



Fuller Brook Park Preservation Project
Executive Summary
Phase 2 Preliminary Design Report

Prepared for the
Fuller Brook Park Coordinating Committee
Wellesley Natural Resources Commission
Wellesley, Massachusetts
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For more information related to the Phase 2: Preliminary Design project, please see the project CD that includes the following:

- **Phase 2 Preliminary Design Report:** Executive Summary, Introduction, Existing Conditions, Options & Alternatives, Treatment Recommendations, Phase 3 & 4 Recommendations, Maintenance Recommendations
 - **Appendices:** Stakeholder Interviews, Public Meeting Presentations & Feedback, Vegetation Assessment, Universal Access Standards, Cultural Resource Standards and Compliance, Additional Technical Information
 - **Phase 2 Preliminary Design Plans**
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Executive Summary

Fuller Brook Park Preservation Project Phase 2: Preliminary Design Report

Overview

Fuller Brook Park is the most popular and well-used park in Wellesley, excluding athletic fields, and is known to many as simply the "Brook Path," a discontinuous pedestrian route that stretches approximately 2 ½ miles from Dover Road to Maugus Avenue along Fuller and Caroline Brooks. The associated parkland comprises approximately 23 acres of scenic and historic landscape, excluding the segment through the Hunnewell athletic fields. The park was nominated to the National Register of Historic Places for its innovative historic landscape design. In addition to its historic significance, Fuller Brook Park also provides critical and vital floodplain and recreational assets for the Town. It is also a well-used route for school children travelling to the Hunnewell Elementary School and Wellesley High School.

Despite its bucolic natural character, Fuller Brook Park is in urgent need of repair to ensure that its vital path system, stream, and vegetation are preserved for the next generation. From its original concept developed in 1899, Fuller Brook Park was intended to provide both a continuous recreational route as well as a functioning natural drainage system. Yet, the concrete curbing installed six decades ago is severely compromised and the stream bank is choked in many places with invasive vegetation so that water flow is impeded and the stability of the stream course is threatened. Specimen trees need pruning to reduce threats to park users, and the path is both deteriorated and does not meet current standards for universal access.

Approximately 7,500 Wellesley residents live within walking distance of Fuller Brook Park. The land is under the jurisdiction of the Natural Resources Commission (NRC) and is maintained by the Department of Public Works (DPW). This Phase 2 Preliminary Design project has been directed by the Fuller Brook Park Coordinating Committee (FBPCC), which includes representatives from the NRC and DPW as well as the School Committee, Historic Commission, Community Preservation Committee, Planning Board, Trails Committee, Board of Selectmen, and citizen advocate. The FBPCC selected the project consultant team (Pressley Associates with AECOM, Tree Specialists, and LEC Environmental) and work was completed between August and December 2010.

This Phase 2 Preliminary Design project builds on the Preservation Master Plan for Fuller Brook Park completed by the Halvorson Design Partnership in 2009. The intent of this project is to advance the Master Plan with more specific recommendations to solve deteriorated conditions within the park in the spirit of its original design and to unite the two disconnected sections through Hunnewell Field. This phase considers the Park as four segments, each with a distinctive landscape character:

- Segment 1: Dover Road to Grove Street
- Segment 2: Grove Street to State Street
- Segment 3: Hunnewell Field area
- Segment 4: Paine Street to Maugus Avenue



Segment 1: Dover Road to Grove Street	Segment 2: Grove Street to State Street	Segment 3: Hunnewell Field	Segment 4: Paine Street to Maukus Avenue
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Project Area

Public Information & Participation

The FBPCC developed an extensive public participation strategy for Phase 2 to communicate the issues, alternatives and recommendations for the Park and ensure a sufficient community dialogue. Key components of the public information process include:

- A **website** (www.wellesleyma.gov/Fullerbrook) dedicated to providing background and current information about the evolving project;
- An extensive **email distribution list** used for regular communication with interested residents;
- **Stakeholder interviews** with nine Town departments, commissions and committees (Historical Commission, Planning Department, School Department, Recreation Department, Department of Public Works/Parks, DPW/Engineering, Trails Committee, Natural Resources Commission, Wetlands Protection Committee);
- Three sets of **public meetings** to solicit community feedback:
 - September 15-16, 2010: Issues, Opportunities & Goals
 - October 27- 28, November 7, 2010: Options
 - December 15-16, 2010: Recommendations
- Public **feedback** and comments were provided through verbal questions and responses recorded at public meetings, written communication, and email;
- Targeted **updates and communication** with abutters and other interested parties undertaken by the FBPCC.

Public Process & Feedback

The first set of public meetings presented project issues, opportunities and goals including design criteria building on the guiding principles of the Master Plan. The second set of public

meetings presented a wide range of options for the treatment of the Park's vegetation, stream course and bank, boundary and path. The third set of public meetings sought public feedback to refine the overall recommendations for park improvements.

This process yielded some important information and feedback that greatly influenced the final design recommendations. The FBPCC, NRC, and consultant team carefully reviewed all comments to understand the needs and wants of the community and to address public concerns. Many respondents, though not all, expressed a strong desire to retain a naturalistic, permeable path, particularly in Segment 1, with a narrower width than had been recommended in the Master Plan. All options to potentially re-route the path to address slope stabilization, wet conditions, universal access, or other issues were carefully scrutinized by the community so that the final design recommendations were further revised even after the last public meeting to reflect this additional input. Despite the cost and complicated implementation, many residents supported the concept of removing the concrete curbing in the stream bed and re-establishing a more natural character along the stream bank.

Residents greatly reinforced the goals for Fuller Brook Park by articulating those qualities they value most, such as the Park's naturalistic character, views of the two brooks, and the winding path. Flooding and drainage continue to be a concern for abutters and regular users of the path, so that the Preliminary Design Plans propose substantial improvements to address this issue in support of other infrastructure improvements to be undertaken by the DPW as part of the Stormwater Master Plan Update.

The Phase 2 Preliminary Design project considered the current condition of Fuller Brook Park related to the character, vegetation, stream and bank, and path for each of the four segments. This was followed by developing a series of options and alternatives to address a range of issues apparent in the park, from invasive species to universal access. Based on public feedback and review by the FBPCC, the final recommendations for these features provide the foundation for work to be completed in Phases 3 and 4.

Park History & Significance

From its inception, Fuller Brook Park was intended to serve two purposes: aiding in stormwater management (drainage) and providing valuable public green space (path).¹ In 1897, the Wellesley Park Commission hired the landscape architecture firm Olmsted, Olmsted & Eliot to provide recommendations for the creation of a series of parks to be laid out in the Town. John Charles Olmsted and Warren Manning, who had been working on plans for the Muddy River in Boston and Brookline, provided specific recommendations related to Fuller Brook Park. In 1899, the Town began acquiring the land necessary for Fuller Brook Park. Landscape architect Warren Manning is credited with the development of plans for the 2 ½-mile long park after he left the Olmsted firm.



Stream bank plantings, a meandering brook and pedestrian paths defined the scenic park experience along the Muddy River in the Emerald Necklace Park System, the precedent for Fuller Brook Park (courtesy NPS, Frederick Law Olmsted National Historic Site).

The Town continued to acquire additional lands over the course of the ensuing years, as well as implementing improvements such as work on the brook, stabilization of the stream bank with willows and birches, and the planting of over 400 trees. In 1910, the Town began implementation of a central sewer system and hired engineer Ernest Bowditch to make recommendations for additional land acquisition for Fuller Brook Park to aid in the construction of infrastructure. This work was completed by 1921. Through the 1930s, increased residential development necessitated additional work to improve the drainage and stormwater capacity of Fuller Brook. In 1936, the Town constructed a new high school at the south edge of what is now known as Hunnewell Field. Up until this time, Fuller Brook Park extended through Hunnewell Field, connecting with Caroline Brook to the east.

The Park was neglected during World War II, resulting in gradually deteriorating conditions. During the mid-20th century, work focused on mediating the evident disrepair. By the late 1950s drainage had become a substantial issue and the Massachusetts Department of Public Works implemented significant changes to address this within the Park, which resulted in the straightening of the water course, removal of vegetation along the stream edge and the addition of concrete curbing along the stream edge from Dover Road to Grove Street.² These changes greatly affected the naturalistic character of Fuller Brook Park. Since then, Wellesley has continued to carry out improvements to maintain the functionality of the Park while also recapturing its natural character. This included the addition of plantings, path improvements and the reconstruction of bridges. Beginning roughly in the 1970s, efforts have focused on finding a balance between the need to adequately accommodate stormwater and drainage issues while also providing the residents of Wellesley with a scenic green space.³



Concrete curbs and steep turf banks considerably altered the naturalistic character of Fuller Brook Park in the 1950s.



Collapsed concrete liners now impede water flow throughout Segment 1 and contribute to bank erosion.

Relationship to the Phase 1 Master Plan

In 2009, Halvorson Design Partnership, in collaboration with Shary Page Berg and Tree Specialists, completed the *Fuller Brook Park Preservation Master Plan* for the Wellesley Natural Resources Commission. The purpose of the Master Plan was to “document the natural, historic, and aesthetic values of the Park and to make recommendations for preserving and revitalizing it in the spirit of its original creators.” The overarching goal of the *Preservation Master Plan* was to provide guidance to aid in the preservation of Fuller Brook Park by enhancing current conditions while protecting the historic integrity of the public landscape.⁴

A valuable product of the *Preservation Master Plan* was the definition of principles and goals set forth to guide park preservation, management, and use.⁵

The seven guiding principles and goals are:

- A park for the public
- A beautiful park
- A park that honors its history
- A window on nature
- A park for passive recreation
- A park linked to a larger system
- A multi-purpose park

Goals & Objectives for Phase 2 (Design Criteria)

Phase 2 of the Fuller Brook Park Preservation Project utilized the guiding principles and goals from Phase 1 to frame a series of twelve design criteria with associated management goals (see Phase 2 Report) that provide the benchmark for design work to enhance the unique character of the Park. These criteria, listed below, served as a critical tool in evaluating various alternatives and options for the treatment of the Park’s path, vegetation, stream course and structures.

The Phase 2 Design Criteria⁶ are:

- Enhance and facilitate passive recreational use including universal access;
- Maintain and enhance the scenic and naturalistic character of Fuller Brook Park;
- Preserve the integrity of the cultural landscape and historic resources;
- Protect, preserve, and enhance natural resources including aquatic, wetland, and upland habitats;
- Improve storm water capacity and drainage;

- Strengthen the identity of Fuller Brook Park as a single resource, while simultaneously respecting the variations in landscape character and experience found along its length;
- Connect the Fuller Brook and Caroline Brook segments to create a continuous park and path;
- Reduce health/safety risks and threats to park features;
- Address community concerns and desires related to Fuller Brook Park improvements;
- Provide improvements that are sustainable and maintainable;
- Develop an improvement strategy that can be implemented in phases;
- Provide the maximum cost benefit to the Town of Wellesley.

Summary of Existing Conditions

Segment 1

Overall Character

Segment 1 has a bucolic character that is well-loved and appreciated by park users. The path meanders from Dover Road to Grove Street on the east side of Fuller Brook, with pedestrian bridges that connect the path to the opposite side at Leighton Road and Appleby Street. The path is sandwiched tightly between the top of the stream bank and the park boundary from Vane Street to just beyond Tappan Road so that park users must travel directly adjacent to private yards. Groves of mature specimen trees create a pleasant shaded walk. Some areas of the Park are consumed by invasive vegetation so that views to the brook and its historic bridges are obscured during the growing season.

Vegetation

Segment 1 has the highest concentration of high-risk trees that require immediate action, as well as significant areas of invasive vegetation threatening the stream bank.

Stream

The Fuller Brook stream course and bank is the most deteriorated in Segment 1, largely because of the displaced and broken concrete curbing that impedes water flow, concentrating the stream flow behind the curbing and hastening bank erosion. Because the curbing is dislodged in several places, the channel size is inadequate to effectively convey water during storm events. The stream bank is highest in this segment at an average of 6’.

Structures

Segment 1 contains three historic vehicular bridges and two historic footbridges. All vehicular bridges (Dover Road, Cottage Street, Grove Street) appear to be in good structural condition, but with some damage from encroaching vegetation and erosion at abutments resulting from road runoff. The same is true for the two pedestrian bridges at Leighton Road and Appleby Road. They are in overall good structural condition but have eroded abutments.

Path

The existing Brook Path ranges from 3.5' to 10.8' in width (average 6.4') and is surfaced in crushed stone/gravel with the exception of pedestrian connections over footbridges at Leighton Road and Appleby Road, which are surfaced in bituminous concrete. There are few areas where standing water accumulates after rain fall. Much of the path meets the 5% grade requirement for universal access except for the approaches to the Dover Street Bridge and the Grove Street Bridge (southwest side).



Path near Dover Road; these boulders mark the southern entrance and are a signature feature for Fuller Brook Park.

Segment 2

Overall Character

Segment 2 is similar in character to Segment 1, but with a bituminous paved path that moves from the southeast to northwest sides of the brook from Cameron Street to Wellesley Avenue. The path section north of Cameron Street is close to the property line, skirting the Hunnewell Elementary School and this segment is heavily used by school children. Like Segment 1, groves of mature specimen trees create a pleasantly shaded walk. Some areas of the Park are consumed by invasive vegetation so that views to the brook and its historic bridges are obscured during the growing season.

Vegetation

Segment 2 has the second highest concentration of high-risk trees that require immediate action, and over 3 acres of land consumed by invasive vegetation, much of which threatens the stream bank - the largest area of invasive species in the Park.

Stream

The Fuller Brook stream course and bank are less deteriorated than Segment 1, but upland areas are subject to seasonal flooding, possibly the result of the lower (4') stream bank and adjacent topography. This is especially true in the upland areas on either side of Wellesley Avenue. Several areas of stream bank suffer from erosion and need stabilization.



Uprooted trees in wet area near the bituminous path southwest of Wellesley Avenue.

Structures

Segment 2 contains four historic vehicular bridges, two historic footbridges, and the historic Grove Street Flume. All vehicular bridges (Cameron Street, Brook Street, Wellesley Avenue, and State Street) appear to be in good structural condition, but with some damage from encroaching vegetation and erosion at abutments resulting from road runoff. The same is true for the Morton Street pedestrian bridge and bridge over Cold Spring Brook, which are in overall good structural condition but has eroded abutments. The Grove Street Flume is in generally good condition.

Path

The existing Brook Path is the most consistent in this segment, ranging from 4.5' to 6.25' in width (average 5') and is surfaced with bituminous concrete. The bituminous path is approaching the end of its material life and is cracked and deteriorated in many places, resulting in drainage issues and tripping hazards. Because this segment is actively used by school children, the shoulders of the path are trampled and compacted in many

places, creating muddy conditions. The transition between the bituminous pavement and the shoulder is also deteriorated so that there is a slight drop off between the path and shoulder. Much of the path meets the 5% grade requirement for universal access except for the approaches to the Cameron Street Bridge (both sides), Brook Street (west side only), and Wellesley Avenue Bridge (both sides).

Segment 3

Overall Character

Segment 3 differs considerably from the rest of Fuller Brook Park because it was significantly altered by the construction of the Hunnewell Fields and the resulting loss of a connecting path. The blue dashed line shown above illustrates the current designated path through the field area, which follows a narrow beaten footpath to the field access road, then out to the existing sidewalk along Rice Street. Most of this area is under the jurisdiction of the NRC, with the exception of the triangular parcel just west of Rice Street, which is School Department land.

Vegetation

The footpath between the football field and Skating Pond is bordered on the east side by a tall fir hedge that provides a visual screen of the field. A grove of mature trees provides a pleasant shaded walk on the northwest side of the football field. Much of the rest Segment 3 is dominated either by mown turf on the existing athletic fields, wetland vegetation, or open woodland.

Stream

Segment 3 marks the convergence of Fuller Brook and Caroline Brook at the Skating Pond. The daylighted section of Caroline Brook northeast of the temporary parking/basketball court is inaccessible due to thick wetland and invasive vegetation. Portions of this brook are culverted through the field area, daylighting again in a structured causeway that drains into the Skating Pond.

Structures

The existing chain-link along the football field is rusted and topped with barbed wire along the existing footpath. Several small structures provide equipment storage and impede pedestrian movement through the field area.

Path

A constructed path does not exist through the entire length of this segment. Between State [Smith] Street and the existing parking lot, a short section of bituminous path connects to the Crosstown Path. From the parking lot, a beaten 12-18" footpath

winds to the northwest side of the football field. From here, pedestrians walk down the access road, connecting on the existing path to the sidewalk at Rice Street. A new stonedust path will provide access from the basketball court/temporary parking area to the high school; a small connecting path crosses Caroline Brook northeast of the parking area.



Existing narrow beaten footpath along the chain-link fence and fir hedge bordering the football field in Segment 3.

Segment 4

Overall Character

Segment 4 has three distinct character areas; between Paine Street and Forest Street, the path travels through areas of dense natural vegetation, including a large sensitive wetland. Between Forest Street and Caroline Street, the relatively straight path is bordered by woodland and areas of Norway maple saplings. From Caroline Street to Maugus Avenue, the Park become increasingly less natural in character, terminating at Phillips Park, which has play equipment and a small ball field. This is the only part of the Park with a raised boardwalk (bridge) over Caroline Brook.

Vegetation

The large natural wetland system east of Paine Street is an important ecosystem, with small areas that are affected by invasive plants such as Purple Loosestrife. Relative to other areas of the Park, the trees in Segment 4 are in better condition, although this segment does have a very significant concentration of Norway maple saplings along the boundary, with a total of 2.5 acres of invasive vegetation.

Stream

Caroline Brook is daylighted in approximately half of Segment 4 from Caroline Street to Paine Street. Upstream from Caroline Street, it is in a culvert. Significant accumulation of sediment is visible in Caroline Brook, despite the fact that it was dredged

approximately eight years ago. The sediment appears to be relatively uniform in character and could be coming from road sand. Investigating the source of this sedimentation is critical to do prior to undertaking any future dredging. There is some evidence of bank erosion, particularly in areas with high concentrations of Norway maple on the stream bank. Close to Paine Street, the path forms a ridge between two seasonally wet areas so that further work is needed to determine the level and frequency of flooding in this area.

Structures

There are two historic structures in this segment. They include the Forest Street Bridge Culvert and the Caroline Brook Culverts and Headwall at Caroline Street. The Forest Street Bridge is experiencing some erosion at the abutments from path and road runoff.

Path

The path varies considerably in Segment 4, ranging in width from a beaten footpath to over 12' in width. The section just east of Paine Street is surfaced in wood chips, with a small 3'-9" wide synthetic wood bridge crossing Caroline Brook. From Forest Street to Seaward Road, the path is gravel, transitioning to stonedust in Phillips Park where it terminates at the Phillips Park driveway.



Stonedust path at Phillips Park.

Options & Alternatives

Preliminary Design considered a wide variety of options or alternatives to address the range of deteriorated conditions and desired improvements to Fuller Brook Park. In some cases, these alternatives represented different design solutions for a given park feature, such as the path. In other cases, the range of solutions included differing levels of effort. The range of options considered is recorded in the PowerPoint Presentations for Public Meeting #2 as well as the Phase 2 Preliminary Design Report, and are summarized briefly below.

Vegetation

Phase 2 considered both the condition of existing vegetation and the potential for additional planting to reinforce the design criteria and preserve the character of the Park. Tree Specialists developed a series of options to address specific issues related to the condition of the Park's existing trees, shrubs, turf and invasive species. Rather than provide a series of alternatives, Tree Specialists recommended a series of priorities or levels of intervention as actions that the Town must do, should do, or could do to solve urgent health and safety concerns, threats to park resources, and areas where the vegetation has an adverse affect on natural systems. This included distinct priorities for tree removals, pruning, and invasive species management.

Stream

Fuller Brook and Caroline Brook are essential to the character of the Park as well as functioning as an important part of the park's floodplain function. AECOM developed alternatives and recommendations for the treatment of the stream course and bank to address deteriorated conditions. Issues related to the stream course are most significant in Segments 1 and 4 due to the presence of concrete curbing and sedimentation, with all segments needing some level of bank stabilization. The stream banks along both Fuller Brook and Caroline Brook are commonly undercut or eroding, often under large trees or areas where there is a lack of stabilizing vegetation. The concrete curbing also contributes to the instability of the bank in Segment 1 because the channel flow is forced against the bank by the curb. To solve this, AECOM evaluated a range of bank stabilization techniques for the Park, ranging from highly "engineered" solutions such as rip rap and gabion to more natural methods (live stakes, live fascines, brush layers, brush mattresses, natural fiber bank material, root wads, natural boulders and re-grading).



Collapsed concrete liners in Fuller Brook, Segment 1.



Sediment in Caroline Brook, Segment 4.

Upland flooding

Options considered to mitigate seasonal flooding in areas where the active floodplain extends into the portions of the Park where the path is located, include the development of vegetated detention areas such as wet meadows, bioswales, and rain gardens.

Park Boundary

Fuller Brook Park has an irregular boundary that is largely adjacent to residential properties. In many places, this ambiguity means that park users cannot tell where the edge of the Park is and private land begins, so that much of the Park is unusable. There are also a few instances where abutters have inadvertently landscaped or added fences within the park boundary. Options to address the ambiguity of the park boundary should be developed in concert with adjacent landowners and may vary depending on specific site conditions. Three alternatives for the delineation of the park boundary were considered: granite boundary markers, buffer planting, and split-rail fence.

Path

Options explored for the Fuller Brook path include width, surface, alignment, and grade changes to meet universal access standards.

Width

The path width varies enormously along the length of the Park, from a 12" wide beaten footpath to areas that exceed 12' in width. The 2009 Preservation Master Plan recommended a consistent 8' wide path throughout the Park. Based on public input, several path widths 4', 5', 6', 8' and 10' were explored generally related to the degree of access and use they afforded.

Surface

Path surface also varies for each segment and often within each segment. Existing surfaces included dirt, gravel, bituminous concrete, wood chips and synthetic boardwalk. Alternative path surfaces considered and evaluated for Fuller Brook Park included wood chips, gravel/crushed stone, stonedust, stabilized soft surface, bituminous concrete (standard, permeable, rolled stone), and boardwalk.

Universal Access

A few existing areas along the path exceed the recommended grade for universal access (5%), most of which relate to the slopes approaching street crossings. However, with the exception of the bituminous path in Segment 2, most of the path in the Park does not meet current universal design standards for slip-resistant surfaces. Since one of the design criteria for Phase 2 is improving universal access, the alternatives considered a range of access from no change to full compliance with the Americans with Disabilities Act (ADA).



Narrow section of dirt path in Fuller Brook Park, Segment 4. This is an example of a path that does not meet universal access standards due to width and surface material.

Final Recommendations

Existing Conditions Section West of Wellesley Avenue



Proposed Conditions



Conceptual sketch showing the character of proposed changes to Fuller Brook Park, reflecting the desire for naturalistic character, enhanced floodplain function, and open views to historic bridges. In this instance, the path has been re-routed to create the opportunity for a wet-meadow in a location that is subject to seasonal flooding.

The final recommendations for Fuller Brook Park are reflected in the Preliminary Design Plans that form the complete submittal for Phase 2. These recommendations address 10% design for the treatment of existing vegetation, stream course and bank, and path alignment. The final recommendations were presented at two public meetings in December 15-16, and revised to reflect community feedback. Several key considerations emerged as a result of the second and third set of public meetings:

Features desired by most respondents:

- Preservation and enhancement of the naturalistic character for the Park overall;
- Restoration of the stream, which includes removal of the deteriorated concrete curbing in Segment 1, dredging where needed, and a naturalistic treatment for bank stabilization;
- Natural, soft surface path with a narrower width than had been recommended in the Master Plan;

- Stabilized path shoulders using structural soil;
- Retention of the existing path alignment overall;
- Open views to historic bridges and other features;
- Preservation of the Park's tree collection, enhancement of plant diversity and vegetation character including meadows;
- Preservation and restoration of the Park's historic bridges.

Features considered that were not desired by most respondents:

- Consistent 8' wide bituminous path;
- Major changes to path alignment, such as moving the path to the opposite side of the brook in Segment 2;
- "Engineered" solutions for bank stabilization;
- Split-rail fence.

A few topics mentioned during the public process deserve additional follow-up by the Town:

- Address safety concerns at all road crossings;
- Monitor flooding; assess drainage infrastructure that did not meet the size threshold for the Stormwater Master Plan Update;
- Develop links and connections to other Town paths, trails, and destinations.

The location and extent of all recommendations is included in the Preliminary Design Plans.



Example of a character-defining specimen tree in Fuller Brook Park.

Vegetation Recommendations

1. Trees

The existing tree collection is essential to the character of Fuller Brook Park. The goals for tree work are to preserve and perpetuate a healthy tree collection and manage the potential risks to visitors, abutters, and important park features, such as bridges. Current issues include a number of high risk trees, trees that pose threats to existing resources, and trees requiring stabilization work. Priorities for tree work address both tree

pruning and stabilization needs as well as removals. Based on public review, feedback from the FBPCC, and cost, implementation of priority 1 & 2 tree work is recommended, including pruning, bracing, and removal:

- **Priority 1 (must do):** High risk trees (significant defect, close to a high value target and high level occupancy). This includes trees that are damaging important infrastructure or very close to the existing path, abutter, street, or other actively used feature.
- **Priority 2 (should do):** Medium risk trees (significant defect, close to a high value target but with a moderate level of occupancy; stabilization work needed on significant specimens; and an ongoing planting program to perpetuate and improve the canopy.

Option deferred:

- **Priority 3 (could do):** Stabilization work on low risk trees in perimeter areas.

2. Invasive Vegetation

This includes plants such as Norway maple (*Acer platanoides*), bittersweet (*Celastrus orbiculatus*), Japanese knotweed (*Polygonum cuspidatum*) and ten other invasive plant species identified in Fuller Brook Park. Options for the treatment of invasive vegetation are based on the presumption of management rather than total eradication. The current widespread condition of invasive vegetation throughout Fuller Brook Park exacerbates a number of other problems in the Park. For example, unmanaged invasive growth along the stream bank creates dense shade and root competition, eliminating the herbaceous layer and resulting in bare soil conditions that are prone to run-off and erosion. Bittersweet and other vines are growing into mature trees and girdling trunks and branches. The invasive growth also obstructs desirable views in many areas and limits plant diversity that reduces viable wildlife habitat.

For these reasons, the goal of invasive species management is to protect and preserve the integrity of the cultural landscape and historic resources; protect, preserve, and enhance natural resources including aquatic habitat and wetlands; and ultimately provide improvements that are both sustainable and maintainable. Based on the evaluation of alternatives, the final recommendations include all priority 1 and 2 invasive species work, assuming that the management of views will be addressed through a combination work that includes bank stabilization, invasive species management, and planting:

- **Priority 1 (must do):** Treat/manage invasive vegetation that is compromising the stream bank and rapidly

colonizing large areas to the exclusion of native understory grown along the water course;

- **Priority 2 (should do):** Treat/manage invasive vegetation that is outcompeting naturalized areas along the Park's perimeter to the exclusion of native understory growth and areas encroaching into lawn.

Invasive species options to be considered in the next phase, as more detailed plans are developed for the stream and planting include:

- **Priority 3 (could do):** Treat/manage invasive vegetation that is encroaching on or eliminating important views.

The vegetation recommendations also include areas for additional planting. This includes:

- Buffer planting (trees, shrubs, herbaceous plants) in areas where the removal of invasive species may open up the park to views of adjacent properties or where new planting is desired to help define the Park edge;
- Infill planting, similar to above, where new native vegetation can be added amongst existing plants, after invasives are removed;
- New shrub planting in areas where bank stabilization work, such as at bridge abutments, would be strengthened by carefully placed woody vegetation.

- Areas recommended for wet meadows to aid in the park's floodplain function.

A recommended plant list, which builds on the NRC's existing plant lists and is adapted to Fuller Brook Park, is included in the Phase 2 Preliminary Design Report.



Invasive Norway Maple seedlings in Segment 4.

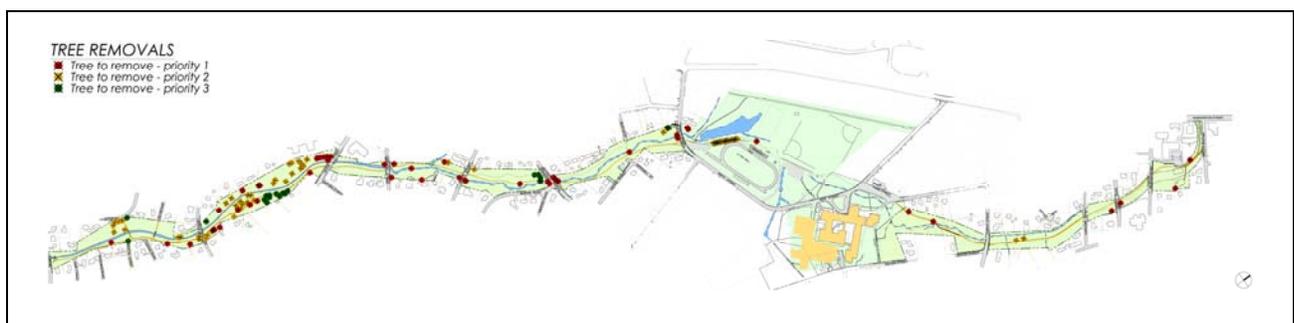




Photo simulation showing vegetation management in Segment 4. After removal of Norway Maple saplings, install native shrubs and trees to retain a lush, green corridor.

Stream Bed & Bank Recommendations

Stream bed

The stream bed in both Fuller and Caroline Brooks is compromised by the addition of material contributed both intentionally and unintentionally by humans. This includes the concrete curbing in Segment 1, which was added in the 1950s, as well as a significant accumulation of sediment in Segment 4. The existing curbing is deteriorated, no longer serves its intended purpose, detracts from the natural character of the Park, and is impeding water flow. Similarly, the sediment accumulation in Caroline Brook and near outfalls in Fuller Brook

also impedes channel conveyance and detracts from the development of natural stream habitat. AECOM recommends the following approaches to address these problems:

- Remove all curbing throughout Fuller Brook;
- Stabilize banks and create a more naturalistic channel;
- Dredge significant sediment accumulations;
- Identify potential upstream/upbasin sediment sources.

Stream bank

The stream banks along both Fuller Brook and Caroline Brook are commonly undercut or eroding, often under large trees or areas where there is a lack of stabilizing vegetation. The concrete curbing also contributes to the instability of the bank in Segment 1 because the channel flow is forced against the bank by the curb. After evaluating the range of solutions to stabilize the stream bank, the final recommendations include a combination of natural boulders (30%) and fiber coir (70%) at the toe of the bank with live stakes used on the re-graded slope to prevent erosion. This technique can be used throughout the Park, and could be combined, where appropriate, with a diverse designed planting in areas where a specific visual or aesthetic effect is desired.

Note that there are a few additional areas needing further study prior to completion of Phase 3 construction documents and permits for stream improvements:

- Hydraulic analysis and inundation evaluation;
- Soil/sediment survey;
- Investigation of sediment source (Segment 4).

Upland flooding

Methods to mitigate seasonal flooding in areas where the active floodplain extends into the portions of the Park where the path is located, include the addition of wet meadows (detention areas) in Segment 2 illustrated above. Additional detail related to upland drainage will developed in Phase 3.

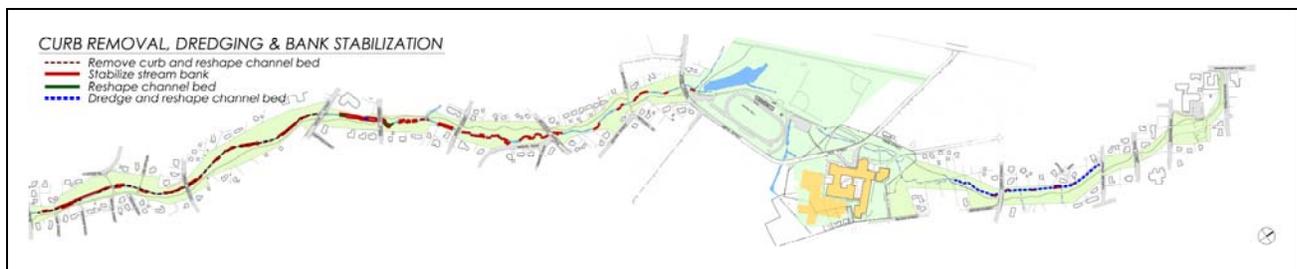


Photo simulation showing stream restoration and bank stabilization using boulder toe, natural coir logs, and live stakes in Segment 1.

Structures

Most of the historic structures evaluated in this phase are in overall good condition, with minor issues associated with masonry, facings, erosion at abutments, and existing or potential encroachment from tree roots. Repairs to five historic bridges are recommended.

Park Boundary

A flush granite marker is recommended to mark the boundary of Fuller Brook Park. Buffer planting is also indicated in some areas and will be more fully designed in Phase 3.

Path Recommendations

Recommendations for the treatment of the path received the most scrutiny during the public process, and continued to be refined after the December public meeting. Regarding width, the final recommendation for much of the Park is a 6' wide path, reduced from the 8' width recommended in the Master Plan. To maintain use and help preserve the adjacent turf, 3' wide grass shoulders utilizing structural soil are recommended. This provides a more stable substrate for pedestrians who must step off the path to allow others to pass by, but still "reads" as continuous grass turf. Slight adjustments to path alignment and slope are recommended in several locations to meet the target 5% grade for universal access. Additional, minor adjustments to path alignment respond to slope erosion; in segment 2, the path has been moved away from the brook southwest of Wellesley Avenue to enhance the floodplain with a new wet meadow.

The recommended path surface is a permeable stabilized soft surface. This path surface is achieved with a product called 'Stabilizer', a non-toxic soil additive derived from natural materials. It binds crushed stone to provide a durable, natural aggregate surface. The advantages of this material are:

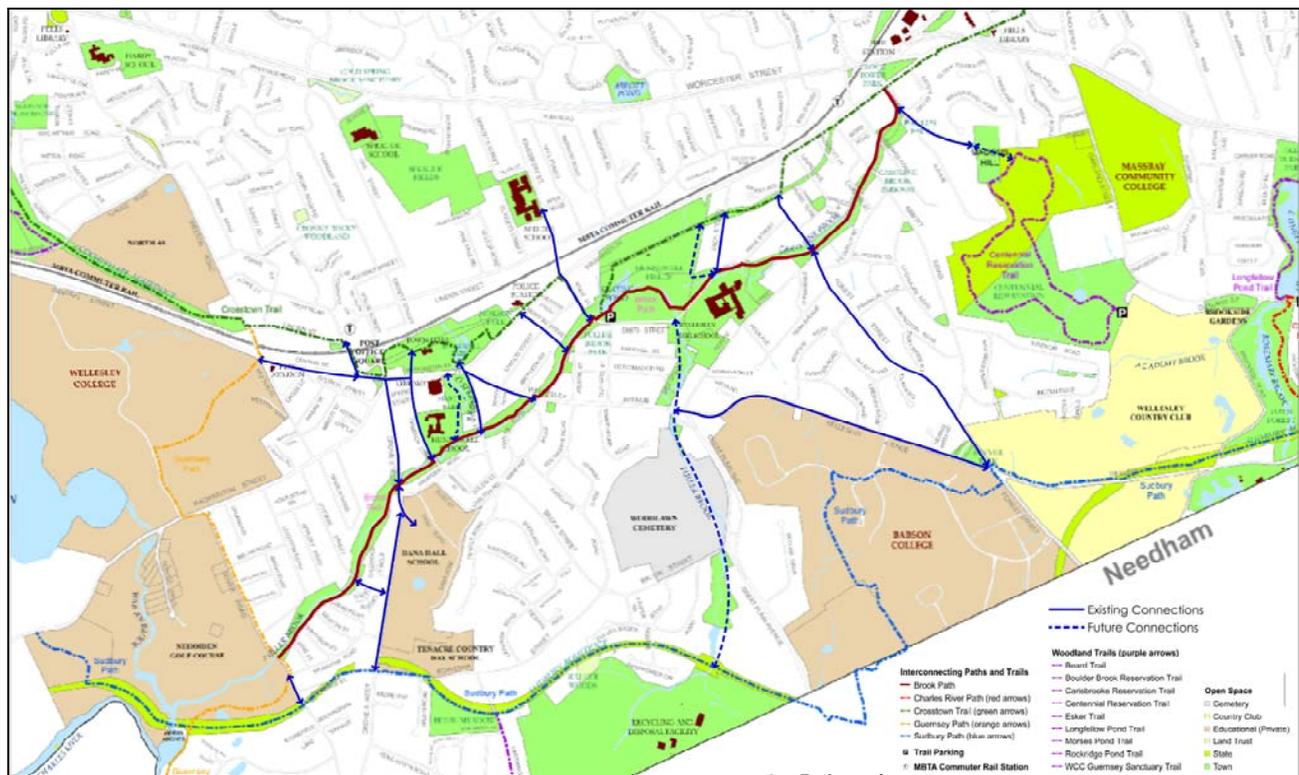
- It provides a semi-hard surface path that complements the naturalistic character of Fuller Brook Park.

- It achieves and withstands higher use, accommodating pedestrians, bicycles, strollers, etc.
- The path will be permeable, enhancing the stormwater management function of the path surface.
- It is universally accessible.
- Stabilizer can be mixed with local materials, creating a path that is in character with the rest of the Park landscape and the broader network of open space in Wellesley.

Since Stabilizer is not ideal in areas that are subject to extensive flooding or continuous inundation (e.g. more than a week), further analysis may determine that bituminous concrete may be the preferred surface treatment in a few, limited locations. At road crossings where the permeable path meets the sidewalk, short sections of bituminous concrete will ease the transition between the path and sidewalk. A new 6' wide boardwalk is proposed in Segment 4.

Strengthen Path Connections to and from Fuller Brook Park

Phase 2 examined options to strengthen path connections to and from Fuller Brook. The diagram below shows some of these existing or potential connections. These improvements are not included in the cost estimate.



Summary Recommendations & Costs by Segment

Segment 1: Dover Road to Grove Street

Vegetation

- Implement all priority 1 & 2 tree work (32 removals; plus stabilization, pruning & bracing);
- Implement all priority 1 & 2 invasive species work (1.75 acres);
- Install new shade trees to retain woodland character;
- Install buffer planting (trees, shrubs, herbaceous plants);
- Install shrub planting at bridge abutments to aid in slope stabilization;
- Stabilize turf where needed.

- Stabilize bank (30% boulder toe, 70% natural fiber toe, re-vegetate with live stakes).

Path

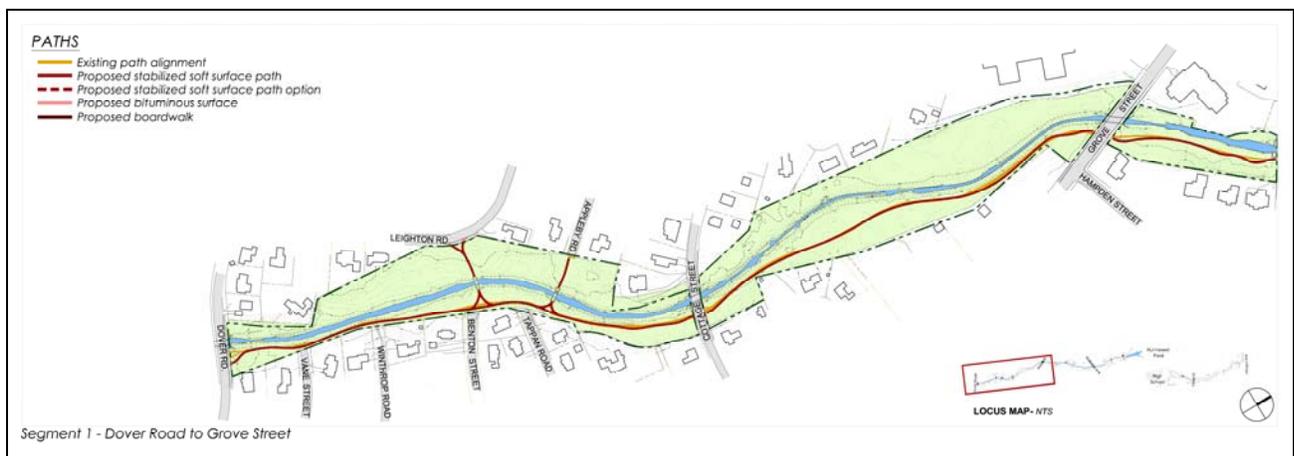
- 6' wide stabilized soft surface path;
- Bituminous apron at road crossings;
- 3' wide grass shoulders with structural soil;
- Grade adjustments at Dover Road, Grove Street to meet target 5% grade.

Stream

- Remove deteriorated curbing (6500 linear feet);
- Restore stream bed after curb removal (3,300 linear feet);
- Excavate and grade bank after curb removal (6,500 linear feet);

Summary Costs for Segment 1

Vegetation	\$ 422,158
Stream	\$ 1,370,750
Path	\$ 151,100
Total	\$ 1,944,008



Segment 2: Grove Street to State Street

Vegetation

- Implement priority 1 & 2 tree work (32 removals; plus stabilization, pruning & bracing);
- Implement priority 1 & 2 invasive species work (1.2 acres);
- Install new native shade and framework trees;
- Install buffer planting (trees, shrubs, herbaceous plants);
- Install shrub planting at bridge abutments to aid in slope stabilization;
- Install new wet meadows southwest and northeast of Wellesley Avenue to enhance floodplain function;
- Stabilize turf where needed.

Stream

- Excavate, grade, and stabilize bank (excavation & dredging 2300 linear feet, 30% boulder toe, 70% natural fiber toe, re-vegetate with live stakes).

Structures

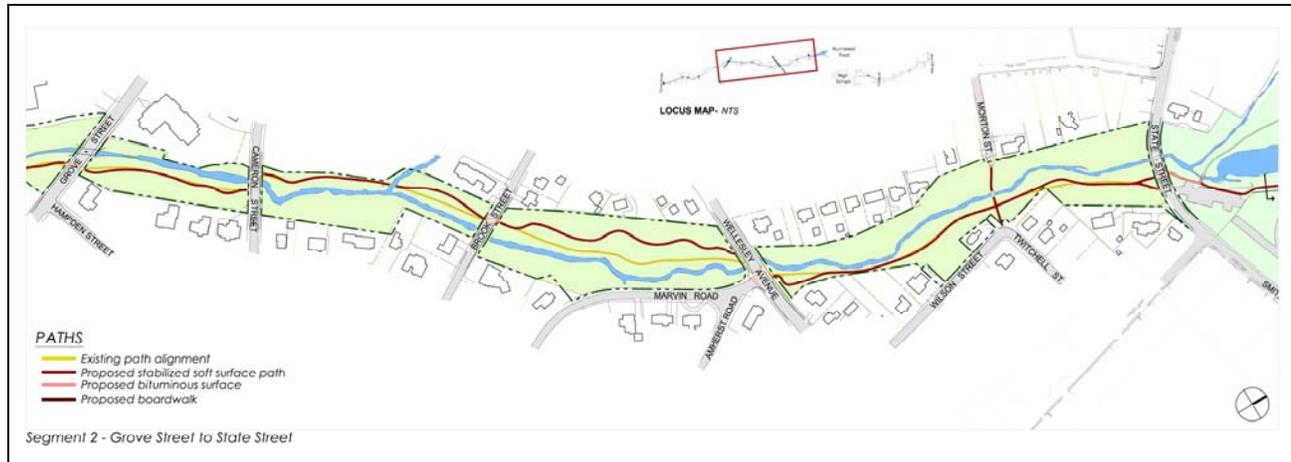
- Preserve and repair historic Cameron Street Bridge, Brook Street Bridge, Wellesley Avenue Bridge, State Street Bridge.

Segment 2 continued

Path

- 6' wide stabilized soft surface path;
- Bituminous apron at road crossings;
- 3' wide grass shoulders with structural soil;
- Re-align path southwest of Wellesley Avenue to create wet meadow in area prone to seasonal flooding;
- Grade adjustments at Grove Street and Wellesley Avenue to meet target 5% grade.

Summary Costs for Segment 2	
Vegetation	\$ 374,023
Stream	\$ 380,650
Path	\$ 181,100
Structures	\$ 65,700
Total	\$ 1,001,473



Segment 3: Hunnewell Field Area

Vegetation

- Implement priority 1 & 2 tree work (8 removals; plus stabilization, pruning & bracing);
- Implement priority 1 & 2 invasive species work (0.7 acres);
- Remove existing fir hedge along football field and replace with informal planting of small trees, shrubs, and herbaceous plants;
- Install new native shade and framework trees;
- Install new buffer planting (trees, shrubs, herbaceous plants) along new path west of Rice Street.

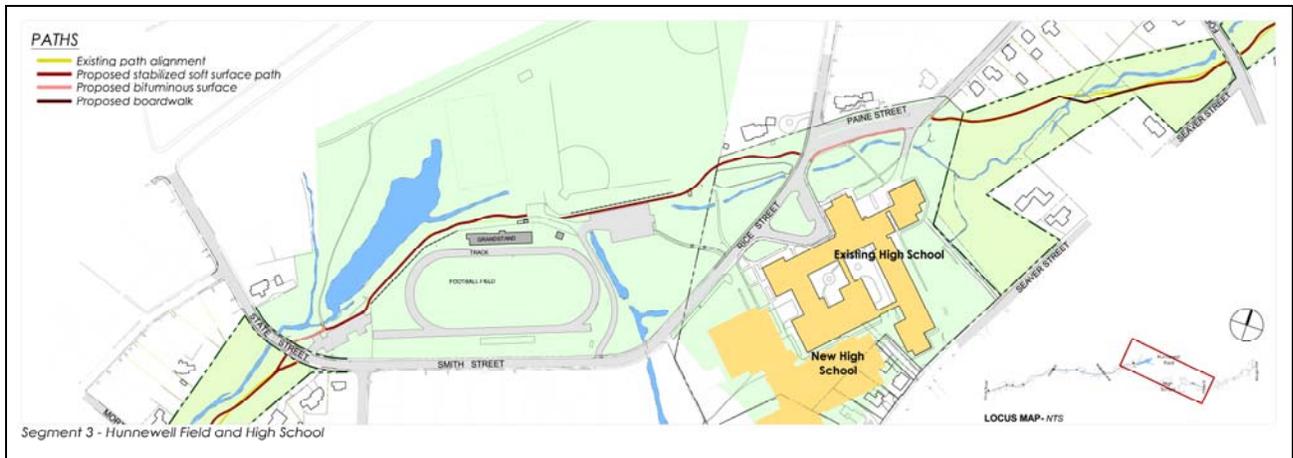
Stream

- Excavate, grade, and stabilize bank (excavation & dredging 600 linear feet, 30% boulder toe, 70% natural fiber toe, re-vegetate with live stakes).

New Path

- 6' wide stabilized soft surface path;
- 3' wide grass shoulders with structural soil where space allows;
- Remove small section of pavement from State Street lot to make space for new path; re-stripe as parallel parking;
- Remove fence along football field and replace with new 10' fence and privacy screen inside location of existing fir hedge;
- Reconfigure gravel service drive between fields and relocate storage sheds, batting cage, etc.;
- Install new 6' fence along baseball field;
- Install bituminous concrete apron at Rice Street;
- Use existing sidewalk and cross-walks at Paine Street.

Summary Costs for Segment 3	
Vegetation	\$ 152,104
Stream	\$ 99,300
Path	\$ 257,300
Fencing	\$ 29,950
Total	\$ 538,654



Segment 4: Paine Street to Maugus Avenue

Vegetation

- Implement priority 1 & 2 tree work (16 removals; plus stabilization, pruning & bracing);
- Implement priority 1 & 2 invasive species work (2.5 acres)
- Install new native shade and framework trees;
- Install fill planting along Park boundary;
- Stabilize turf where needed.

Stream

- Dredge and remove sediment in stream bed (2,000 cubic yards)
- Restore stream bed (1,800 linear feet)
- Stabilize bank (excavation & dredging 500 linear feet, 30% boulder toe, 70% natural fiber toe, re-vegetate with live stakes).

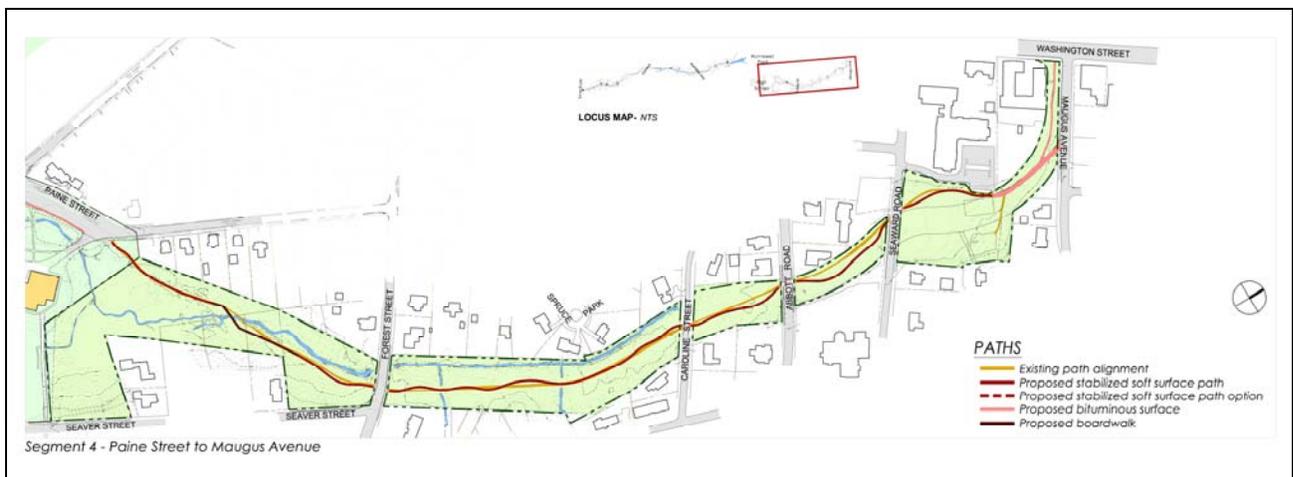
Structures

- Preserve and repair historic Forest Street Bridge.

Path

- 6' wide stabilized soft surface path;
- Bituminous apron at road crossings;
- 3' wide grass shoulders with structural soil;
- New 6' wide, 310' long boardwalk across Caroline Brook between Paine Street and Forest Street;
- Re-align path between Abbott Road and Seaward Road away from Park boundary;
- Grade adjustments at boardwalk, Forest Street, Abbott Road to meet target 5% grade.

Summary Costs for Segment 4	
Vegetation	\$ 315,750
Stream	\$ 272,750
Path	\$ 378,465
Structures	\$ 15,461
Total	\$ 982,426



Phase 3: Design & Permitting

The next phase for the Fuller Brook Preservation Project is the completion of final design and construction documents and all associated permits required to implement the recommendations. Because much of the work is within a designated wetland or resource area, and the entire Park is eligible for listing on the National Register of Historic Places, the permitting and review process is substantial. This includes the following federal, state and local permits/review:

Wellesley

- Wellesley Wetland Notice of Intent filing
- Wellesley Design Review Board (DRB)
- Wellesley Zoning Board of Appeals (ZBA)

State

- Environmental Notification Form (MEPA)
- 401 Water Quality Permit (Massachusetts DEP)
- Chapter 91 Application (Massachusetts DEP)
- Massachusetts Historical Commission, Project Notification Form

Federal

- Army Corps of Engineers Permit

Based on the overall scope of the projected work for Fuller Brook Park, a full Environmental Impact Report is not anticipated. However, this will be decided by MEPA as part of the Environmental Notification Form filing.

The Phase 2 project team also identified several additional studies that are needed to inform the technical solutions in Phase 3, particularly with respect to stream bank stabilization and dredging. These include:

- Hydraulic Analysis
- Soil/Sediment Survey
- Sedimentation Investigation for Segment 4

Early Action Recommendations

A demonstration section should be installed in spring 2011, showing the 6' wide stabilized soft surface path. This will allow park users to gain a better sense of the recommended path and will also act as a materials trial for the surface treatment.

Some of the urgent vegetation work (e.g. tree removals and stabilization) could be completed by the Town as an in-house (DPW) or contracted project, provided sufficient approvals

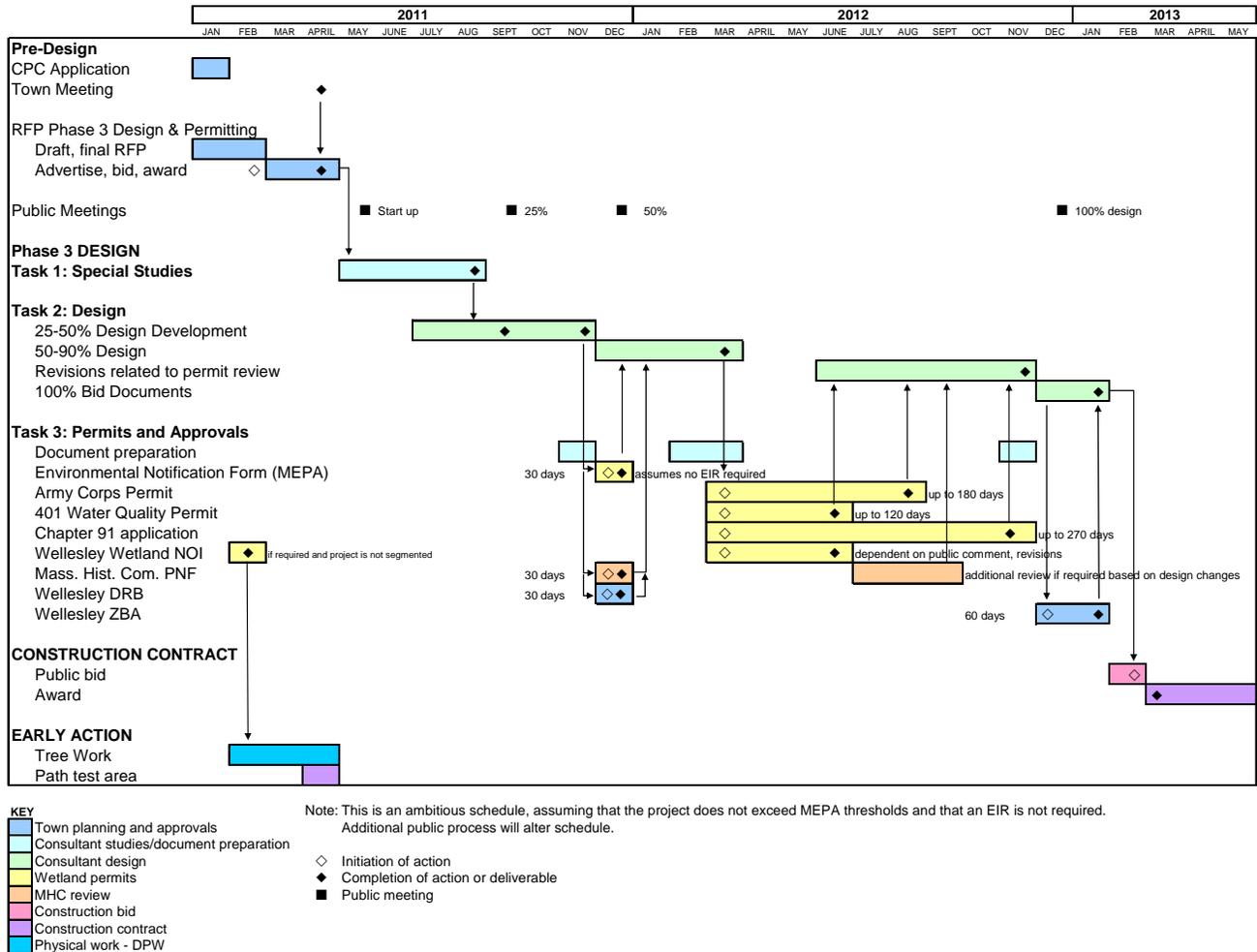
from NRC and Wellesley Wetlands Protection Committee are secured.

The projected costs for Phase 3 are listed below.

PHASE 3 Design and Permitting, Projected Costs		
MEPA ENF	12,000	Excludes EIR
DEP Chap. 91	13,000	
Army Corps of Eng.	10,500	
401 Water Quality	9,000	
MHC PNF	15,000	
Wellesley WPC NOI	15,000	
Wellesley DRB	2,000	
Wellesley ZBA	5,000	
TOTAL	\$ 81,500	All costs exclude design changes necessitated by review process
Additional Studies		
Hydraulic Analysis	50,000	
Soil/Sed. Survey	50,000	Includes entire brook (segments 1, 2, 4)
Sediment Invest.	10,000	
TOTAL	\$ 110,000	
DESIGN FEE		
Alt. A	443,535	Based on 8% of projected construction cost
Alt. B	471,684	(\$150,000 engineering, \$50,000 tree/invasive species plans & specs, 8% landscape architecture, 9 meetings)
Subtotal	635,035	
10% contingency	63,504	
Project Manager	70,000	
TOTAL	768,539	Alternative A

The chart on page 19 suggests a possible work flow for the project in Phase 3, assuming that the initial MEPA review does not necessitate a full EIR.

Fuller Brook Park Preservation Project
Phase 3: Final Design and Permitting Flow Chart



Phase 4 Estimated Construction Costs

The following tables present itemized unit costs developed for the entire Fuller Brook Park based on the recommendations developed during Phase 2. This includes several changes from the costs and recommendations reflected in the Master Plan. Areas that represent a likely reduction from the Master Plan include:

- Reduction in the width of the path from 8' to 6', and a change in surface material from bituminous concrete to stabilized soft surface (permeable surface);
- Reduction in the length of the boardwalk in Segment 4 from approximately 500' in length to 310'.

Areas that were developed in greater detail in Phase 2, and which therefore represent an increase in the total project cost from that included in the Master Plan:

- Detailed engineering evaluation and recommendations for the treatment of the stream course and bank including dredging and removal of the existing deteriorated concrete curbing.
- Complete recommendations for a new path with associated site improvements through the Hunnewell Field area (Segment 3).
- High level of evaluation and work recommendations for the treatment of deteriorated/invasive vegetation.

Cost reductions undertaken include:

- Elimination of all priority 3 vegetation work: tree pruning & removals, invasive species management (\$51,080);
- Elimination of custom planting 30% of the stabilized stream bank (\$118,350);
- Elimination of re-surfacing driveway at Phillips Park (\$62,500).

SEGMENT 1: Dover Road to Grove Street				
ITEM	UNIT COST	UNIT	AREA	ITEM COST
Path				
Demolition and removal of existing path	\$0.50	sf	19,300	\$ 9,650
Demolition, removal, disposal of existing bituminous	\$2.00	sf	2,100	\$ 4,200
Grading (fill) and site preparation	\$25.00	cu.yd.	100	\$ 2,500
Installation of stabilized soft surface	\$6.00	sf	19,000	\$ 114,000
Stabilized grass shoulder	\$1.00	sf	19,000	\$ 19,000
Bituminous apron at intersections	\$5.00	sf	350	\$ 1,750
TOTAL PATH				\$ 151,100
Vegetation				
Tree removal - priority 1	\$100.00	hr	86	\$ 8,600
Tree removal - priority 2	\$100.00	hr	78	\$ 7,800
Tree removal - priority 3	\$100.00	hr	281	\$ 28,100
Tree stabilization - priority 1	\$100.00	hr	104	\$ 10,400
Tree stabilization - priority 2	\$100.00	hr	118	\$ 11,800
Tree stabilization - priority 3	\$100.00	hr	37	\$ 3,700
Invasive species removal - priority 1	\$1.00	sf	42,900	\$ 42,900
Invasive species removal - priority 2	\$1.00	sf	33,400	\$ 33,400
Invasive species removal - priority 3	\$1.00	sf	1,700	\$ 1,700
Herbicide application	\$0.50	sf	3,815	\$ 1,908
Upland planting - shrubs and ground cover	\$7.50	sf	6,500	\$ 48,750
Buffer planting - small trees, shrubs, ground cover	\$10.00	sf	19,000	\$ 190,000
Specimen/shade tree replacement - large trees	\$1,500.00	ea.	25	\$ 37,500
Tree replacement - whips	\$15.00	ea.	40	\$ 600
New grass area (4" loam + seed)	\$0.75	sf	38,000	\$ 28,500
TOTAL VEGETATION (priority 1 and 2 only)				\$ 422,158
Stream				
Removal of concrete curbing	\$10.00	lf	6,500	\$ 65,000
Stream bed restoration after curb removal	\$50.00	lf	3,300	\$ 165,000
Bank excavation and grading after curb removal	\$40.00	lf	6,500	\$ 260,000
Bank stabilization - boulder toe + live stakes (30%)	\$265.00	lf	1,950	\$ 516,750
Bank stabilization - natural fiber toe + live stakes (70%)	\$80.00	lf	4,550	\$ 364,000
Custom planting on 30% of stabilized streambank	\$7.50	sf	11,700	\$ 87,750
TOTAL STREAM (curb removal)				\$ 1,370,750
TOTAL SEGMENT 1				\$ 1,944,008

SEGMENT 2: Grove Street to State Street				
ITEM	UNIT COST	UNIT	AREA	ITEM COST
Path				
Demolition, removal, disposal of existing bituminous	\$2.00	sf	16,100	\$ 32,200
Grading (fill) and site preparation	\$25.00	cu.yd.	200	\$ 5,000
Installation of stabilized soft surface	\$6.00	sf	20,200	\$ 121,200
Stabilized grass shoulder	\$1.00	sf	20,200	\$ 20,200
Bituminous aprons at intersection	\$5.00	sf	500	\$ 2,500
TOTAL PATH				\$ 181,100
Vegetation				
Tree removal - priority 1	\$100.00	hr	137	\$ 13,700
Tree removal - priority 2	\$100.00	hr	54	\$ 5,400
Tree removal - priority 3	\$100.00	hr	32	\$ 3,200
Tree stabilization - priority 1	\$100.00	hr	186	\$ 18,600
Tree stabilization - priority 2	\$100.00	hr	338	\$ 33,800
Tree stabilization - priority 3	\$100.00	hr	51	\$ 5,100
Invasive species removal - priority 1	\$1.00	sf	76,500	\$ 76,500
Invasive species removal - priority 2	\$1.00	sf	58,400	\$ 58,400
Invasive species removal - priority 3	\$1.00	sf	0	\$ -
Herbicide application	\$0.50	sf	6,745	\$ 3,373
Wet meadow establishment - seeding	\$0.50	sf	20,000	\$ 10,000
Wet meadow establishment - plugs	\$2.00	sf	9,600	\$ 19,200
Buffer planting - small trees, shrubs, ground cover	\$10.00	sf	6,500	\$ 65,000
Shrubs and ground cover massing	\$7.50	sf	1,400	\$ 10,500
Specimen/shade tree replacement	\$1,500.00	ea.	20	\$ 30,000
New trees - whips	\$15.00	ea.	20	\$ 300
New grass area (4" loam + seed)	\$0.75	sf	39,000	\$ 29,250
TOTAL VEGETATION				\$ 374,023
Stream				
Bank excavation/dredging	\$30.00	lf	2300	\$ 69,000
Bank stabilization - boulder toe + live stakes (30%)	\$265.00	lf	690	\$ 182,850
Bank stabilization - natural fiber toe + live stakes (70%)	\$80.00	lf	1610	\$ 128,800
Custom planting on 30% of stabilized streambank	\$7.50	sf	2,760	\$ 20,700
TOTAL STREAM				\$ 380,650
Structures				
Cameron Street Bridge				\$ 13,400
Brook Street Bridge				\$ 28,100
Wellesley Avenue Bridge				\$ 12,200
State Street Bridge				\$ 12,000
TOTAL STRUCTURES				\$ 65,700
TOTAL SEGMENT 2				\$ 1,001,473

SEGMENT 3: State Street to Paine Street (Hunnewell Field Area)				
ITEM	UNIT COST	UNIT	AREA	ITEM COST
Path, drives and parking areas				
Demolition and removal of existing path, gravel service drive	\$0.50	sf	6,700	\$ 3,350
Demolition, removal, disposal of State Street bituminous	\$2.00	sf	1,200	\$ 2,400
Grading (fill) and site preparation	\$25.00	cu.yd.	300	\$ 7,500
Installation of stabilized soft surface	\$6.00	sf	36,500	\$ 219,000
Bituminous aprons at street	\$5.00	sf	50	\$ 250
Installation of new gravel service drive	\$4.00	sf	3,700	\$ 14,800
Stabilized grass shoulder	\$1.00	sf	10,000	\$ 10,000
TOTAL PATH				\$ 257,300
Vegetation				
Tree removal - priority 1	\$100.00	hr	24	\$ 2,400
Tree removal - priority 2	\$100.00	hr	30	\$ 3,000
Tree removal - priority 3	\$100.00	hr	0	\$ -
Tree stabilization - priority 1	\$100.00	hr	124	\$ 12,400
Tree stabilization - priority 2	\$100.00	hr	48	\$ 4,800
Tree stabilization - priority 3	\$100.00	hr	18	\$ 1,800
Invasive species removal - priority 1	\$1.00	sf	21,433	\$ 21,433
Invasive species removal - priority 2	\$1.00	sf	9,688	\$ 9,688
Invasive species removal - priority 3	\$1.00	sf	0	\$ -
Herbicide application	\$0.50		1,556	\$ 778
Buffer planting - trees, shrubs, ground cover	\$10.00	sf	7,563	\$ 75,630
Specimen tree replacement	\$1,500.00	ea.	8	\$ 12,000
New trees - whips	\$15.00	ea.	15	\$ 225
Removal of existing hedge, stump grinding	\$150.00	ea.	25	\$ 3,750
New grass area (4" soil + grass)	\$0.75	sf	8,000	\$ 6,000
TOTAL VEGETATION				\$ 152,104
Stream				
Bank excavation/dredging	\$30.00	lf	600	\$ 18,000
Bank stabilization - boulder toe + live stakes (30%)	\$265.00	lf	180	\$ 47,700
Bank stabilization - natural fiber toe + live stakes (70%)	\$80.00	lf	420	\$ 33,600
Custom planting on 30% of stabilized streambank	\$7.50	sf	720	\$ 5,400
TOTAL STREAM				\$ 99,300
Other				
Removal and disposal of existing chain link fence	\$4.00	lf	400	\$ 1,600
New 10' chain link fence	\$75.00	lf	350	\$ 26,250
Privacy screen on 10' chain link	\$6.00	lf	350	\$ 2,100
New 6' chain link fence at baseball field	\$45.00	lf	320	\$ 14,400
TOTAL OTHER				\$ 29,950
TOTAL SEGMENT 3				\$ 538,654

SEGMENT 4: Paine Street to Maugus Avenue				
ITEM	UNIT COST	UNIT	AREA	ITEM COST
Path				
Demolition and removal of existing path	\$0.50	sf	18,200	\$ 9,100
Demolition and removal of existing boardwalk	\$2.00	sf	300	\$ 600
Grading (fill) and site preparation	\$25.00	cu.yd.	200	\$ 5,000
Installation of stabilized soft surface	\$6.00	sf	14,600	\$ 87,600
Stabilized grass shoulder	\$1.00	sf	14,700	\$ 14,700
Bituminous path + driveway	\$5.00	sf	5,543	\$ 27,715
New 6' wide boardwalk	\$125.00	sf	1,870	\$ 233,750
TOTAL PATH				\$ 378,465
Vegetation				
Tree removal - priority 1	\$100.00	hr	95	\$ 9,500
Tree removal - priority 2	\$100.00	hr	38	\$ 3,800
Tree removal - priority 3	\$100.00	hr	0	\$ -
Tree stabilization - priority 1	\$100.00	hr	218	\$ 21,800
Tree stabilization - priority 2	\$100.00	hr	163	\$ 16,300
Tree stabilization - priority 3	\$100.00	hr	34	\$ 3,400
Invasive species removal - priority 1	\$1.00	sf	57,200	\$ 57,200
Invasive species removal - priority 2	\$1.00	sf	52,000	\$ 52,000
Invasive species removal - priority 3	\$1.00	sf	5,780	\$ 5,780
Herbicide treatment	\$0.50	sf	5,460	\$ 2,730
Infill planting along Park boundary	\$2.50	sf	53,000	\$ 132,500
Specimen tree replacement	\$1,500.00	ea.	10	\$ 15,000
New trees - whips	\$15.00	ea.	10	\$ 150
New grass area (4" loam + seed)	\$0.75	sf	10,000	\$ 7,500
TOTAL VEGETATION				\$ 315,750
Stream				
Dredging and removal of sediment in stream bed	\$50.00	cy	2,000	\$ 100,000
Bed restoration due to dredging alteration	\$50.00	lf	1,800	\$ 90,000
Bank stabilization - excavation and dredging	\$30.00	lf	500	\$ 15,000
Bank stabilization - boulder toe + live stakes (30%)	\$265.00	lf	150	\$ 39,750
Bank stabilization - fiber toe + live stakes (70%)	\$80.00	lf	350	\$ 28,000
Custom planting on 30% of stabilized streambank	\$7.50	sf	600	\$ 4,500
TOTAL STREAM				\$ 272,750
Structures				
Forest Street Bridge				\$ 15,461
TOTAL STRUCTURES				\$ 15,461
TOTAL SEGMENT 4				\$ 982,426

TOTAL PHASE 4 COSTS				
Subtotal Segment Costs				\$ 4,466,560
Park-wide Improvements				
	Park-wide pruning along path			\$ 31,600
	Boundary markers			\$ 61,000
	Wayfinding, signage			\$ 24,000
	Benches, amenities			\$ 37,000
		Subtotal		\$ 4,620,160
	Total with 20% Contingency			\$ 5,544,192
Additional Town Costs Identified in Master Plan				
	Clerk of the Works	\$ 15,000	yr 2	\$ 30,000
	Project Manager	\$ 50,000	yr 2	\$ 100,000
				\$ 130,000
	Items not included in construction total			

Phase 4 Construction Implementation & Phasing

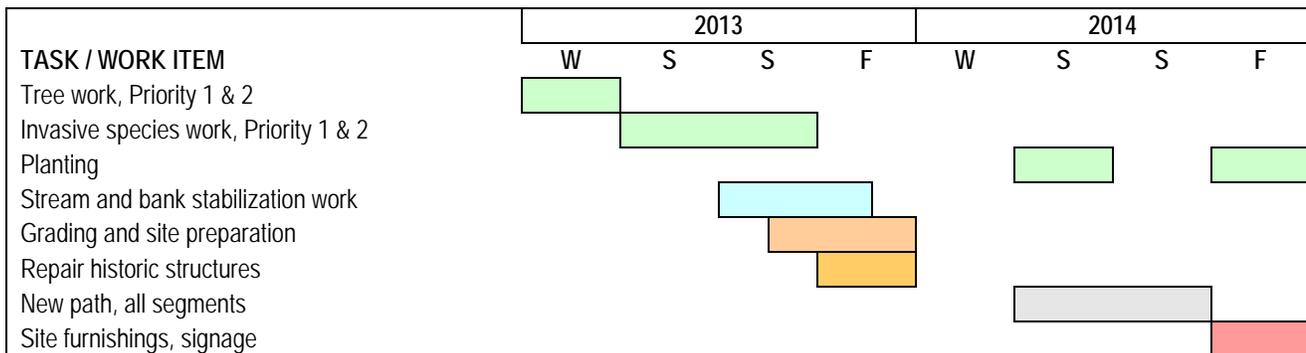
The improvements proposed for Fuller Brook Park lend themselves to distinct phases, based either on the type of work/contract or the geographic area in which the work is to be performed. It is also important to note that some work is more seasonally dependent than others, and some should be done first to ensure that sequential improvements do not inadvertently damage the restored landscape.

The estimated total construction duration for the project, assuming an early spring start date, is a year and half, once all design, permits, and approvals are in place. The most efficient method for implementation is to combine like projects together, such as all stream work and bank stabilization. In the event that funding for the entire Phase 4 project is not available, the division of work can be allocated into a series of distinct projects. If that does occur the following is recommended:

- 1.) Undertake high risk tree work as soon as possible. Priority 1 tree work – pruning and removals – represent immediate threats to Park users or abutters.

- 2.) Complete work in the stream (dredging, bank stabilization) prior to undertaking other parts of the project. If possible, do all dredging and bank stabilization as one contract.
- 3.) Coordinate vegetation removals with final planting recommendations to minimize disruption to the vegetated character of the Park. Advance work may be required to ensure that the exact native species are available.
- 4.) Complete path improvements (e.g. installation of stabilized soft surface) in the same construction contract.

The flow chart below presents a potential order of work for a 2-year construction project, immediately following Phase 3 Design and Permitting.



Maintenance

Fuller Brook Park, like all public landscapes, requires maintenance to retain and preserve the qualities that make it such a vital community, recreational, natural, and historic resource. Landscape maintenance should always support the optimal use, accessibility, character, and visitor experience of the Park. In this case, it should also support the critical role that the site plays as a natural resource area, for the growth and development of natural plant communities and the wildlife that depends on them. Fuller Brook is also a significant historic resource, so the features, materials and landscape spaces that contribute to its significance should be retained through sound preservation maintenance. Whereas many developed landscapes serve only as aesthetic or functional spaces for human use and enjoyment, this space represents a unique opportunity to preserve a representation of a native regional landscape. The need for many of the capital improvements currently recommended for Fuller Brook Park are the result of deferred maintenance, such as the spread of invasive species.

The implementation of the Fuller Brook Park Preservation Project will restore the Park and re-balance the forces of deterioration. As the work is completed, an integrated strategy for care should be developed. This could include a guarantee and maintenance period for new planting that is part of the construction contract, as well as the development of a management and maintenance plan by both the Wellesley Natural Resources Commission (NRC) and the Department of Public Works (DPW). It should include a detailed annual work plan that is agreed to before spring work begins, including any approvals needed for work within the wetland or wetland resource area, so that work can proceed efficiently.

The restored stream and stream bank should be self-sustaining, but annual monitoring should be undertaken to look for undermined banks, invasive vegetation, and sedimentation. Implementation of Stormwater BMPs (Best Management Practices) such as street sweeping and cleanout of storm drains will help to reduce sedimentation resulting from road run-off.

Acquiring any specialized equipment needed to care for the Park in its improved condition will help ensure that the efforts carried out to enhance the Park landscape are maintained into the future. The new stabilized soft surface path will meet universal access standards and be permeable and plowable. To keep it in good condition, annual raking and rolling will be

required and the DPW plow blade should be raised above the surface of the path.

Creation of a Friends of Fuller Brook Park could provide a strong advocate and community voice for the Park. With direction, the Friends could contribute volunteer labor that could potentially decrease the demand on Town resources for ongoing park maintenance. The Friends group could organize volunteer days where neighborhood residents can perform manageable but important tasks like spring or fall clean-up and weeding.



Stone bridges are an important character-defining feature of Fuller Brook Park.

Endnotes

- ¹ Shary Page Berg, Landscape Historian, "Fuller Brook Park Cultural Landscape Report." Wellesley, Massachusetts: Wellesley Natural Resources Commission, Fall 2004: 16-20.
- ² Ibid. 26-27.
- ³ Ibid. 27-31.
- ⁴ Halvorson Design Partnership, "Fuller Brook Park Preservation Master Plan." Wellesley, Massachusetts: Wellesley Natural Resources Commission, November 2009: i-ii.
- ⁵ Halvorson. Preservation Master Plan, i.
- ⁶ For the complete design criteria, associated management goals, and corresponding guiding principles, please see the full Fuller Brook Park Phase 2 Report.

