SECTION 1. PROJECT APPROACH

General

Public resources, especially as unique as the Fuller Brook Park, contribute heavily to what makes Wellesley a great place to live. The Fuller Brook Park Preservation Project is now entering into its third phase, the implementation of the design. While all phases of the program are important for various reasons, this is the phase that will directly result in the skilled crafting of the desired improvements into an engineered plan that is fiscally sound and technically accurate. This will ensure that the construction phase is successful and that this valuable resource will be improved and protected for future generations to enjoy.

Fuller Brook Park has a rich history that is locally significant and important to planning and design of park improvements. Starting with John Charles Olmsted's 1897 report recommending the linear park/parkway, with Warren Manning's work in 1897 and beyond, through the major implementation design work of Ernest Bowditch, Fuller Brook Park has continued to evolve.

As stated in the RFP, we understand the Town's objectives of the Preservation Project to be fairly broad and comprehensive; ranging from restoration of infrastructure, removal of incompatible elements, preservation of resources, and the enhancement of the experience for the many visitors to this public space. As identified in the Executive Summary of the Preliminary Design Report, guiding objectives are to:

- 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

Project Description

The Fuller Brook Park is a 23 acre passive public space, stretching more than 2 miles from Dover Street to Maugus Avenue. The Park project is divided into 4 Segments.

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

While part of a common resource, each segment has its own character and characteristics. A brief review of these characteristics are reviewed in the Table which follows:

Key Characteristics by Segment

SEGMENT	PATH	STREAM	CHARACTER	STRUCTURES	VEGITATION	OTHER
1	Unpaved w/ Ave width 6.5', Approaches to roadways > 5%, Some locations of standing rain water	Deteriorated, Concrete Curb, Highest bank height,	Bucolic, Some narrow areas,	3 Bridges 2 Footbridges	Highest Concentration of High Risk Trees, Invasive vegetation obscures Brook & Bridges.	Runoff from side streets, Steep slopes
2	Paved, Ave 5', Some trip hazards, Worn shoulders, Approaches to roadways > 5%	Less Deteriorated	Majestic, Well Shaded w/ mature lawn	4 Bridges, 2 Footbridge, Grove St Flume, Erosion at abutments	High Concentration High risk Trees, Invasive vegetation obscures Brook & Bridges.	Hunnewell School, Use by Children
3	Unpaved, Intermittent and , disjointed, Marginalized by surrounding area, Path Needs to be established	Conveyance of Fuller & Caroline Brook, Culvert structure at causeway,	Pleasant, Ranges from Cultivated Landscape to woodlands to wetlands	No Bridges, Small structures impede movement	Less Shade, Thick wetland, invasive vegetation obscure access to Brook	High School, Fields, Shared jurisdiction, Fencing @ field in poor condition
4	Varying from footpath to 12', Sections of woodchip & stonedust surface, Section of boardwalk	Caroline Brook open 50% of Segment, Significant repeat sediment	Varies Dense Natural Vegetation, including wetlands, to Woodlands, to more urban	Forest St Bridge, 2 Caroline Culverts,	Large natural wetland, Trees in better condition	Phillips Park, Play, ball field, Path close to fence

The Project has many design elements, some very tangible others not so readily apparent. Key elements are:

- 2.25 miles of Path Rehabilitation
- 325 LF of Boardwalk
- 1.7 miles of Brook w/
    - 2,650 LF of Liner Removal, Channel Reconstruction
    - 2,500 LF Channel Reconstruction
    - 4,900 LF Bank stabilization
    - 1,350 LF Dredging
- Restoration of Five Vehicular Bridges (at Forster, State, Brook, Wellesley and Cameron)
- Creation of three wet meadows (totaling approximately 20,000SF)
- Implement System of interpretive/directional signs
- Buffer and Upland Plantings
- Management of Invasive Materials

Behind these tangible features are matters of hydraulics and hydrology of the Caroline and Fuller Brooks and their watersheds. The brooks and the park are part of a stormwater management system which drains a large portion of the Town. The functionality of the drainage system involves the brooks, as well as the adjacent park lands.

Insights

Our Team has reviewed the various referenced documents and has conducted numerous site visits of the Fuller Brook Park project area. In addition, some members of the Team call Wellesley their home. BETA's long ongoing relationship with the Town of Wellesley has allowed us to develop a thorough understanding of your project. Based on this understanding and our recent observations, we note the following **Insights** on the project to demonstrate our knowledge and how it will demonstrate our approach to its design development and construction implementation.

Historic Landscape

Extensive and comprehensive research on the history of Park's development was undertaken as part of the first two phases of this project. These efforts recently uncovered drawings by Warren Manning found in Town archives. This up to date research is included in the application to the National Register of Historic Places. Our Team has conducted online research at the Warren Manning archives at Iowa State University and at Harvard's Loeb Library, but has not yet uncovered new material. We will use this prior research and other materials uncovered to identify remnant elements and design ideas from the historic landscape to guide the design and to identify historic themes and stories that might be used as part of an interpretive program.

Value Engineering

Early on in the process, after completing our initial review of the project documents, senior members of our team will conduct the first of two brainstorming sessions on the elements of the project and options for construction cost reduction and/or work prioritization. Ideas will be discussed with the FBPCC. At this early stage, the focus will be on elements of the current plan and an order of magnitude assessment of dollars spent. For example, the current plans call for immediate invasive species management along the southeast border of Philips Park. Should this be reconsidered and discussed further as a cost saving measure, we suggest so. Also to be considered will be the way the construction could be sequenced.

A second session will be conducted later in the design process, after special studies and the preliminary design and details have been completed. This session will be a much more detailed evaluation of options along with bid and/or construction strategies to manage construction cost. Ideas along with pro's and con's relative to capital cost and maintenance costs will be discussed with the FBPCC. Some examples for cost discussion would be on the handling of sediments, path construction, bank stabilization, the disposal of sediment materials and what segments or aspects of the work should be done in what order.

Path Layout and Design

The Preliminary Design Plans shows alignment shifts in the path for various functional reasons. These include providing space for wet meadows, avoiding manhole covers, moving away from fences or other fixed objects which are currently very close to the path, and/or improving the path's approach to roadway crossings. Alignment shifts are also proposed to add interest and enhance visual appearance. This proposed alignment will be reviewed, adjusted and design engineered to facilitate its layout in the field for construction purposes as well as quantity calculations for contractor payment.

As the detail of the path design develops, it will be important to carefully engineer the vertical aspects of the path to: maintain at least a minimum slope to its surface either along or across the path or both; consider accessibility; avoid un-drainable low points and protect it against erosion. This includes secondary paths providing access to local streets along the Park or to points of interest in the Park. The cross slope of the path would vary depending on adjacent features and the prevailing terrain. For example, our field walk revealed that the path has considerable steepness on some of its approaches to intersecting roadways. The design should look to provide a flattened area and a more gradual profile slope to improve safety, universal accessibility and to reduce wear action of the surface. In addition, these simple measures would also serve to reduce storm-water runoff and roadway debris from the intersecting roadways from entering onto the path and into the brook.

Path Surfaces

Our Team will assist the Town and the FBPCC in the evaluation of the test path sections being installed this summer. A basic question is whether the cost, construction impacts, and effectiveness of the structural soil shoulders make this concept impractical. Observations in the Park indicate that worn areas adjacent to the existing path are found in in most areas. As a result, this will be a critical part of the project.

The FBPCC may want to consider varying materials and cross sectional design for better and more cost effective solutions. For instance, there are ways to construct crushed stone paths that have the same stability characteristics as soil stabilizer for handicap access but with a lower cost. This type of path composition may have application, especially in areas of seasonal flooding or high water table.

For example, the Turner's Pond project (full project description located in the appendix) utilized both crushed stone and soil stabilizer path surfaces. Soil stabilizer was used on the side of the pond with dryer soils and crushed stone was used on the lower, wetter side of the pond. This project utilized an innovative technique was used in the construction of the soil stabilizer path. Stabilizer and aggregate were mixed and hydrated off-site and then the blended material was laid down in a hydrated condition. This prevented a frequent cause of failure in soil stabilizer paths: the failure to hydrate the full depth of the material, if hydration is done in place after installation.

Concerning the area of wet soils between Forest Street and Paine Street – the Team will consider the extent and location of proposed boardwalk. Soil stabilizer path is not recommended in this area because of the high water table. An option may be to use crushed stone with siphons under the path connecting the wetlands on either side to preserve the hydrology of the wetland.

Our Team includes boardwalk experience. Noted is over ½ mile of Trex boardwalk along the South Boston Beaches and a wetlands boardwalk at Wellesley College, installed as part of the Paintshop Pond Environmental Remediation Project.

Views and Vistas

How the users perceive the Park is tied, in a large part, to their visual experience. The alignment of the path, the proximity of the brook, location of vegetation within the Park and elements at the Park's borders that enclose or frame views define this experience. The Path's redesign, vegetation management, placement of site furnishings, new plantings and possible screening will all need to be carefully identified on the construction plans so that the intended preservation or screening of views is carried out as intended.
Our Team has wealth of experience with developing construction documents that accurately depicts the intended "visual" design in a manner that is easy for a contractor to understand and construct the intended design. This includes developing details and specifications that fully describe the work and, when necessary, identifying those elements that are better finalized in the field.

On balance, careful consideration will need to be given to preserving shade on the watercourse so as not to alter the water temperature to a great degree. Water temperature and oxygen balance are important habitat considerations when undertaking such a major watercourse reconstruction project.

Aggressive Sideline Terrain

There are some locations in Segment 1 where the park is narrow and the terrain slopes steeply towards the path and brook. This is obviously not a good condition, particularly where this condition falls at the dead end of paved roadways such as Tappan road and Benton Street. Roadway runoff erodes the park embankment, the path and the Brook as well as carrying sediment to the brook. Measures will be considered to intercept heavy overland flows, reduce its velocity and dissipate its energy prior to reaching the path and the brook.

Roadway Crossings/Pedestrian Safety

The path intersects 11 roadways. Three of these currently have high visibility pedestrian crossings with signage and warning beacons. While some of the remaining may not need enhanced measures, there are others that should be evaluated for greater pedestrian safety given traffic flow and other parameters. An example is Cottage Street and Abbott Road, where some preliminary studies have been conducted. Our Traffic Engineers will review these locations and make recommendations for the Town's consideration.

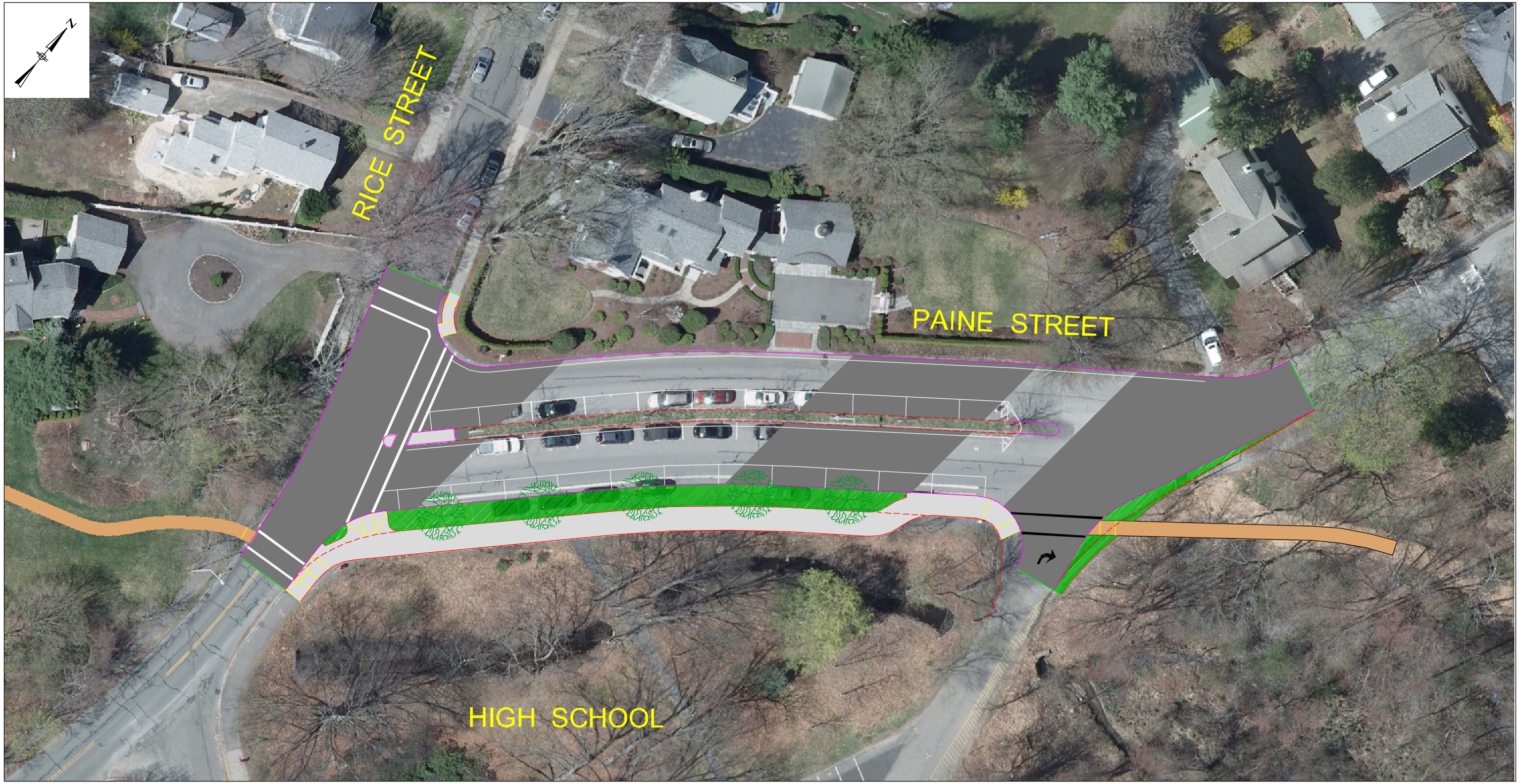
Paine Street

At Paine Street, the Path transitions from Segment 4 to Segment 3. This is, in many ways, the most dramatic change in the Park's environment going from a large natural wetlands to a built-up environment, involving the high school and a town roadway. The emergence of the path at Paine Street is problematic from the perspectives of grading and continuity of its visual appearance, but also from a safety perspective. The edge of roadway is very close to the path where it emerges from the wetlands area. The roadway has an adverse curve, which reduces sightline between path users and vehicles leaving the High School parking lot. The preliminary plan shows some proposed geometry / curb extension in this location to address these issues.

In addition, with the construction of the new High School and the related circulation and use modifications associated, it may be worth exploring the reduction of the pavement width on Paine Street and widening the current sidewalk area to provide a better siting for the path. *See Exhibit 1.* Options to address some of the issues could include providing a tree lined esplanade along the sidewalk/path between Rice Street to the High School Drive to establish an improved environment. This geometric change would also reduce the length of the pedestrian crossing across Paine Street at the Rice Street intersection. **At both the High School Access Road and Rice Street, our traffic engineers will review conditions of pedestrian crossing and make recommendations that may be appropriate.** *See **Exhibit 1** for Proposed Conceptual Improvements.*

Footbridges

While the intent is to retain the current footbridges, with the possible exception of the one in the boardwalk area in Segment 4, there are related issues to be addressed. Our field walk noted that at most bridges, there is an unprotected area between the path and the brook at the end of the bridge railings. While in many cases, the drop in elevation is not significant between the path and the brook, there are some locations where the drop is significant. An example is the footbridge path near the rear of the Hunnewell School. Our Team will evaluate measures to provide a level of protection that is in keeping with the natural character of the surroundings. The goal will be to minimize potential falls/slips, particularly in locations used by school aged children. Also to be considered in some of these locations there is a need to retard the flow of heavy runoff from the path flowing into the brook to minimize erosion of the bank.



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JULY. 18, 2010

FULLER BROOK PARK PRESERVATION PROJECT

WELLESLEY, MASSACHUSETTS

EXHIBIT 1:
POSSIBLE IMPROVEMENTS
FULLER BROOK PATH AT PAINE STREET

Bridge Restoration

The five roadway structures crossing Fuller Brook Park contain stone work elements that greatly enhance the historic character and experience of the path. These structures appear to be in reasonably good condition based on our initial observations. Unfortunately, many are visually obstructed by invasive plants and trees growing along the brook and sometimes within and around the wingwalls. In addition, minor embankment erosion has occurred at some locations at the ends of the stone wingwalls.

Though the path physically crosses only two of the five roadway structures, Cameron Street and Wellesley Avenue, our Team will evaluate options to enhance and restore each of the five structures. At most locations it appears that only the removal of the invasive plants and trees will be required. At others, minor restoration to the affected wingwalls and some cosmetic issues need to be addressed.

As a cost saving measure and given the fact that this is a Park Restoration Project, it is anticipated that the Town may want not to alter the existing stone parapets and wooden guardrail, even though they may not comply with current standards.

The following is a brief review of each of the five structures:

Cameron Street

This structure consists of a 4 ft high x 8 ft wide by approximately 42.5 feet long box culvert with field stone wingwalls and headwalls formed into the shape of an arch. These walls extend up to form parapets along the back edge of the sidewalks. In the northeast corner of the crossing a small section of steel highway guardrail has been installed to protect vehicles from the rather steep embankment sloping down to the river.

Brook Street

This structure consists of twin 6 foot diameter reinforced concrete pipes with stone wingwalls and brick / stone headwalls. It was noted that there are several gaps between the stone headwalls and the brick and mortar area above and around the pipes. At this location, short sections of wooden guardrail are present just in front of the culvert's headwalls.

Wellesley Avenue

This structure consists of a 6.1 ft high x 7.5 ft wide by approximately 46.5 feet long box culvert with field stone wingwalls and headwalls formed into the shape of an arch. These walls are in very good condition and extend up to form very nice looking curved parapet walls along the back edge of the sidewalks. The ivy plants and curved parapets provide a historic look and feel to this location.

State Street

This structure consists of an unknown sized box culvert with field stone wingwalls and headwalls formed into an arch. This structure is heavily overgrown with vegetation and not very visible from the path. Again, at this location, the stone walls extend up to form parapet walls along the back edge of the sidewalks.

Forest Street

At this location, a 60" diameter reinforced concrete pipe carries Fuller Brook under the roadway. Stone block wingwalls and headwalls provide support of the roadway embankment. At this location some minor bank erosion was noted at the ends of the wingwalls. Along the roadway a short section of steel guardrail with wooden posts and an all wooden guardrail are present.

Roadway Drainage

While the focus of the project is the Park, the effort to restore the brook needs to consider what is happening with drainage on the intersecting roadways. It appears that in many locations, roadway drainage is flowing, untreated, directly into the brook. Of particular concern is the catch basin located within Caroline Road, which is an unpaved roadway. The

basin is depressed and most likely is a regular source and conduit for sediments reaching the brook and contributing to the required past and planned dredging. Another location is at the Forest Street Bridge where catch basins appear to discharge directly into the brook without the benefit of sumps or other BMP's. **Our Team will evaluate each roadway crossing and develop low investment recommendations to improve direct discharges to the brook**. We will also consult with the DPW on upstream sediment sources and changes that may be being proposed, as part of the Town's Stormwater Management Plan

Landscape Character

Based on our review of the previous studies and public commentary, it seems that there is a desire to modify the landscape character of the park in certain areas in the direction of reducing the area of mown lawn and restoring a variety of woodland, meadow, parkland, and streamside landscape. Moving in this direction can maintain and enhance the beauty of Fuller Brook Park and reduce mowing to make more resources available for actions such as invasive species management that will be required with the new park. We will also work with park managers to suggest turf management practices such as varied mowing regimes and lower maintenance grass species.

Invasive Materials

It is difficult to eradicate all invasive plants from the site because of the resulting impact and the extensive seed sources both inside and outside the park. The previous studies have effectively identified and proposed management actions for the most significant species. They have also established reasonable priorities among areas. We will undertake further review of the priority areas to confirm or rethink the earlier recommendations and also weigh them in the balance of all the project funding requirements and priority actions.

Signage

Signage for the Fuller Brook Park should be an integral part of the Park's design and character. Our Team suggests several types of signage for this project. The first is wayfinding signage, as an option for the FBPCC's consideration, interpretive signage and lastly, safety signage at roadway crossings.

Wayfinding signage should not only direct users to and through the park, it should reinforce the Park's unique qualities and experience the user is in contact with. As a communication tool primarily located at each to the Park's access points, the signage plays an important part of setting the tone for the user's experience. The sign and all of its components need to provide a visual demarcation of the entrance (and egress), subtlety convey the Park's significance and become a memorable part of the experience. When used outside the limits of the Park, these signs become a reminder of this important part of the community and provide an easy to follow system for new users.

Interpretive signage can play a significant role in telling the many stories of Fuller Brook Park. How and why it was conceived, what roles does it play in the community, how has

it evolved over time and as an urban park, and how it functions today can all be part of an ongoing narrative explained along the trail system. As an educational tool to the numerous schools adjacent and near to the Park as well as to the public at large, these panels and their stories can foster a greater appreciation for the park and instill a sense of ownership that helps to preserve the Parks character.

Safety signage is needed at roadway crossings and in relation to secondary pathways connecting the main path to side streets along the park.

Both the wayfinding and interpretive signage should also contribute to the esthetics of the park. Design and material selections should relate to other features (both existing and proposed) within the park. Durability is also a factor with signage and the actual graphic panel material will be related to standards that the National Park Service currently employs. Also, sign designs will need to be in conformance with the Town's Sign bylaw. For safety signage, the design and material will be in conformance with the MUTCD and MassDOT Standards.

Graphic content will also be made available in the digital form so that potential users of the trail system (such as schools and their teachers) have reduced copies of the interpretive information along with supplemental research that would enhance an outdoor classroom experience.

The creation of the actual interpretive panel results from team members working with a small steering committee usually comprised of the members of the preservation commission, library research department, and local historians. Story lines are formulated and historic photos and documents are selected to be copied and used within the panels. Illustrations (supplied by the team members) are provided to help complete the "storyline" along with the final text which is usually supplied by the steering committee. Full size, colored graphics are reviewed and approved by the steering committee prior to production.

Site Furniture

Current site furniture includes signage, trash receptacles, and benches. It will be preferable to develop a consistent vocabulary of park signage and a consistent trash receptacle may be desired. The current eclectic collection of benches, many of which have been donated, adds a nice variety to the park. We would recommend that benches installed be of a sufficiently high quality to be durable but that a mix of styles and continuing a program of donations is desirable.

Define Park Boundaries

In many locations, the limits of what is the park and what is private property are, at best not clearly delineated and most likely "hide" encroachments onto the park. The residential area within Segment 3 near the High School area is a good example. Our Team will consult with

the Town officials on ways to better physically delineate the official boundaries of the park. Measures can include park boundary markers at key points of the park's property line. In addition, plantings will be strategically located to visually define the park edges, where appropriate or where needed, to clear encroachments and also define limits of public maintenance program.

Stream Restoration

The stream design will strive to return Caroline Brook and Fuller Brook to a more naturalized condition including varying width, riffles and pools, varying substrate and edge conditions. The banks in numerous locations throughout the project area are suffering from erosion due to what appears to be erosive flows from stormwater runoff entering the brooks. Bank stabilization and associated stream restoration need to be addressed using a two-pronged approach: 1) improving the physical conditions of the brook, and 2) managing the erosive flows and sediment accumulation in the brook. This will involve creating physical bank stabilization designs, managing the stormwater discharging to the brooks that are causing the erosion and contributing to the severe sedimentation affecting the brook. The management of stormwater discharges to the brook is a vital aspect of restoring the brook.

Construction implementation of stream restoration is an important key to the success of the project. Our Team will include construction details and notes, as well as develop a phasing plan for the park improvement project, in order to ensure proper installation of the stream improvements. Stream restoration would normally take place from upstream to downstream, to the extent possible, so that downstream improvements are not damaged before the upstream improvements can be performed. However, our Team will investigate and make recommendations about whether it makes sense to do some stream bank stabilization downstream prior to other improvements, such as dredging or removal of concrete curbing/liners in other areas of the stream.

The Wellesley Department of Public Works has a parallel effort to develop a Stormwater Master Plan, so our intention is not to duplicate that effort. However, our Team does anticipate spending the effort to coordinate with the DPW to both make general recommendations for up gradient source controls and effective stormwater best management practices, as well as identifying locations and low impact development (LID) practices that may be appropriate within the Fuller Brook Park Master Plan Design to address stormwater runoff from adjacent roadways and from the path itself. The Team also anticipates creating a series of bank stabilization designs specific to site characteristics for different lengths of the stream.

Bank Stabilization

Numerous areas throughout the park are denoted as needing bank stabilization, removal of concrete liners and other materials, and reconstructing of the channel shape. Given the relatively flat topography of the stream and the consistency of the stream in size and channel shape, our Team anticipates that the practices and techniques for bank stabilization and channel reconstruction will be consistent throughout the length of the project. Similarly, the method and design for removing concrete liners will also be consistent across areas where this work is necessary. Therefore, it is anticipated that the design plans will include a plan view showing locations for these practices, and cross-section details that describe how these practices will be implemented for various stretches of the stream. The hydraulic analysis will be used to verify that the design is suitable for the expected stream flow velocities and volumes.

Our Team will develop bank stabilization designs that incorporate naturalistic elements such as coir logs and live stakes, boulder toe lines and geotextile matting, as well as native plantings up through the top of bank and buffer. Where possible, we will examine opportunities to increase the flood plain to reduce the erosive forces on the banks at downstream locations. Native buffer plantings will be used to further stabilize the top of bank and protect from erosion caused by direct runoff to the stream. Bank stabilization and stream restoration construction will occur from upstream to downstream in order to avoid having upstream sedimentation and erosion from affecting downstream efforts. In the areas where existing trees are being undercut by the stream and trees need to be removed, stream geometry will be examined to determine if the entire stump is to be removed or whether coir logs, boulders or other naturalistic feature can be used to bolster the bank and use the existing stump for stability.

LID's/ Wet Meadows:

Several areas within the park, primarily between Cameron Street and State Street, experience seasonal inundation and generally damp conditions that conflict with the recreational use of the pathway. The conceptual plan for the park suggests, rightly so, that the pathway should be realigned to avoid these areas to the extent possible so that these areas may be restored to a more natural floodplain function and to improve the safety and suitability of the pathway. Seasonally or periodically inundated or wet areas will be enhanced as park features such as wet meadows, small constructed wetland (pocket wetland) features, rain gardens (small bioretention systems), swales or other vegetated low impact development (LID) features, depending on the site specific conditions. Wet

meadows can be created rather simply with a change in the vegetation from turf grass to more wetland species.

The creation of a more significant feature, such as a pocket wetland or rain garden, involves digging out existing soils and replacing or augmenting them with more suitable soils, creating a depression for flood storage and planting a specific palate of native plantings for the given hydrologic environment. These can be designed with a variety of plantings and in a variety of shapes to maintain a visually interesting and appealing landscape element while serving a floodplain or stormwater management purpose. In some cases, a simple replanting of vegetation is all that may be necessary or desired, and no sizing calculations will be necessary. In other areas, a wetland, bioretention system, swale may be appropriate to combine the flood plain services with the stormwater management of overland flow from adjacent areas (including neighboring yards). **Our Team will evaluate these options on a case by case basis and size the proposed features appropriately, if needed**.

Stormwater Management -Capacity and Flood Control

Caroline Brook has a 294 acre watershed and Fuller Brooks has 2244 acres (1091 acres in Wellesley). These Brooks provide a very necessary function and serve as natural conduits for stormwater runoff for a large portion of Wellesley. As the Town has developed and drainage system directed more runoff, the Town has had to consider how to increase capacity and prevent erosion. Over the years, projects to lower, re-align, line and widen were completed to drain wetlands and accommodate flows while sacrificing the natural look. Also additional flow, stream flow dynamics and lack of maintenance over time have caused erosion, sedimentation accumulation and flooding.

Review of the 2004 Stormwater Master Plan Update (SWMPU) indicates that there are some problems and issues related to the project area. Calculations show that for Fuller Brook roadway culverts can accommodate the 100 year storm event without over topping roadways, while according to the report Caroline Brook experiences overtopping at four locations. As part our effort, the Team will analyze the stream models, impacts of proposed improvements and methods to maintain hydraulic flow balance between pre and post construction, including providing additional storage, varying width, riffles and pools, varying substrate and edge conditions.

Clearly, stormwater discharges from adjacent roadways are contributing significant sediment loads to the streams, which then clog the flow capacity of the stream, smother the natural habitat provided by the stream bed, and contribute pollutants to the stream itself. In addition, uncontrolled stormwater discharges to the brook cause significant erosion due to the unmanaged peak flows during storm events. While it is often perceived that erosion occurs during the largest, most infrequent storm events, it has been shown that bank eroding forces are generally created during the more frequent 1-year and 2-year storm events. Therefore, stormwater management (including both retrofitting existing discharges and managing future discharges) is a vital part of the long-term bank stabilization

plan for these brooks. The conditions in the stream created by the erosion and sedimentation in the stream bed also provide the foundation and create a perfect environment for invasive species, which can outcompete native noninvasive species in impaired 'stressful' environments. This furthers the case for improved stormwater management as a basic design principle within this project.

Our Team is extremely well versed in source controls and low maintenance, low impact development (LID) designs to improve stormwater management to manage peak discharges and reduce pollutant loads, including primarily sediment and nutrients. The benefits of LID techniques, such as bioretention systems (rain gardens), constructed wetlands, tree box filters), and porous asphalt, are that they are naturalistic in design, are low maintenance, requiring equipment and techniques typical of regular landscape maintenance, and are extremely effective in reducing pollutant loads. When designed appropriately, they can also be effective in controlling the peak flows during the 1-year event, the channel forming rainfall event.

Stormwater Management -Treatment / Water Quality

Although sampling data reviewed as part of the SWMPU do not identify major problems, EPA and DEP list both the Fuller Brook and Charles River as impaired waterbodies. Local street drainage systems discharge directly into the Brook with little to no treatment. Organic enrichment/low dissolved oxygen, pathogens and siltation are listed as impairments to Fuller Brook. Fuller Brook is tributary to the Charles River, which is listed as impaired for biossessments, noxious aquatic plants, nutrients, PCBs and Pesticides.

Although not the primary focus of the project, the Team will look for opportunities to meet the anticipated new EPA MS4 permit requirements. For instance, any new storage areas could be designed to incorporate treatment components to capture sediments and other pollutants and provide infiltration reducing nutrient loading on the Brook and the Charles River. Particular attention will be focused on areas that produce greater amounts of sedimentation. For instance Caroline Street, a gravel road that may be producing higher sediment necessitating dredging of the Brook in this location, might be retrofit with BMPS, or LIDs such as sediment traps and grass swales.

Our Team will develop source control recommendations to be coordinated with the Wellesley Stormwater Master Plan, as well as LID recommendations to treat stormwater from adjacent impervious areas within the park. Broad source control recommendations might include a reduction in road sand used on the roadways as well as the

path itself, as well as improved erosion control requirements for construction projects. For example, porous asphalt tested at the University of New Hampshire Stormwater Center has been shown to require less sand and salt because of the reduction of standing water on the surface, and it is reasonable to expect that other porous path surfaces may have the same conditions.

Additional water quality improvement benefits are likely to include providing more natural color and other aesthetic aspects by reduce sheens from petroleum products and turbidity in roadway runoff. This will become more important as plantings are managed to provide more views of the Brooks.

Initial Contaminate Research

Our Team performed an Initial environmental screening of this project based on the research on the MassDEP's online database for release tracking numbers (RTNs) along the segments of the proposed project, where dredging of the Brook is proposed. Research identified four (4) RTNs that are within 500' of the brook. All four of these RTNs have been closed under the MassDEP regulations, which indicate that there are no uncontrolled sources of oil or hazardous materials and there is no significant risk associated at any the sites. A summary of these sites are as follows:

31 Clifford Street
RTN# 3-10334

In 1993, a release of 250 gallons of #2 fuel oil occurred from a leaking residential above ground storage tank (AST). Immediate response actions were conducted to clean the spill, and a Class A-2 Response Action Outcome (RAO) was submitted to MassDEP on December 20, 1994 indicating that a permanent solution has been achieved.

50 Rice Street, Wellesley High School
RTN# 3-23348

On November 7, 2003, an existing UST was overfilled during routine delivery. The spill was cleaned using absorbent pads, and affected soils were excavated and managed off-site at a licensed facility. A Class A-1 RAO was submitted to the MassDEP in 2004 stating that the threat of release has been eliminated and a permanent solution was achieved.

RTN# 3-28506

An environmental field screening and limited analytical testing program was conducted at the High School in May 2009. During this program, concentrations of arsenic were detected in natural subsurface soils above the reportable standards. The lateral extent of the contamination has been defined to an area approximately 75 feet wide by 200 feet long beneath the parking lot. The source of the arsenic may be natural, or may represent a localized release that occurred prior to the school building construction in the early 1970s. Arsenic was not detected in groundwater. A Class B-1 RAO was filed indicating that remedial actions have not been conducted because a level of no significant risk exists.

13 Clovelly Road
RTN# 3-23815

In May 2004, levels of petroleum hydrocarbons were detected in soil above regulatory standards. A Class A-1 RAO was submitted to MassDEP on December 13, 2004 indicating that response actions resulted in a condition of no significant risk, and a permanent solution was obtained at the site.

While the initial environmental screening does not indicate immediate concern for migration of contaminated materials, the online resources provide limited information. There is still the potential for migration of a release from drainage inlets in the surrounding area to the brook that may warrant supplemental investigations prior to dredging of the brook.

Sediment Investigation / Testing

Sediment along Segment 4 of the brook will need to be characterized in-situ for a determination on vs. off-site disposal management prior to dredging. Composite samples along discrete reaches of the brook are required for analysis of the parameters required for off-site reuse such as landfill cover material under the MassDEP COMM 97 Guidelines. Such in-situ sampling and analysis performed during the design phase will provide the information necessary to make informed decisions regarding excavated sediment reuse and/or disposal options. In the event that the analytical results fall below background levels, it may be possible to reduce management costs during construction by allowing either on or off-site management under other applicable regulations. Specifically, the effort will assess whether contaminant levels exceed background, reportable concentrations under the MCP and/or other thresholds under the Solid Waste regulations that could trigger the need for a beneficial use determination.

Initially, sampling and analysis will be performed to meet COMM 97 requirements; however, it may be possible to justify implementation of a more cost-effective management option, once the actual analytical results are tabulated and assessed. In the event that segregated vegetation, unacceptable sediment and other deleterious materials are deemed to be unsuitable for off-site reuse as cover material at a lined landfill, it may need to be disposed as solid waste.

In addition, sediments will be field screened during sampling for the presence of overt signs of contamination (i.e staining, olfactory evidence, total volatile organic compounds via photo ionization device). In the event contamination is suspected, samples will be collected for selected analyses.

A similar approach will be utilized for any soil, vegetation and other deleterious materials excavated along the bank of the brook during implementation of bank stabilization measures. The only difference is that such unsuitable material would be segregated during construction, stockpiled, characterized and disposed of at an appropriately licensed disposal

facility after award of the construction contract. Our Team has significant experience in soil characterization and the knowledge of the applicable statuary requirements.

Cost Estimates

An initial review of cost sheets within the Preliminary Report suggests that the overall construction cost may be somewhat underestimated. The cost of permitting requirements, drainage/stormwater quality enhancements, structural restorations, contractor mobilization and the actual mitigation of the construction operation may not be adequately covered by the contingency used in the budgetary cost estimate.

BETA has a significant track record in estimating the construction cost of projects, as evidenced by the many projects undertaken for the Town of Wellesley over the past decade. These include the Washington Street Corridor Project, the Weston Road Project, the Townwide Traffic Signal upgrade and Central Control System, and Pedestrian Safety/Crossing improvements.

Construction Documents and Beyond

The project's design effort will culminate in the preparation of construction contract documents and cost estimates. This "end of process" effort really takes shape in the background over the entire design process and results in the compilation of an integrated package of design plans and details, specifications and estimates. The preparation of a biddable, well engineered design and clear specification and methods of contractor payment are critical for the real Project's success. BETA is very familiar with the Wellesley DPW project bid process, including the contractor selection process.

Our Team possesses the background, experience and track record in developing contract documents for complex projects, assisting communities like Wellesley with the bid process and contract administration through construction. BETA will lead the effort with in-house senior staff in the fields of civil engineering, stormwater and drainage design and landscape architecture. Together, they have over 100 years of experience in developing construction plans and cost estimates for complex and creative projects throughout the Commonwealth. In addition, BETA will have its Construction Services Division review the full package for completeness, technical accuracy and constructability.

While having the experience and technical background in the various technical areas required for this project is important, being able to communicate the project intent to contractors in clear terms is also an important key to success. Our Team possesses the broad skills and deep experience to bring all these elements together in a solid set of contract documents.

Landscape Maintenance Planning

Landscape Maintenance Planning is best done in concert with those responsible for the maintenance. In this way, the Maintenance Work Plan can be tailored to be sensitive to the capabilities of staff, available equipment, and budget funds as well as the unique characteristics or issues of the site. Our Team can bring the knowledge of the design's intent, knowledge of maintenance practices, and an independent eye to developing or enhancing the annual work plan.

The purpose of a Site Management and Maintenance Plan is to develop specific work tasks and management guidelines to protect the capital investment and direct the long term improvement of the resource. Plans typically contain maps, descriptions, management actions, maintenance tasks, manpower, equipment, skill needs, and budgetary requirements for the short term actions and long term program for preservation of the resource. Various Zones will be indentified, say for mowing regimens, tree management, understory management, and invasive species management. Also to be identified would be such items as annual tree inspections and maintenance, invasive species inspections, inspection and maintenance of stormwater features, maintenance of signage and furnishings, and other tasks common throughout the park. Plans also typically include a graphic schedule to show the flow of work by zone throughout the year. Actual schedules will have to be quite flexible to respond to weather and manpower changes. **In some cases, it is prudent to file the Maintenance Plan as part of NOI filings to the Conservation Commission so that annual maintenance can be done without further filings.**

As noted above, the development of a Site Management and Maintenance Work Plan will require close coordination with the Department of Natural Resources and the Department of Public Works to assure that the plan is consistent with town operations and that the park managers agree to and support the work proposed. **Our Team includes individuals with significant experience in the development of Site management and Maintenance plans for public open space.**

SECTION 2. SCOPE OF SERVICES

The scope will follow the tasks identified in the Town's RFP. As requested, a three-ring binder with communications, meeting notes and support materials including print-outs of Power Point presentations generated during the final design and permitting process will be maintained as work progresses and provided to the Town upon the conclusion of the project. The following is presented to demonstrate our understanding and to add depth to the description of the planned effort and services.

A. Initial Tasks

A.1 Project Familiarization/Start-up

The basic objective of this effort will be to take a fresh look at the site and project materials with an eye to cost effective implementation. We envision that