

Community Preservation Committee Town of Arlington

CPA Funding – FY2018 Final Application

One (1) electronic copy and three (3) hard copies of the completed Application must be submitted to the CPC by **Friday, December 9, 2016 in order to be considered for the 2017 Annual Town Meeting**, with the electronic copy sent to AFidalgo@town.arlington.ma.us and the hard copies to:

Community Preservation Committee c/o Amy Fidalgo
Town of Arlington, 730 Massachusetts Ave., Arlington, MA 02476

Applications will be date stamped and assigned control numbers in the order that the hard copies are received.


Project Title Spy Pond Edge Protection and Erosion Control Project - Phase II Implementation

Applicant/Contact Person Cori Beckwith, Administrator

Organization Arlington Conservation Commission

Mailing Address Town Hall, 730 Massachusetts Avenue, Arlington, MA 02476

Telephone 781-316-3012 E-mail arlingtonma.gov/conservation

Signature  Date 09 December 2016
rev. 26 January 2017

CPA Category (select one):

- Community Housing Historic Preservation
 Open Space Recreation

Amount Requested ~~\$534,925.00~~ \$552,900

Total Project Cost ~~\$534,925.00~~ \$552,900

PROJECT DESCRIPTION: Attach answers to the following questions. Applications will be returned as incomplete if all requested information is not provided. Include supporting materials as necessary.

The Conservation Commission is requesting \$552,900 to preserve four (4) Town-owned parcels of failed shoreline along Spy Pond (see Project Locus Plan, Appendix 1). The funding will cover the preparation of contract documents (including construction plans), project permitting, contract bidding, construction, and construction oversight. The Commission anticipates bidding the project in Winter FY2018 and beginning construction in Spring FY2018. These cost figures are from the Spy Pond Edge Protection and Erosion Control Project Feasibility Project that used CPA funds in the current fiscal year.

Spy Pond is a 103-acre kettle hole pond located in the Mystic River Watershed. The Town-owned parcels that have been identified as needing preservation and long-term protection include:

- Spy Pond Park Shoreline
- Scannell Field Shoreline
- Arlington Boys and Girls Club Shoreline
- Spring Valley Street Shoreline

Shoreline erosion in these areas has resulted from high recreational pressure, stormwater inputs from overland flow, and wave/ice action (see Appendix 2 for parcel locations and Appendix 3 for Site Characterization Report).

Spy Pond Park is located on the North Shore of Spy Pond between Pond Lane and Linwood Street and is the main public access point to the pond. It is a heavily utilized park, which has a playground, public boat ramp (for kayaks and canoes, motorized boats up to 10 HP and emergency response), picnic area and access to the adjacent Minuteman Bike Path. Other publicly owned parcels of land around Spy Pond are located at the end of Wellington Street adjacent to the Arlington Boys and Girls Club (60 Pond Lane), from the edge of Scannell Field at Linwood Circle to the Spy Pond Condominiums, and a small parcel of land at the end of Spring Valley Street on the West Shore of Spy Pond (see Public Parcel Location Plan, Appendix 2).

1. **Project Goals:** What are the goals of the proposed project?

The Conservation Commission and its partners wish to mitigate erosion and preserve the public shoreline in a manner that improves the ecological structure and function of Spy Pond's shoreline while meeting the following stated goals:

- Preserve, stabilize & strengthen the pond's banks
- Control bank erosion

- Protect & enhance wildlife habitat
- Control access to prevent unauthorized paths
- Encourage commitment from constituency groups
- Increase quality of water & opportunity for water use
- Promote stormwater infiltration along the shoreline
- Implement environmental education

The Commission also hopes to utilize the permitting, construction and other project documents to assist private property owners along Spy Pond with performing similar projects on their own shoreline. The Commission plans to make such project documents and information readily accessible.

2. **Community Need:** Why is the project needed? Does it address needs identified in existing Town plans?

In the Spring of 2013, members of the Conservation Commission noticed that the shoreline edge along Spy Pond was deteriorating and that there was the potential for long-term failure adjacent to public open space. The Commission in 2014 invited those who care for and maintain Spy Pond Park, for example the Friends of Spy Pond Park, to discuss ways to enhance, protect and further stabilize the shoreline. As a result of these discussions the Arlington Conservation Commission applied for and received a 2017 CPA grant for a Spy Pond Edge Protection and Erosion Control Feasibility Study.

The feasibility study included an assessment of the existing shoreline condition, development of alternative preservation and protection strategies that address shoreline stabilization and erosion control, and the development of a final Concept Plan for the four project areas. The shoreline at Spy Pond Park was found to be marginally stable. The shoreline at Scannell Field, Arlington Boys & Girls Club, and Spring Valley Street was found to be unstable (See Appendix 3 for Site Characterization Report).

The project addresses needs identified in several town plans and documents including the Town of Arlington's Master Plan, Open Space and Recreation Plan, and the Community Preservation Plan. Refer to Appendix 4 for this additional information.

3. **Community Support:** What is the nature and level of support for this project? Include letters of support and any petitions.

The Arlington Conservation Commission held discussions with the Assistant Town Manager, individuals from the Town's Department of Public Works and the Director of Recreation. Members of the Friends of Spy Pond Park and the Vision 2020 Spy Pond Committee attended all public meetings this fall and have been engaged in the Feasibility Study. The Commission briefed the Town Recreation Commission on

November 7 on the details of the study and has gained their support. Fifteen letters of support have been received for the project and are attached (See Appendix 5).

4. **Project Documentation:** Attach any applicable engineering plans, architectural drawings, site plans, photographs, any other renderings, relevant studies or material.

Spy Pond Edge Protection and Erosion Control Project documents prepared by Chester Engineers include the following:

- Site Characterization Report (Appendix 3).
- Concept Plans (Appendix 6).
- Design, Engineering, Permitting, Bid Support, and Construction Administration Consultant Services Estimate (Appendix 7)
- Preliminary Construction Cost Estimate (Appendix 8).

5. **Timeline:** What is the schedule for project implementation, including a timeline for all critical milestones?

- Design and Construction Documents – Summer/Fall 2017
- Permit Applications – Fall/Winter 2017 to 2018
- Construction Bid – Winter 2018
- Construction and Construction Administration Services –Spring/Summer/Fall 2018

No construction will take place in Spy Pond Park during July and August 2018 at the request of the Town's Department of Parks and Recreation. Future strategies for construction access will be developed to keep the main path and parking lot at Spy Pond Park open during the construction phase.

6. **Credentials:** How will the experience of the applicant contribute to the success of this project?

The Town of Arlington Conservation Commission is comprised of volunteers with experience and expertise to successfully complete the project. The Conservation Commission agent, a Town employee, will support those efforts. The Commission has a registered landscape architect, several engineers and environmental lawyers. Each of these individuals brings important expertise to the group for organizing, overseeing and planning this effort.

The project will be designed by registered landscape architects and engineers, selected through an open bidding process managed by the Town's Purchasing Department. The project will be publicly bid and constructed by a qualified licensed general contractor approved by the Town.

Please see the Professional Standards Section below for additional credentials.

7. **Budget:** What is the total budget for the project and how will funds be sourced and spent? All items of expenditure must be clearly identified. Distinguish between hard and soft costs and contingencies. (NOTE: CPA funds may not be used for maintenance.)

The total project cost is \$552,900 which includes the following:

- Estimated Design, Engineering, Permitting, Bid Support, and Construction Administration Consultant Fee (Appendix 7) - \$139,486
- Estimated Construction Cost (Appendix 8) - \$413,414

A 15% contingency has been included in the Estimated Construction Cost to allow for unexpected subsurface conditions related to excavation and potential elevated levels of arsenic in the soils along the shoreline due to the historical use of herbicides in the area. The contingency funds will also be used for future supplemental work on the project that is identified after construction. The Conservation Commission will review and approve all work that would use the contingency fund ensuring the request is a legitimate capital improvement of the original project and not maintenance.

8. **Other Funding:** What additional funding sources are available, committed, or under consideration? Include commitment letters, if available, and describe any other attempts to secure funding for this project.

At this time no other funding sources have been identified.

9. **Maintenance:** If ongoing maintenance is required for your project, how will it be funded?

A Vegetative Management Plan will be developed as part of the Contract Documents and will be used by the Contractor to perform work required during the 3-year planting warranty. This Plan will subsequently be used by volunteers and Town employees to perform long-term maintenance. An operations and maintenance (O&M) manual will be developed for the stormwater best management practices (BMPs), also as part of the Contract Documents, and will be used for permitting purposes. The Department of Public Works (DPW) Engineering Division would be required to perform the long-term maintenance of the stormwater BMPs after construction, and will be responsible for funding of such. Also, an on-site educational training session for volunteers and DPW staff has been included in the project budget.

10. **Impact on Town Budget:** What, if any, potential secondary effects will your proposed project have on the Town's Operating Budget? Are there any capital projects that rely on the successful completion of your project?

Potential impacts on the Town's Operating Budget would be associated with long-term maintenance requirements as discussed above.

There are no known capital projects that rely on the successful completion of this project

ADDITIONAL INFORMATION: Provide the following additional information, as applicable.

1. **Control of Site:** Documentation that you have control over the site, such as a Purchase and Sales Agreement, option or deed. If the applicant does not have site control, explain what communications have occurred with the bodies that have control and how public benefits will be protected in perpetuity or otherwise.

All parcels are Town-owned. See attached assessor's map for parcel locations (Appendix 1).

2. **Deed Restrictions:** In order for funding to be distributed, an appropriate deed restriction, meeting the requirements of Chapter 184 of Mass General Laws pursuant to section 12 of the Community Preservation Act, must be filed with the CPC. Provide a copy of the actual or proposed restrictions that will apply to this project.

N/A

3. **Acquisitions:** For acquisition projects, attach appraisals and agreements if available. Attach a copy of the deed.

N/A

4. **Feasibility:** Provide list of further actions or steps that will be required for completion of the project, such as environmental assessments, zoning approvals, and any other known barriers to moving forward.

The design and permitting will begin in the summer of 2017 (for more detail see item #6). The Commission anticipates bidding the project in early 2018 with a spring 2018 construction start.

5. **Hazardous Materials:** Provide evidence that the proposed project site is free of hazardous materials or there is a plan for remediation in place.

The sediments of Spy Pond are known to contain arsenic, mostly originating from the historic runoff of herbicides. Soil data collection and testing, which are proposed as part of the design and engineering phase of the project, will identify the extent of any hazardous materials near the shoreline.

6. **Permitting:** Provide evidence that the project does not violate any zoning ordinances, covenants, restrictions or other laws or regulations. What permits, if any, are needed for

this project? Provide the expected date of receipt for necessary permits, and copies of any permits already acquired.

The project will require submission of a Notice of Intent (NOI) permit through the Town of Arlington Conservation Commission and MA DEP in conformance with the Wetlands Protection Act (WPA) Regulations. Prior to the NOI filing, all proposed work will be reviewed and coordinated with the Natural Heritage Endangered Species Program (NHESP), the Massachusetts Historical Commission (MHC), and the U.S. Army Corps of Engineers (USACE). Since Spy Pond is a Great Pond regulated by MA DEP Waterways, a Chapter 91 application will be filed with MA DEP Waterways. The project, if over an acre of earth disturbance is proposed, may also require preparation of a Stormwater Pollution Prevention Plan (SWPPP) and filing of an NOI with the Environmental Protection Agency (EPA) requesting coverage under the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). An Environmental Notification Form (ENF) filing or other Massachusetts Environmental Policy Act (MEPA) review may also be required as part of this project. Application for these permits will be submitted at the 60% Contract Document Phase of the project.

7. **Environmental Concerns:** Identify all known wetlands, floodplains, and/or any natural resource limitation that occur within the boundaries of your submission.

The proposed work areas are known to be in Wetland Resource Areas, Buffer Zone, Floodplain, Bank, and Land Under Water. A known Massachusetts Threatened Plant Species, Engelmann's Umbrella-sedge (*Cyperus engelmannii*), is a state species of special concern (threatened) and has been found within the proposed study area. All work will be under the review of the Natural Heritage Endangered Species Program (NHESP). The shoreline was surveyed in the fall of 2015 and a full topographic survey was conducted in 2016. Therefore, NHESP will have recent information to review when considering the work proposal. A site visit with the State Botanist to identify the location of the annual Engelmann's Umbrella-sedge has been included in the Consultant Fee Estimate (Appendix 6).

8. **Professional Standards:** Evidence that appropriate professional standards will be followed if construction, restoration or rehabilitation is proposed. Evidence that the applicant and the project team have the proven or potential capacity to conduct the scope and scale of the proposed project, as evidenced by project leaders with appropriate qualifications and technical experience or access to technical expertise.

The Conservation Commission's Administrator or another entity within the Town's Planning Department may be responsible for the coordination and management of this project. The Arlington Conservation Commission, the project's sponsor, will work hand in hand with the Town in managing the project. The Conservation Commission is comprised of:

- Nathaniel Stevens, Chair – Lawyer with a wetland and environmental firm in Massachusetts, speaker at MACC annual conference
- Curtis Connors – Lawyer in environmental litigation practice
- David E. White – Energy consultant
- Charles L. Tirone – Conservation Administrator – Town of Reading
- Janine White – Registered civil engineer and drainage design engineer for BSC Group
- Susan Chapnick – President of environmental consulting firm, NEH Inc.
- Michael Nonni – Landscape designer
- Catherine Garnett, Associate - Registered landscape architect with 20 years' experience with the MassDCR
- Eileen Coleman, Associate - Educator

The project will be designed by registered landscape architects and engineers, selected through an open bidding process managed by the Town's Purchasing Department. Construction cost estimates for project feasibility have been prepared by a registered landscape architect and engineer. The project will be publicly bid and constructed by a qualified licensed general contractor approved by the Town of Arlington Purchasing Department.

The project will be managed by the Conservation Commission and its agent. Other assistance will be provided by the Town Manager's Office, Parks and Recreation Department, and Department of Public Works (DPW).

The Concept Plans and Cost Estimates were prepared by Chester Engineers.

9. **Further Attachments:** Assessor's map showing location of the project.

Appendix 1: Assessor's map showing project locus

Appendix 2: Aerial Image Showing Public Parcel Locations

Appendix 3: Site Characterization Report

Appendix 4: References to Town Plans and Documents

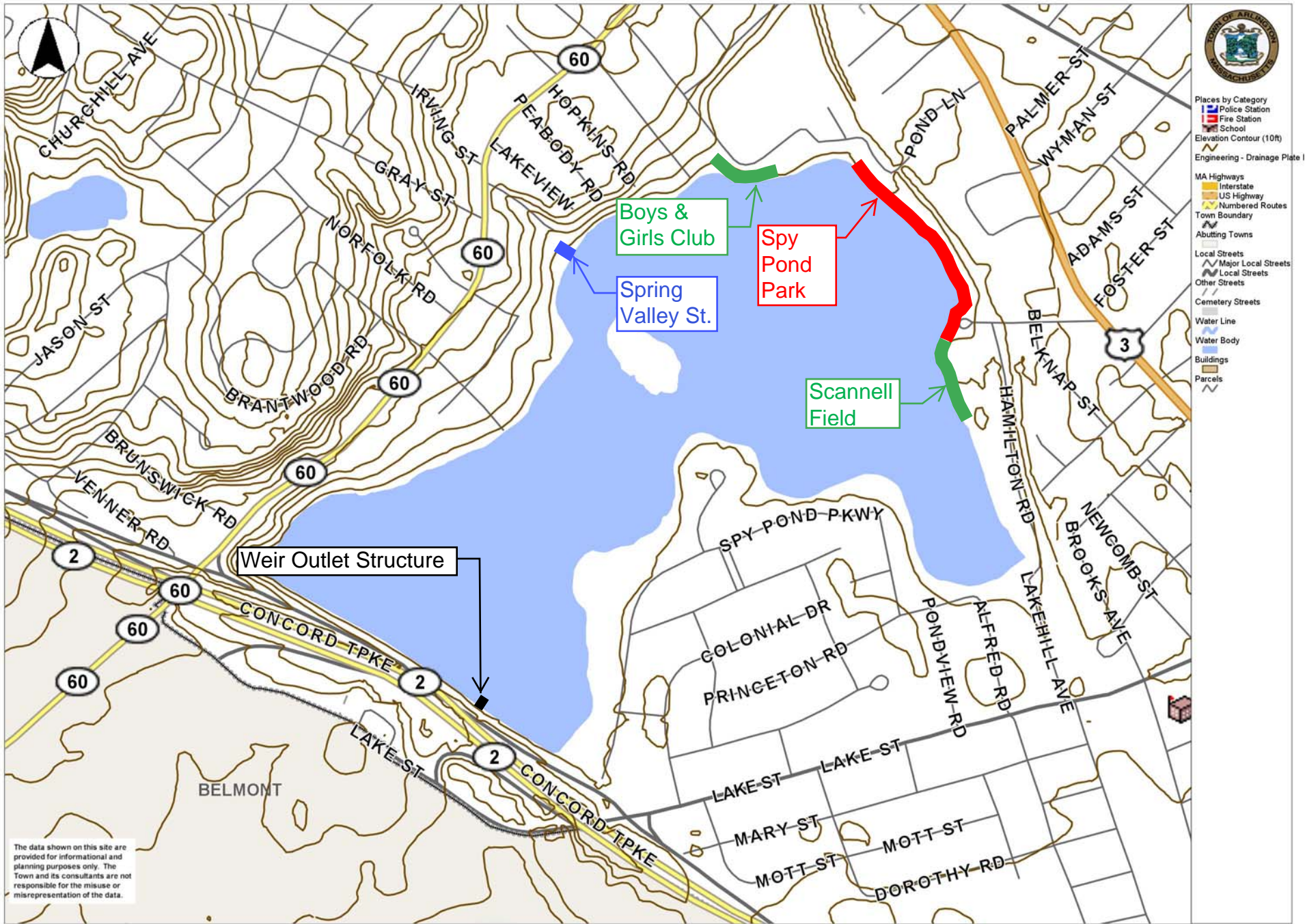
Appendix 5: Letters of Support

Appendix 6: Concept Plans

Appendix 7: Design, Engineering, Permitting, Bid Support, Construction Administration Services Consultant Fee Estimate

Appendix 8: Preliminary Construction Cost Estimate

Appendix 1: Assessor's Map (Project Locus)



The data shown on this site are provided for informational and planning purposes only. The Town and its consultants are not responsible for the misuse or misrepresentation of the data.

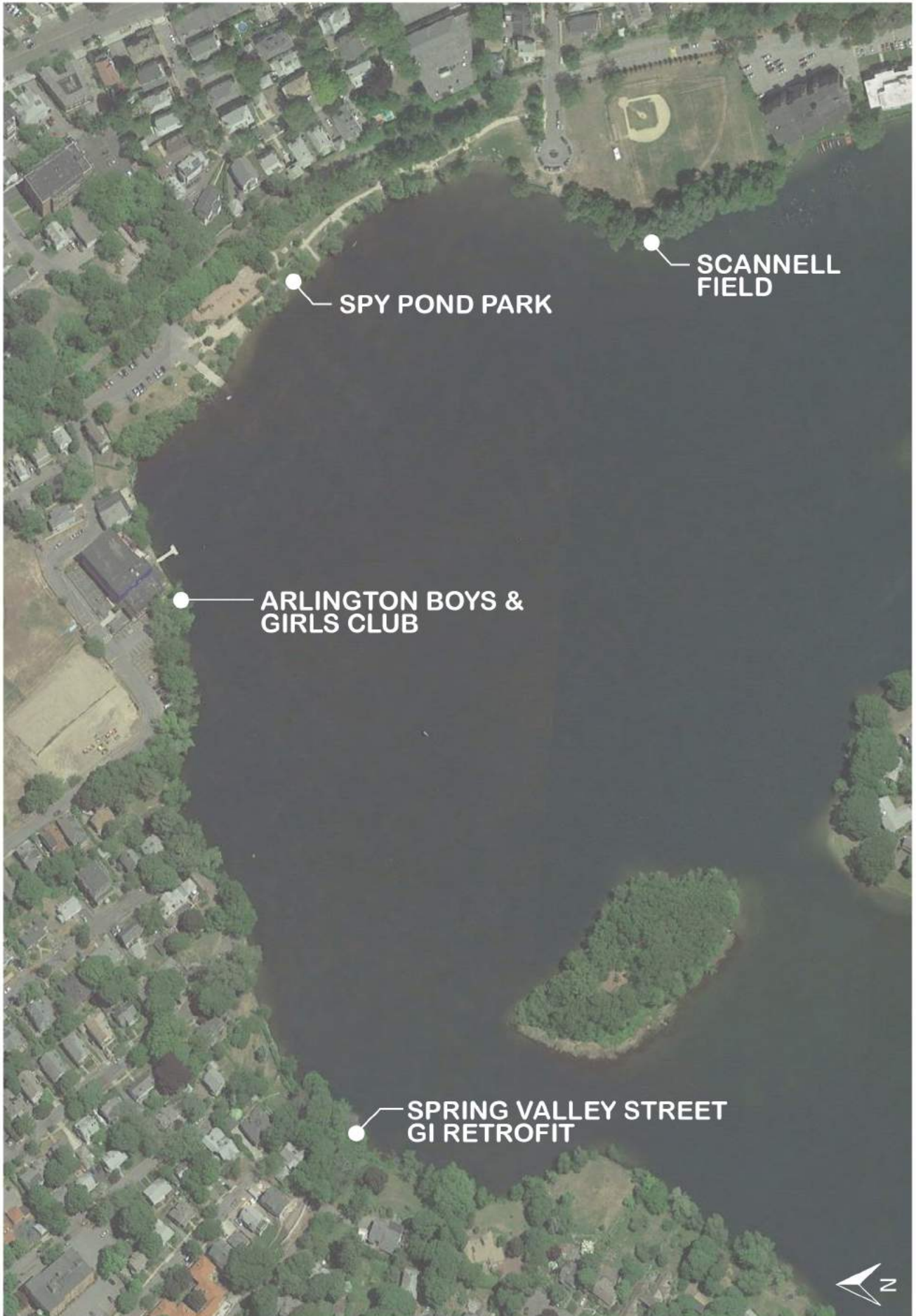
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Town of Arlington RFP Locus Map

Appendix 2: Aerial Image Showing Public Parcel Locations

APPENDIX 2: AERIAL IMAGE SHOWING PUBLIC PARCEL LOCATIONS



Appendix 3: Site Characterization Report

Spy Pond Edge Protection and Erosion Control Project

Site Characterization Report

Town of Arlington

December 2016



Introduction

Considerable effort has been expended in recent years to create an ecologically viable, functionally efficient and aesthetically pleasing facility at Spy Pond. During the mid-19th century Spy Pond provided drinking water to the people of Arlington, however, it was abandoned due to increased human activity in the vicinity, including commercial gardening that yielded sediments and nutrients in runoff resulting in extensive weed growth. This situation became prevalent in the early 1900s. Around that time, farms were being converted to lots and roads as the community became increasingly urbanized further affecting water quality that continued to decline with the proliferation of stormwater outfalls. Nevertheless, as a respite from daily activities Spy Pond continued to serve as a focal point for rest and relaxation within the community.

In a 1980-81 Diagnostic Study of Spy Pond by the Massachusetts Division of Water Pollution Control the authors observed that public use and enjoyment of Spy Pond had declined in recent years. The current situation, however, is clear evidence that restoration work in the park over the past decade has been effective and Spy Pond is once again a major focal point for the community. There are, however areas within the park, adjacent to Scannell Field on the east end and adjacent to the Boys and Girls club at the west end where uncontrolled use has created deteriorating conditions that impact water quality and long term sustainability.

Existing Information Sources

Eleven documents were provided by the Town of Arlington Conservation Commission for review to gain familiarity with the significant issues to be dealt with as identified over the past 30 years. These include:

1. **Plan of Route 2 Spy Pond Outlet, prepared for MassDOT** - The reconstructed roadway has 11 outfalls that directly flow into Spy Pond with minimal mitigation measures. Water levels are given based on the 1929 MDPW datum. NAVD 88 datum elevations are provided in brackets. Outlet Spillway elevation 4.17' [3.37'], Historic High water (October 22, 1996) 7.00' [6.20'], typical water elevation (1987-1996) 4.50' [3.70'], Historic Low water (1985-1987) 2.0'+/- [1.2'].
2. **Plans of Route 2 Drainage Repairs and Improvements at Various Locations (Spy Pond), RDA Submission, prepared for MassDOT** - These improvements are unrelated to Spy Pond.
3. **Request for Determination of Applicability prepared by Vanasse Hangen Brustlin, Inc. (VHB), for Route 2 Stormwater Improvements, 2012** - This project has no relationship to the issues under consideration for this project.
4. **Spring Valley Street, Arlington, Concept Plan for a Green Infrastructure Retrofit prepared by Chester Engineers, 2014** - This proposal will be incorporated into this project for consideration.

5. **Spy Pond Bank Stabilization by William Green Associates, 1992** – Solution based on water level of 4.08 as of November 1990. Bank stabilization relies on stone toe with erosion control blanket and ornamental planting on the bank.
6. **Spy Pond Park, 50% Construction Documents prepared by Carol R. Johnson Associates, 2004** - Several areas are identified with various techniques for bank stabilization that are currently not evident on-the-ground with the exception of a stone slope and a stabilized planting area with stacked coir logs along the shore at the end of Linwood Street.
7. **Characterization and Cycling of Phosphorus and Arsenic in Spy Pond prepared for Massachusetts Department of Environmental Management, Lakes and Ponds Program, 2000** - High inputs of phosphorus have caused the pond to become hypereutrophic, resulting in high rates of sedimentation and algal growth.
8. **Review of Recommendations for the Restoration of Spy Pond, Arlington prepared by Hydroanalysis Inc., 1997** - Controls on stormwater that reduce phosphorus reaching the pond are preferable to in-pond controls. Wetland treatment remains a viable alternative for stormwater treatment flowing to Spy Pond.
9. **Feasibility Study of Lake Restoration in Spy Pond, Arlington prepared by the Environmental Design and Planning, Inc., 1982** - Excerpt including the table of contents.
10. **Spy Pond, A Diagnostic Study, 1980-1981 prepared by the Massachusetts Department of Environmental Quality Engineering** - Spy Pond was classified as a eutrophic lake. The major source of nutrients causing the eutrophic conditions was from the stormwater runoff entering the lake.
11. **Spy Pond Stormwater Management Program (s319) prepared by the Town of Arlington, 2007** – Priority pollutants targeted include phosphorous, sediment, suspended solids removal. Installation of leaching catch basin and baffle tanks to reduce phosphorous input into the pond.
12. **Updated Recommendations for Shoreline Restoration prepared by Carol R. Johnson Associates, 2014.**
13. **NOI for Spy Pond Condominium Assn. prepared by New England Environmental, 2010.**

Site Analysis

To account for variable conditions on the ground, the project has been divided into four separate areas as follows:

- Area 1 – Scannell Field
- Area 2 – Spy Pond Park
- Area 3 - Boys & Girls Club
- Area 4 – Spring Valley Street

Please refer on the next page to **Figure 1 - Project Area Locations**.

Figure 1 – Project Location



Prior to developing a full site characterization for each of the four areas, a set of criteria was created to establish the relative stability of the shoreline edge in each area and the need for erosion control. Three classifications with criteria were established as follows:

Table 1. Shoreline Categorization		
Stable	Marginally Stable	Unstable
<ul style="list-style-type: none"> • Vegetated or hardscaped • Uncompacted soil • Controlled human use • Shallower slope • Controlled stormwater runoff • Hard or soft edge 	<ul style="list-style-type: none"> • Scattered loss of vegetation • Compacted soils • Uncontrolled human use 	<ul style="list-style-type: none"> • Loss of stabilizing vegetation • Compacted soil • Uncontrolled human use • Steep slope • Uncontrolled stormwater runoff

Area 1 – Scannell Field (Unstable)

Figure 2 – Area1: Scannell Field



Access and Circulation

The Linwood Street cul-de-sac provides primary access to this area, located on the east side of Spy Pond just south of Spy Pond Park. It is accessible by vehicle, bicycle, or on foot. There is limited two-hour parking in this area so some visitors will likely use the parking lot at the north end of Spy Pond Park and walk.

Circulation on-site is, primarily, foot traffic, either to play or observe a ball game, or to gain access to the pond in a more remote location within the Spy Pond Park. Herein lies the problem since there are no formal pathways that provide access to the water on the pond side of the fence that separates the ball field from the slope to the water.

Existing Vegetation and Habitat Conditions

Numerous old growth trees line the shoreline with extensive root structures providing partial stabilization to portions of the slope and the vertical bank in the vicinity of the water line. In many cases, however, the roots are being undermined by wave action that has eroded soil for depths up to two feet into the slope beneath the roots. Considerable erosion is occurring along vertical banks that are not contained by roots.

There is distributed shrub cover on the slope with root masses to assist in soil stabilization, however, the uncontrolled foot access has created numerous pathways starting along the fence line directly downslope to the water's edge. In these locations vegetation is eliminated and the compacted soil is exposed to erosion exacerbated by uninterrupted sheet flow across the athletic field. Erosion has exposed the roots of many of the old growth trees with ongoing contributions to sediment buildup within the pond.



Photograph 1: Tree with Exposed Roots

The majority of the area is in poor condition with dead and dying trees, exposed roots, unstable banks, extensive areas of eroding soils, and litter that will require a comprehensive approach to stabilization including control of the human activity that is at the root of the problem.



Photograph 2: Erosion with Visible Undercutting



Photograph 3: Erosion and Lack of Vegetation



Photograph 4: Unstable Bank with Exposed Roots and Undercutting

As riparian habitat this area provides cover and food for a variety of small mammals and birds. The deteriorating condition of the slope, however, creates a condition that is less than optimal. Furthermore, the fishery is further degraded by ongoing sedimentation within the water column.

Water Quality

In addition to an actively eroding slope that contributes sediment to the pond, uninterrupted runoff from the athletic field, a likely source of nitrogen and phosphorous fertilization also affects the perennial decline of Spy Pond water quality.

Figure 3– Area1: Scannell Field, Uncontrolled Runoff & Erosion on Slope



Potential Infiltration Areas

As stated above, sheet flow across the athletic field is a likely source of contamination in the pond and, it also contributes to accelerated erosion on the slope. Mitigation is possible by constructing a linear swale along the fence line to stimulate infiltration. The swale could be linked to a bioretention basin in the open area near the cul-de-sac for more effective pollutant removal.

Area 2 – Spy Pond Park (Marginally Stable)

Figure 4 – Area 2: Spy Pond Park



Access and Circulation

Area 2 is the primary destination for those who are visiting Spy Pond Park. There are four locations for both vehicular and pedestrian access from the nearby residential and commercial areas. Pond Lane provides the primary access to the parking area located at the north end of the park. A secondary access through the parking area is from Wellington Street, further to the west in the vicinity of the Boys and Girls Club. Linwood Street leads to a cul-de-sac on the east side of the park providing access to the park facilities on one side and the Scannell Field on the other. This is primarily a drop-off and pick-up area since the two-hour parking is limited. The Minuteman Commuter Bikeway crosses Linwood Street a short distance uphill from the cul-de-sac providing additional access to Spy Pond Park.

Circulation on site is primarily for pedestrians along designated pathways that provide access to all facilities, including a grassed slope leading to the beach, picnic tables, access points to the water for fishing or relaxation, benches, a children’s play area, and a boat ramp for launching small, non-motorized boats, canoes and kayaks. The site improvements to the park were part of the restoration project completed in 2006, see **Figure 5** below.

Figure 5 –Spy Pond Park Restoration

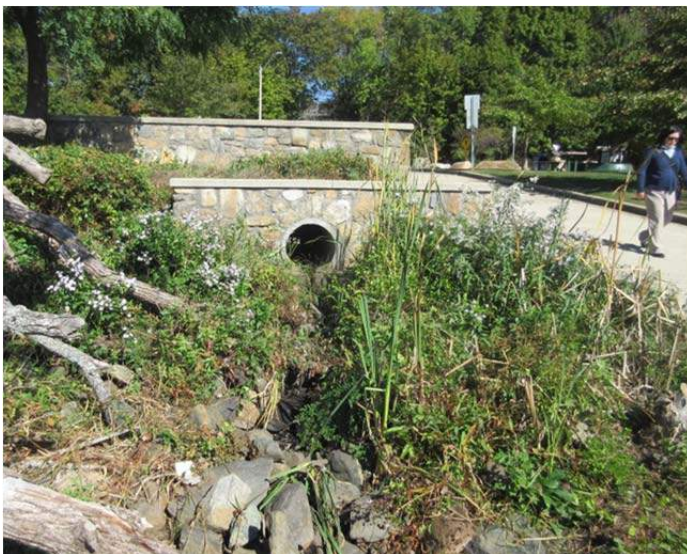


For the most part pedestrians limit themselves to the defined pathways; however, desire lines do exist along the slope to the pond in a few locations between the boat ramp and the beach providing additional access to the water. These informal pathways eliminate stabilizing vegetation that lead to erosion and, consequently, sedimentation in Spy Pond.



Photographs 5 and 6: Foot Paths in Plant Beds with Compacted Soil and Erosion

The area west of the boat ramp on the slope between the water and the retaining wall near the parking lot was not part of the renovations in 2006. This area is essentially removed from the center of activity in the park but it apparently attracts visitation as indicated by the casual pathways and loss of stabilizing vegetation. Dead and dying trees and a poorly maintained stormwater outfall indicate neglect for this somewhat isolated portion of the park.



Photograph 7: 18-inch Stormwater Outfall



Photograph 8: Foot Path along Stone Wall

Existing Vegetation and Habitat Conditions

With a few exceptions, on site vegetation appears to be healthy and well maintained. Outliers include the areas where uncontrolled pathways eliminate the plant growth that provides soil stabilization, particularly west of the boat ramp. Also, along the immediate shoreline, in a few cases where there is a

slight escarpment with no stabilizing tree roots, wave action has eliminated the stabilizing vegetation. There were also a couple of areas where the exposed tree roots along the bank are being undercut by wave action. The line between turf and the north beach is poorly defined and requires some material presence to clearly articulate the boundary.



Photograph 9: Eroded Pond Edge



Photograph 10: Exposed Tree Roots Being Undercut

A well-defined tree and shrub layer on the slope up to the adjacent bikeway provides cover and food for both small mammals and birds. Shrubs and trees along the shoreline provide additional cover. Spy Pond itself can provide some warm water fish habitat although as a water body classified as hypereutrophic it has limitations. The accompanying excessive plant growth, occasional algal blooms, low dissolved oxygen content, low transparency, etc. limit species diversity and, consequently, sport fishing opportunities.

Water Quality and Water Level Management

The total watershed area draining to Spy Pond is 964 acres. The entire watershed with one small exception at Menotomy Park drains through 43 separate outfalls into Spy Pond (Existing Information Source #10, page 2). High inputs of phosphorous have caused the pond to become hypereutrophic. Stormwater runoff and dry weather base flow from a very urban area are the primary contributors to the problem. In addition, there are substantial amounts of both phosphorous and arsenic in the upper 10 to 20 centimeters of the sediments that includes past agricultural use and runoff to the pond. Transport of the sediments into the water column occurs during spring and fall turnover; however, phosphorous inputs in stormwater runoff appear to be as much as 3 to 6 times higher than sediment inputs.

Water level management can be an effective tool for managing water quality. Winter drawdown of the lake surface has at least two beneficial outcomes, controlling macrophytes and reducing shoreline erosion. Lowering the water level by at least three feet in winter exposes shallow aquatic plants to drying and freezing. Plants most affected are Eurasian watermilfoil (*Myriophyllum spicatum*) and Coontail (*Ceratophyllum demersum*). In addition, bank erosion can be reduced by removing accelerated wave action from winter storms and ice buildup from the immediate shoreline (Existing information source #8, page 2).

Area 3 – Boys & Girls Club (Unstable)

Figure 6 – Area 3: Boys & Girls Club



Access and Circulation

Wellington Street is the primary access to this area, although it can be reached via the Pond Lane Extension that links to the Spy Pond Park parking area. There are spaces for 28 cars in the area but this is primarily to serve the adjacent Boys and Girls Club. Abutting the parking area is a grassed strip of land above the steep slope down to Spy Pond that is used for snow storage in the winter.

Because this area is relatively isolated from the rest of Spy Pond Park, it is not as heavily used. There is no formal access to the pond and so casual pathways down and across the vertical slope have evolved in several locations over time. All of these informal access areas are eroding and contributing sediment to the pond.

Existing Vegetation, Habitat, and Water Quality Conditions

Vegetation in this location has not been disturbed to the extent that it has adjacent to Scannell Field since primary access is along the top of the slope in a grassed area. There are, however, nine separate pathways down the steep slope to another pathway at mid slope and, occasionally, along the water's edge. All nine have compacted, eroding soil that is deposited in the pond. As a relatively isolated area it

serves to provide habitat for small animals and birds, however, sediment from the uncontrolled pathways contributes negatively to the aquatic habitat. Any and all sediment that enters the water of Spy Pond continues to degrade the water quality.



Photograph 11: Steep Eroded Slope



Photograph 12: Numerous Foot Paths

Stormwater from the adjacent pavement in Wellington Street and Pond Lane Extension drains into a catch basin at the curb next to this segment of parkland. From there it is piped through a manhole directly into Spy Pond at the base of the slope. The 12-inch outfall is partially filled with sediment and water. The outfall is ill-defined due to the lack of an endwall and the surrounding vegetation that grown in obscuring it from view.



Photograph 13: Obscured 12-inch Stormwater Outfall

Area 4 – Spring Valley Street (Unstable)

Figure 7 – Area 4: Spring Valley Street



Circulation and Access

This component of the project was part of a conceptual green infrastructure retrofit developed by Chester Engineers in 2014 in conjunction with a stormwater grant sponsored by Mystic River Watershed Association (MyWRA) and implemented through Arlington’s Public Works Department. The concept was designed to divert stormwater runoff from the Spring Valley Street into a cascading bioretention channel leading to a small treatment wetland and from there into Spy Pond. It is situated at the end of Spring Valley Street, accessible by vehicle or on foot. The area currently serves as a small boat launch facility for surrounding neighbors.



Photograph 14: Uncontrolled Stormwater Runoff



Photograph 15: Small Boat Launch Facility, Lower End of Spring Valley Street

Existing Vegetation, Habitat, and Water Quality Conditions

A recent rainfall event that produced high energy sheet flow across the paved boat launch area at the end Spring Valley Road undermined and overturned a 30-inch diameter poplar tree that served to stabilize the bank adjacent to Spy Pond. The upturned, root ball, approximately eight feet in diameter has created a large, eroding crater in the slope at the water's edge. The fallen tree extends out into the pond for approximately 80 feet, supported by broken limbs.



Photograph 16: Eroded Slope near Stormwater Outfall



Photograph 17: Eroded Slope at the Uprooted Tree



Photograph 18: Uprooted Tree

In addition to the fallen tree, there are a few small trees on the periphery of the site, however, extensive use as a boat launch facility has eliminated understory and ground plane vegetation with the exception of some scattered groundcover. The portion of the bank to the pond that is not affected by the overturned tree is vegetated, and relatively stable. Habitat value for upland species is minimal and sediment from the exposed and eroding soil negatively impacts both water quality and aquatic habitat.

Summary of Existing Shoreline Conditions

Existing Shoreline Categorizations			
Area 1: Scannell Field	Area 2: Spy Pond Park	Area 3: Boys & Girls Club	Area 4: Spring Valley Street
Unstable <ul style="list-style-type: none"> • Loss of stabilizing vegetation • Compacted soils • Uncontrolled human use • Steep slope • Uncontrolled stormwater runoff 	Marginally Stable <ul style="list-style-type: none"> • Scattered loss of vegetation • Compacted Soils • Uncontrolled human use 	Unstable <ul style="list-style-type: none"> • Loss of stabilizing vegetation • Compacted soil • Uncontrolled human use • Steep slope 	Unstable <ul style="list-style-type: none"> • Loss of stabilization • Steep slope • Uncontrolled stormwater runoff • Human use

Appendix 4: References to Town Plans and Documents

References to Town Plans and Documents

The Arlington Master Plan, adopted in 2015, identifies the public health and ecologic benefits of open spaces in Arlington, including Spy Pond. The following excerpts exemplify the need to preserve Spy Pond's shoreline from future damage:

"adaptation to climate change and environmentally sustainable planning and engineering approaches for natural resource management,"

"protecting all water bodies and watersheds for both healthy ecological balance and recreational purposes,"

"native and natural choices for landscaping on Town-owned properties,"

"Water quality and environmental degradation of Spy Pond is an ongoing concern."

Additionally, Arlington's Open Space and Recreation Plan (2015-2022), identifies a community need associated with the use and preservation of Spy Pond:

Spy Pond description of Access, Recreational Use and Wildlife Use reiterates the importance of this water body to residents of Arlington and other nearby communities (as potential tourist destination).

"All of the water bodies in Arlington (particularly Spy Pond) face the threat of nonpoint pollution from roadway, house, business, and storm water runoff... Non point pollution travels through runoff or sheets of rainwater that travels across the land."

Page 122 and 123 (Goals of the Plan)

Goal 2 – Preserve, maintain and enhance existing open spaces, including watersheds, water bodies, and natural areas; parks, playgrounds and outdoor recreational facilities; and historic sites and cultural landscapes.

Goal 3 – Coordinate and strengthen local and regional planning and management of open spaces with various Town departments, commissions, and volunteer groups.

Goal 4 – Increase public awareness, accessibility, and community stewardship of the Town's open spaces and recreational facilities.

Goal 5 – Use environmentally sustainable planning and engineering approaches for climate change and natural resources management.

Our project meets the following selection Criteria from the Community Preservation Plan selection criteria for Open Space and Recreation:

- Land that is considered open space.
- Land containing natural resources, including: surface water bodies, wetland, vernal pools and riparian zone, other lands subject to the Wetlands Protection Act.
- Land of habitat for wildlife significance (subject to Massachusetts Endangered Species Act).
- Land adjacent to existing open space or conservation lands that may promote connectivity of habitat, protect or enhance wildlife, water, and human corridors; provide a buffer for existing open space.
- Land connecting open space (Spy Pond Park) and conservation lands such as bike trails (Minuteman Bike Path) and pedestrian paths.
- Land that provides flood control or water storage, especially land bordering Arlington's ponds, rivers and streams and their watersheds.
- Land that has historic significance, is scenic, provides scenic vistas, protects, the character of the Town, or that meets the Town's recreation needs.

In addition from the Recreation Section of the Plan:

- Land that may offer protection to wildlife within the recreation site.
- Land that enhances the public spaces surrounding a recreation site.
- Land that acts as a natural buffer to a recreation site.

Appendix 5: Letters of Support

Lawrence "Stroker" Rogovin
32 Philips St.
Arlington, MA 02474
(781) 641-2506
stroker1001@gmail.com

Community Preservation Committee
c/o Mr. Adam Chapdelaine
Town Manager
730 Mass. Ave.
Arlington, MA 02476

December, 4, 2016

Dear Community Preservation Committee,

I'm writing to urge your continued support for the Arlington Conservation Commission's efforts to control erosion along the banks of Spy Pond. As you know, now that a final proposal for this work has been recently completed, the next step is to secure the necessary permits in 2017 for work the following year.

As a 22-year resident of Arlington and 20-year member of the Spy Pond Environment Task Group (Vision 2020 volunteers working with the town), I'm intimately familiar with the conservation and recreational issues pertaining to Spy Pond. For the past fifteen years, our group has sponsored an annual work day to mitigate erosion along the path along the southern shore paralleling Rt. 2. Since our earliest efforts, we've partnered with many other community groups—including the Boy Scouts, Girl Scouts, Appalachian Mountain Club, and Arlington/Belmont Rowing, to name but a few who provided vital expertise and manpower. Our other contributions to pond health have included aquatic weed control, phragmites removal, planting indigenous species, endangered species protection, water quality monitoring, etc.

So you see, my concern for the work now under review by the Town of Arlington is a logical extension of a long and lively interest in the pond's welfare, and its safe enjoyment by joggers, fishermen, boaters, bikers, skaters, and everyone else who's naturally drawn to this marvelous public resource. The work under discussion here is necessary to stabilize and maintain this vital resource, and would add significantly to the quality of life for abutters and visitors alike. The public education and outreach portion of the plan is particularly welcome news, as it dovetails nicely with the important work the Spy Pond Task Force has already been doing for decades to raise public awareness about the need to reduce nutrient load, weeds, invasive species, and other factors that degrade the pond and everyone's enjoyment of it.

In closing, please lend this work your approval and support.

Respectfully,

Stroker Rogovin

246 Pleasant Street
Arlington MA 02476-8134
06-Dec-2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Mass. Ave
Arlington, MA 02476

STATEMENT IN SUPPORT OF SPY POND EDGE CONTROL PHASE 2 PROPOSAL

Spy Pond Park is a remarkable success, thanks to good design, good construction, and to a very dedicated and well-managed volunteer maintenance effort.

The continued success of this community asset depends on controlling shore erosion, on a shoreline facing a long fetch and strong winds. The Chester Engineers Phase 2 proposal seems a good plan to balance access, view, and stability.

I'm not so sure about another key to Spy Pond Park usefulness, and that is goose control. The paths proposed look to me like a goose highway, because they are short and unobstructed. I hope this issue will come up with the contractor.

The parts of the plan dealing with other segments of the shoreline seem reasonable.

Yours very truly,

William Eykamp



Arlington Boys & Girls Club

Sixty Pond Lane

Arlington, MA 02474-6586

Phone: (781) 648-1617

Fax (781) 648-5064

abgclub@comcast.net

www.abgclub.org

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Secretary

Elizabeth M. Bowler

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Maureen E. Duddy

Executive Director

Derek F. Curran

December 6, 2016

Community Preservation Committee
c/o Mr. Adam Chapdelaine
Town Manager
730 Mass. Ave
Arlington, MA 02476

Dear Conservation Committee,

Board of Directors

Angelo A. Black

Megan Bloch

Daniel A. Brosnan

Robert Buckley

Robert A. Budding

Eduarda Carreiro

Christopher Doyle

Dr. Kevin J. Fallon

Sean Garballey

Julie E. Hall

Paul Kent

Brendan J. Kiernan

James O. Nicholson

Elisabeth Restrepo

Sandra Rudolph

Joanna M. Shannon

Jennifer Tripp

I am writing to support the preservation and protection of the Spy Pond shoreline and improving the water quality of Spy Pond, through increasing storm water infiltration, stabilization of the shoreline and any other measures deemed appropriate.

The Arlington Boys & Girls Club is fortunate to be located on the beautiful shores of Spy Pond. The Pond provides many unique experiences and opportunity for our members. They can learn to boat, watch the wildlife and see Spy Pond transform from season to season.

I believe making sure Spy Pond is around for future generations of Club members and for the Arlington community is critical. I support the Conservation Commission's application for CPA funding for Phase 2 of their project that involves permitting, construction, and maintenance needed to stabilize, preserve and control the erosion around Spy Pond.

Sincerely,

Derek F. Curran
Executive Director
Arlington Boys & Girls Club

Honorary Directors

Stephen J. Andrew

Robert E. Bowes

John E. Bowler

Thomas M. Britt

Stephen W. DeCoursey

Maureen E. Duddy

Richard B. Gallagher

Dr. Norman Garber

Karen Houser-Mahoney

Richard Niles

Rachel Prindle



RE: Phase 2 of Spy Pond Edge Protection and Erosion Control Project

**Arlington Land Trust
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Vice President
Clarissa Rowe

Secretary
Ann LeRoy

Treasurer
Brian Rehrig

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Peter Belknap
Karen Johnson
Carol Kowalski
Chris Leich
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Katie Theoharides

Advisory Board
Ken Donnelly
Nora Frank
Sean Garballey
Cathy Garnett
Jay Kaufman
Kevin Knobloch
Anne Paulsen
Dave Rogers

December 7, 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Massachusetts Ave.
Arlington, MA 02476

Dear Mr. Chapdelaine,

On behalf of the Arlington Land Trust, I am writing in support of the Conservation Commission's application for Community Preservation Act funds for Phase 2 of the Spy Pond shoreline erosion control and habitat improvement project. The Conservation Commission, with current CPA funds, has completed an initial assessment and conceptual design and is now seeking additional funds to obtain the necessary permits required for the next steps, to be followed by construction once all the preliminary work is in order.

The Arlington Land Trust owns Elizabeth Island in Spy Pond, which is protected in perpetuity and open to the public. To further ensure long-term protection of the island, the Massachusetts Audubon Society and Arlington Conservation Commission co-hold a conservation restriction on the island. Erosion control along the pond edge will improve and protect water quality and habitat, and the results of this work will be an educational resource for visitors exploring the pond edge. These are also goals outlined in Arlington's *Open Space and Recreation Plan* for 2015-2022.

We hope that you and the Community Preservation Committee will support the Conservation Commission's Phase 2 application to implement the shoreline protection plans that have been developed over the past several months.

Thank you for your consideration,

Jennifer Ryan, President
Arlington Land Trust

10 Milton Street
Arlington MA 02474-8706

7 December 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Massachusetts Avenue
Arlington, MA 02476

Dear Mr. Chapdelaine,

I write in support of the Arlington Conservation Commission's application to the Arlington Community Preservation Committee for Phase II of the "Spy Pond Edge Protection and Control Project."

As mentioned in my previous support letter, I am the Arlington Garden Club member responsible for maintenance of the Spy Pond Rain Garden. The Park is a valuable, visible asset in Arlington, and we are fortunate to have been able to site the rain garden there four years ago.

We are aware, however, that little attention has been made to controlling the serious erosion issues around the pond's shoreline. Such efforts were strongly endorsed in Arlington's Master Plan when it stated the goal of "protecting all water bodies and watersheds for both healthy ecological balance and recreational purposes." The application for the CPC requests funds to attend to that important work.

Our labor as gardeners in the rain garden contributes to another Master Plan goal by using "native [plantings] and natural choices for landscaping on Town-owned properties." Such plantings enhance the ecology of the park, and we encourage continuation of native plants to combat erosion of the pond's shoreline.

I unconditionally endorse funding the project for which the Conservation Commission is requesting funding in its December 9, 2016 application, seeking funding for the permitting, construction, and maintenance phases of this project with Community Preservation Funds.

Thank you to the CPC for its consideration of Phase II of this project.

Emily Snyder
Vice President-Operations, Arlington Garden Club
Chair, AGC's Spy Pond Rain Garden Committee

To: Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Mass. Ave., Arlington, MA 02476

From: Anne and Christopher Ellinger
21 Linwood St.
Arlington MA 02474

Dec. 3, 2016

Dear Community Preservation Committee,

We are writing in full support of Phase II of the Spy Pond Edge Protection and Erosion Control Project. We hope the Town will designate Community Preservation Funding towards the permitting, construction and maintenance of this project.

As we wrote back in January, we have lived next to Spy Pond Park for over 30 years. It and the pond are Town treasures, vital to preserve. In the warmer weather, hundreds of people daily, from all over Arlington and beyond get pleasure and renewal from their beauty. The current erosion problem is serious and pervasive, and has ramifications for both the park and the water quality of the pond.

Years ago we helped to start FSPP, and were active in the early days of its successful efforts to renovate the Park. Since then, we have admired the FSPP from afar. We are continually impressed by the dedication of the leaders, the breadth of experience of the many volunteers, and the careful stewardship of the Town's resources. Thus, we join them in endorsing this second phase of the project. We're especially pleased to see the improvements proposed along Scannell field, as it is a beautiful area that is seriously eroded.

We imagine you'll have much competition for the CPC funds. We hope you will prioritize this request, so essential for preserving this spot of beauty and respite amidst urban life. Feel free to contact us if you want.

Thanks for your good work.
Christopher and Anne Ellinger
781-646-1705, anne.ellinger@gmail.com



Friends of Spy Pond Park, Inc.

*P.O. Box 1051
Arlington, MA 02474*

December 5, 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Massachusetts Avenue
Arlington, MA 02476

Community Preservation Committee:

On behalf of the Friends of Spy Pond Park I am writing this letter of support for the Conservation Commission's request for Community Preservation Funds for Phase II of the "Spy Pond Edge Protection and Erosion Control Project". As I mentioned my previous letter to you, as ad hoc caretakers of Spy Pond Park, our members greatly appreciate this jewel of Arlington and are concerned about preserving and protecting the park shoreline and improving the water quality of Spy Pond. At the risk of being redundant, I am presenting again the following points:

Arlington's Master Plan substantiates support for this request further by the following:

Page 18

"adaptation to climate change and environmentally sustainable planning and engineering approaches for natural resource management"

"protecting all water bodies and watersheds for both healthy ecological balance and recreational purposes"

"native and natural choices for landscaping on Town-owned properties",

Page 133

"Water quality and environmental degradation of Spy Pond is an ongoing concern."

Arlington's Open Space and Recreation Plan 2015-2022 also indicates support:

Page 55

Spy Pond description of Access, Recreational Use and Wildlife Use reiterates the importance of this water body to residents of Arlington and other nearby communities, (and as a potential tourist destination).

Page 65

The Historical Society's Smith Museum now displays the 6 ½ foot tusk, which is about 42,000 years old, that Arvid Carlson found in 1959 in Spy Pond. (This area does have historical

significance, too, via Elizabeth Island and the use of the pond as an historical site for practicing war maneuvers.)

Page 70

“All of the water bodies in Arlington (particularly Spy Pond....) face the threat of nonpoint pollution from roadway, house, business, and storm water runoff.... Nonpoint pollution travels through runoff or sheets of rainwater that travels across the land.”

Page 122 &123

Goal 2 Preserve, maintain and enhance existing open spaces, including watersheds, water bodies, and natural area; parks, playgrounds, and outdoor recreational facilities; and historic sites and cultural landscapes.

Goal 5 Use environmentally sustainable planning and engineering approaches for climate change and natural resources management.

As the above statements indicate, the Town supports a project such as the one for which the Conservation Commission is requesting funding in their December 9, 2016 application. After reviewing the Phase I analysis of shoreline conditions and proposed concept design plans prepared by Chester Engineers, the Friends of Spy Pond Park wholeheartedly endorses continued funding for the permitting, construction, and maintenance phases of this project with Community Preservation Funds.

Sincerely,



Karen L. Grossman
President
Friends of Spy Pond Park

December 6, 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Mass. Avenue
Arlington, Massachusetts 02476

Dear Community Preservation Committee:

We would like to express our gratitude for funding the conceptual design phase of the Spy Pond Edge Protection and Erosion Control project. As a community we have a lot to be proud of with respect to the transformation Spy Pond has undergone in the last 20 years. For generations the pond was a dumping ground for beer cans and trash, industrial waste, fertilizer run-off, and reportedly even an automobile!

Now we have a pond and park that we can be proud of. And with a little more love and work (and money), we'll be able to repair it and shore it up against the forces of nature and the ravages of run-off, pollution, foot-traffic, etc. We urge you to move forward with the permit and construction (Phase II) of the project to preserve and protect our investment and our heritage.

As abutters, one of our concerns is about the river of storm-water which flows down Pond Terrace, and overflows into the pond during heavy rainstorms. Doing our part, we installed a rain barrel to help avoid run-off from our property and, inspired by the public rain-garden installed at Spy Pond, we created a mini rain-garden on our property, which accepts overflow water from our rain barrel, thereby reducing our contribution to the overflow.

As property owners "upstream" from the pond, we welcome any educational opportunities to help us and our neighbors avoid being part of the problem.

The second phase of this conservation project will benefit the health of Spy Pond, diminish pollution from storm-water runoff, curtail erosion, protect the shoreline, and provide education to residents and visitors concerning preservation of this precious resource. We strongly support Phase II, and we hope you will too.

Thank you for your consideration,

Lisa & Stephen Reynolds
1 Pond Terrace, Arlington



Open Space Committee

RE: Phase 2 of Spy Pond Edge Protection and Erosion Control Project

December 5, 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Massachusetts Ave.
Arlington, MA 02476

Dear Adam Chapdelaine,

On behalf of the Open Space Committee, I am writing in support of the Conservation Commission's application for Community Preservation Act funds for Phase 2 of the Spy Pond shoreline project. Following receipt of CPA funds for the initial assessment and conceptual design in 2016, Con Com is now seeking additional funds to obtain the necessary permits required for the next steps in 2017, to be followed by construction once all the preliminary work is in order. The focus is on publicly owned areas along Spy Pond within Spy Pond Park, at the end of Wellington Street adjacent to the Arlington Boys and Girls Club, adjacent to Spy Pond Park from the edge of the Scannell Field at Linwood Circle, and a small parcel of land at the end of Spring Valley Street.

The implementation of this project will benefit the health of Spy Pond, diminish pollution from stormwater runoff, curtail erosion, protect the shoreline of the pond, and provide education to residents and visitors concerning preservation of this precious environment. In addition, abutters will be encouraged to investigate what they might do on their own shoreline property to continue these erosion control efforts.

Protection of and improvements to the water quality and natural resources of Spy Pond are among the most important goals and objectives outlined in the Town's *Open Space and Recreation Plan* for 2015-2022. See for example Chapter 9, Action Plan, Goal 2-a: Preserve, maintain, and enhance the Town's natural heritage, including watersheds, water bodies, native flora and fauna, and existing natural areas.

We hope that you and the Community Preservation Committee will support the Conservation Commission's Phase 2 application to implement the shoreline protection plans that have been developed through extensive professional research and an inclusive public process. This project is directly relevant to the goals of the Town's *Open Space and Recreation Plan* and thus deserves positive reinforcement.

Thank you and best regards,

A handwritten signature in blue ink that reads "Ann LeRoy".

Ann LeRoy, Chair
Arlington Open Space Committee



Engineering Division

TOWN OF ARLINGTON
Department of Public Works
51 Grove Street
Arlington, Massachusetts 02476
Office (781) 316-3320 Fax (781) 316-3281

MEMORANDUM OF SUPPORT

Re: Spy Pond Edge Protection and Erosion Control Project

Date: December 8, 2016

The Department of Public Works (DPW) acknowledges stormwater runoff and erosion as significant factors that have an adverse impact on water quality. As such, the DPW supports projects and activities that promote improvements to local water resource areas and improve the overall water quality conditions within the Town.

The DPW supports the current proposal of the Spy Pond Edge Protection and Erosion Control Project particularly due to the potential for reduced erosion, improved slope stabilization, and for added water quality benefits for Spy Pond and down-gradient water features. Of particular importance would be the feature proposed at the terminus of Spring Valley that would greatly improve the runoff conditions that currently are uncontrolled directly into Spy Pond. The bio-engineering feature proposed would provide water quality benefits for the majority of storm events encountered as well as other improvements including ground water infiltration and sequestration of some road contaminants.

Sincerely,

Wayne A. Chouinard, PE
Town Engineer



December 6, 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine
Town Manager
730 Mass. Ave.
Arlington, MA 02476

Dear Adam Chapdelaine,

On behalf of the Mystic River Watershed Association, I am writing in support of the application submitted to the Arlington Community Preservation Committee by the Town of Arlington's Conservation Commission. This well-respected Arlington organization seeks funding for Phase II of the Spy Pond Edge Protection and Erosion Control Project, moving the project from concept to implementation.

Spy Pond is a 103-acre kettle-hole pond located in and near the heart of Arlington that provides exceptional vistas and serves as important open space for several densely developed east Arlington neighborhoods. This heavily utilized park has a playground, public boat ramp (for kayaks and canoes, motorized boats up to 10 mph and emergency response), picnic areas and access to the adjacent Minuteman bike path.

Addressing the health of this important natural resource is an excellent use of Community Preservation Act funding. A completed Edge Protection and Erosion Control Plan will diminish pollution from stormwater runoff, curtail erosion, protect the shoreline of the pond, and provide education to residents and visitors concerning preservation of this precious environment.

The Mystic River Watershed Association hopes that you give this important project consideration. If you have any questions or require additional information, please feel free to contact me.

With warm regards,

Patrick Herron
Executive Director

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Spy Pond Committee

Brad Barber
74 Spy Pond Pkwy
Arlington, MA 02474
December 6, 2016

Community Preservation Committee
c/o Mr. Adam Chapdelaine
Town Manager
730 Mass. Avenue
Arlington, MA 02476

Dear Mr. Chapdelaine,

At tonight's meeting, the Spy Pond Committee of Vision 2020 discussed the results of the Spy Pond Edge Protection and Erosion Feasibility Study. The committee had two and three representatives at each public session.

We were impressed with the work of the Conservation Commission and Chester Engineering. They studied the town's properties on Spy Pond, identified areas of erosion, and sought public input on addressing these issues. Their plan of rebuilding the edge, removing excessive paths, and constructing paths with lookouts is a good one.

The next step is obtaining permits and finalizing construction plans. The project will be completed in 2018. We urge the town to fund this project through the Community Preservation Act. It stabilizes the shoreline of Spy Pond, controls storm water runoff, and encourages public access.

Spy Pond, Spy Pond Park, and the Boys and Girls Club are among Arlington's treasures. Let's keep them that way.

Sincerely,

Brad Barber, co-chair
Steve Ricci, co-chair

Spy Pond Committee of the Vision 2020
<http://www.arlingtonma.gov/spypond>

To: Arlington Community Preservation Committee
c/o Adam Chapdelaine, Arlington Town Manager
730 Mass. Ave, Arlington, MA 02476

December 5, 2016

From: Colin & Susanne Blair
28 Peabody Rd
Arlington, MA 02476

Re: Spy Pond Edge & Erosion project, Phase II

As we wrote last winter, Spy Pond is an invaluable resource – for people of all ages and for birds. The views from its shores are extraordinary, especially at sunset. We find being there to be incredibly calming as **one never hears vehicle noise at all**. Also all sorts of birds swoop, splash, fish and rest.

Thus, **without reservation we support CPA funding of the next phase** of this project for the four public areas of shoreline that will improve Spy Pond's water quality.

The 8 project goals outlined at the Con Comm meeting Dec. 1st all make sense. Along the pond's edge the vegetation, soil density do need improvement. And the foot-paths must be reduced and more controlled so that plants and more porous ground can exist. Also, as we live on the Pleasant Street side, we are aware of the Spring Valley & B&G Club sites and how they offer different and worthy pond views.

So, for the benefit of both humans and birds, we would argue that preserving the pond's shore, monitoring its water and protecting its habitat for wildlife are **very important for all residents of this town – not just one group or just those fortunate to live nearby**. It is just what CPA funds should be used for.

We'll be looking for the eagles this winter! Thanks kindly.

Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Mass. Ave.
Arlington, MA 02476

December 4, 2016

Dear Community Preservation Committee:

Last January we wrote to your office in support of a funding request by the Town of Arlington's Conservation Commission for funding to engage a consultant to provide a conceptual design for Spy Pond Edge Protection and Erosion Control.

We recently had the pleasure of reviewing the results of those efforts by Chester Engineers and we wanted to commend you and all those involved on the Conservation Commission, Friends of Spy Pond Park, etc. on a very comprehensive piece of work.

Additionally, we have come to learn that Phase II of this important project and associated activities will soon be put forth to the Arlington Community Preservation Committee for fund allocation approval.

Again, in keeping with our January letter, we are writing to express our sincere hope that you approve CPA funding so the great work from Phase I can become a reality. We fully support construction, to benefit the health of Spy Pond, diminish pollution from storm-water runoff, curtail erosion, protect the shoreline of the pond, and provide education to residents and visitors concerning preservation of this precious environment that is enjoyed by so many individuals in Arlington and the surrounding towns.

Spy Pond is incredibly wonderful and we truly appreciate all the hard work by so many people to keep it as such. This, combined with the requested CPA funding, will help to ensure that it remains a true jewel in our town.

Sincerely,

/S/ David /S/ Lauren

David and Lauren Kopans
2 Princeton Road
Arlington, MA 02474

Lally Stowell
38 Elmhurst Rd.
Arlington, MA 02474
December 6, 2016

Arlington Community Preservation Committee
c/o Adam Chapdelaine, Town Manager
730 Mass Ave.
Arlington, MA 02476

To Whom It May Concern:

As an Arlington resident and member of the Friends of Spy Pond Park, I strongly support the Conservation Commission's request for Community Preservation Funds for Phase II of the Spy Pond Edge Protection and Erosion Control Project. I appreciate the careful thought and research that went into the creation and presentation of the concept design plans by Chester Engineers, and the pertinent questions they raised at their presentations of these plans to the Conservation Commission. The incorporation of the suggestions from the public will be important in the design implementation. It is a plan that clearly addresses challenging issues involving shoreline erosion, water quality and storm water runoff. I think it is crucial that serious attention be given to these growing problems and appreciate that this first step has been taken.

Spy Pond is a unique resource that is used, appreciated and valued in many ways by residents of Arlington and nearby communities. As a frequent visitor to Spy Pond Park, I have seen families and individuals of all ages, backgrounds and diverse cultures walking through the park, observing the wildlife, enjoying the many varied views of the pond, spending time with their children at the playground, picnic tables or beaches, and relaxing on one of the benches or boulders at the water's edge.

I hope that serious consideration is given to enacting Phase II of this project with Community Preservation funds which would cover permitting, construction, and maintenance in the designated areas of Spy Pond Park, Scannell Field, next to the Boys and Girls Club, and Spring Valley Street, thereby preserving one of Arlington's gems for generations to come.

Sincerely,

Lally Stowell

Appendix 6: Concept Plans



Spy Pond Edge Protection and Erosion Control Project

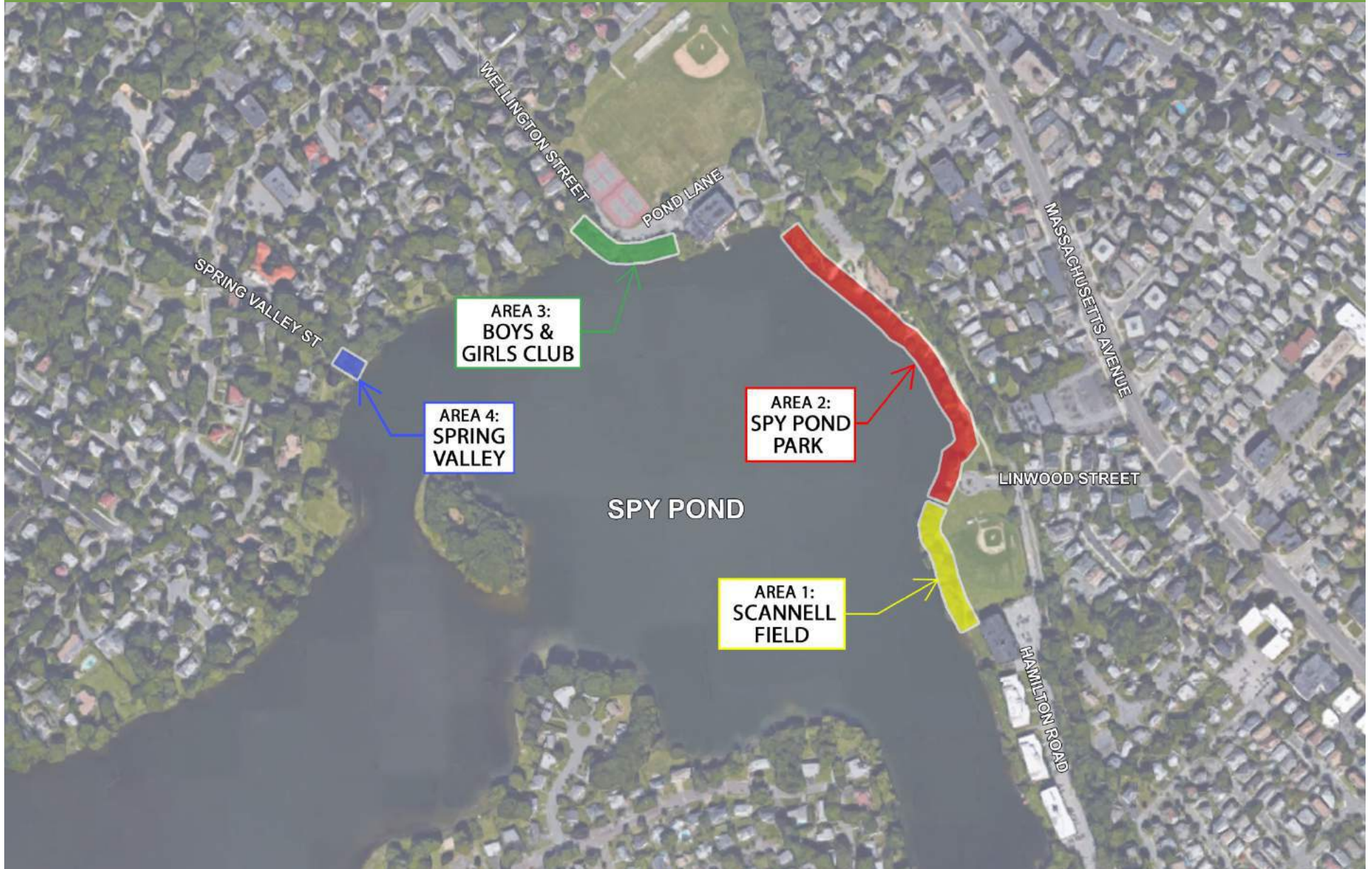
Town of Arlington, MA

Final Concept Plan

08 December 2016



Project Location



Project Goals

1. Preserve, stabilize & strengthen the pond's banks
2. Control bank erosion
3. Protect & enhance wildlife habitat
4. Control access to prevent unauthorized paths
5. Broaden & strengthen constituency groups
6. Increase quality & opportunity for water use
7. Promote stormwater infiltration along the shoreline
8. Implement environmental education

Site Activities

Activities

- Ball Playing
- Jogging & Walking
- Kayaking & Canoeing
- Fishing
- Picnicking & Gathering
- Children's Play
- Crew Team



Shoreline Categorization

STABLE

- Vegetated
- Uncompacted soils
- Controlled runoff
- Shallower slopes
- Controlled human use
- Hard or soft edge

VS.

UNSTABLE

- Loss of stabilizing vegetation
- Compacted soils
- Uncontrolled runoff
- Steep slopes
- Uncontrolled human use

Three Categories:

- Unstable
- Marginally Stable
- Stable

Scannell Field



Existing Shoreline Conditions









Scannell Field - Unstable

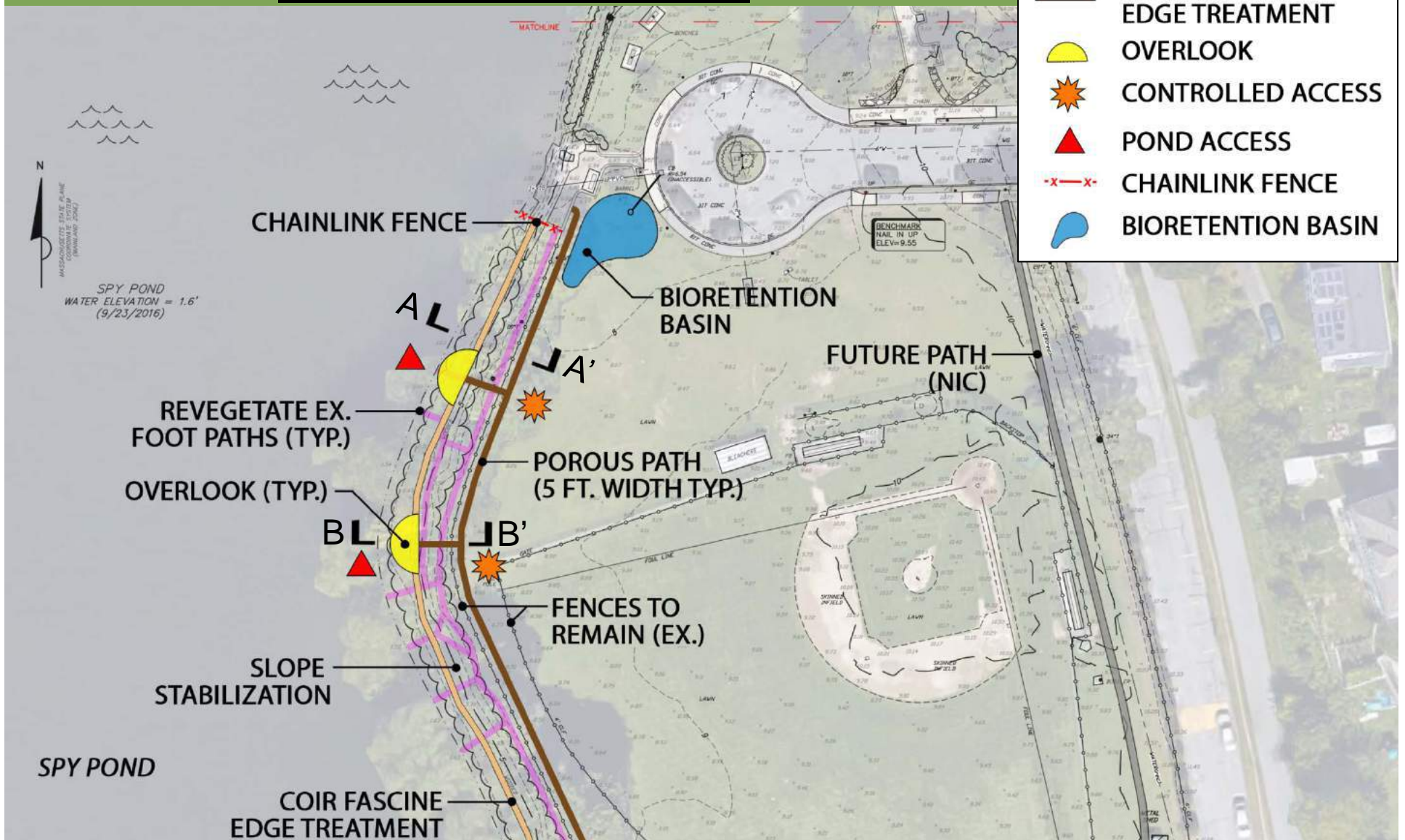
- Loss of stabilizing vegetation & soils
- Compacted soils
- Uncontrolled human use
- Steep slope
- Uncontrolled stormwater runoff



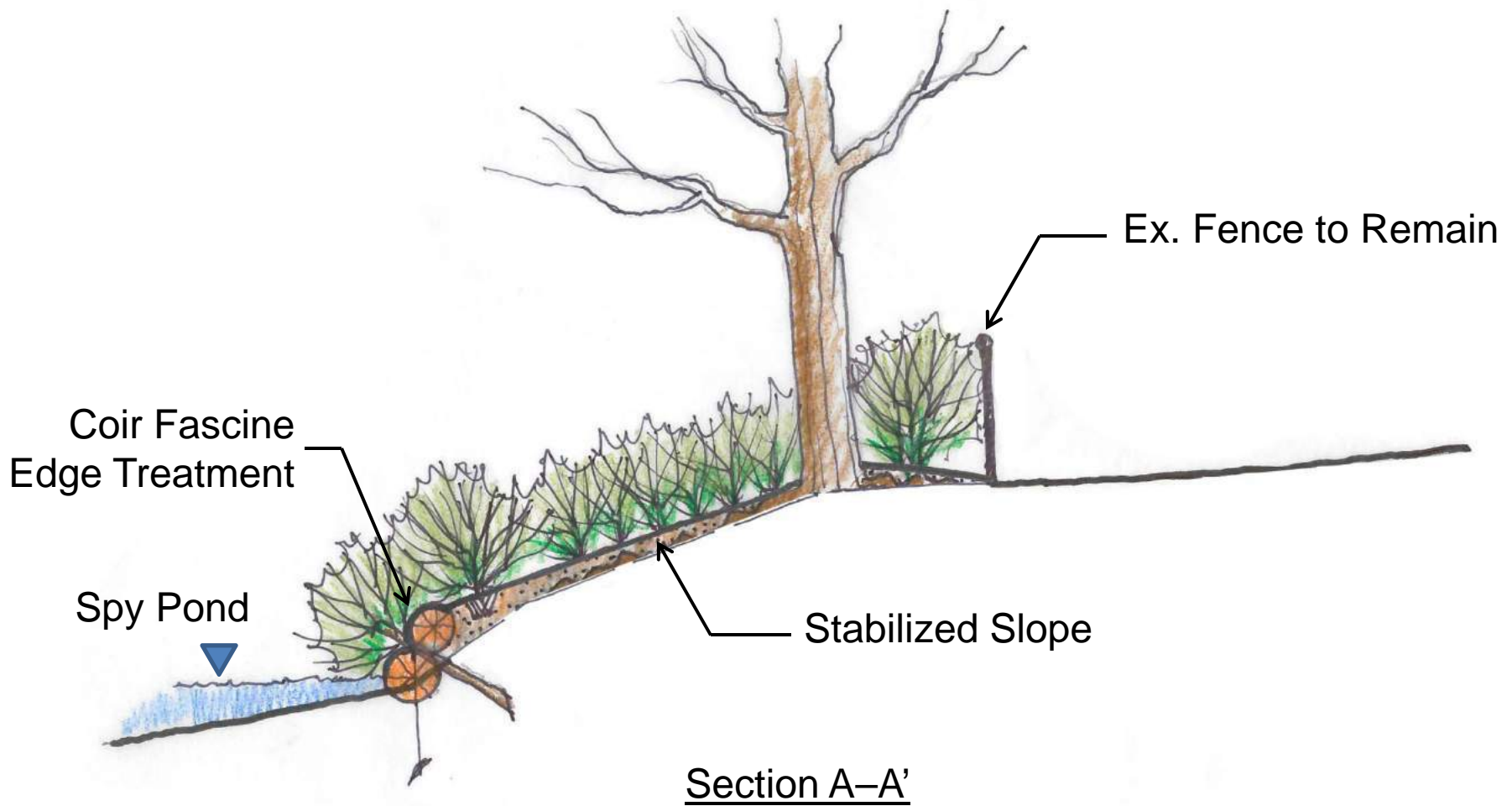
Preferred Concept Scannell Field

LEGEND

-  REVEGETATE EX. FOOT PATHS
-  POROUS PATH
-  POROUS PATH (NIC)
-  COIR FASCINE EDGE TREATMENT
-  OVERLOOK
-  CONTROLLED ACCESS
-  POND ACCESS
-  CHAINLINK FENCE
-  BIORETENTION BASIN

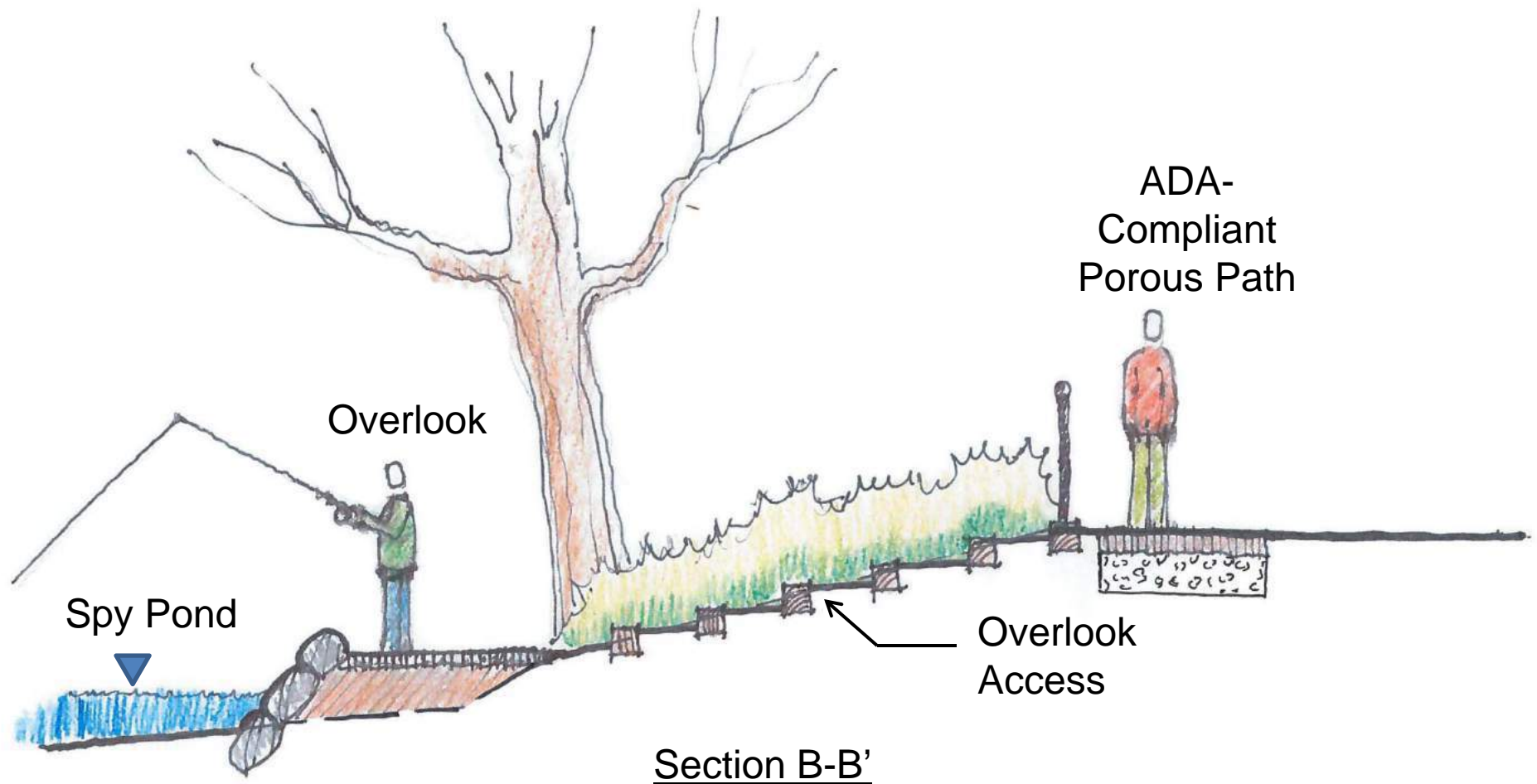


Preferred Concept Scannell Field

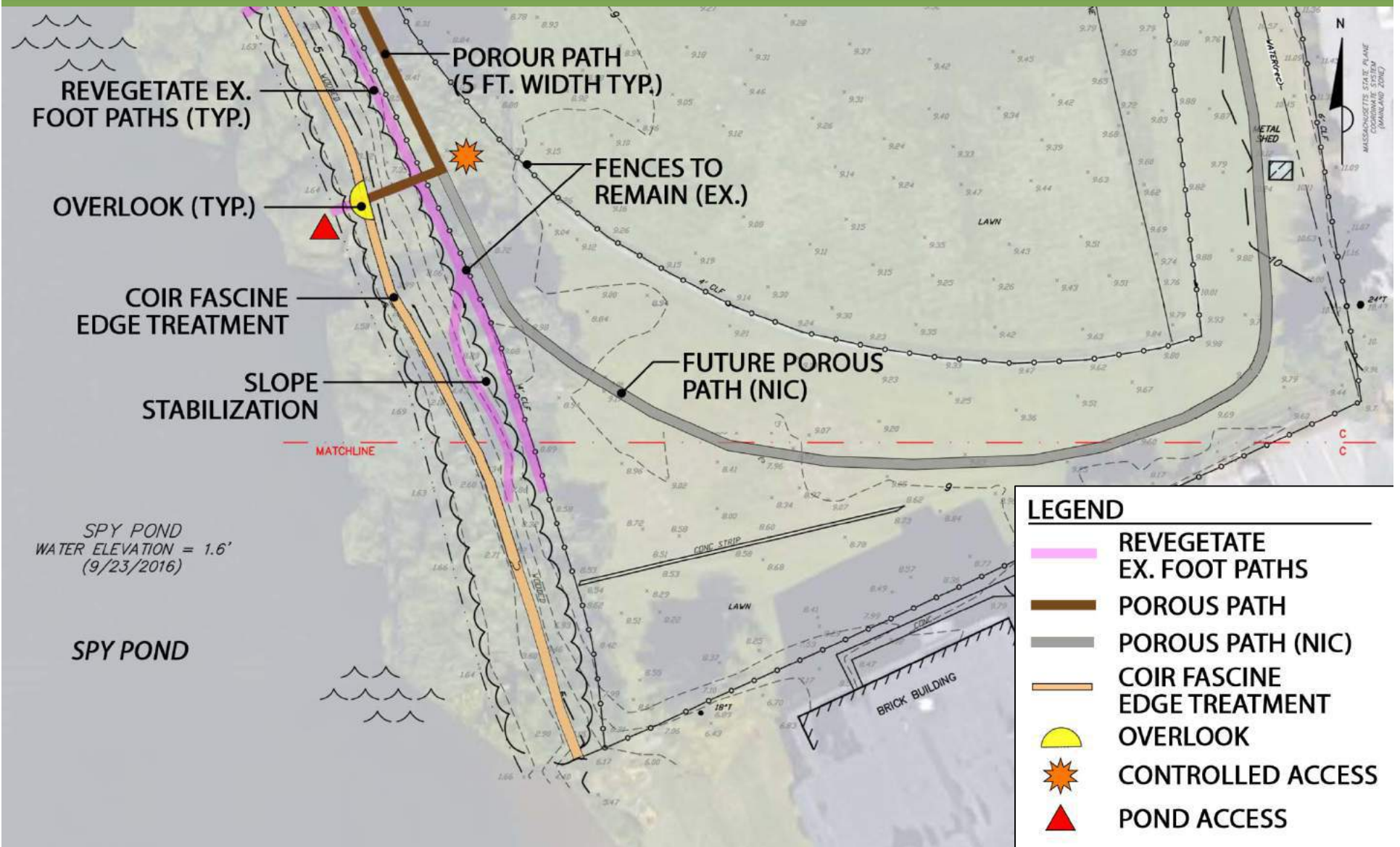


Preferred Concept

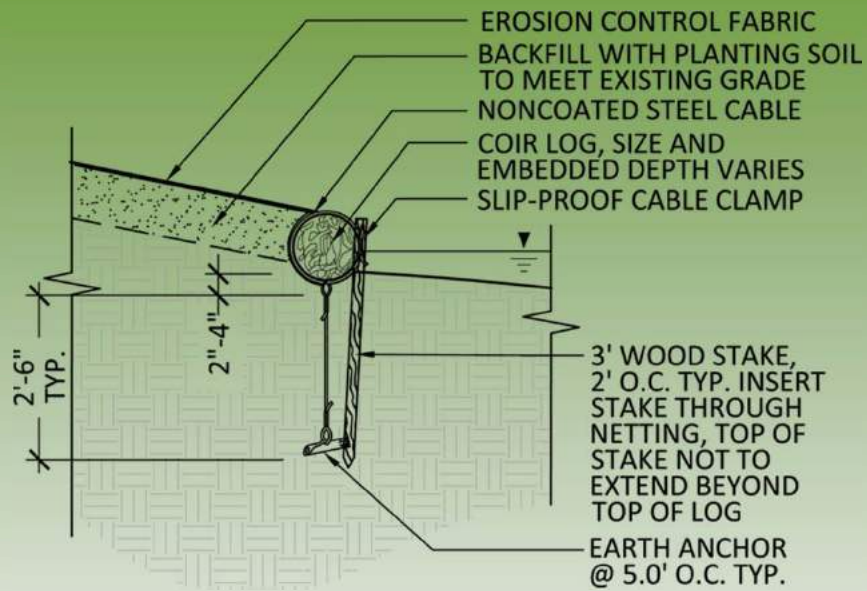
Scannell Field



Preferred Concept Scannell Field



Coir Fascines



Stormwater Management

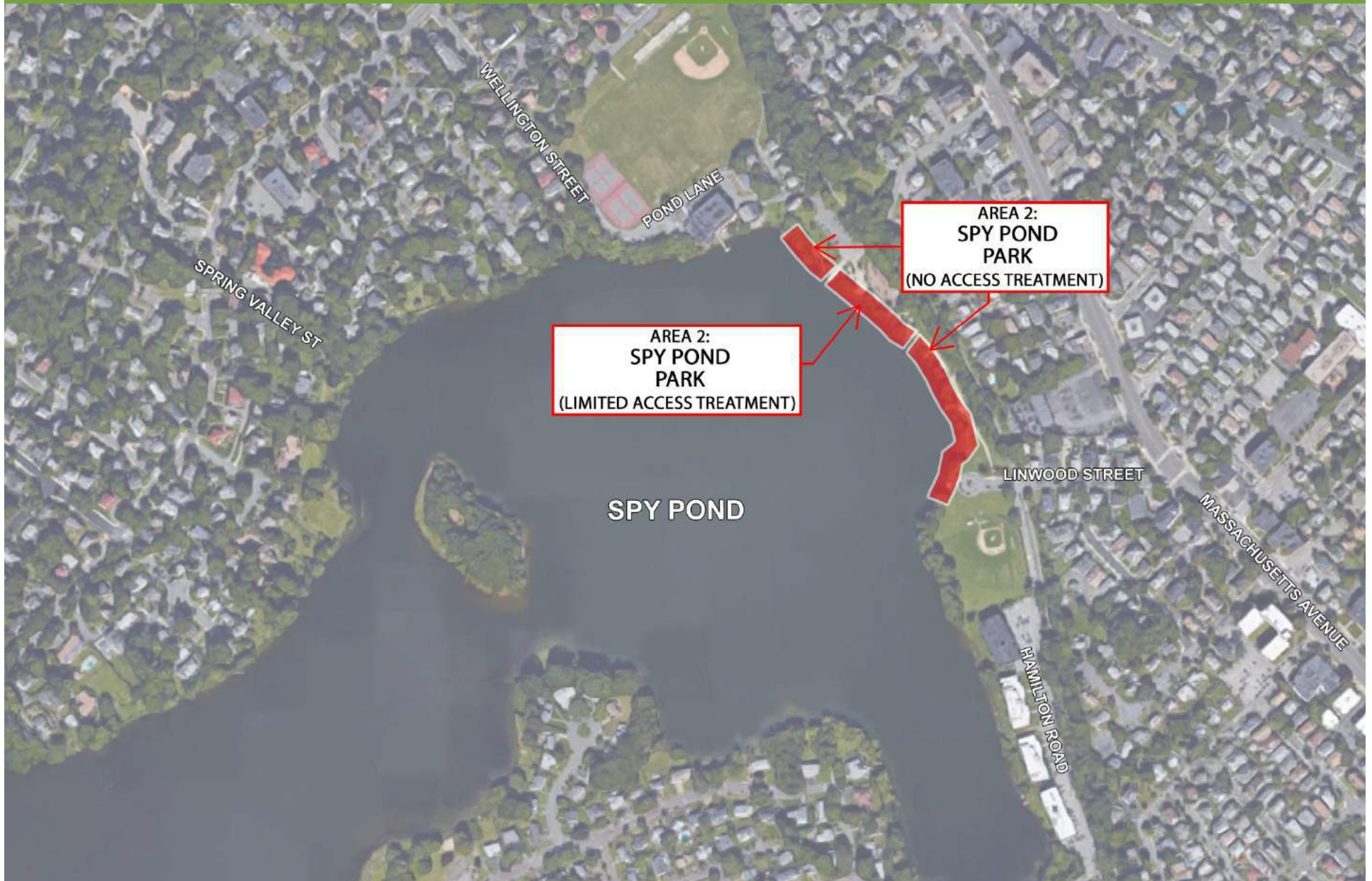
Porous Pavement



Bioretention Basin



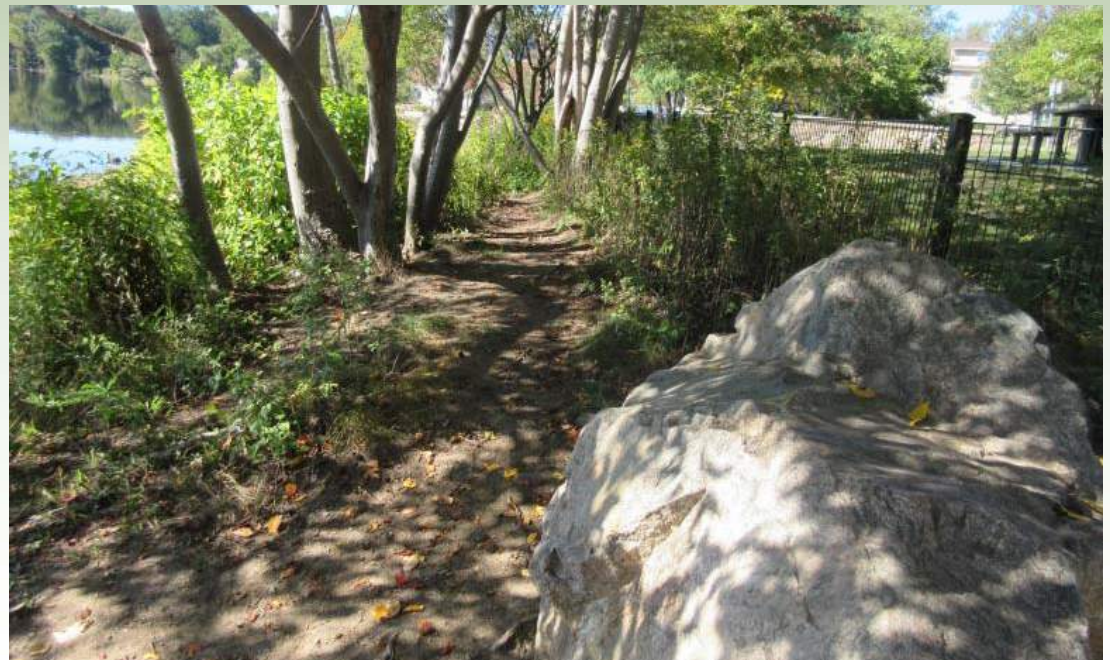
Spy Pond Park



Existing Shoreline Conditions

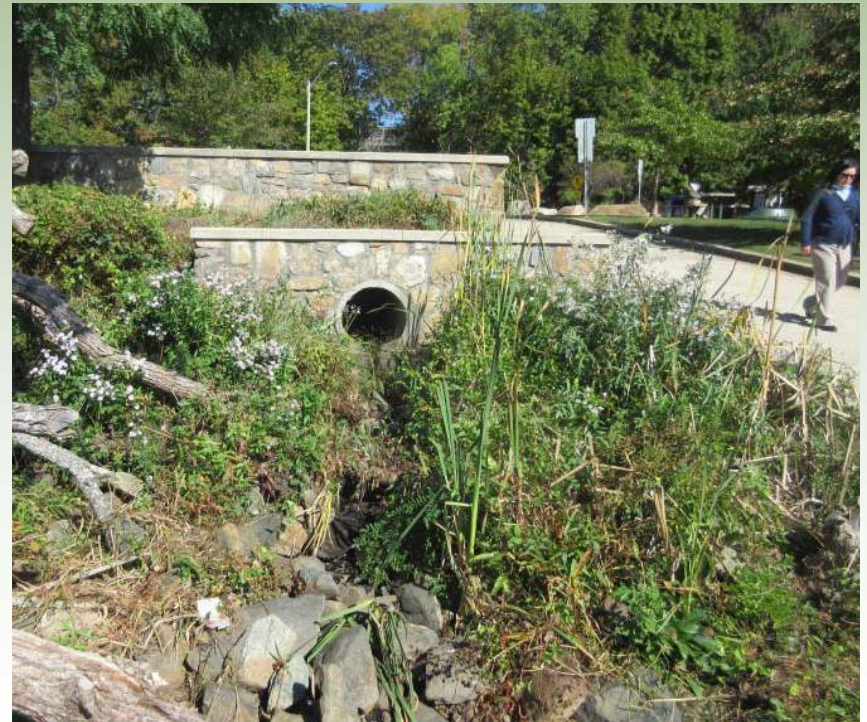
Spy Pond Park – Marginally Stable

- Scattered loss of vegetation
- Compacted soils
- Uncontrolled human use

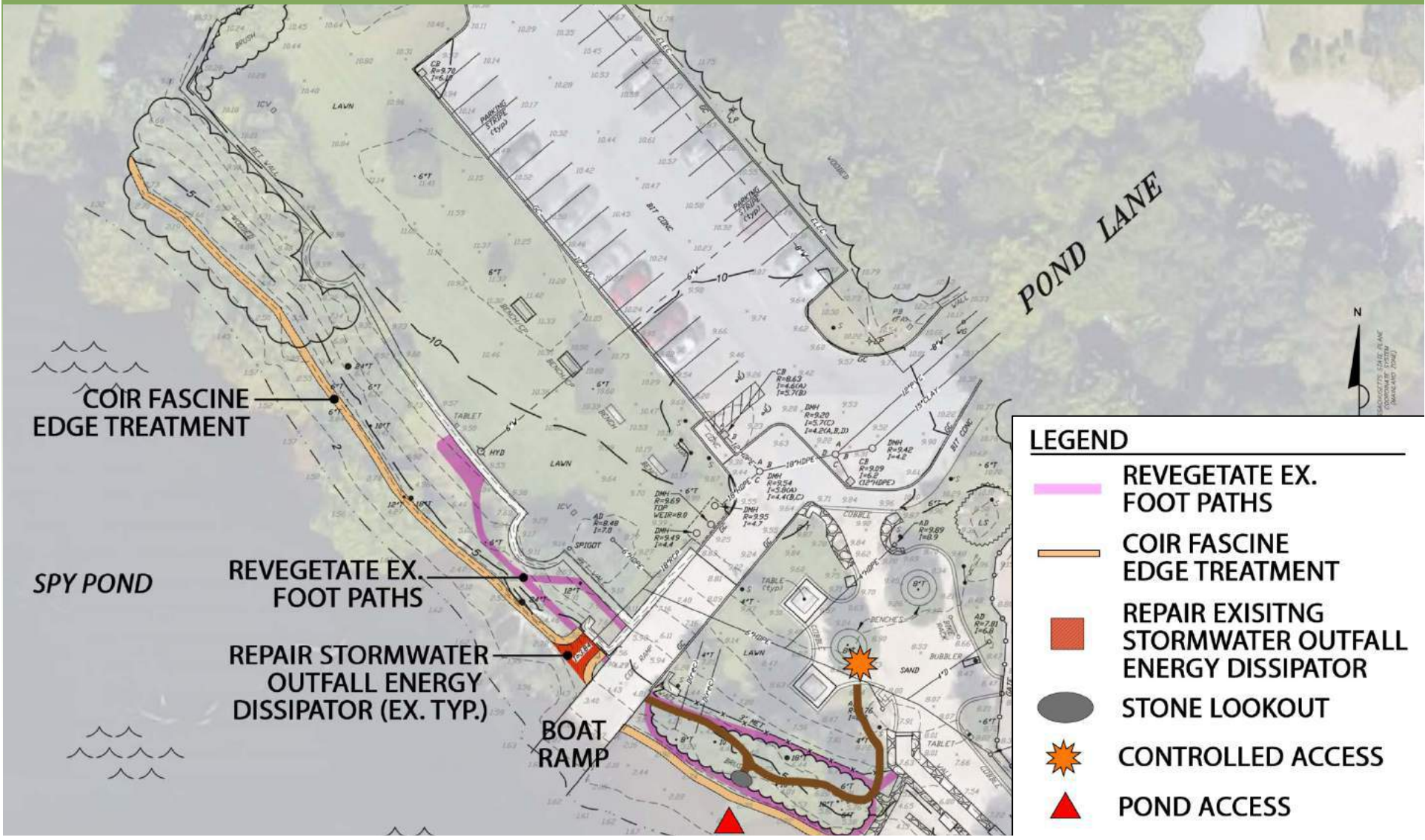


Existing Shoreline Conditions

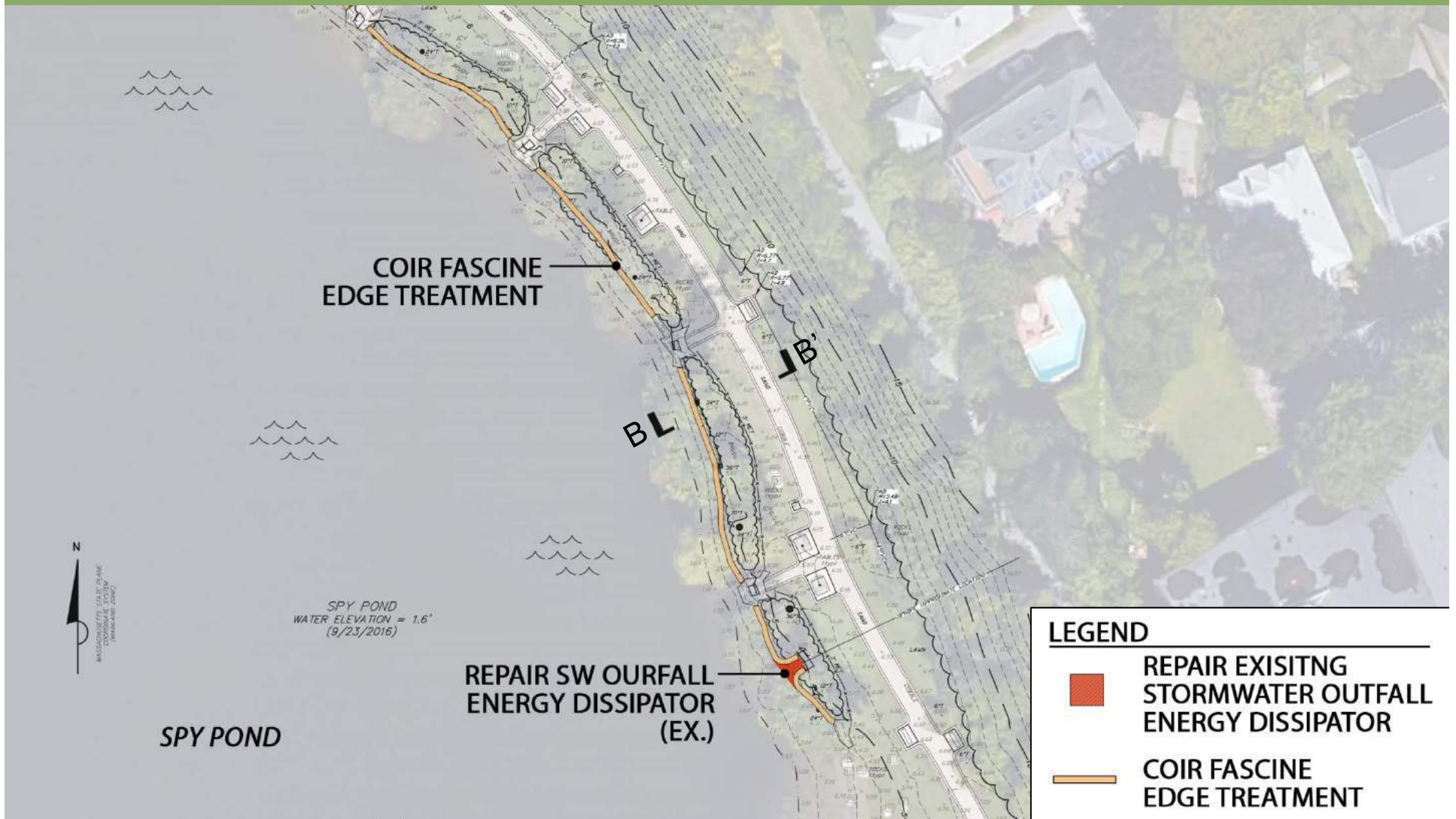
Spy Pond Park – Marginally Stable



Preferred Concept Spy Pond Park (No Access Treatment)

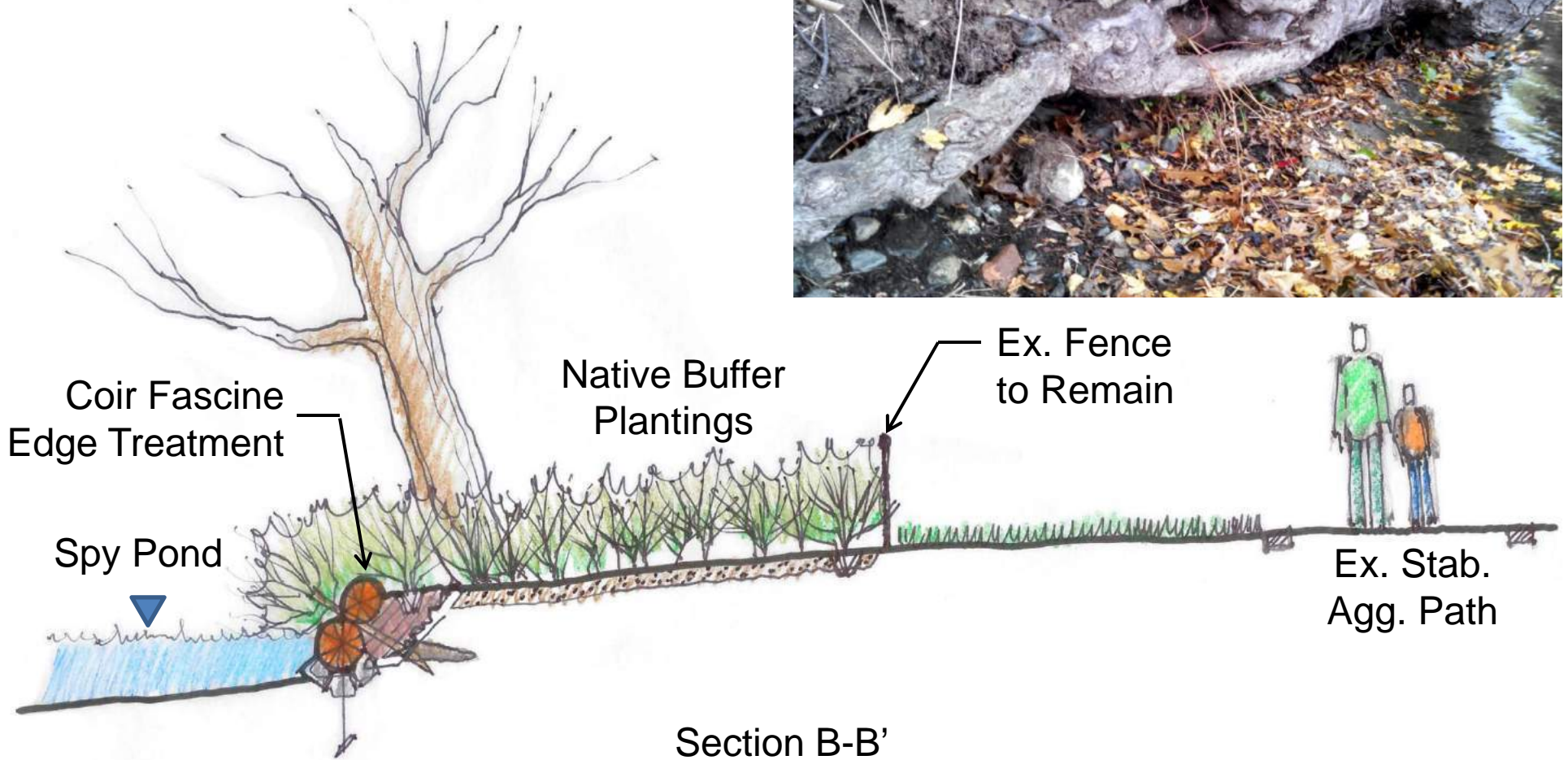


Preferred Concept Spy Pond Park (No Access Treatment)



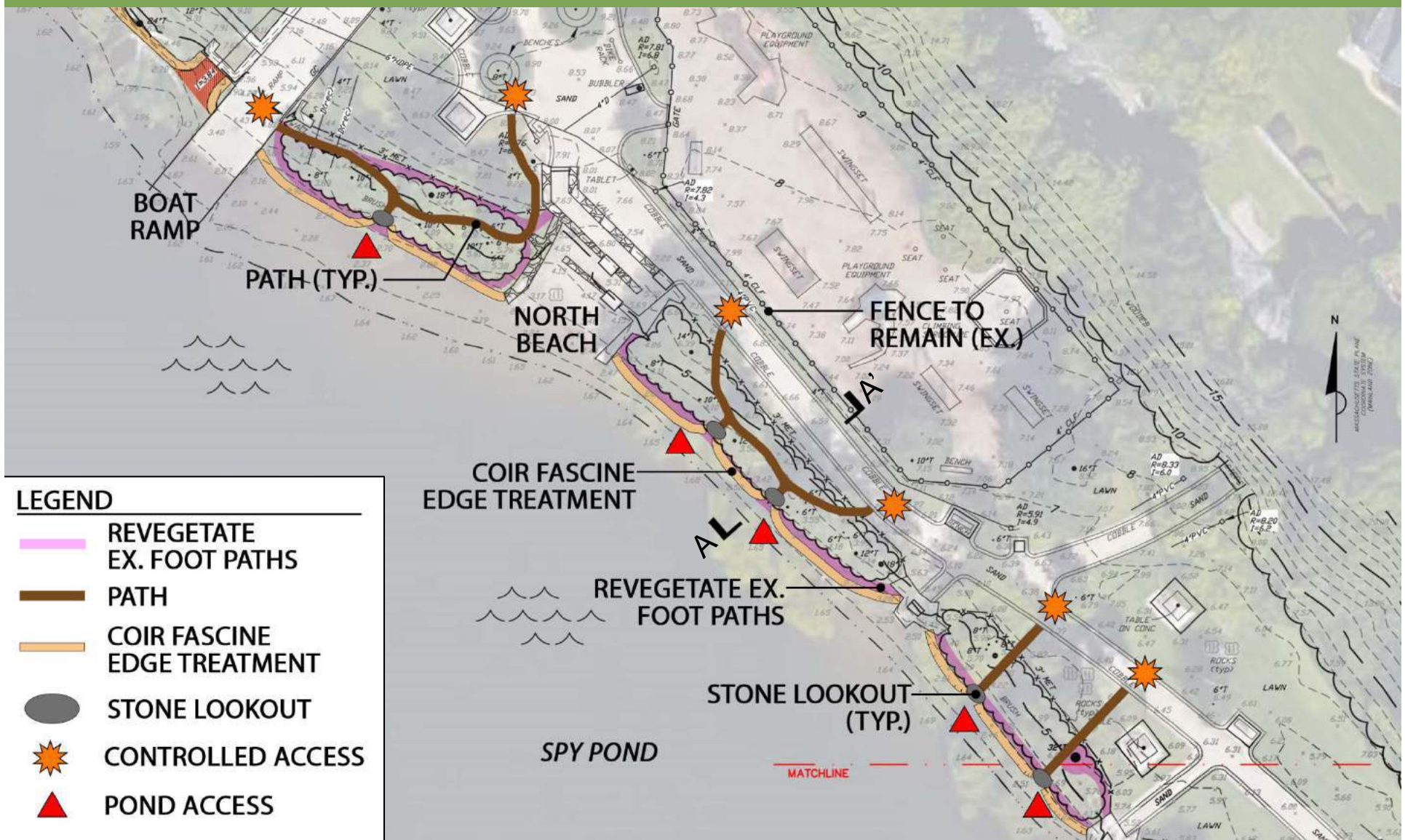
Preferred Concept

Spy Pond Park (No Access Treatment)



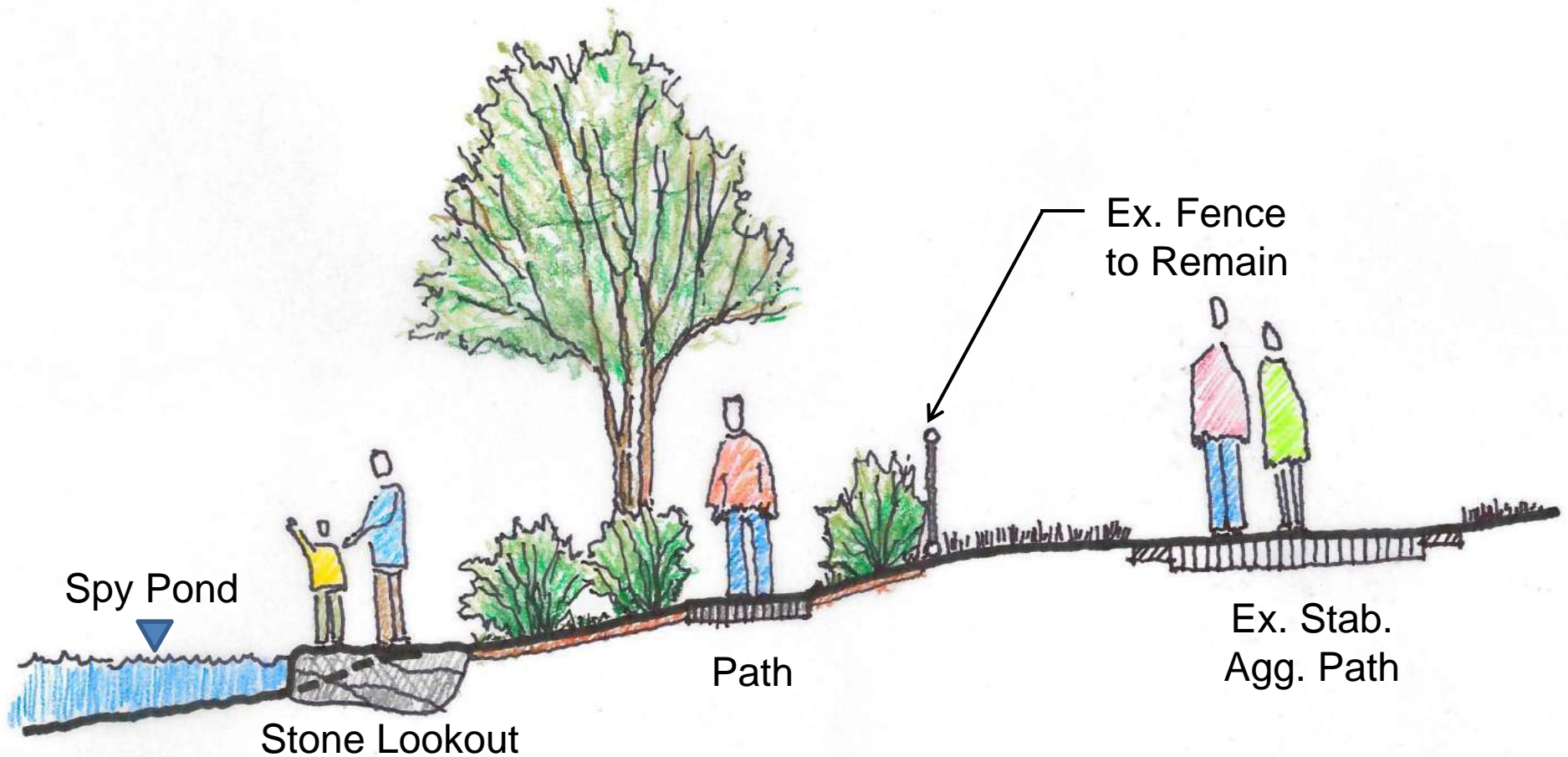
Preferred Concept

Spy Pond Park (Limited Access Treatment)



Preferred Concept

Spy Pond Park (Limited Access Treatment)



Section A-A'

Educational Signage - Examples

Permanent

Fresh Pond Reservation
Protecting the Cambridge Water Supply since 1889

Stream C Woodland Restoration

Area Features

- Native woodland wildlife habitat
- Wildlife nesting area
- Vegetated buffer

To protect this habitat *for all to enjoy*

- Stay on roadway
- Keep dogs out

Thank you for helping us protect the ecological functions of these water supply lands and their natural beauty.

Cambridge Water Board
City of Cambridge Water Department
200 Fresh Pond Parkway
www.cambridgema.gov/water

David Kaplan, Watershed Manager
617-349-4799
dkaplan@cambridgema.gov



Temporary

Welcome to the Ravine

This is a sensitive wildlife area. Please keep it beautiful and do not disturb the wildlife or the natural habitat.

- Stay on paths
- Keep dogs leashed at all times
- Do not damage or remove plants
- Walk bicycles

Well water is used here during water shortages.

To report a problem, call (800) 201-PARK.
To volunteer, call (718) 965-8960.
To donate to the Park, call (718) 965-8988.

Prospect Park

Guided tours of the Ravine and other natural areas leave from the Audubon Center at the Boathouse on Saturdays and Sundays at 3:00 PM, from April to early November. For information call (718) 287-3400.

Park Guides are sponsored by **USBC**



Black's Nook Site Improvements

The Fresh Pond Reservation Master Plan identifies reconstruction and stabilization of the degraded shoreline of Black's Nook as a very high priority. In response, this restoration project aims to increase wildlife habitat value and water quality by fostering native wetland and woodland plant communities and stabilizing the shoreline with native vegetation, soil logs and erosion control matting. In order to enhance the use of the pond as a natural resource study area for children, the plan includes a redesigned woodland trail using porous pavement, observation platforms, and an elevated wooden path. A createdernal pond will also provide important breeding habitat for amphibians and invertebrates. By widening paths and improving the Concord Avenue entrance, this project will allow for universal accessibility while also preserving the sense of wildness that makes Black's Nook unique.

Construction Schedule: Site improvements begin in the Fall 2010 and will be completed by Summer 2011.

Black Nook timber observation platforms.

Plant community-based woodland and wetland restoration.

Shoreline restoration and plant community-based woodland and wetland restoration.

To receive updates on current project work, email us at fpr@cambridgema.gov

Plant Establishment



Boys & Girls Club



Existing Shoreline Conditions

Boys & Girls Club - Unstable



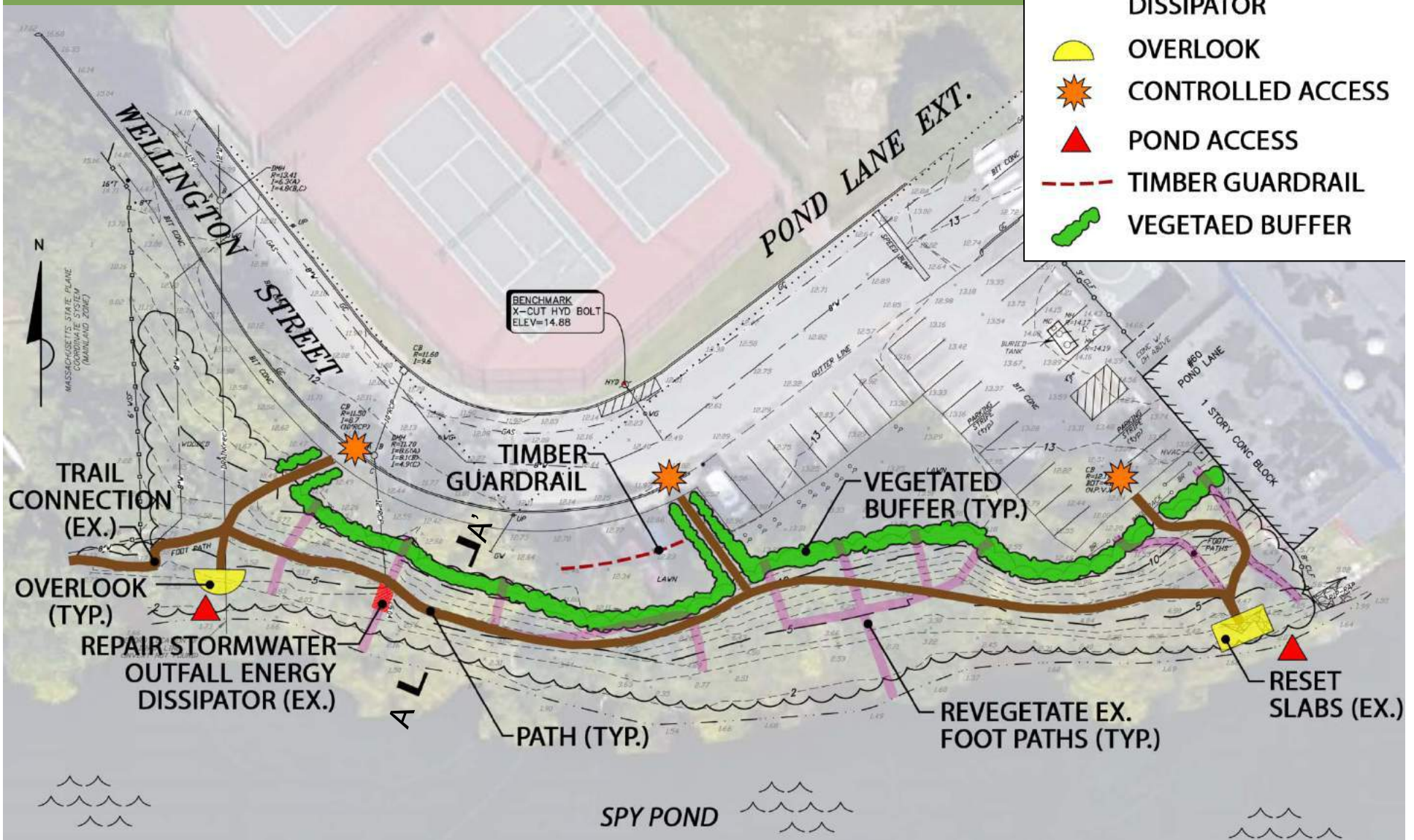
- Loss of stabilizing vegetation
- Compacted soils
- Uncontrolled human use
- Steep slope



Preferred Concept Boys & Girls Club

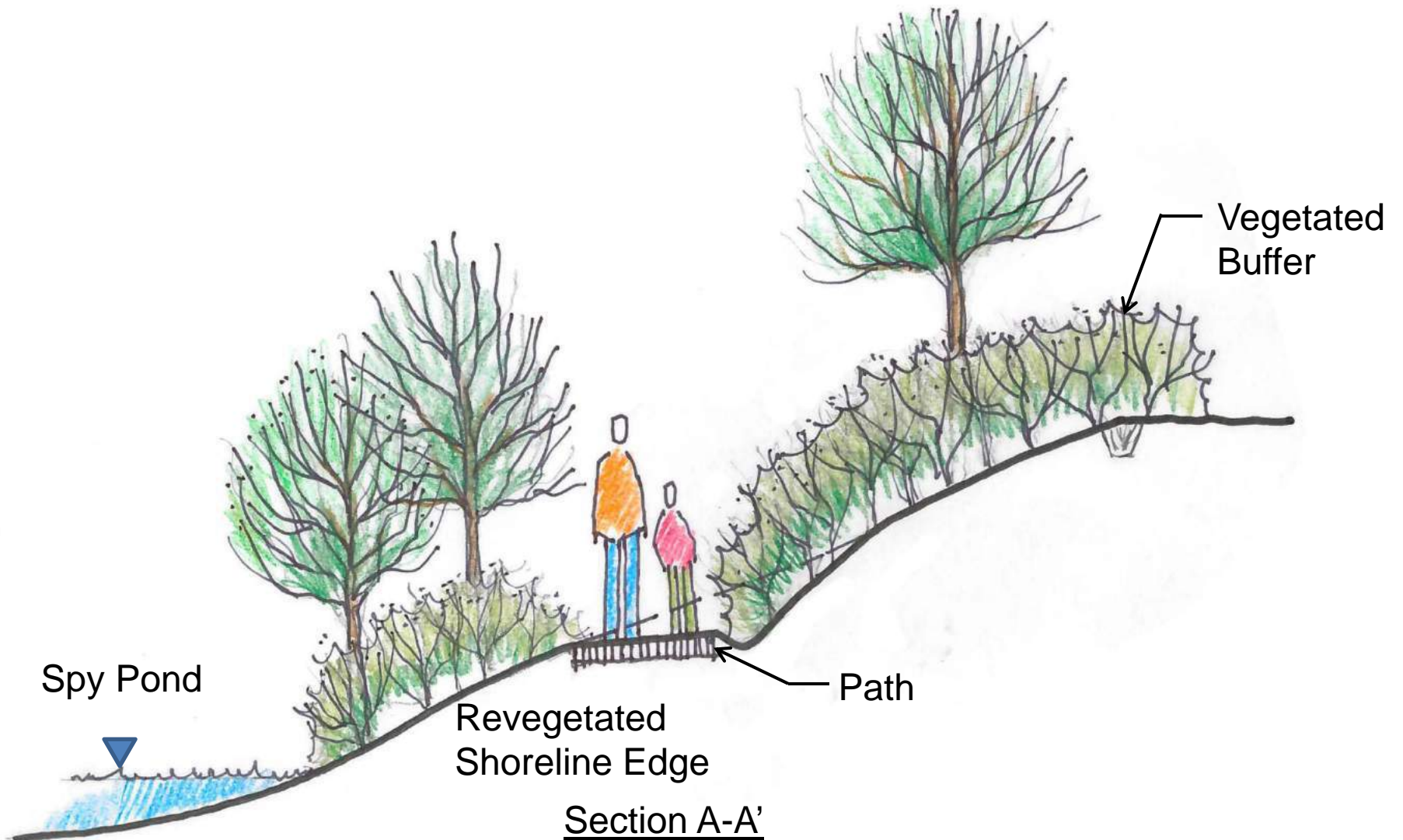
LEGEND

-  REVEGETATE EX. FOOT PATHS
-  PATH
-  REPAIR STORMWATER OUTFALL ENERGY DISSIPATOR
-  OVERLOOK
-  CONTROLLED ACCESS
-  POND ACCESS
-  TIMBER GUARDRAIL
-  VEGETATED BUFFER



Preferred Concept

Boys & Girls Club



Shoreline path during
construction (1996)



Three years later



Spring Valley Street



Existing Shoreline Conditions

Spring Valley Road – Unstable



- Loss of stabilization
- Steep slope
- Uncontrolled stormwater runoff
- Human use

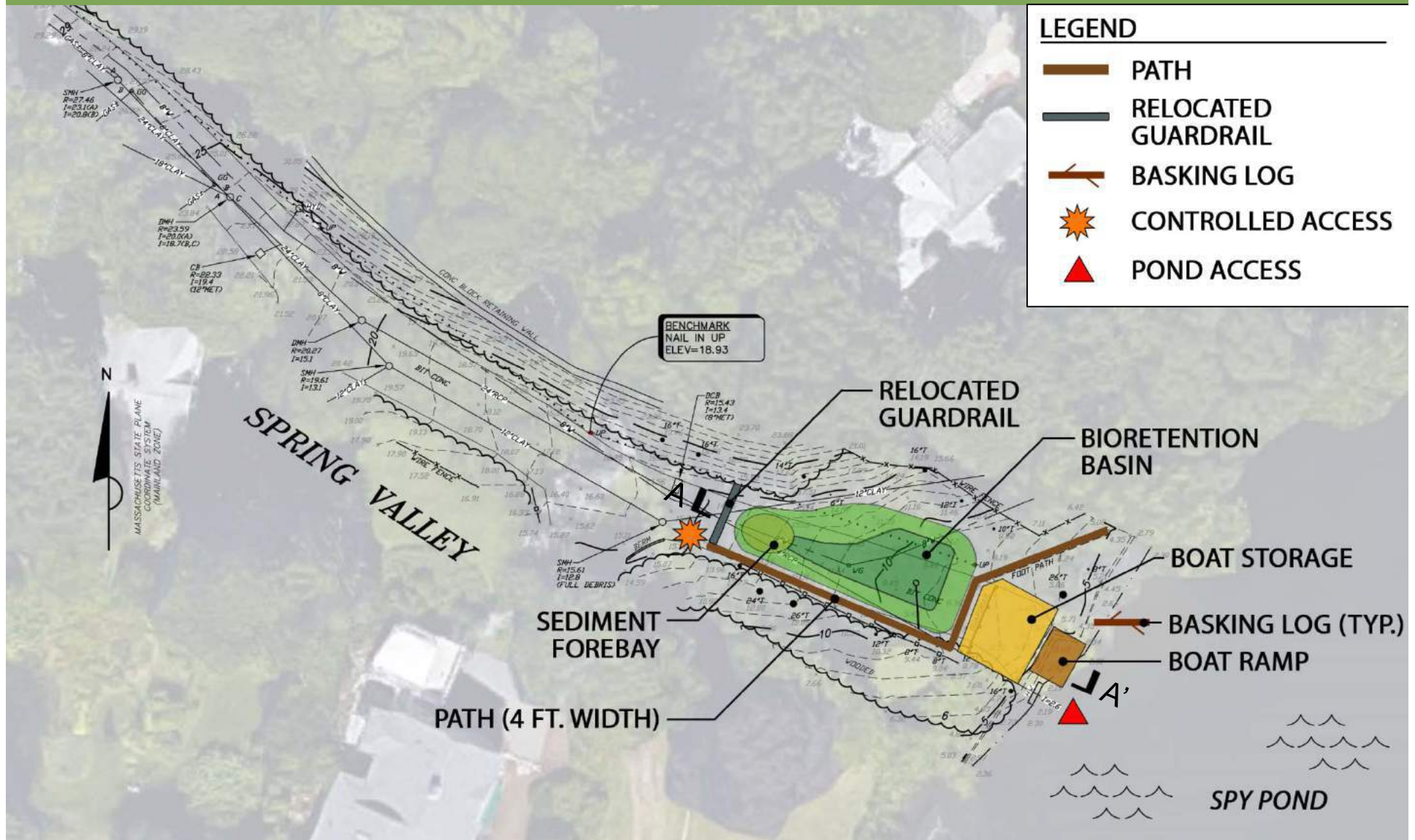


Existing Shoreline Conditions

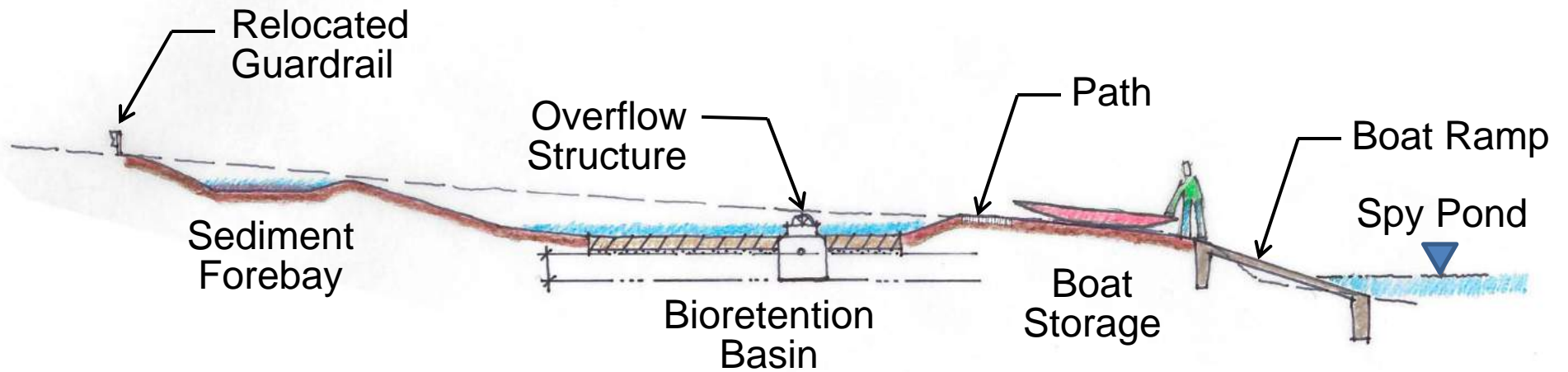
Spring Valley Road – Unstable



Preferred Concept Spring Valley Street



Preferred Concept Spring Valley Street



Section A-A'

Shoreline Planting

High Marsh Herbaceous Plants



Left to Right: *Eupatorium maculatum*, *Eupatorium perfoliatum*, *Juncus canadensis*, *Juncus effusus*



Left to Right: *Carex stipata*, *Carex vulpinodea*, *Caltha palustris*



Left to Right: *Hibiscus moscheutos*, *Scirpus cyperinus*, *Leersia oryzoides*

Shoreline Planting

Native Shrubs (Low to Medium)



Left to Right: *Spiraea tomentosa*, *Cornus sericea*, *Rosa palustris*



Left to Right: *Rhus aromatica*, *Clethra alnifolia*, *Photinia pyrifolia*

Shoreline Planting

Native Shrubs (Tall)



Left to Right: *Cornus amomum*, *Ilex verticillata*, *Cephalanthus occidentalis*



Left to Right: *Alnus rugosa*, *Vaccinium corymbosum*, *Salix discolor*

Appendix 7: Design, Engineering, Permitting, Bid
Support, Construction Administration Services
Consultant Fee Estimate

Fee Proposal for Spy Pond Edge Protection and Erosion Control for Phase 2 (Contract Documents and Construction Observation)
Town of Arlington Conservation Commission, Arlington MA

	STAFF CLASSIFICATION	SR PROJ ENG	PROJ ENG	SR ENG	ENG TECH	SR TECH		
	HOURLY STAFF RATE INCLUDING OVERHEAD AND FEE	\$170.00	\$148.00	\$129.00	\$105.00	\$80.00	Total Task Hours	Budget Total
No.	Activity Work Task	(hrs)	(hrs)	(hrs)	(hrs)	(hrs)		
Task 1 - Site Evaluation								
1.1	Interdisciplinary team site walk	4	4	4			12	\$1,788.00
1.2	ID invasive vegetation and coordinate with surveyor			8		8	16	\$1,672.00
1.3	Subconsultant Task - Additional Survey (includes tree survey >4in dbh, ID species, dbh, canopy diameter, spot grates; delineate and survey resource area boundaries; boundary survey for Spring Valley Street; add soil sample, invasive vegetation, and protect sedge locations to base survey)							\$8,000.00
1.4	Subconsultant Task - Soil Sampling (up to six (6) samples for heavy metals)							\$900.00
1.5	Site evaluation review meeting with Town of Arlington (one 1-person meeting)		4				4	\$592.00
1.6	Project management & coordination		4				4	\$592.00
	Subtotal, Task 1	4	12	12	0	8	36	\$13,544.00
Task 2 - Construction Documents								
2.1	Review soil and planting soil test results	1	1	2			4	\$576.00
2.2	Develop Slope Stabilization/Drainage Design	12	32	16			60	\$8,840.00
2.3	Additional Site Visit (2-person)		4	4			8	\$1,108.00
2.4	Prepare 30% Construction Documents drawings (CAD)	2	4	4	8	24	42	\$4,208.00
2.5	Prepare Opinion of Probable Construction Costs, 30% CD level	2	2	2			6	\$894.00
2.6	Prepare 60% Construction Document drawings (CAD)	4	16	8	4	24	56	\$6,420.00
2.7	Prepare 60% Technical Specifications	4	8	16	2	6	36	\$4,618.00
2.8	Develop 60% Opinion of Probable Construction Costs	4	8	8		24	44	\$4,816.00
2.9	Additional Site Visit (2-person)		4	4			8	\$1,108.00
2.10	Develop Vegetation Management and Educational Signage Plans	2	4	8		16	30	\$3,244.00
2.11	Prepare 100% Technical Specifications and Cost Estimate	4	8	4	2	6	24	\$3,070.00
2.12	Finalize 100% Construction Document drawings (CAD)	2	2	2	4	8	18	\$1,954.00
2.13	Finalize 100% Specifications	2	2	2	4		10	\$1,314.00
2.14	Coordination with Town of Arlington Purchasing Dept. for Div 0 and 1 specs		4	8			12	\$1,624.00
2.15	Review meeting with Town of Arlington and working group (two, 2-person meetings)		8	8		2	18	\$2,376.00
2.16	Public Meeting (one, 2-person, including PowerPoint presentation and boards)		10	6		8	24	\$2,894.00
2.17	Project management and coordination		12				12	\$1,776.00
2.18	QA/QC	8	4	4		2	18	\$2,628.00
	Subtotal, Task 2	47	133	106	24	120	430	\$53,468.00
Task 3 - Permitting								
3.1	Preparation of Notice of Intent (NOI) Submittal Package to Conservation Commission	2	16	4	4	6	32	\$4,124.00
3.2	Develop O&M Plan and narrative	2	4	4		8	18	\$2,088.00
3.3	Coordination with NHESP, MHC & USACE		8	8		4	20	\$2,536.00
3.4	Submittal of NOI Package to Conservation Commission and DEP		2		4	4	10	\$1,036.00
3.5	Perform site walk with Conservation Commission Representatives		4				4	\$592.00
3.6	Presentation of NOI submittal to Conservation Commission (two, 2-person meeting)	8	8				16	\$2,544.00
3.7	Preparation of presentation graphics		6			10	16	\$1,688.00
3.8	Revisions per Commission comments		2			8	10	\$936.00
3.9	Record OOC at Registry of Deeds				2		2	\$210.00
3.10	SWPPP and eNOI (assume > 1 acre disturbance)		4	4	8	24	40	\$3,868.00
3.11	Chapter 91 Application	2	16		24	8	50	\$5,868.00
3.12	MEPA ENF or other Review	2	16	4	6	16	44	\$5,134.00
3.12	Project management and coordination		12				12	\$1,776.00
3.13	QA/QC	4	4			1	9	\$1,352.00
	Subtotal, Task 3	20	102	24	48	89	283	\$33,752.00
Task 4 - Bidding and Award Support								
4.1	Submit bid package & coordinate with Town of Arlington Purchasing Department		2			4	6	\$616.00
4.2	Attend Pre-bid conference (including prep)	4	4			2	10	\$1,432.00
4.3	Provide response to bidder's questions	2	4	2			8	\$1,190.00
4.4	Assist Town of Arlington in bidder investigations	2	8			2	12	\$1,684.00
4.5	Project management and coordination	1	4				5	\$762.00
	Subtotal, Task 4	9	22	2	0	8	41	\$5,684.00
Task 5 - Construction Administration								
5.1	Attend Meetings & Site Visits		2			4	6	\$616.00
	Pre-Construction Conferences, incl. Con Com administrator (2 mtg., 2-person)		8	8			16	\$2,216.00
	Nursery site visit to tag plants (1 trip)			8			8	\$1,032.00
	Weekly observation site visits (estimated 16 mtgs w/ filed memo)	4	24		40		68	\$8,432.00
5.2	Review construction schedule		2				2	\$296.00
5.3	Review shop drawings		8		16		24	\$2,864.00
5.4	Certify quantities for payments		8		4		12	\$1,604.00
5.5	Change order processing		8				8	\$1,184.00
5.6	Review and submit the final and Complete Record Set of Construction Documents to the City		4			8	12	\$1,232.00
5.7	Submit final letter to Conservation Commission to receive Certificate of Compliance	1			4		5	\$590.00
5.8	On-Site Training for DPW and Volunteers		6	6			12	\$1,662.00
	Prepare presentation		6	6		12	24	\$2,622.00
5.9	Annual site visits to document Planting Maintenance (3, one-person visits, includes site reports)			12			12	\$1,548.00
5.10	Project management and coordination	4	20				24	\$3,640.00
	Subtotal, Task 5	9	96	40	64	24	233	\$29,538.00
	SUBTOTAL, DIRECT LABOR	89	365	184	136	249	1023	\$135,986.00

**Fee Proposal for Spy Pond Edge Protection and Erosion Control for
Phase 2 (Contract Documents and Construction Observation)**
Town of Arlington Conservation Commission, Arlington MA

Estimated Expenses

Mileage (estimated)	\$800.00
Photocopies	\$200.00
Mailing & Shipping	\$500.00
Drawings & Presentation Submittals	\$2,000.00
Total Expenses	\$3,500.00

PROJECT TOTAL - PHASE 2

\$139,486.00

Appendix 8: Preliminary Construction Cost Estimate

Spy Pond Edge Protection and Erosion Control Project

Town of Arlington

Preliminary Cost Estimate

12/8/2016, rev. 1/26/2017

			Quantity	Unit	Unit Cost	Total Cost
Mobilization	1505.1	Mobilization	1.00	LS	\$15,000	\$15,000
Mobilization Sub Total						\$15,000
Erosion Control	1568.1	Erosion and Sediment Control	1.00	LS	\$20,000	\$20,000
ESC Sub Total						\$20,000
Traffic & Ped. Management	1570.1	Traffic and Pedestrian Management	1.00	LS	\$5,000	\$5,000
TM Sub Total						\$5,000
Site Preparation	2100.1	Remove and dispose debris	1.00	LS	\$5,000	\$5,000
	2100.2	6' Ht. Temporary Chain Link Construction Fence	350.00	LF	\$15	\$5,250
	2100.3	6' Ht. Temporary Chain Link Construction Fence Gate	2.00	EA	\$300	\$600
	2100.4	Tree Pruning and Removal	3.00	PER DAY	\$1,800	\$5,400
	2100.5	Sawcut Pavement - Spring Valley	16.00	LF	\$10	\$160
	2100.6	Remove and Disposal of On-Site Material	270.00	CY	\$30	\$8,100
	2100.7	Remove and Dispose Bituminous Concrete and Sub-Base (16" depth) - Spring Valley	200.00	CY	\$40	\$8,000
	2100.8	Remove and Dispose Rip Rap	10.00	CY	\$25	\$250
Site Preparation Sub Total						\$32,760
Earthwork	2120.1	Pipe Outlet Energy Dissipator	4.00	EA	\$2,000	\$8,000
	2120.2	Stone Backfill - #57	30.00	CY	\$50	\$1,500
	2120.3	Stone Backfill - Pea Gravel	10.00	CY	\$55	\$550
	2120.4	Non-woven Geotextile Fabric	400.00	SY	\$8	\$3,200
Catchbasin	2252.1	Precast Concrete Catch Basin - Overflow Structure w/ frame & grate	2.00	EA	\$4,000	\$8,000
Earthwork and Catch Basin Sub Total						\$21,250
Paving and Surfacing	2500.1	Compacted Gravel Surfacing	340.00	SY	\$20	\$6,800
	2500.2	Porous Flexible Paving	180.00	SY	\$45	\$8,100
	2500.3	Cabled Concrete Block	200.00	SF	\$22	\$4,400
Paving & Surfacing Sub Total						\$19,300
Slope Stabilization	2550.1	Coir Fascine w/ Anchors	540.00	LF	\$30	\$16,200
	2550.2	Double Coir Fascine w/ Anchors	600.00	LF	\$40	\$24,000
	2550.3	Slope Treatment w/ Coir mesh rolled erosion control blanket	350.00	SY	\$35	\$12,250
	2550.4	Restore Compacted Soils (scarify and compost)	100.00	SY	\$28	\$2,800
Slope Stabilization Sub Total						\$55,250
PVC Pipe	2622.1	Underdrains - 6" Perforated PVC w/ Fittings	360.00	LF	\$20	\$7,200
	2622.2	Underdrains - 6" PVC cleanouts/Observation Well	2.00	EA	\$300	\$600
	2622.3	6" PVC Pipe	35.00	LF	\$40	\$1,400
Ductile Iron Pipe	2622.4	8" Ductile Iron Pipe	80.00	LF	\$60	\$4,800
Pipe Sub Total						\$14,000
Site Improvements	2800.1	Timber Guardrail	55	LF	\$65	\$3,575
	2800.2	Plant Establishment Fence (4' height)	1800	LF	\$7	\$12,600
	2800.3	Plant Establishment Fence Gate (4' height)	6	EA	\$750	\$4,500
	2800.4	Educational Signage	1	LS	\$6,000	\$6,000
	2800.5	Lookouts (includes stone slab and setting bed)	9	EA	\$7,500	\$67,500
	2800.6	Reset slabs	1	EA	\$1,000	\$1,000
	2800.6	Goose Deterrent Fence	720	LF	\$12	\$8,640
Site Improvements Sub Total						\$103,815
Planting	2954.1	Planting Soil	500	CY	\$40	\$20,000
	2954.2	Chain Link Fence (6' ht)	25	LF	\$30	\$750
	2954.3	Bark mulch (2")	7	CY	\$55	\$385
	2954.4	Deciduous Tree (B&B)	10	EA	\$350	\$3,500
	2954.5	Live Stakes (1.5 feet O.C., each stake 2-3 feet)	700	EA	\$3.00	\$2,100
	2954.6	Herbaceous Plant Plugs (in coir logs)	720	EA	\$4.00	\$2,880
	2954.7	Bioretention Basin Planting (2" plugs)	1150	EA	\$4.00	\$4,600
	2954.8	Shrub Plantings (cont.)	230	EA	\$30	\$6,900
	2954.9	Herbaceous Planting (1 gal. cont.)	500	EA	\$20	\$10,000
	2954.10	Woodland Groundcover Planting (2" plug)	1000	EA	\$7	\$7,000
Planting Sub Total						\$58,115
Landscape Mgmt	2955	Landscape Warranty (3 year)	1	LS	\$15,000	\$15,000
Landscape Management Sub Total						\$15,000
Project Sub Total						\$359,490
Contingency (15%)						\$53,924
Project Total						\$413,414
Assumptions:						
1. All prices included in this estimate are unit costs which include labor and materials.						
2. This estimate represents an opinion of probable cost for construction for items under the scope of this project and does not necessarily depict potential unit price discrepancies, variances, or additional services.						