



## MEMORANDUM

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TO: Matthew Lawlor, WalkUP Roslindale  
Nidhi Gulati, LivableStreets Alliance

FROM: Jennifer Relstab, P.E. and Patrick Kelly

DATE: April 14, 2017

RE: Roslindale Gateway Path Conceptual Plan and Cost Estimate

CC: Brian Kuchar (Horsley Witten Group, Inc.)

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The Horsley Witten Group, Inc. (HW) is pleased to provide the following memorandum which summarizes the 10% conceptual plan for the Roslindale Gateway Path in Roslindale, MA. This memorandum includes a description of the conceptual path layout, material selection, site amenities, and opinion of probable costs. The 10% conceptual design plans as well as other supporting information are provided as attachments to this memorandum.

### **Acknowledgements**

HW would like to acknowledge Taft Hill Park Development and Roslindale Village Main Street, who provided funding for this study.

### **Background**

The idea of the Roslindale Gateway Path originated several years ago, but has been championed since 2015 by the WalkUP Roslindale, a community group in Roslindale, MA. WalkUP Roslindale envisions a path to provide a safe connection to and through the Arnold Arboretum to the Forest Hills area and the Southwest Corridor. In 2016, WalkUP Roslindale partnered with the LivableStreets Alliance, under the Greenway Partners Program, and a team from the Tufts Urban and Environmental Department to develop a planning study for the path. The study, released in May 2016, provided a summary of existing concerns for transportation, visions for community engagement and recommendations for development of the path.

In June 2016, WalkUP Roslindale and LivableStreets partnered with HW to further develop the concept design and conduct a site survey in the MBTA parcel adjacent to the Roslindale Village Commuter Rail Station. The team met in July 2016 to discuss the vision for the Roslindale Gateway path, which includes the following goals:

- A safer connection for local commuters from Roslindale Village to and through the Arnold Arboretum. This connection will be part of a larger network being proposed that will connect Roslindale Village to the proposed Blackwell Path Extension, Forest Hills area and the Southwest Corridor;
- A link for underserved portions of Roslindale to the Arnold Arboretum and to Roslindale Village; and

- An opportunity for residents and visitors to experience and learn more about the Arnold Arboretum.

In July 2016, HW staff members Hannah Carlson, RLA, and Jennifer Relstab, P.E., walked the site with representatives of WalkUP Roslindale and LivableStreets Alliance to confirm existing conditions and discuss the preferred locations for the proposed path. Following HW's preliminary evaluation of path layout and surface material selection, HW performed a follow-up site visit in October 2016 with Stephen Schneider, the Director of Operations at the Arnold Arboretum, to discuss preferred path options and connections which may be implemented by the Arnold Arboretum. In December 2016 HW conducted a site visit and a topography survey of a 30-foot wide section of the Massachusetts Bay Transportation Authority (MBTA) parcel. Information regarding key existing elements for path design, such as significant diameter trees, stone walls and fence lines, were also located.

HW used the survey data, supplemented with additional topography data from the City of Boston and the Boston Water and Sewer Commission as well as aerial photography to determine a proposed ADA accessible path layout. GIS data provided by the Arnold Arboretum was used to determine species and size of the trees that may be affected by the proposed path.

### **Summary of Existing Conditions**

The area evaluated in this study includes an MBTA parcel adjacent to the Roslindale Village Commuter Rail stop and a portion of the Arnold Arboretum, which extends from the MBTA parcel to Poplar Gate and south of Peters Hill Road. A map showing the overall study area is provided in **Attachment A, Figure A.1**. Connections to the Blackwell Extension Path were evaluated at Poplar Gate and near the underpass at South Street near Archdale Road.

The MBTA parcel is bounded by the Roslindale Village Commuter Rail to the west, residential parcels to the north, the Arnold Arboretum to the east and train tracks to the south. A chain link fence defines the parcel boundary to the west and south, while a stone wall defines the parcel boundary to the east. The wooded parcel is generally flat nearest the tracks, but has a steep hillside going towards the north. The soils in this area are Newport silt loam, which are primarily in hydrologic soil group (HSG B) and have a moderate infiltration capacity. Two wet areas were identified during the survey of the parcel, which could indicate that stormwater is ponding in the area or soils may have a poor infiltration capacity.

Within the study area boundary, the Arnold Arboretum parcel abuts the MBTA parcel at a stone wall. A footpath runs parallel to the Arnold Arboretum parcel boundaries, beginning at the end of Arborough Road and continuing adjacent to the train tracks towards South Street. The topography is generally flat, though the elevation drops along a hillside close to South Street. There are several types of trees within the study area portion of the Arnold Arboretum, including Crabapples, Oaks, Redwoods and Pines. Soils are generally Newport silt loam and Udorthents, which is an HSG A soil (high infiltration capacity).

An existing drainage swale is located in the eastern portion of the Arnold Arboretum, which drains to two 30" diameter pipes that discharge on the other side of South Street. The swale appears to capture overland flow and drainage from a catch basin on Peters Hill Road. Several footpaths connect around the drainage swale, leading up to Poplar Gate and other existing paths within the Arnold Arboretum. A short rock wall defines the Arnold Arboretum boundary at South Street.

## Summary of Concept

The 10% conceptual plan provides a 10-foot wide accessible pathway from the Roslindale Village MBTA Commuter Rail platform through an existing MBTA parcel and the Arnold Arboretum to South Street. The path through the Arnold Arboretum generally follows existing footpaths which are parallel to the train tracks and end near the MBTA underpass at South Street. The overall concept layout is shown in **Figure A.1** in **Attachment A**.

The design incorporates the following general elements to reinforce the vision for the Roslindale Gateway Path:

- A slightly sinuous route that allows commuters to efficiently travel from Roslindale Village to the future Blackwell Path Extension, while also allowing recreational users the ability to better experience the Arnold Arboretum;
- ADA accessible path layout which provides additional uses for various activities (e.g., walking with a stroller);
- Provide access for nearby residents with a connection at the MBTA underpass at South Street/Archdale Road to the proposed Blackwell Extension Path; and
- Gateways and signage, both way finding and educational, at key locations to encourage user access and interaction with the Arnold Arboretum.

The concept design plans are presented in two sections, Sections 1 and 2, to correspond to the MBTA and Arnold Arboretum properties, respectively. The plans are provided in **Attachment B** and are summarized below. A digital rendering of the path is included in **Attachment C** to provide additional context to the design recommendations noted.

### Section 1 – Roslindale Village to Arnold Arboretum (MBTA Property)

#### *Layout*

The proposed entrance to the Roslindale Gateway Path is located at the northeastern edge of the existing platform at the Roslindale Village Commuter Rail stop where the platform abuts the MBTA parcel and the commuter rail right-of-way. A smaller gateway is proposed to highlight the entrance to increase visibility. The path primarily follows existing grade and meanders around existing larger diameter trees to provide character to the path as well as canopy cover for shading. Stormwater management features, such as bioretention areas, are recommended to manage runoff from the surrounding area. These features can also be integrated into the path design to provide an educational opportunity for residents and visitors. As the path continues toward the Arnold Arboretum, the existing slope becomes steeper with slopes up to approximately 20%; consequently, a boardwalk is recommended for accessibility (maximum slope of 5%).

#### *Materials*

To manage grade changes and ensure ease of maintenance, the recommended path material along the flatter slopes is bituminous concrete (asphalt). IPE wood is the recommended material for the boardwalk decking, with railings to ensure safety of pedestrians. Helical piles are for support. The material options selected are consistent with those suggested for the proposed Blackwell Extension Path. The gateway at the Roslindale Village Commuter Rail stop is a simple, metal gate structure.

#### *Site Amenities*

Way finding signage is recommended at the gateway to provide clear orientation for users and note key features along the path. Benches may be added along the route to provide seating

and viewing areas. More visible lighting is recommended in this section to safely guide path users to and from the gateway and encourage users to remain on the path with the close proximity of the MBTA train tracks, which are adjacent to the existing chain link fence.

## Section 2 – Arnold Arboretum Property (to South Street)

### *Layout*

The path continues within the Arnold Arboretum along a fairly flat and open area where an existing footpath runs parallel to the MBTA train tracks. The recommended path layout meanders to encourage users to reduce speeds and pedestrians to interact with the Arnold Arboretum. The path connects to the proposed Blackwell Extension path at South Street near the MBTA underpass. The Arnold Arboretum has proposed an additional connection to the path (as a separate Arboretum project) from Peters Hill Road to provide pedestrians coming from Poplar Gate as well as the Walter Street/Bussey Street area to connect to the path easily.

To create an accessible path (maximum slope of 5%) along the hillside nearest to South Street, the recommended path (Option A) layout is a switchback along the slope, which has an existing maximum slope of approximately 30%. The path intersects with the existing footpath near the upgradient portion of the drainage swale. An alternative option (Option B) would be to extend the switchback around the drainage swale, over the drainage pipe outfalls. Option A is a slightly more direct route and requires a crossing over the drainage swale. The Option B route is a more circuitous route with increased path radii for wider turns that avoid conflicts with activities along the hillside (e.g., sledding in the winter). Option B would likely impact a large diameter *Quercus acutissima* (Sawtooth Oak) species. For either path option, a two foot shoulder is recommended on each side along switchback for the safety of users.

There are two slight meanders as the path approaches South Street to encourage commuters to reduce speed at the crossing. It is recommended that path be graded to meet the grade at South Street; however, a bike and/or stroller ramp could be added with stairs to reduce the amount of grading required. Examples of bike ramps are provided in **Attachment A (Figures A.2 through A.4)** A small gateway would be placed at South Street to provide a visible entrance for users coming from the lower South Street and Archdale Road neighborhood. A crosswalk with appropriate signage would provide a safe connection to the proposed Blackwell Extension Path.

### *Materials*

Within the Arnold Arboretum, where slopes are less 3%, the recommended path material is a crushed stone dust. Where slopes are steeper, bituminous concrete (asphalt) is recommended to minimize potential slope erosion and maintenance, particularly in the switchback sections. The Arnold Arboretum's proposed connection to the path from Peters Hill Road is mulch.

### *Site Amenities*

Way finding signage is recommended where the path exits the MBTA parcel into the Arnold Arboretum for both pedestrians coming from Arborough Road and Peters Hill via the existing footpath and users of the Roslindale Gateway Path. Way finding signage is also recommended at the gateway for users entering from the lower South Street and Archdale Road neighborhood. An interpretive sign is suggested at the location of the *Metasequoias* (Dawn Redwoods) for an education and outreach opportunity for the Arnold Arboretum.

Benches, similar to those along the existing asphalt roadway in Peters Hill, could also be provided in strategic locations along the crushed stone dust portion of the path for viewing

opportunities. Benches are not recommended along the switchback portion of the path due to the existing uses of this area (e.g., sledding) and the existing drainage swale.

Minimal lighting in this section is recommended, to the extent possible, in accordance with the existing lighting policies of the Arnold Arboretum and to discourage nighttime activities in and around the path. Supplemental lighting could be considered in strategic areas to guide users around the switchback portion of the path and illuminate the path or bike ramp and stairs to South Street.

## **Review of Materials and Lighting Options**

### **Materials**

HW reviewed various materials for the pathway that are summarized in **Table 1**. Crushed stone dust is preferred for the Roslindale Gateway Path, due to its natural appearance and low cost. However, as can be seen in the existing Blackwell Path, the material can become rutted and eroded over time, particularly in areas along steeper slopes, and can require frequent maintenance. As a result, bituminous concrete (asphalt) was recommended in portions of the path where slopes are greater than 3%. Porous asphalt is an alternative material option, but is more costly and generally requires more maintenance than standard asphalt. Stabilized soil, which has an appearance similar to crushed stone dust and is used in similar conditions, is not recommended because of the potential chemical additives required and the proximity of the trail to significant species in the Arnold Arboretum. Examples of these materials are shown in **Attachment A (Figures A.5 through A.7)**.

### **Lighting**

HW also reviewed potential lighting options for the different portions of the path. Arnold Arboretum expressed concern with providing electricity for lighting, so solar powered options were primarily evaluated. The evaluated lighting options are summarized in **Table 2**. Of the options available, the photo luminescent pebbles or stones would be able to provide ambient lighting along both the asphalt and crushed stone dust portions of the path. Low profile bollards or in-grade lighting is recommended in areas where additional lighting for safety or navigation is warranted, such as in Section 1 where the path is nearest to the MBTA train tracks or along portions of the switchback in Section 2. Both of these options provide subtle sources of light to avoid compromising on visibility and safety for users. Lighting examples are shown in **Attachment A (Figures A.8 and A.9)**. Motion detection could be considered along the path to temporarily illuminate specific areas as they are being used.

The crossing of South Street to the proposed Blackwell Extension Path is not included in this conceptual design. However, motion sensor lights can be added to crossing signs and in-grade lighting options at the crosswalk to provide a safe connection between the two proposed paths.

**Table 1. Comparison of Possible Path Surface Types**

Surface Type	Construction Cost	Maintenance Costs	Accessibility Issues	Stormwater Runoff	Erosion Issues	Pros	Cons
<b>Hot Mix Asphalt (Pavement)</b>	Medium	Low	Low	High	Low	Low maintenance	Stormwater runoff
<b>Porous Asphalt</b>	High	Medium	Low	Low	Low	Pervious	Periodic vacuuming
<b>Dense Graded Stone / Crushed Stone Dust</b>	Low	Medium	Medium	Medium	Medium	Natural looking	Surface erosion/ sedimentation
<b>Stabilized Soil</b>	Medium	Low	Medium/Low	Medium	Medium/Low	Natural looking	Chemical treatment

**Table 2. Comparison of Lighting Options**

Lighting Type	Pros	Cons	Notes	Cost
<b>Bollard (with conduit)</b>	<ul style="list-style-type: none"> <li>• Will function regardless of weather</li> <li>• Provides large light radius</li> </ul>	<ul style="list-style-type: none"> <li>• Costly</li> <li>• Susceptible to vandalism</li> </ul>		Highest
<b>Bollard Solar</b>	<ul style="list-style-type: none"> <li>• No trench and conduit</li> <li>• Provides large light radius</li> </ul>	<ul style="list-style-type: none"> <li>• Costly</li> <li>• Susceptible to vandalism</li> <li>• May not function well in poor weather</li> <li>• Limited battery life</li> </ul>	Will function with limited sunlight	High
<b>In Grade Solar</b>	<ul style="list-style-type: none"> <li>• No trench and conduit</li> <li>• Less susceptible to vandalism</li> </ul>	<ul style="list-style-type: none"> <li>• Costly</li> <li>• May not function well in poor weather</li> <li>• Does not provide large light radius</li> <li>• May need more to provide adequate path delineation</li> <li>• Can be covered by snow</li> </ul>	Will function with limited sunlight	Medium/High
<b>Photo Luminescent Stones</b>	<ul style="list-style-type: none"> <li>• No trench or conduit</li> <li>• Less susceptible to vandalism</li> <li>• Can provide ambient light for entire path</li> </ul>	<ul style="list-style-type: none"> <li>• May not function well in poor weather</li> <li>• Does not provide large light radius</li> <li>• Can be covered by snow</li> </ul>	Will function with limited sunlight	Low

## Opinion of Probable Costs

An opinion of probable costs was prepared based on the 10% conceptual design plans as shown in **Attachment B** and described within this memorandum. **Table 3** summarizes the costs by section for each type of work to be done. The itemized costs are provided in **Attachment C** for Sections 1 and 2. General notes, assumptions and other qualifications regarding the estimate are provided as footnotes within **Attachment C**.

**Table 3. Summary of Probable Costs for the Roslindale Gateway Path**

Type of Work	Description	Section 1	Section 2 <sup>5</sup>	All Sections
<i>Site Preparation</i> <sup>1</sup>	Mobilization, tree protection	\$12,250	\$4,200	<b>\$16,450</b>
<i>Erosion Control</i>	Protect site from erosion and sedimentation	\$11,000	\$11,000	<b>\$22,000</b>
<i>Site Demolition</i>	Removal of existing structures	N/A	\$5,000	<b>\$5,000</b>
<i>Site Clearing</i>	Clearing and grubbing	\$5,700	\$5,700	<b>\$11,400</b>
<i>Earthworks</i>	Excavation	\$35,000	\$32,000	<b>\$67,000</b>
<i>Stormwater Management</i>	Includes slope stabilization	\$50,000	\$25,000	<b>\$75,000</b>
<i>Path Surface</i>	Grading and installation of paving, boardwalk and crushed stone dust	\$165,000	\$68,500	<b>\$233,500</b>
<i>Site Amenities</i> <sup>2</sup>	Signage, gateways, lighting, misc. items (benches, bike racks)	\$62,500	\$74,000	<b>\$136,500</b>
<i>Landscape</i> <sup>3</sup>	Loam and seed	\$2,000	\$4,000	<b>\$6,000</b>
	Rounded Subtotal	\$344,000	\$230,000	\$574,000
	Contingencies <sup>4</sup>	\$147,900	\$98,900	\$246,800
	<b>Total Estimated Cost</b>	<b>\$491,900</b>	<b>\$328,900</b>	<b>\$820,800</b>

1) Site mobilization/demobilization is included in Section 1 costs, which incorporates mobilization for the entire project. Phasing of the construction of the project would increase costs under Section 2.

2) It is understood that the Arnold Arboretum may provide benches and possibly other site amenities, which are shown as an allowance in Attachment C.

3) It is assumed that this item will cover repair and stabilization of all disturbed areas. Arnold Arboretum will provide additional landscaping within Section 2 for an additional cost not considered with this conceptual design.

4) Contingencies include: construction cost (e.g., project changes and/or unit cost changes); site survey, engineering and design; and construction administration.

5) There are two path layout options available for the switchback shown in Section 2. These costs specifically reflect Option A; however, the costs of Option A and B are comparable.