain jurisdictional wetland resource areas and buffer zones, including BVW, Inland Bank, LUWW, 200-foot Riverfront Area, BLSF, 100-foot Buffer Zone to BVW and Inland Bank, and locally-regulated Adjacent Upland Resource Areas. On June 22, 2017, a delineation of these areas was approved by the Concord NRC (ORAD DEP File No. 137-1373), and is the basis for this filing. Project Plans included in this NOI reflect the approved wetland Resource Area boundaries. Each Resource Area is discussed in the following paragraphs.

2.1.1 Bank (310 CMR 10.54)

A Bank is the portion of the land surface which normally abuts and confines a water body. It occurs between a water body and a vegetated bordering wetland and adjacent flood plain, or, in the absence of these, it occurs between a water body and an upland. The upper boundary of a Bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a Bank is the mean annual low flow level.

Banks are likely to be significant to public or private water supply, to ground water supply, to flood control, to storm damage prevention, to the prevention of pollution and to the protection of fisheries and wildlife habitat. Where Banks are composed of concrete, asphalt or other artificial impervious material, said Banks are likely to be significant to flood control and storm damage prevention. Banks are areas where ground water discharges to the surface and where, under some circumstances, surface water recharges the ground water. Where Banks are partially or totally vegetated, the vegetation serves to maintain the Banks' stability, which in turn protects water quality by reducing erosion and siltation.

At the NCC, Banks are associated with three man-made ponds on the golf course, seven intermittent streams, and two perennial streams within or near the Project site.

This project involves work on the Bank of two ponds: the 8th hole pond (649 l.f.) and the 15th hole pond (563 l.f.)

2.1.2 Bordering Vegetated Wetlands (310 CMR 10.55) and Locally-Regulated Isolated Vegetated Wetlands

Bordering Vegetated Wetlands are likely to be significant to public or private water supply, to ground water supply, to flood control, to storm damage prevention, to prevention of pollution, to the protection of fisheries and to wildlife habitat.

The Wetland Protection Act defines freshwater wetlands by hydrology and vegetation. Hydrology is the driving force which creates wetlands, but it is a transient, temporal parameter. The presence of water at or near the ground surface during a significant portion of the year supports, and in fact promotes, the growth of wetland indicator plants. Prolonged or frequent saturation or inundation also produces hydric soils, and creates anaerobic conditions that favor the growth of wetland indicator plants. Hydric soils are direct indicators of long-term hydrologic conditions and are present throughout the year. Hydric soils can also be “relics” of past hydrologic regimes that no longer influence the plant community.

Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. Where an area has been disturbed (e.g. by cutting, filling, or cultivation), the boundary is the line within which there are indicators of saturated or inundated conditions sufficient to support a predominance of wetland indicator plants, a predominance of wetland indicator plants, or credible evidence from a competent source that the area supported or would support under undisturbed conditions a predominance of wetland indicator plants prior to the disturbance.

Fourteen BVWs were identified within or near the Project area. Additionally, there are four locally-regulated isolated wetlands within the Project limits in Sudbury. The jurisdictional limits of all BVWs and IVWs are depicted on the Project Site Plans.

This project involves work in BVW adjacent to the Bank of one pond: the 15th hole pond (508 s.f.)

2.1.3 Land Under Waterbodies and Waterways (310 CMR 10.56)

Land under Water Bodies and Waterways is the land beneath any creek, river, stream, pond or lake. Said land may be composed of organic muck or peat, fine sediments, rocks or bedrock. The boundary of Land under Water Bodies and Waterways is the mean annual low water level. Land under Water Bodies and Waterways is likely to be significant to public and private water supply, to ground water supply, to flood control, to storm damage prevention, to prevention of pollution and to protection of fisheries and wildlife habitat. Where such land is composed of concrete, asphalt or other artificial impervious material, said land is likely to be significant to flood control and storm damage prevention. Where Land under Water Bodies and Waterways is composed of pervious material, such land represents a point of exchange between surface and ground water.

At NCC there are two distinct forms of LUWW—intermittent and perennial streams, for which there are a total of nine, and the manmade ponds on the golf course, for which there are a total of three.

This project involves work on LUW in two ponds: the 8th hole pond (16,450 s.f.) and the 15th hole pond (12,152 s.f.)

2.1.4 Land Subject to Flooding (310 CMR10.57)

Bordering Land Subject to Flooding (BLSF) is an area with low, flat topography adjacent to and inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.

The boundary of BLSF is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm. Said boundary shall be that determined by reference to the most recently available flood profile data prepared for the community within which the work is proposed under the National Flood Insurance Program (NFIP), currently administered by the Federal Emergency Management Agency, successor to the U.S. Department of Housing and Urban Development. Said boundary, so determined, shall be presumed accurate. This presumption is rebuttable and may be overcome only by credible evidence from a registered professional engineer or other professional competent in such matters. Where NFIP Profile data is unavailable, the boundary of BLSF shall be the maximum lateral extent of flood water which has been observed or recorded. In the event of a conflict, the issuing authority may require the applicant to determine the boundary of BLSF by engineering calculations.

MassGIS (2016) shows portions of the site located within the 100-year floodplain (Zone AE). Per 310 CMR 10.57(2)(a)3, the boundary of Bordering Land Subject to Flooding (BLSF) is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm. Elevation data (LiDAR imagery) was used to establish this resource area on the site. The FEMA Flood Insurance Rate Maps (FIRM) for this area shows the 100-year floodplain elevation to be 121 feet (NAVD, '88). Attachment B contains maps showing where the land surfaces at the Nashawtuc Country Club are at or below elevation 121 feet.

There are no Isolated Land Subject to Flooding (ILSF) areas on the property of the NCC.

2.1.5 Riverfront Area 310 CMR 10.58

A Riverfront Area is the area of land between a river's (perennial only) mean annual high-water line and a parallel line measured horizontally. Unlike other Resource Areas in the WPA, Riverfront Area may include or overlap other resource areas or their buffer zones. Riverfront Area does not have a buffer zone.

Where a proposed activity involves work within the riverfront area, the regulation state that the issuing authority shall presume that the area is significant to protect the private or public water supply; to protect the groundwater; to provide flood control; to prevent storm damage; to prevent pollution; to protect land containing shellfish; to protect wildlife habitat; and to protect fisheries. The regulations go on to state "The presence of natural vegetation within riverfront areas is critical to sustaining rivers as ecosystems and providing these public values."

At NCC, Cold Brook and the Sudbury River are perennial watercourses and have an associated 200-foot Riverfront Area. Please note that portions of the Riverfront Area within the Project limits are not comprised of "natural vegetation" as it is meant in the regulations; the entire RFA on the course has been affected by past golf course turf management efforts, a condition which predates the passage of either the Wetlands Protection Act or the Rivers Act.

2.1.6 Other Regulated Areas

Per the MassGIS and the Massachusetts Natural Heritage Atlas (13th Edition, October 2008), there are no potential or certified vernal pools within or near the site. However, a portion of the site to the west, adjacent to the Great Meadows National Wildlife Refuge is located within an area of Priority and Estimated Habitat for rare species. In addition, the site is not located within an Area of Critical Environmental Concern (ACEC) per the 2008 Massachusetts ACEC List (September

2008, Executive Office of Environmental Affairs). The site does not contain Outstanding Resource Waters listed in the Massachusetts Surface Water Quality Standards (314 CMR 4.00).

3.0 PROPOSED ACTIVITIES

The proposed work on the golf course includes:

- Rebuilding various greens on the course. Most of the existing greens were built long ago by simply mounding up native soils. These “push-up” greens have served the Club well but all have become compacted and require intensive maintenance and extensive fertilizer, water, and chemical input to remain healthy. New greens are proposed to be built to a more current standard, called USGA greens. USGA greens are a turf layer underlain by pervious sand layers which allows watering to be effective at the root zone and allows adequate drainage so the turf does not develop oversaturated conditions which can lead to fungal outbreaks and turf damage. By minimizing fungal outbreaks, the superintendent does not have to apply as many chemicals to the turf to keep it healthy. Most of the greens are proposed to be rebuilt in their existing footprint. A few greens are proposed to be reshaped or slightly enlarged. All this work is proposed in existing turf areas.

Where necessary, greens will be rebuilt by stripping off the turf surface for potential reuse, excavating the soil down to the desired subgrade elevation, installing the underlying pervious layers (mostly green sand, and some gravel), installing the underdrain and irrigation system, and finally adding the soil layer that will support the turf surface. Depending on the size location, and proposed contouring of the green surface this process can take from a few days to a week or more.

- Rebuilding various teeing areas on the course. As with the greens these areas were originally built by pushing up native soils to form a “mound”. Ideally a teeing area should be level and adequately sized to accommodate intensive use and allow for rotating teeing positions to give the turf time to heal. Some of the tees have slumped over time and some are just too small, causing uneven surfaces and intensive use over a smaller surface area. Consequently, maintenance demands are higher and rebuilding the tees (mostly within their existing footprint) is required.

As with rebuilding greens, the existing turf surface will first be cut for potential reuse. The underlying soil will be reshaped and augmented as necessary, and new irrigation lines will be installed. Finally, the surface of the tee will be seeded (or sodded). This process should take a day or two per tee.

- Adding a few new teeing areas. Golf clubs cater to golfers of a wide variety of ages and abilities. The Club is investing in family golf and is proposing to build additional sets of tees in a few areas to accommodate younger, and more elderly, players. These tees will be built in existing turf areas in a similar fashion to the description in the previous paragraph. Each tee would be built in a day or two.
- Rebuilding bunkers/relocating bunkers. Many of the bunkers (aka “sand traps”) are proposed to be rebuilt. Over time the underlying sand in the bunkers clogs, which impedes drainage after a rainfall event. Some of the bunkers have lost their original shape over time due primarily to mowing around the area. A few of the bunkers need to be either enlarged or moved slightly because the way golf is played (and the equipment used) has changed dramatically over the past 100 years.

Bunkers will be rebuilt by first removing the existing sand, which may be re-used on other areas of the course. Then the bunker is reshaped and the drainage pipes in the bunker repaired or replaced. In some of the bunkers a geotextile layer may be added to keep the sand and subsoils segregated and to help drainage. After the shaping the bunker is surrounded by soil mounds which will be seeded or sodded with an appropriate turfgrass and the bunker is filled with new sand. Rebuilding each bunker should only take 1 to 2 days.

- Building new bunkers. On a few of the golf holes the Club proposes to install new bunkers in existing turf areas to increase the challenge of the golf hole. This will involve first excavating to a desired subgrade, then installing drainage and geotextile materials, and finally mounding around the bunker and filling the bunker with sand. Building each bunker should only take 2 to 4 days.
- Reshaping fairways. On a few of the golf holes the Club proposes to slightly change the shape and size of the fairway to either increase (or in some cases soften or decrease) the challenge of the golf hole. Most of the proposed changes to the fairways will be accomplished simply by changing mowing areas on existing turf surfaces and changing some of the turf varieties in the new fairway area from those used in “primary rough” to those used on fairways.
- Reshaping man-made ponds. To improve the layout of the course, two man-made ponds will be reshaped within the general area of their existing location. The proposed pond layout will be excavated to grade, leaving a small temporary levee between the old pond and the new. Water from the existing pond will be pumped to new portions of the pond, thereby dewatering the end of the pond to be filled in. The old portions of the pond will be subsequently filled to grade and restored and the temporary levee removed.
- Irrigation system replacement. The existing irrigation system serving the golf course is over 20 years old and approaching the end of its lifespan. NCC is proposing to replace the entire irrigation system including piping, controls, and spray heads to promote more efficient and precise watering (thereby reducing water usage overall) and realign irrigation with the other various golf course improvements proposed above. Irrigation system replacement will involve minor trenching and the installation of polyethylene piping and spray heads within a few inches of the surface of turf areas. Trenches will be approximately 18-inches wide. During installation, cut turf will be stockpiled adjacent to the trench, and following installation of the irrigation line, turf will be replaced, resulting in immediate soil stabilization. Therefore, trenches will be opened, pipe laid, trenches backfilled, and the turf replaced each day as the project progresses. This activity does not involve large areas of excavation or open trenches for an extended period.

4.0 POTENTIAL IMPACTS

An impact summary table (Table 1) is attached at the end of this Narrative. A detailed analysis of BLSF impacts and mitigation is provided in Attachment E. A discussion of impacts is provided in the following sections.

4.1 Land Under Waterbodies and Waterways (LUWW)

The project will result in 28,451 square feet of impacts to LUWW associated with reshaping man-made ponds near Holes 8 and 15. However the project also proposes the creation of 35,527 square feet of LUWW through the reconfiguration of said ponds (16,333 s.f. at the 15th hole and 19,194 s.f. at the 8th hole).

4.2 Bank

The project will result in impacts to 1,212 linear feet of Inland Bank associated with reshaping man-made ponds near Holes 8 and 15. However, through this activity, approximately 1,225 linear feet of Inland Bank will also be created (675 l.f. at the 8th hole pond and 550 l.f. at the 15th hole pond).

4.3 Bordering Vegetated Wetlands (BVWs)

The project will result in 508 square feet of impact to BVW associated with reshaping the man-made pond near Hole 15. All impacts to BVW will be fully mitigated through the creation of 1,000 square feet of wetland replication areas bordering on the Bank of the reconfigured golf course pond.

Wetland replication areas will be constructed by excavating the area to grade and filling the area with hydric soil. The area will be planted and/or seeded with a wetland seed mix, stabilized, and allowed to revegetate. Wetland replication areas will be monitored for a period of one (1) growing season upon completion of planting to ensure success.

4.4 Bordering Land Subject to Flooding (BLSF)

The project will not result in the loss of storage volume in BLSF and none of the project elements will affect flood flow or flow patterns. The project does not increase impervious surfaces on the site.

Table 2 (included at the end of this Narrative Section) and the enclosed plans (Attachment B) show the extent of BLSF alteration (Base Flood Elevations; BFEs) per the NFIP Profiles by using LiDAR imagery 1-foot contour intervals across the site. Per the WPA, BLSF begins at the upslope edge of the outermost (most upslope) resource area.

There are 13 locations in Sudbury where work is proposed in BLSF:

| Area* | Activity | Plan Sheet Reference |
|--------------|---|-----------------------------|
| 9 | Grading associated with the reconstruction of tees at Holes 1 and 10 | 1 |
| 10 | Grading associated with the reconstruction of bunkers to the right of the fairway at Hole 1 | 1 |
| 11 | Grading associated with the reconstruction of the green at Hole 11 and tees at Hole 12 | 11 |
| 12 | Grading associated with the reconstruction of the green at Hole 14 | 13 |
| 13 | Grading associated with the reconstruction of the green at Hole 10 and tees at Hole 11 | 11 |
| 14 | Grading associated with the reconstruction of the bunker near the green at Hole 13 | 13 |
| 15 | Grading near the pond at Holes 15 and 16 | 16 |
| 16 | Grading associated with the reconstruction of the green at Hole 1 and the bunker and green at Hole 16 | 16 |
| 18 | Grading associated with the reconstruction of the green at Hole 8 and the tees at Hole 2 | 2 |

| | | |
|---------------------------------|--|----|
| 20 | Grading associated with the reconstruction of the green at Hole 7 and the tees at Hole 8 | 8 |
| 24 | Grading adjacent to the fairway at Hole 3 | 3 |
| 25 | Grading adjacent to the fairway at Hole 3 | 3 |
| 26 | Grading adjacent to the fairway at Hole 10 and south of the green at Hole 11 | 10 |
| Additional Flood Storage Area 6 | Grading associated with the creation of additional compensatory flood storage at Hole 11 green | 11 |

*Areas 1-8, 17, 19, and 21-23 are located within the Town of Concord and are therefore not described in this application.

Because the grading is changing in the work areas, the cuts and fills on a foot-by-foot basis have been calculated as required under the WPA regulations. Included in Attachment F are calculations and a memorandum signed and stamped by a Massachusetts Registered Professional Engineer which show that work on the course will result in an increase in available flood storage within BLSF.

4.5 Riverfront Area (RFA)

Table 1 shows, on a golf hole by golf hole basis, the impacts that the proposed project elements may have on RFA. These impact areas are also depicted on Sheets 1-5, 10, and 12-14 (Attachment C). In total, the Project is estimated to affect a total of 179,426 square feet of RFA in Sudbury. Specifically, ground disturbing activities within RFA are associated with the following activities:

- Reconstruction of the tee area at Holes 1 and 10;
- Reconstruction of the tee area, fairway bunkers 1, 2, and 3, and green area at Hole 3;
- Reconstruction of fairway bunkers 1 and 2, and green area at Hole 5;
- Reconstruction of the green area at Hole 10;
- Reconstruction of the green area and tee area at Holes 12 and 13; and,
- Reconstruction of the tee area at Hole 14.

The new features will function in essentially the same manner as they currently do. Therefore, there is no real reduction in RFA, and all the interests currently served by RFA in these areas will continue in the future. Throughout construction, BMPs including the use of erosion and sediment controls will be utilized to reduce the likelihood of adverse impacts to RFA, and disturbed areas will be restored upon completion, as discussed in the following section.

4.6 Adjacent Upland Resource Area (AURA)

Various portions of the activities will occur within the locally-regulated AURA, many of which overlap with other resource areas. Although work is proposed within the AURA, construction BMPs will be used throughout to prevent adverse impacts to the resource areas the AURA is intended to protect, and disturbed areas will be stabilized upon completion of work. Overall, no significant difference between pre-construction conditions and post-construction conditions is anticipated within the AURA. The proposed activities are limited to the existing disturbed footprint of a golf course facility only, and will not result in disturbance to previously undisturbed areas.

5.0 PROPOSED MITIGATION (RESTORATION)

For Riverfront Area, the areas where work will be performed will serve the same functions and have the same values as they did prior to the project. Therefore, the proposed mitigation is restoration and stabilization of those areas. There is no loss of resource areas due to the project, therefore creation of new resource areas is not required.

For Land Subject to Flooding, analyses have shown that the project will not result in a loss of floodplain storage, nor will it impede flood flows. Therefore, the proposed restoration is the creation of two compensatory storage areas in Sudbury and the strict adherence to the grading plans for the 13 impact areas presented in this NOI.

Compensatory Storage Area #5 is currently an out-of-play area behind the 10th green. The area is vegetated by a variety of herbaceous plants and some shrubs. Common herbs are impatiens, vetch, nightshade, ragweed, dock, and thistle. Common shrubs include a large stand of buckthorn, one small red oak sapling, and a small stand of red osier dogwood. The area is moist, but is not a wetland. Once re-graded for compensatory storage the area will be planted with a variety of shrubs (4 pussy willows (*Salix discolor*; FACW) and 4 American elderberry (*Sambucus canadensis*; FACW) and seeded with a native plant conservation seed mix. Since grades will be reduced in this area there is a chance that it may develop into a wetland and an appropriate seed mix will be selected on that basis. The compensation area will serve similar habitat functions as currently exist, but removing some of the invasives from the area will result in a net ecological benefit.

Compensatory Storage Area #6 is currently an out-of-play area between the 10th fairway and the 11th green approach. The area is vegetated by turfgrass and there are 4 large trees in the area. The trees were planted in a line and it is possible to grade on either side of the line outside of the dripline of the trees, thereby preserving the trees and providing adequate compensatory storage. The area will be restored with turfgrass (primarily long fescues) following grading.

For Bank, LUWW, and BVW, mitigation is proposed in the form of replication, as described in the aforementioned sections. The project will result in a net increase of each resource area on-site.

6.0 COMPLIANCE WITH PERFORMANCE STANDARDS OF THE WPA

The following sections outline the performance standards for each affected resource area established by the WPA, and the project's compliance with each.

6.1 Bank (310 CMR 10.54)(4))

(a) ...any proposed work on a Bank shall not impair the following:

1. the physical stability of the Bank;
2. the water carrying capacity of the existing channel within the Bank;
3. ground water and surface water quality;
4. the capacity of the Bank to provide breeding habitat, escape cover and food for fisheries;
5. the capacity of the Bank to provide important wildlife habitat functions.
6. Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.54(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards...

Although portions of the proposed project will result in permanent impacts to Bank associated with reshaping man-made ponds, the project also proposes to reconstruct approximately 1,225 linear feet of new pond Bank as mitigation for these impacts. Reconstructed Bank has been designed to contain the relocated footprint of LUWW associated with two man-made ponds, and will retain the same physical characteristics as the existing Banks within the project area. Therefore, no changes to the functions and values provided by the Bank are expected to occur from the proposed activities.

(b) ...structures may be permitted in or on a Bank when required to prevent flood damage to facilities, buildings and roads constructed prior to the effective date of 310 CMR 10.51 through 10.60 or constructed pursuant to a Notice of Intent filed prior to the effective date of 310 CMR 10.51 through 10.60 (April 1, 1983), including the renovation or reconstruction (but not substantial enlargement) of such facilities, buildings and roads,...

Not applicable; portions of the project which will result in impacts to Bank are associated with reshaping man-made ponds only. The proposed activities are not intended to prevent flood damage.

(c) ...no project may be permitted which will have any adverse effect on specified habitat sites of Rare Species, as identified by procedures established under 310 CMR 10.59.

Not applicable; no portions of the project which will result in impacts to Bank are proposed within areas of NHESP Priority and Estimated Habitat for rare species.

6.2 *Bordering Vegetated Wetlands (310 CMR 10.55)(4)*

(a) ...any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.

Portions of the project which will result in impacts to BVW are associated with reshaping man-made ponds. Although these activities will result in the loss of BVW which border upon said ponds, the project also proposes full mitigation for this loss in the form of wetland replication areas.

(b) ...the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5000 square feet of Bordering Vegetated Wetland...

As mentioned above, the project proposes mitigation in the form of 1,000 square feet of wetland replication above the Bank of the relocated pond. The proposed wetland replication area will border on the new, proposed limits of the man-made pond at the 15th hole, providing suitable hydrology and replicating the existing BVW configuration to the maximum extent practicable.

(c) ...the issuing authority may issue an Order of Conditions permitting work which results in the loss of a portion of Bordering Vegetated Wetland when;

- 1. said portion has a surface area less than 500 square feet;*
- 2. said portion extends in a distinct linear configuration ("finger-like") into adjacent uplands; and*
- 3. in the judgment of the issuing authority it is not reasonable to scale down, redesign or otherwise change the proposed work so that it could be completed without loss of said wetland.*

Not applicable.

(d) ...no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species...

Not applicable; no portions of the project which will occur within BVW are located with areas of NHESP Priority and Estimated Habitat for rare species.

(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern...

Not applicable; no portions of the project are located within an Area of Critical Environmental Concern.

6.3 Land Under Waterbodies and Waterways (310 CMR 10.56(4))

(a) ...any proposed work within Land under Water Bodies and Waterways shall not impair the following:

- 1. The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;*
- 2. Ground and surface water quality;*
- 3. The capacity of said land to provide breeding habitat, escape cover and food for fisheries; and*
- 4. The capacity of said land to provide important wildlife habitat functions.*
- 5. Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.56(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards...*

Although portions of the proposed project will result in permanent impacts to LUW associated with reshaping man-made ponds, the project also proposes to create 35,527 square feet of LUWW as mitigation for these impacts (16,333 s.f. at the 15th hole and 19,194 s.f. at the 8th hole). LUWW created as mitigation has been designed to contain the same volume of water associated with two man-made ponds, and will retain the same physical characteristics as the existing LUWW within the project area. Therefore, no changes to the functions and values provided by LUWW are expected to occur from the proposed activities.

(b) ...issuing authority may issue an Order in accordance with M.G.L. c. 131, § 40 to maintain or improve boat channels within Land under Water Bodies and Waterways...

Not applicable; the proposed activities within LUWW are not intended to maintain or improve boat channels.

(c) ...no 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.

Not applicable; no portions of the project where impacts are proposed to Inland Bank are within an area of NHESP Priority and Estimated Habitat.

6.4 Bordering Land Subject to Flooding (310 CMR 10.57)(4)(a)

(1) Compensatory storage shall be provided for all flood storage volume that will be lost as the result of a proposed project within Bordering Land Subject to Flooding...Compensatory storage

shall mean a volume not previously used for flood storage and shall be incrementally equal to the theoretical volume of flood water at each elevation, up to and including the 100-year flood elevation, which would be displaced by the proposed project. Such compensatory volume shall have an unrestricted hydraulic connection to the same waterway or water body. Further, with respect to waterways, such compensatory volume shall be provided within the same reach of the river, stream or creek.

Compensatory storage has been designed to mitigate all portions of the project which are proposed in BLSF. A table depicting cut and fill volumes at each incremental elevation is included in Attachment F to demonstrate compliance with this performance standard.

(2) Work within Bordering Land Subject to Flooding, including that work required to provide the above-specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity.

The work within BLSF will not restrict flows or cause an increase in flood stage or velocity. Flood waters will be allowed to flow and recede freely within the floodplain.

(3) Work in those portions of bordering land subject to flooding found to be significant to the protection of wildlife habitat shall not impair its capacity to provide important wildlife habitat functions.

Portions of the project which are proposed within BLSF will not impair its capacity to provide important wildlife habitat functions. As previously mentioned, the project is proposed within the footprint of the existing golf course facility only, which currently provides limited wildlife habitat value. While grades within the project area will be slightly modified to maintain and improve the course, the area will not substantially change from pre-construction conditions to post-construction conditions, and will continue to operate as an active golf course facility. Therefore, no adverse impacts to wildlife habitat are expected to occur because of project activities.

6.5 Riverfront Area, 310 CMR 10.58(4)

(a) Protection of Other Resource Areas. The work shall meet the performance standards for all other resource areas within the riverfront area...when work in the riverfront area is also within the buffer zone to another resource area, the performance standards for the riverfront area shall contribute to the protection of the interests of M.G.L. c. 131, § 40 in lieu of any additional requirements that might otherwise be imposed on work in the buffer zone within the riverfront area.

The Project meets all performance standards for other resource areas within RFA, including portions of the project which are within both RFA and BLSF, Inland Bank, LUWW, and/or Buffer Zone. The proposed activities are limited to previously disturbed areas of an actively managed and utilized golf course facility only, and will not adversely affect the capacity of the RFA to protect the interests of M.G.L c. 131 S. 40.

(b) Protection of Rare Species. No project may be permitted within the riverfront area which will have any adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species...

Portions of the project which occur within the limits of both RFA and NHESP Priority and Estimated Habitat will occur within previously disturbed portions of an existing golf course facility only, which provide little habitat value to rare species. However, a copy of this NOI has also been submitted to NHESP for review and affirmation that the project, as designed, will not result in a prohibited take of rare species habitat.

(c) Practicable and Substantially Equivalent Economic Alternatives. There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.

The Project has been designed to maintain and improve an existing golf course facility within its existing footprint. The golf course is not being expanded, and the existing facilities are being utilized to the maximum extent practicable through necessary improvements. Although portions of the project will result in disturbance to RFA, the proposed activities are intended to improve the efficiency of golf course maintenance, such as watering and pesticide application, thereby reducing the amount of inputs needed to maintain the area to Club standards.

7.0 BEST MANAGEMENT PRACTICES

Throughout the project, construction BMPs will be utilized to prevent adverse impacts to resource areas. A discussion of each of the proposed BMPs is described herein.

7.1 Erosion and Sediment Controls

Prior to the start of construction, erosion and sediment controls composed of compost filter tubes will be installed between the work areas and resource areas. Controls will be staked to ensure proper contact with the ground surface, and will be inspected by construction personnel daily to remove any accumulating sediment or supplement controls based on changing site conditions. Controls will remain in place until disturbed areas are permanently stabilized, or otherwise required by the Conservation Commission.

7.2 Materials Stockpiling

Construction materials, including soil stockpiles, will be stored outside of resource areas and buffer zones to the maximum extent practicable. If this is not feasible, stockpiles will be surrounded by sediment controls and/or covered and secured with a tarp.

7.3 Dewatering

Dewatering will be required to reshape two man-made ponds on the course. The existing ponds will be dewatered using a hose and pumping system, using the new pod basin for storage. There may be a need to partially dewater the ponds to an external area. If this is required a dewatering crib will be set up to dissipate flows and prevent sedimentation. At no time will pumped water be allowed to discharge directly into resource areas.

7.4 Restoration

Most of disturbed areas will be restored by replacing cut turf stored for reuse within the footprint of disturbed areas. However, if the existing turf is unusable, disturbed areas will be restored either with sod or with the appropriate golf course seed mix and stabilized. The areas will be monitored

for successful restoration and any supplemental restoration needs until all areas have permanently revegetated.

8.0 CONCLUSION

The Applicant requests that the Sudbury Conservation Commission issue an Order of Conditions under the Town's Bylaw and the Massachusetts Wetlands Protection Act allowing the project to proceed as proposed.

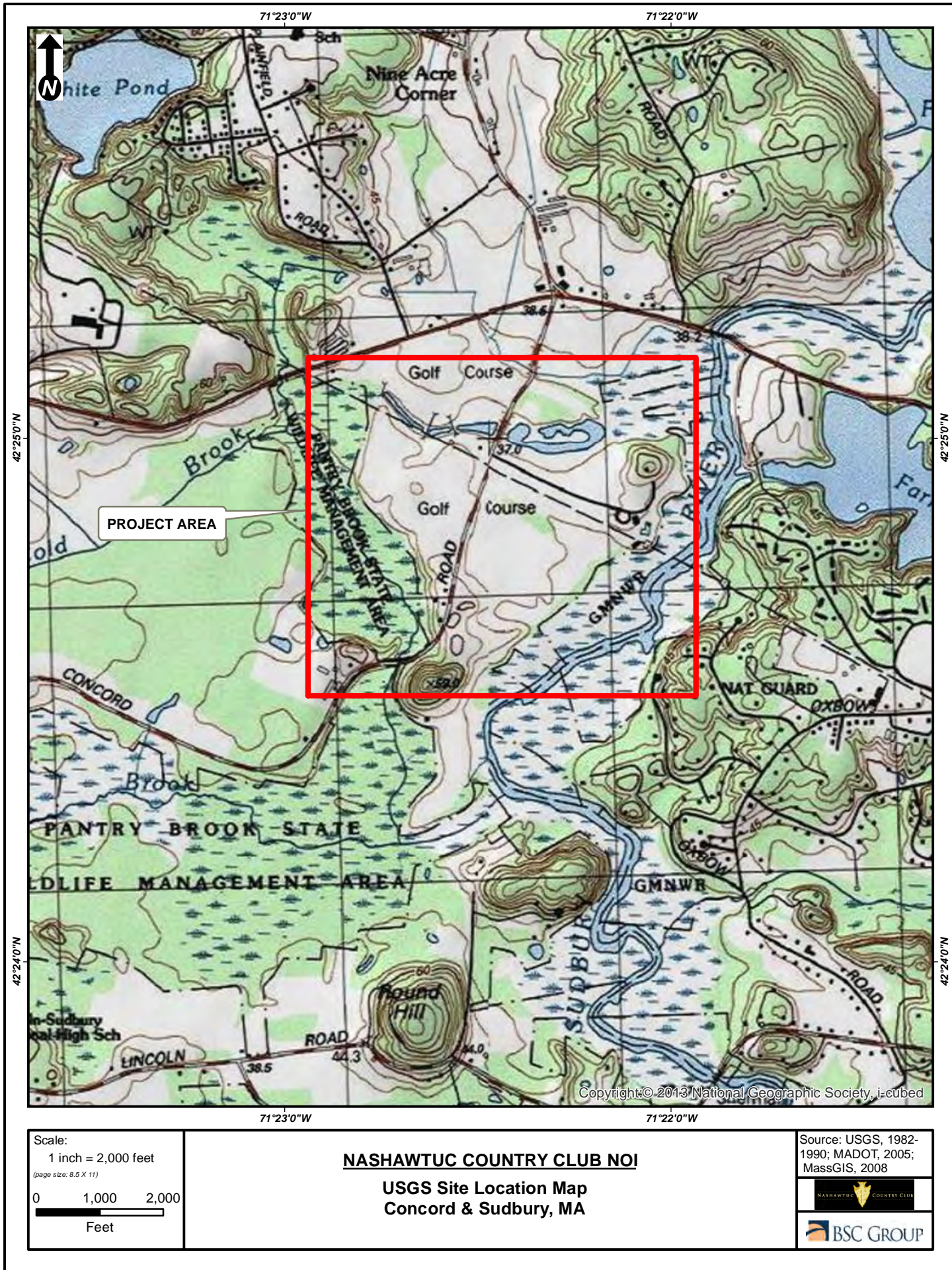
Table 1. Summary of Project Impacts within Sudbury

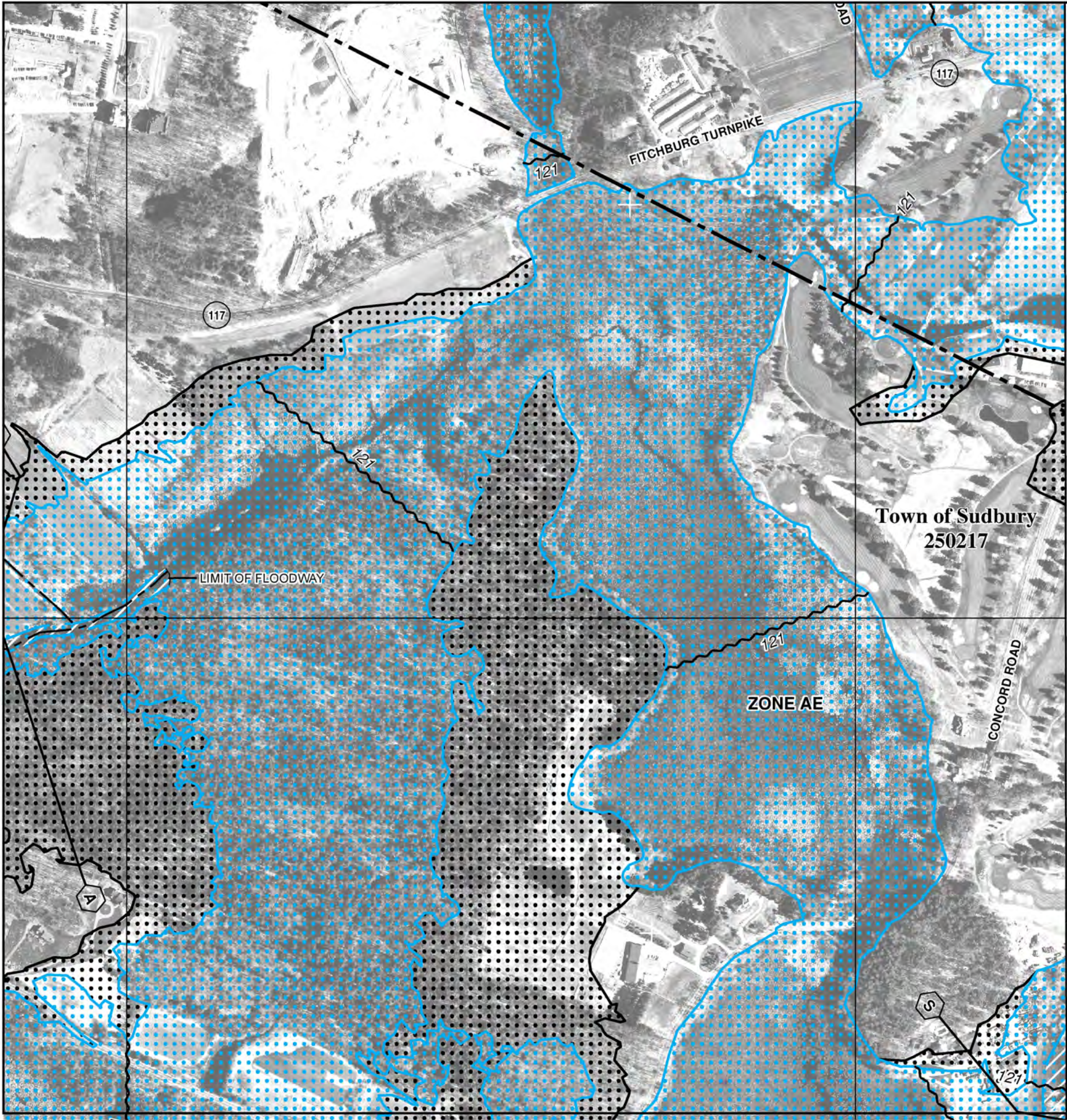
| Hole Number | Feature (tee, bunker. Etc.) | BVW Impacts (sf) | Bank Impacts (lf) | LUW Impacts (sf) | Inner Riparian Impacts (sf) | Outer Riparian Impacts (sf) | Total RFA Impacts (sf) | Total Buffer Zone Impacts |
|-------------|-----------------------------|------------------|-------------------|------------------|-----------------------------|-----------------------------|------------------------|---------------------------|
| 1/10 | Tee Area | | | | 8,673 | 9,614 | 18,287 | |
| 1 | Fairway Bunker 1 | | | | | | | 969 |
| 1 | Fairway Bunker 2 | | | | | | | 6,731 |
| 1 | Green Area | | | | | | | 48 |
| 2 | Tee Area | | | | | | | 2,826 |
| 3 | Tee Area | | | | | 22,782 | 22,782 | |
| 3 | Fairway Bunker 1/2 | | | | 19,217 | 627 | 19,844 | 321 |
| 3 | Fairway Bunker 3 | | | | | 2,835 | 2,835 | |
| 3 | Green Area | | | | 8,949 | 16,433 | 25,382 | |
| 4 | Tee Area | | | | 4,137 | 8,953 | 13,090 | |
| 4 | Green Area | | | | | | | 129 |
| 5 | Tee Area | | | | | | | 24,107 |
| 5 | Fairway Bunker 1 | | | | 166 | 7,845 | 8,011 | |
| 5 | Fairway Bunker 2 | | | | | 1,858 | 1,858 | |
| 5 | Green Area | | | | 4,153 | 2,395 | 6,548 | |
| 7 | Green Area | - | | | | | | 21,438 |
| 8 | Tee Area | - | | | | | | 41,093 |
| 8 | Pond/Green Area | | 649 | 16,450 | | | | 51,910 |
| 10/11 | 10 Green Area/11 Tee Area | | | | 4,385 | 12,614 | 16,999 | 8,925 |
| 11 | Green Area | | | | | | | 5,362 |
| 12 | Tee Area | | | | | | | 4,999 |
| 12/13 | Green Area/Tee Area | | | | 15,667 | 16,047 | 31,714 | 1,526 |
| 14 | Tee Area | | | | | 4,119 | 4,119 | |
| 15 | Tee Area | | | | | | | 5,960 |
| 15 | Fairway Bunker/Pond | 508 | 563 | 12,001 | | | | 35,235 |
| Throughout | Irrigation | | | | 1,125 | 6,832 | 7,957 | 6,812 |
| TOTAL | | 508 | 1,212 | 28,451 | 66,472 | 112,954 | 179,426 | 218,391 |

Attachment B

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

FIGURES
(Some Bound Separately)





MAP SCALE 1" = 500'



PANEL 0367F

FIRM

FLOOD INSURANCE RATE MAP
MIDDLESEX COUNTY,
MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 367 OF 656
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|------------------|--------|-------|--------|
| CONCORD, TOWN OF | 250189 | 0367 | F |
| SUDBURY, TOWN OF | 250217 | 0367 | F |

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

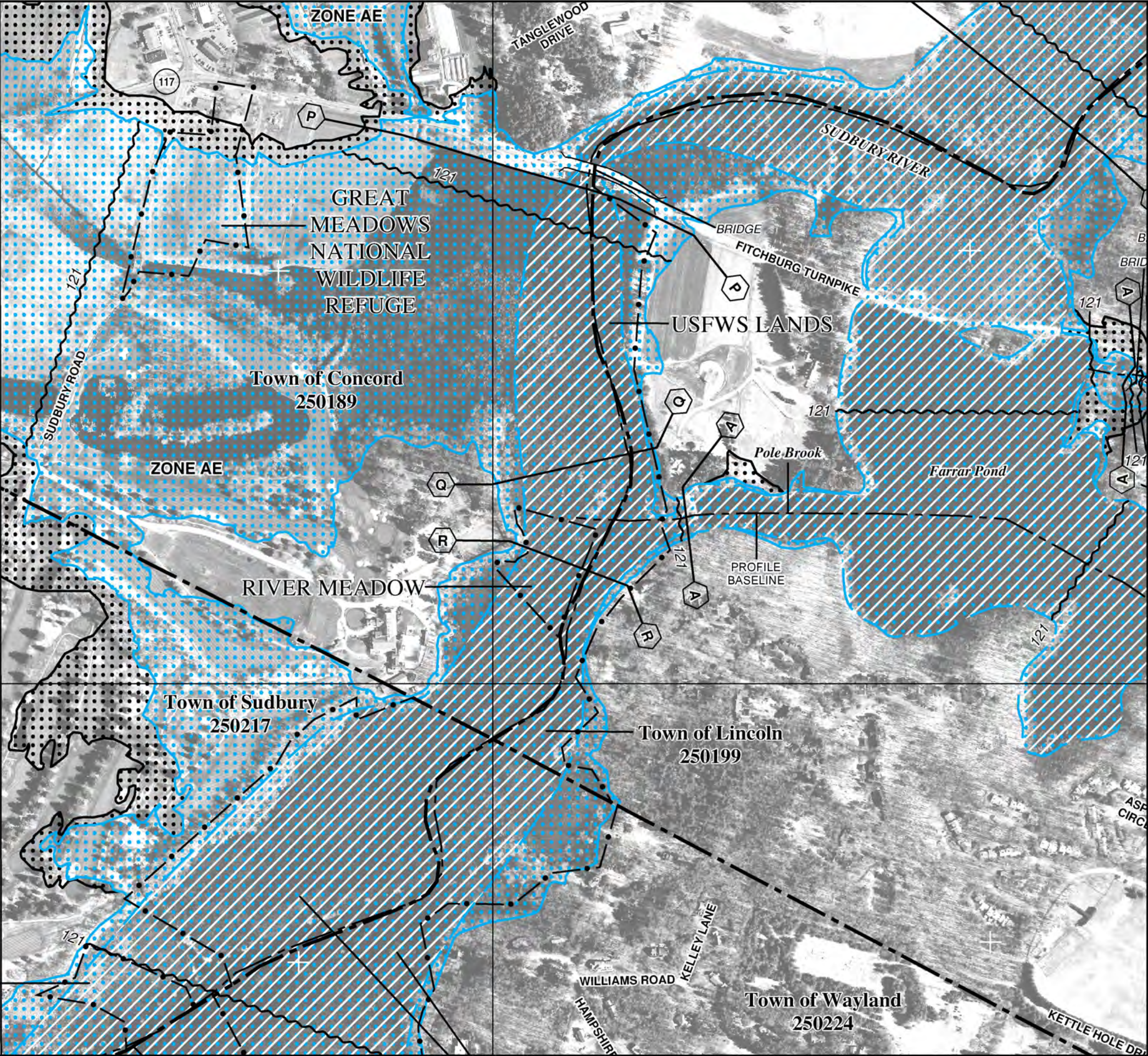


MAP NUMBER
25017C0367F
MAP REVISED
JULY 7, 2014

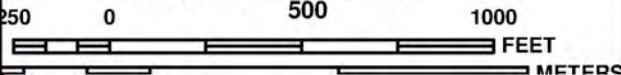
Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

JOINS PANEL 0367



MAP SCALE 1" = 500'



PANEL 0386F

FIRM

FLOOD INSURANCE RATE MAP
MIDDLESEX COUNTY,
MASSACHUSETTS
(ALL JURISDICTIONS)

PANEL 386 OF 656
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|------------------|--------|-------|--------|
| CONCORD, TOWN OF | 250189 | 0386 | F |
| LINCOLN, TOWN OF | 250199 | 0386 | F |
| SUDBURY, TOWN OF | 250217 | 0386 | F |
| WAYLAND, TOWN OF | 250224 | 0386 | F |

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
25017C0386F
MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

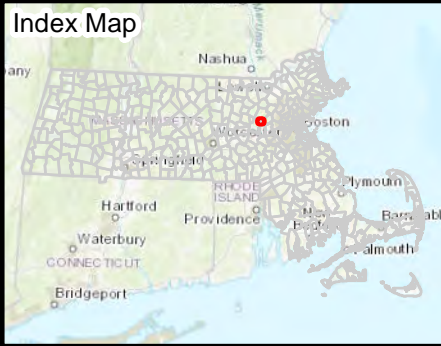
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

AT MEADOWS
ONAL WILDLIFE
REFUGE

Attachment C

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

NHESP MAPPING
NHESP INFO REQUEST LETTER



Legend

- Potential Vernal Pools
- NHESP Priority & Estimated Habitats
- Town Boundary

Scale

1 inch = 500 feet

0 500 1,000 Feet

North Arrow

N

Source:

-MassGIS
Basemap & Environmental Data
-Aerial & Topo Imagery
ESRI, DigitalGlobe, GeoEye, i-cubed,
DeLorme, NAVTEQ, TomTom, Intermap,
Increment P Corp., AEX, GEBCO, USDA,
USGS, FAO, NPS, NRCAN, GeoBase,
Getmapping, Aerogrid, IGP, IGN, Kadaster
NL, Ordnance Survey, ESRI Japan, METI,
ESRI China (Hong Kong), swisstopo, & the
GIS User Community

NASHAWTUC COUNTRY CLUB NOI

NHESP Map

Concord & Sudbury, MA

June 29, 2018

Natural Heritage & Endangered Species Program
MassWildlife Field Headquarters
1 Rabbit Hill Road
Westborough, MA 01581

**RE: Notice of Intent—Golf Course Improvements Project
Nashawtuc Country Club, Concord and Sudbury, Massachusetts**

Dear NHESP Reviewer:

On behalf of the Nashawtuc Country Club, BSC Group, Inc. is filing the attached Notice of Intent (NOI) under the Massachusetts Wetlands Protection Act and the Town of Sudbury Wetlands Bylaw for proposed improvements to the golf course. These improvements include renovation of some of the tees and greens, modifications to existing bunkers, construction of new bunkers, reconfiguration of two man-made ponds, and installation of a replacement irrigation system. The Nashawtuc Country Club received an Order of Resource Area Delineation from the Conservation Commission on June 22, 2017 affirming the resource area boundaries on the site. All the enclosed materials reflect the agreed-upon boundaries.

Enclosed is one copy of the NOI (WPA Form 3). The enclosed copy contains:

- Mapping (at 11"X17") showing the location of the resource areas, buffer zones, and the proposed work;
- NHESP fee and copies of the checks for the WPA filing;
- A project narrative describing the existing conditions, proposed project, impacts of the project, and proposed mitigation/restoration;
- USGS location map;
- FEMA FIRMs for the area (2);
- NHESP mapping for the area;
- Certified abutters list, abutters notice, and affidavit of service.

Also enclosed is a check made payable to the Commonwealth of Massachusetts for the NHESP filing fees under the Wetlands Protection Act (\$300.00). As required under the Act abutters within 100 feet of the property line in Sudbury have been notified by certified mail/return receipt, a copy of the NOI has been sent to the MADEP Northeast Regional Office. A similar filing has been made in Concord at the same time as this filing for all project elements in the Town of Concord. That filing is being sent to you under separate cover.

If you should need additional copies of the NOI please let me know. On behalf of the Nashawtuc Country Club we ask that you review this material in time for the July 16th

Engineers

Environmental
Scientists

Custom Software
Developers

Landscape
Architects

Planners

Surveyors



Conservation Commission meeting. If you have any questions, please feel free to contact me at 617-896-4519 or by email at mtoohill@bscgroup.com.

Sincerely,

Michael J. Toohill, PWS, CE, CERP
Senior Environmental Scientist and Associate

Encl.: NOI Package
Filing Fee Check

cc: Richard Shultz and Troy Noble; Nashawtuc Country Club
Bryce Swanson; Rees Jones, Inc.
Mass. DEP, NERO BRP WW
Sudbury Conservation Commission

Attachment D

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

SITE PHOTOGRAPHS



Photo #1: SUDBURY. Proposed compensatory storage area #5 behind the 10th green. *Facing southwest*



Photo #2: SUDBURY. Proposed compensatory storage area #6 between the 10th and 11th golf holes. *Facing northeast.*



Photo #3: SUDBURY. Proposed compensatory storage area #6 between the 10th and 11th golf holes. *Facing south.*



Photo #4: SUDBURY. Pond between the 15th and 16th golf holes. End of the pond to be filled. *Facing south.*



Photo #5: SUDBURY. Pond between the 15th and 16th golf holes. End of the pond to be expanded. *Facing south.*



Photo #6: SUDBURY. Pond between the 15th and 16th golf holes. End of the pond to be expanded. *Facing south.*



Photo #7: CONCORD. Compensatory storage area #1 next to the 17th green; mound to be removed. *Facing north.*



Photo #8: CONCORD. Compensatory storage area #4 behind the maintenance facility; slope in buffer to be cut. *Facing north.*



Photo #9: CONCORD. Compensatory storage area #4 behind the maintenance facility; slope in buffer to be cut. *Facing northwest.*



Photo #10: CONCORD. Compensatory storage area #3 off Sudbury Road; minor grading at end of field. *Facing northwest.*



Photo #11: SUDBURY. Pond at the 8th hole. End of the pond to be expanded/reshaped. Facing west



Photo #12: SUDBURY. Pond at the 8th hole. Mound to the south of the pond being reshaped. Facing northwest.

Attachment E

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

ABUTTER INFORMATION AND NOTIFICATION

**Notification to Abutters Under the
Massachusetts Wetlands Protection Act and the
Sudbury Wetlands Bylaws**

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40 and the Town of Sudbury's Wetlands Bylaws, you are hereby notified of the following.

- A. The name of the applicant is Nashawtuc Country Club
- B. The applicant has filed a Notice of Intent (NOI) with the Conservation Commission for the Town of Sudbury detailing proposed improvements to the existing golf course. All work will occur on the course.
- C. The address of the lot where the activity is proposed is:
1861 Sudbury Road, Concord, MA
- D. Copies of the NOI may be examined at the Sudbury Conservation Commission Office (275 Old Lancaster Road) between the hours of 9am and 4pm Monday through Friday.
- E. A digital copy of the NOI may be obtained from either (check one) the applicant _____ or the applicant's representative ☒ , by calling this telephone number _____ between the 9 and 5,
(617)896-4519 hours of _____
on the following days of the week: M-F.
- F. The Public Hearing will be held on July 16, 2018 at 7pm at the Sudbury Department of Public Works (DPW) Building located at 275 Old Lancaster Street, Sudbury (or another location if posted at Town Hall).

To confirm please contact the Commission office or view the proposed agenda online at: <https://sudbury.ma.us/conservationcommission/meetings/>

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in the MetroWest Daily News.

NOTE: Notice of the public hearing, including its date, time, and place, will be posted in Sudbury Town Hall not less than forty-eight (48) hours in advance.

NOTE: You also may contact the Sudbury Conservation Commission or the Department of Environmental Protection Northeast Regional Office for more information about this application or the Wetlands Protection Act. To Contact the Sudbury Conservation Commission, please call 978-440-5471.

NOTE: You are hereby notified that a similar filing has been made with the Concord Natural Resources Commission for work within Concord.

AFFIDAVIT OF SERVICE


Under the Massachusetts Wetlands Protection Act

(to be submitted to the Massachusetts Department of Environmental Protection and the
Conservation Commission when filing Abbreviated
Notice of Area Resource Delineation)

I, Michael Toohill, hereby certify under the
pains and penalties of perjury that on July 2, 2018 I gave notification to
abutters in compliance with the second paragraph of Massachusetts General
Laws Chapter 131, Section 40, and the **DEP Guide to Abutter Notification**
dated April 8, 1994, in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands Protection Act
and the Sudbury Wetlands Bylaws by Nashawtuc Country Club with the
Town of Sudbury July 2, 2018 for property located at
1861 Sudbury Road, Concord, MA.

The form of the notification, and a list of the abutters to whom it was given
and their addresses are attached to this Affidavit of Service.



Signature

7/2/18

Date

| abutters_owner1 | abutters_owner2 | abutters_address | abutters_town | abutters_state |
|--------------------------------|--------------------------|----------------------------|---------------|----------------|
| GOATER JEFFREY J & MARCIE J | | 1065 CONCORD RD | SUDBURY | MA |
| HOENIG PETER A & SCHEN CATHY R | CO-TRUSTEES PETER HOENIG | 1073 CONCORD RD | SUDBURY | MA |
| HOENIG PETER A & SCHEN CATHY R | CO-TRUSTEES PETER HOENIG | 1073 CONCORD RD | SUDBURY | MA |
| ZAWADDE JULIET | | 1075 CONCORD RD | SUDBURY | MA |
| BANSE JOHN | | 1074 CONCORD RD | SUDBURY | MA |
| USA - DEPT OF INTERIOR | TRACT #401 | 300 WESTGATE CENTER DR | HADLEY | MA |
| USA - DEPT OF INTERIOR | TRACT #502C | 300 WESTGATE CENTER DR | HADLEY | MA |
| COMM OF MASSACHUSETTS | FISHERIES AND GAME | 251 CAUSE WAY ST SUITE 400 | BOSTON | MA |
| NASHAWTUC COUNTRY CLUB | | 1861 SUDBURY RD | CONCORD | MA |
| SUDBURY WATER DISTRICT | | RAYMOND ROAD | SUDBURY | MA |
| USA - DEPT OF INTERIOR | TRACT # 502B | 300 WESTGATE CENTER DR | HADLEY | MA |
| MACONE DOUGLAS J | | 1030 CONCORD ROAD | SUDBURY | MA |

Attachment F

Nashawtuc Country Club Golf Course Improvements Project
Sudbury, Massachusetts
Notice of Intent

FLOODPLAIN CALCULATIONS AND COMPENSATORY STORAGE ANALYSIS

To: Sudbury Conservation Commission **Date:** June 25, 2018
From: Dominic Rinaldi, P.E., LEED AP BD+C **Proj. No.** 89513.04
Re: Nashawtuc Country Club Golf Course Improvements: Compensatory Flood Storage Calculations

BSC Group, Inc. (BSC), has calculated the changes to flood storage within Bordering Land Subject to Flooding (BLSF) that would occur under proposed improvements at Nashawtuc Country Club. Using existing topography and proposed grading provided to us by others, BSC created 3-dimensional topographic surfaces using AutoCAD Civil 3D for each elevation affected below the 1% chance annual flood elevation at the site (elevation 121). Grading revisions are proposed at various locations throughout the golf course and each impact area was calculated separately.

The town line between Concord and Sudbury bisects the golf course, with the northern area of the course lying within the Town of Concord and the southern area of the course within the Town of Sudbury. As such, flood storage calculations were performed separately for the proposed work within Sudbury and the proposed work within Concord. Additionally, the net incremental flood storage within the total BLSF within both Towns was also determined and is included within this submission.

As required for work within BLSF by the Massachusetts Wetlands Protection Act, 310 CMR 10.57.4(a), "Compensatory storage shall be provided for all flood storage volume that will be lost as the result of a proposed project within Bordering Land Subject to Flooding... Compensatory storage shall mean a volume not previously used for flood storage and shall be incrementally equal to the theoretical volume of flood water at each elevation, up to and including the 100 year flood elevation, which would be displaced by the proposed work." Therefore, for all proposed regrading within BLSF resulting in a loss of flood storage, compensatory storage is proposed within the same flood plain. The proposed improvements and compensatory flood storage areas are shown on the Project Plans and summarized in the attached tables.

The proposed improvements provide an overall net gain of flood storage at each incremental elevation up to and including the 100-year flood elevation within the limits of BLSF and within the Town of Sudbury. It is in the opinion of BSC that the improvements are in compliance with the applicable sections of the Wetlands Protection Act, its enacting regulations and the Town of Sudbury Wetlands Administration Bylaw and Wetlands Bylaw Regulations. Please feel free to reach out to me should you have any questions on this matter.

cc: Debbie Dineen, Conservation Agent
Michael Toohill, BSC



Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|-------------------------------|
| Calc By | BPP | Area 1 - Concord 17th tees |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113 | 0 | 0 |
| 113.0 to 114.0 | 22 | 22 |
| 114.0 to 115.0 | 74 | 52 |
| 115.0 to 116.0 | 286 | 212 |
| 116.0 to 117.0 | 958 | 672 |
| 117.0 to 118.0 | 2129 | 1171 |
| 118.0 to 119.0 | 3919 | 1790 |
| 119.0 to 120.0 | 6038 | 2119 |
| 120.0 to 121.0 | 8213 | 2175 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113 | 0 | 0 | 0 |
| 113.0 to 114.0 | 2 | 2 | -20 |
| 114.0 to 115.0 | 39 | 37 | -15 |
| 115.0 to 116.0 | 216 | 177 | -35 |
| 116.0 to 117.0 | 643 | 427 | -245 |
| 117.0 to 118.0 | 1492 | 849 | -322 |
| 118.0 to 119.0 | 2888 | 1396 | -394 |
| 119.0 to 120.0 | 4357 | 1469 | -650 |
| 120.0 to 121.0 | 6967 | 2610 | 435 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|----------------------------------|
| Calc By | BPP | Area 2 - Concord Pond by 17/9 |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113 | 10 | 10 |
| 113.0 to 114.0 | 106 | 96 |
| 114.0 to 115.0 | 369 | 263 |
| 115.0 to 116.0 | 960 | 591 |
| 116.0 to 117.0 | 1603 | 643 |
| 117.0 to 118.0 | 2247 | 644 |
| 118.0 to 119.0 | 2891 | 644 |
| 119.0 to 120.0 | 3534 | 643 |
| 120.0 to 121.0 | 4178 | 644 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113 | 23 | 23 | 13 |
| 113.0 to 114.0 | 554 | 531 | 435 |
| 114.0 to 115.0 | 1164 | 610 | 347 |
| 115.0 to 116.0 | 1808 | 644 | 53 |
| 116.0 to 117.0 | 2452 | 644 | 1 |
| 117.0 to 118.0 | 3096 | 644 | 0 |
| 118.0 to 119.0 | 3773 | 677 | 33 |
| 119.0 to 120.0 | 4383 | 610 | -33 |
| 120.0 to 121.0 | 5027 | 644 | 0 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--------------------------------|
| Calc By | BPP | Area 3 - Concord 17th green |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 23 | 23 |
| 116.0 to 117.0 | 117 | 94 |
| 117.0 to 118.0 | 268 | 151 |
| 118.0 to 119.0 | 534 | 266 |
| 119.0 to 120.0 | 940 | 406 |
| 120.0 to 121.0 | 1513 | 573 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 1 | 1 | -22 |
| 116.0 to 117.0 | 46 | 45 | -49 |
| 117.0 to 118.0 | 226 | 180 | 29 |
| 118.0 to 119.0 | 510 | 284 | 18 |
| 119.0 to 120.0 | 939 | 429 | 23 |
| 120.0 to 121.0 | 1496 | 557 | -16 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|-------------------------------|
| Calc By | BPP | Area 4 - Concord 18th tees |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 77 | 77 |
| 117.0 to 118.0 | 1780 | 1703 |
| 118.0 to 119.0 | 4287 | 2507 |
| 119.0 to 120.0 | 7153 | 2866 |
| 120.0 to 121.0 | 10080 | 2927 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 160 | 98 | 21 |
| 117.0 to 118.0 | 1646 | 1486 | -217 |
| 118.0 to 119.0 | 4085 | 2439 | -68 |
| 119.0 to 120.0 | 6963 | 2878 | 12 |
| 120.0 to 121.0 | 9890 | 2927 | 0 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 5 - Concord 18th bunker and pond |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 6 | 6 |
| 114.0 to 115.0 | 79 | 73 |
| 115.0 to 116.0 | 455 | 376 |
| 116.0 to 117.0 | 1153 | 698 |
| 117.0 to 118.0 | 1927 | 774 |
| 118.0 to 119.0 | 2700 | 773 |
| 119.0 to 120.0 | 3474 | 774 |
| 120.0 to 121.0 | 4247 | 773 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | -6 |
| 114.0 to 115.0 | 13 | 13 | -60 |
| 115.0 to 116.0 | 132 | 119 | -257 |
| 116.0 to 117.0 | 693 | 561 | -137 |
| 117.0 to 118.0 | 1383 | 690 | -84 |
| 118.0 to 119.0 | 2135 | 752 | -21 |
| 119.0 to 120.0 | 2904 | 769 | -5 |
| 120.0 to 121.0 | 3673 | 769 | -4 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 6 - Concord bunkers short of green at 9 and 18 |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 45 | 45 |
| 118.0 to 119.0 | 305 | 260 |
| 119.0 to 120.0 | 1202 | 897 |
| 120.0 to 121.0 | 2822 | 1620 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 45 | 45 | 45 |
| 118.0 to 119.0 | 319 | 274 | 14 |
| 119.0 to 120.0 | 1060 | 741 | -156 |
| 120.0 to 121.0 | 2621 | 1561 | -59 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 7 - Concord bunkers right side 9th fairway |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 96 | 45 |
| 118.0 to 119.0 | 373 | 277 |
| 119.0 to 120.0 | 767 | 394 |
| 120.0 to 121.0 | 1204 | 437 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 1 | 1 | 1 |
| 117.0 to 118.0 | 98 | 97 | 52 |
| 118.0 to 119.0 | 346 | 248 | -29 |
| 119.0 to 120.0 | 680 | 334 | -60 |
| 120.0 to 121.0 | 1069 | 389 | -48 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|-----------------------------|
| Calc By | BPP | Area 8 - Concord 1st tee |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 |
| 120.0 to 121.0 | 12 | 12 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 1 | 1 | 1 |
| 120.0 to 121.0 | 29 | 28 | 16 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|-------------------|
| Calc By | BPP | Area 9 - Sudbury |
| Date | 6/25/2018 | 1st tee, 10th tee |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 347 | 347 |
| 119.0 to 120.0 | 720 | 373 |
| 120.0 to 121.0 | 1178 | 458 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 121 | 121 | -226 |
| 119.0 to 120.0 | 370 | 249 | -124 |
| 120.0 to 121.0 | 698 | 328 | -130 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 10 - Sudbury bunkers right of fairway 1st hole |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 1 | 1 |
| 118.0 to 119.0 | 284 | 283 |
| 119.0 to 120.0 | 614 | 330 |
| 120.0 to 121.0 | 944 | 330 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 8 | 7 |
| 118.0 to 119.0 | 137 | 137 | -146 |
| 119.0 to 120.0 | 377 | 240 | -90 |
| 120.0 to 121.0 | 659 | 282 | -48 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 11 - Sudbury 11th green, 12th tees |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 52 | 52 |
| 117.0 to 118.0 | 744 | 692 |
| 118.0 to 119.0 | 2172 | 1428 |
| 119.0 to 120.0 | 4738 | 2566 |
| 120.0 to 121.0 | 8806 | 4068 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 52 | 52 | 0 |
| 117.0 to 118.0 | 714 | 662 | -30 |
| 118.0 to 119.0 | 2054 | 1340 | -88 |
| 119.0 to 120.0 | 4594 | 2540 | -26 |
| 120.0 to 121.0 | 8362 | 3768 | -300 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---------------------------------|
| Calc By | BPP | Area 12 - Sudbury 14th green |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 3 | 3 |
| 119.0 to 120.0 | 46 | 43 |
| 120.0 to 121.0 | 177 | 131 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 11 | 11 | 8 |
| 119.0 to 120.0 | 62 | 51 | 8 |
| 120.0 to 121.0 | 178 | 116 | -15 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 13 - Sudbury 10th green, 11th tees |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 390 | 390 |
| 117.0 to 118.0 | 1112 | 722 |
| 118.0 to 119.0 | 2683 | 1571 |
| 119.0 to 120.0 | 4713 | 2030 |
| 120.0 to 121.0 | 7120 | 2407 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 488 | 488 | 98 |
| 117.0 to 118.0 | 1561 | 1073 | 351 |
| 118.0 to 119.0 | 3323 | 1762 | 191 |
| 119.0 to 120.0 | 5523 | 2200 | 170 |
| 120.0 to 121.0 | 8035 | 2512 | 105 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---|
| Calc By | BPP | Area 14 - Sudbury bunker by 13th green |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 301 | 301 |
| 119.0 to 120.0 | 774 | 473 |
| 120.0 to 121.0 | 1425 | 651 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 479 | 479 | 178 |
| 119.0 to 120.0 | 1167 | 688 | 215 |
| 120.0 to 121.0 | 1859 | 692 | 41 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---------------------------------------|
| Calc By | BPP | Area 15 - Sudbury pond along 15/16 |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 |
| 120.0 to 121.0 | 481 | 481 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 | 0 |
| 120.0 to 121.0 | 571 | 571 | 90 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---------------------------------|
| Calc By | BPP | Area 16 - Sudbury |
| Date | 6/25/2018 | 1st green/bunker and 16th green |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 293 | 293 |
| 120.0 to 121.0 | 1834 | 1541 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 73 | 73 | -220 |
| 120.0 to 121.0 | 1464 | 1391 | -150 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--------------------------------|
| Calc By | BPP | Area 17 - Concord 1st green |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 431 | 115 |
| 120.0 to 121.0 | 961 | 530 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 458 | 296 | 181 |
| 120.0 to 121.0 | 1013 | 555 | 25 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---------------------|
| Calc By | BPP | Area 18 - Sudbury |
| Date | 6/25/2018 | 8th green, 2nd tees |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 |
| 120.0 to 121.0 | 197 | 197 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 | 0 |
| 120.0 to 121.0 | 282 | 282 | 85 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|-------------------------------|
| Calc By | BPP | Area 19 - Concord 2nd tees |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 |
| 120.0 to 121.0 | 427 | 427 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 | 0 |
| 120.0 to 121.0 | 331 | 331 | -96 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---------------------|
| Calc By | BPP | Area 20 - Sudbury |
| Date | 6/25/2018 | 7th green, 8th tees |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 28 | 28 |
| 117.0 to 118.0 | 368 | 340 |
| 118.0 to 119.0 | 1187 | 819 |
| 119.0 to 120.0 | 2494 | 1307 |
| 120.0 to 121.0 | 4689 | 2195 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 28 | 28 | 0 |
| 117.0 to 118.0 | 781 | 753 | 413 |
| 118.0 to 119.0 | 2207 | 1426 | 607 |
| 119.0 to 120.0 | 4098 | 1891 | 584 |
| 120.0 to 121.0 | 6393 | 2295 | 100 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---|
| Calc By | BPP | Area 21 - Concord 7th hole bunkers, right and left |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 44 | 44 |
| 116.0 to 117.0 | 554 | 510 |
| 117.0 to 118.0 | 1958 | 1404 |
| 118.0 to 119.0 | 4224 | 2266 |
| 119.0 to 120.0 | 7036 | 2812 |
| 120.0 to 121.0 | 9944 | 2908 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 45 | 45 | 1 |
| 116.0 to 117.0 | 518 | 473 | -37 |
| 117.0 to 118.0 | 1754 | 1236 | -168 |
| 118.0 to 119.0 | 4058 | 2304 | 38 |
| 119.0 to 120.0 | 6810 | 2752 | -60 |
| 120.0 to 121.0 | 9663 | 2853 | -55 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|-------------------|
| Calc By | BPP | Area 22 - Concord |
| Date | 6/25/2018 | 6th tees |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 22 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 122 | 122 |
| 115.0 to 116.0 | 455 | 333 |
| 116.0 to 117.0 | 1361 | 906 |
| 117.0 to 118.0 | 2799 | 1438 |
| 118.0 to 119.0 | 4888 | 2089 |
| 119.0 to 120.0 | 7368 | 2480 |
| 120.0 to 121.0 | 10041 | 2673 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 174 | 174 | 52 |
| 115.0 to 116.0 | 455 | 281 | -52 |
| 116.0 to 117.0 | 1399 | 944 | 38 |
| 117.0 to 118.0 | 2740 | 1341 | -97 |
| 118.0 to 119.0 | 4622 | 1882 | -207 |
| 119.0 to 120.0 | 6901 | 2279 | -201 |
| 120.0 to 121.0 | 9666 | 2765 | 92 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Area 23 - Concord 6th green, 7th tees |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 209 | 209 |
| 117.0 to 118.0 | 665 | 456 |
| 118.0 to 119.0 | 1486 | 821 |
| 119.0 to 120.0 | 3142 | 1656 |
| 120.0 to 121.0 | 4999 | 1857 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 214 | 214 | 5 |
| 117.0 to 118.0 | 695 | 481 | 25 |
| 118.0 to 119.0 | 1494 | 799 | -22 |
| 119.0 to 120.0 | 3149 | 1655 | -1 |
| 120.0 to 121.0 | 5001 | 1852 | -5 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|----------------------------|
| Calc By | BPP | Area 24 - Sudbury |
| Date | 6/25/2018 | Hole 3 Adjacent to fairway |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 4 | 4 |
| 116.0 to 117.0 | 44 | 40 |
| 117.0 to 118.0 | 120 | 76 |
| 118.0 to 119.0 | 229 | 109 |
| 119.0 to 120.0 | 374 | 145 |
| 120.0 to 121.0 | 565 | 191 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 4 | 4 | 0 |
| 116.0 to 117.0 | 44 | 40 | 0 |
| 117.0 to 118.0 | 196 | 152 | 76 |
| 118.0 to 119.0 | 467 | 271 | 162 |
| 119.0 to 120.0 | 774 | 307 | 162 |
| 120.0 to 121.0 | 1124 | 350 | 159 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---|
| Calc By | BPP | Area 25 - Sudbury Hole 3 Adjacent to fairway |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 4 | 4 |
| 116.0 to 117.0 | 69 | 65 |
| 117.0 to 118.0 | 186 | 117 |
| 118.0 to 119.0 | 363 | 177 |
| 119.0 to 120.0 | 617 | 254 |
| 120.0 to 121.0 | 949 | 332 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 4 | 4 | 0 |
| 116.0 to 117.0 | 69 | 65 | 0 |
| 117.0 to 118.0 | 258 | 189 | 72 |
| 118.0 to 119.0 | 563 | 305 | 128 |
| 119.0 to 120.0 | 892 | 329 | 75 |
| 120.0 to 121.0 | 1254 | 362 | 30 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Additional Storage Area 1 - Concord Hole 17 Par 3 Next to Green |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 166 | 166 |
| 118.0 to 119.0 | 667 | 501 |
| 119.0 to 120.0 | 1288 | 621 |
| 120.0 to 121.0 | 1989 | 701 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 370 | 370 | 204 |
| 118.0 to 119.0 | 1129 | 759 | 258 |
| 119.0 to 120.0 | 1888 | 759 | 138 |
| 120.0 to 121.0 | 2648 | 760 | 59 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---|
| Calc By | BPP | Additional Storage Area 2 - Concord Conceptual Irrigation Pond (Not Included as Part of Compensatory Flood Storage Calculations) |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 |
| 120.0 to 121.0 | 0 | 0 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 | 0 |
| 120.0 to 121.0 | 0 | 0 | 0 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Additional Storage Area 3 - Concord Open Field Next to Sudbury Road |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 444 | 444 |
| 117.0 to 118.0 | 3846 | 3402 |
| 118.0 to 119.0 | 10764 | 6918 |
| 119.0 to 120.0 | 19343 | 8579 |
| 120.0 to 121.0 | 28739 | 9396 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 1008 | 1008 | 564 |
| 117.0 to 118.0 | 5305 | 4297 | 895 |
| 118.0 to 119.0 | 13940 | 8635 | 1717 |
| 119.0 to 120.0 | 23151 | 9211 | 632 |
| 120.0 to 121.0 | 32650 | 9499 | 103 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Additional Storage Area 4 - Concord Behind Maintenance Building |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 118 | 118 |
| 114.0 to 115.0 | 563 | 445 |
| 115.0 to 116.0 | 1440 | 877 |
| 116.0 to 117.0 | 2597 | 1157 |
| 117.0 to 118.0 | 3998 | 1401 |
| 118.0 to 119.0 | 5608 | 1610 |
| 119.0 to 120.0 | 7404 | 1796 |
| 120.0 to 121.0 | 9311 | 1907 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 126 | 126 | 8 |
| 114.0 to 115.0 | 914 | 788 | 343 |
| 115.0 to 116.0 | 2333 | 1419 | 542 |
| 116.0 to 117.0 | 3867 | 1534 | 377 |
| 117.0 to 118.0 | 5519 | 1652 | 251 |
| 118.0 to 119.0 | 7277 | 1758 | 148 |
| 119.0 to 120.0 | 9126 | 1849 | 53 |
| 120.0 to 121.0 | 11038 | 1912 | 5 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|---|
| Calc By | BPP | Additional Storage Area 5 - Concord Area South of 10th Hole Green. (Calculation Included as Part of Area 13) |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 |
| 120.0 to 121.0 | 0 | 0 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 0 | 0 | 0 |
| 118.0 to 119.0 | 0 | 0 | 0 |
| 119.0 to 120.0 | 0 | 0 | 0 |
| 120.0 to 121.0 | 0 | 0 | 0 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Additional Storage Area 6 - Sudbury Area South of Hole 11 Green |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

Area 23 - Concord

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Stoage (CY)</u> |
|-------------------|---|---|
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 0 |
| 116.0 to 117.0 | 0 | 0 |
| 117.0 to 118.0 | 5 | 5 |
| 118.0 to 119.0 | 110 | 105 |
| 119.0 to 120.0 | 1534 | 1424 |
| 120.0 to 121.0 | 3069 | 1535 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Stoage (CY)</u> | <u>Net Increase</u> |
|-------------------|---|---|---------------------|
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 0 | 4 | 0 |
| 116.0 to 117.0 | 0 | 0 | 0 |
| 117.0 to 118.0 | 5 | 5 | 0 |
| 118.0 to 119.0 | 686 | 681 | 576 |
| 119.0 to 120.0 | 2162 | 1476 | 52 |
| 120.0 to 121.0 | 3697 | 1535 | 0 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Total Incremental Flood Storage within Concord |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| Elevations | Existing Cumulative Available Flood Storage (CY) | Existing Incremental Available Flood Stoage (CY) |
|----------------|---|---|
| Up to 113.0 | 10 | 10 |
| 113.0 to 114.0 | 252 | 242 |
| 114.0 to 115.0 | 1207 | 955 |
| 115.0 to 116.0 | 3663 | 2456 |
| 116.0 to 117.0 | 9073 | 5410 |
| 117.0 to 118.0 | 21924 | 12851 |
| 118.0 to 119.0 | 42646 | 20722 |
| 119.0 to 120.0 | 69120 | 26474 |
| 120.0 to 121.0 | 98668 | 29548 |

| Elevations | Proposed Cumulative Available Flood Storage (CY) | Proposed Incremental Available Flood Stoage (CY) | Net Increase with Additional Compensatory Storage Areas Included |
|----------------|---|---|---|
| Up to 113.0 | 23 | 23 | 13 |
| 113.0 to 114.0 | 682 | 659 | 417 |
| 114.0 to 115.0 | 2304 | 1622 | 667 |
| 115.0 to 116.0 | 4990 | 2686 | 230 |
| 116.0 to 117.0 | 11001 | 6011 | 601 |
| 117.0 to 118.0 | 24369 | 13368 | 517 |
| 118.0 to 119.0 | 46576 | 22207 | 1485 |
| 119.0 to 120.0 | 72769 | 26193 | -281 |
| 120.0 to 121.0 | 102782 | 30013 | 465 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Total Incremental Flood Storage within Sudbury |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| <u>Elevations</u> | <u>Existing Cumulative Available Flood Storage (CY)</u> | <u>Existing Incremental Available Flood Storage (CY)</u> |
|-------------------|---|--|
| | | |
| Up to 113.0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 |
| 115.0 to 116.0 | 8 | 8 |
| 116.0 to 117.0 | 583 | 336 |
| 117.0 to 118.0 | 2536 | 1953 |
| 118.0 to 119.0 | 8866 | 6330 |
| 119.0 to 120.0 | 16917 | 8051 |
| 120.0 to 121.0 | 31237 | 14320 |

| <u>Elevations</u> | <u>Proposed Cumulative Available Flood Storage (CY)</u> | <u>Proposed Incremental Available Flood Storage (CY)</u> | <u>Net Increase with Additional Compensatory Storage Areas Included</u> |
|-------------------|---|--|---|
| | | | |
| Up to 113.0 | 0 | 0 | 0 |
| 113.0 to 114.0 | 0 | 0 | 0 |
| 114.0 to 115.0 | 0 | 0 | 0 |
| 115.0 to 116.0 | 8 | 8 | 0 |
| 116.0 to 117.0 | 681 | 681 | 345 |
| 117.0 to 118.0 | 3515 | 2834 | 881 |
| 118.0 to 119.0 | 10048 | 6533 | 203 |
| 119.0 to 120.0 | 20092 | 10044 | 1993 |
| 120.0 to 121.0 | 34576 | 14484 | 164 |

Calculation Sheet



| | |
|-------------|----------------------------------|
| Project No. | 8-9513.04 |
| Subject | Flood Storage Calculations |
| Location | Nashawtuc Country Club |
| | Concord / Sudbury, Massachusetts |

| | | |
|------------|-----------|--|
| Calc By | BPP | Total Incremental Flood Storage within Flood Plain |
| Date | 6/25/2018 | |
| Checked By | DRR | |
| Date | 6/25/2018 | |

| Elevations | Existing Cumulative Available Flood Storage (CY) | Existing Incremental Available Flood Stoage (CY) |
|----------------|---|---|
| Up to 113.0 | 10 | 10 |
| 113.0 to 114.0 | 252 | 242 |
| 114.0 to 115.0 | 1207 | 955 |
| 115.0 to 116.0 | 3671 | 2464 |
| 116.0 to 117.0 | 9656 | 5985 |
| 117.0 to 118.0 | 24460 | 14804 |
| 118.0 to 119.0 | 51512 | 27052 |
| 119.0 to 120.0 | 86037 | 34525 |
| 120.0 to 121.0 | 129905 | 43868 |

| Elevations | Proposed Cumulative Available Flood Storage (CY) | Proposed Incremental Available Flood Stoage (CY) | Net Increase with Additional Compensatory Storage Areas Included |
|----------------|---|---|---|
| Up to 113.0 | 23 | 23 | 13 |
| 113.0 to 114.0 | 682 | 659 | 417 |
| 114.0 to 115.0 | 2304 | 1622 | 667 |
| 115.0 to 116.0 | 4998 | 2694 | 230 |
| 116.0 to 117.0 | 11682 | 6684 | 699 |
| 117.0 to 118.0 | 27884 | 16202 | 1398 |
| 118.0 to 119.0 | 56624 | 28740 | 1688 |
| 119.0 to 120.0 | 92861 | 36237 | 1712 |
| 120.0 to 121.0 | 137358 | 44497 | 629 |