



Emerald Necklace Bicycle and Pedestrian Crossings

ADVISORY COMMITTEE

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Rob Daves	High Street Hill Association
Guus Driessen	Transportation Board
Kathe Geist	Riverway Island Neighborhood Association
Linda Hamlin	Planning Board
Patrice Kish	Massachusetts Department of Conservation and Recreation
Arlene Mattison	Brookline GreenSpace Alliance
Tommy Vitolo	Bicycle Advisory Committee/Brookline Bikes
* Committee Chair	

TOWN OF BROOKLINE STAFF

<u>Name</u>	<u>Affiliation</u>
Erin Gallentine	Parks and Open Space Director
Peter Ditto	Engineering and Transportation Director
Rob Kefalas	Project Engineer
Todd Kirrane	Transportation Administrator
Jeff Levine	Planning and Community Development Director
Joe Viola	Assistant Director for Community Planning
Heather Charles Lis	Conservation Assistant

To the Board of Selectmen,

On behalf of the Emerald Necklace Bicycle and Pedestrian Crossings Committee (ENBPCC), we are pleased to submit the attached report and accompanying presentation on the analysis of and recommended improvements to five critical bicycle and pedestrian crossings in the Emerald Necklace Park system in Brookline. The impetus for creating the committee and evaluating these difficult crossings was the availability of a SAFETEA LU Federal earmark for improvements specifically at the Route 9/Washington Street crossing in Brookline. While holding public meetings to determine the recommended solution for this priority crossing, it seemed logical to evaluate and make recommendations for improvements to the other problematic crossings within the Emerald Necklace in Brookline, thereby furthering the vision for safe and accessible crossings.

The charge of the ENBPCC is to participate in the Board of Selectmen led public process to develop a recommended conceptual design for each of the following crossings in the Riverway including the associated bicycle and pedestrian pathway connections between them and treatment of the historic landscape: Route 9/Washington Street, River Road/River Road Access Ramp, Brookline Avenue, Parkway Road and Netherlands Road. The ENBPCC in conjunction with the Town of Brookline Engineering and Transportation Division, Parks and Open Space Division and Planning and Community Development Department, worked with professional planning, design and transportation consultants: GPI, Alta Design and Pressley Associates to make recommendations for improvements to five bicycle and pedestrian crossings and associated pathway connections within the project area.

The final recommended designs:

- Increase the connection between the Emerald Necklace Parks included in the project area;
- Improve the ability of pedestrians and bicycles to cross Washington Street swiftly and safely;
- Support and integrate successfully with the Gateway East/Village Square proposed improvements;
- Reduce confusion and improve the overall circulation of all modes; and,
- Make the area more attractive and livable.

Funding in the amount of approximately \$675,000 is currently available for construction of the Washington Street solution in Brookline, MA. This is comprised of \$539,000 in a SAFETEA LU Federal earmark and a possible state match of \$134,985. Successful completion of this project will include a Riverway/Olmsted Park connection that can be fully designed and built and conceptual designs for the Brookline Avenue, Parkway Road and Netherlands Road crossings and connecting bicycle/pedestrian paths that can be completed for future construction as part of a separate project.

Once directed by the Board of Selectmen, the Town of Brookline Engineering and Transportation Division, Parks and Open Space Division and Planning and Community Development Department will continue to work with the consultant team to develop construction bid documents for the Route 9/Washington Street Crossing and submit it for construction through the MADOT Transportation Improvement Program.

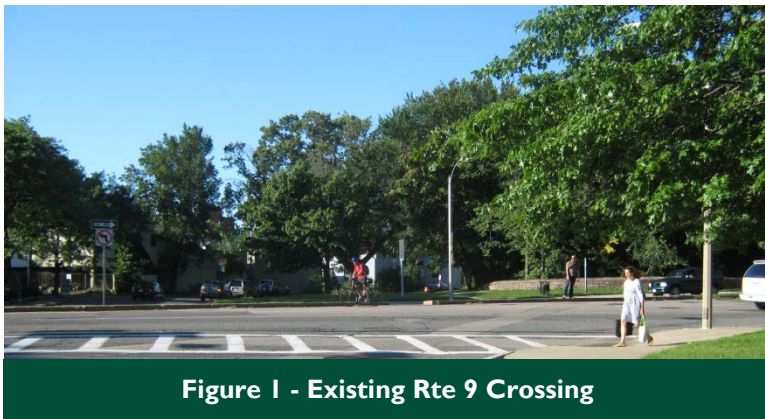
We recommend your support for this project and the associated recommendations so that we can immediately continue work towards a solution for the Route 9/Washington Street crossing through the MADOT process.

Sincerely,

Jesse Mermell
Selectmen

BACKGROUND

The Riverway and Olmsted Park are part of the Emerald Necklace, a 19th century linear park system designed by Frederick Law Olmsted. The parks offer many recreational opportunities and are widely used by bicyclists and pedestrians as a path of travel. The bicycle and pedestrian crossings within the Emerald Necklace in Brookline at Route 9/Washington Street, River Road/River Road access ramp, Brookline Avenue, Parkway Road and Netherlands Road are in need of improvement for accessibility and safety. The paths and crossings are in various stages of deterioration, not designed to current standards, or simply do not exist. The desired end result of this report is to present recommended conceptual plans with estimated construction costs for improved crossings within the Emerald Necklace Parks with emphasis on the Route 9/Washington Street crossing as a priority project to move forward into final design development and construction.



The Riverway and Olmsted Park are separated by Route 9 (Washington Street in Brookline and Huntington Avenue in Boston). The current condition for bicyclists and pedestrians traveling between the Riverway and Olmsted Park is through a break in the median on Washington Street at Pond Avenue and River Road in Brookline. The crossing does not have any signage, pavement markings, or traffic control devices, leading to unsafe crossing conditions and a lack of connection with the rest of the Emerald Necklace.

PROJECT OBJECTIVE

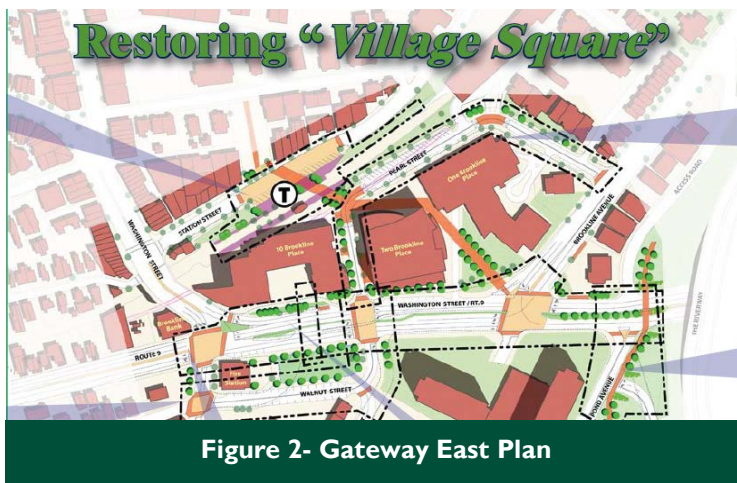
The Town of Brookline would like to explore and recommend safety and connectivity improvement options at all five crossings within the project area and develop a preferred alternative for the Route 9/Washington Street crossing that could be advanced to develop a final design solution and construction documents. The recommendations will:

- Increase the connection between the Emerald Necklace Parks included in the project area;
- Improve the ability of pedestrians and bicycles to safely cross Route 9 (Washington St);
- Support and integrate successfully with the Gateway East/Village Square proposed improvements;
- Reduce confusion and conflicts and improve the overall circulation of all modes, and;
- Make the area more attractive and livable.

INTRODUCTION

There is a clear need for pedestrian and bicycle-crossing improvements along the Emerald Necklace path system in the vicinity of Route 9 in Brookline. The condition has been problematic for many decades and has propagated advocacy for improvements for nearly as long. Bikes Not Bombs and MassBike have held protests; engineering students from Northeastern University have proposed solutions and numerous Town plans and documents have called out for the need for safety and connectivity improvements at this crucial connection in the regional path system. While there has been a great deal of work completed in the last decade to advance facilities for bicycles and pedestrians in both Brookline and Boston; including contra flow bike lanes along Parkway Road and Netherlands Road, the lack of connectivity across Route 9 creates a critical gap in the Emerald Necklace Parkway System.

There are several critical projects that have been completed or are underway that influence this project. The most relevant projects are the Emerald Necklace Master Plan developed by the Department of Conservation and Recreation (DCR) and Pressley Associates (Pressley), the Emerald Necklace Pathway and Crosswalk Treatment Guidelines, as well as the Gateway East project currently being developed by the Town and at the 25% Design level. With Pressley on the GPI Team, the goals and objectives of the Master Plan will be seamlessly incorporated into any conceptual alternatives and final design elements. Furthermore, with their understanding of the DCR's concerns and objectives; cooperation, coordination and consensus with DCR will be simplified.



The Town's Gateway East project is a major undertaking to provide connectivity of the Gateway East area of Brookline. Currently the areas of Station Street, Pearl Street and Washington Street are cut off from the more residential section of Brookline south of Route 9/Washington Street. The existing overhead pedestrian bridge is closed and pedestrians are forced to either cross illegally in the areas of the existing Walnut Street intersection with Route 9 or travel out of their way to cross at either Washington Street/High Street or at the intersection of Route 9 at Brookline Avenue.

The proposed Gateway East design will remove the pedestrian bridge, eliminate the existing intersection of Route 9 at Walnut Street and extend Walnut Street to align opposite Pearl Street. A new signalized four-way intersection will be constructed and provide a viable pedestrian crossing for the corridor. In addition to the new traffic signal at Pearl Street and Walnut Street, the project will include upgrades to the traffic signals at both the Washington Street/High Street/Route 9 and Washington Street at Brookline Avenue intersections and incorporate the three signals into a closed loop coordinated signal system.

One of the critical tasks under Phase I of the Emerald Necklace Bicycle and Pedestrian Crossings is to fully review the proposed signal design and operations as currently designed under the Gateway East 25% Design Plans and ensure that any potential at-grade (signalized or unsignalized) pedestrian and bicycle crossing of Route 9 in the vicinity of Pond Avenue will not hinder operations along the corridor. As such, the operations of the Route 9 at Huntington Avenue signalized intersection in Boston, just to the east of the potential crossing, was also examined and the findings were coordinated with the City of Boston's Transportation Department (BTD).

In addition, in 1999 the DCR (then Metropolitan District Commission) developed full construction documents to provide signalized at-grade crossing of Route 9 at Pond Avenue. However, while the concept of the plan (a signalized crossing of Route 9) was viable, it did not fully address the needs of pedestrian and cyclists. The plan did not modify the geometry of the Pond Avenue/Jamaicaway intersection and did not provide enough queuing area for pedestrians and cyclists waiting to cross Route 9. In addition, if the median were widened by a few feet, it could provide a refuge for cyclists or pedestrians crossing the corridor. The project was never constructed and the area is still regularly utilized as a crossing point by pedestrians and cyclists, even though no formal crossing is present.

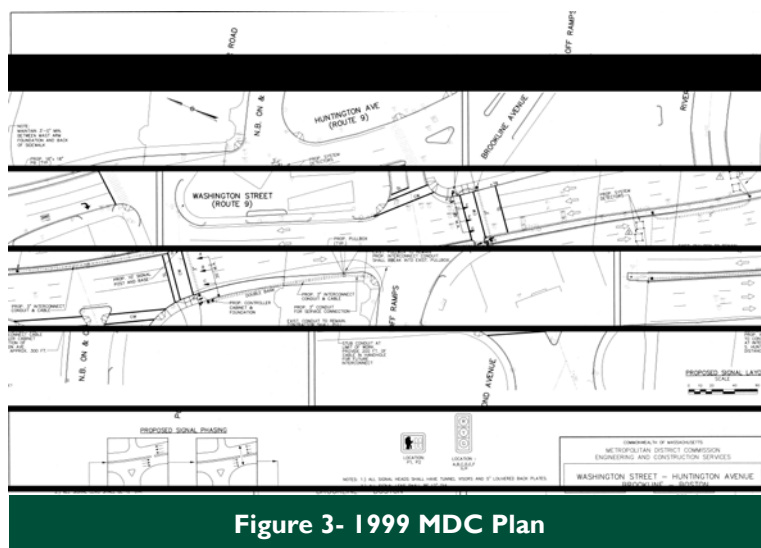


Figure 3- 1999 MDC Plan

STUDY AREA

The study area is depicted in the *Emerald Necklace Crossings Map* on the following page. The critical study areas have been identified as:

- Netherlands Road and Parkway Road
- Brookline Avenue Crossing
- Brookline Avenue – Parkway Road to River Road
- River Road and the Riverway on/off ramps
- Pond Street and the Jamaica Way on/off ramps
- Route 9 At-Grade Crossing
- Riverway/Jamaica Way Bridge Crossing over Route 9

In working toward developing potential alternatives to provide a continuous pathway throughout the Emerald Necklace connecting Olmsted Park to the Riverway, several critical project goals were developed; including:

- Continuity of the path from Netherlands Road to Olmsted Park
- Coherence of the network for bicycle and pedestrian connectivity
- Improve safety for all users, especially at the Route 9 crossing
- Minimize disruption to traffic
- Enhance the park-user experience
- Maintain historic integrity of the Emerald Necklace

Phase I of the study examined the existing conditions, developed alternative enhancement options, and through a cooperative effort of the Advisory Committee, Town of Brookline Staff, Public Participants and Consulting Team, ultimately developed final recommendations for improvements to each of the above critical areas.

Emerald Necklace Bicycle and Pedestrian Crossings

Emerald Necklace Crossings Map

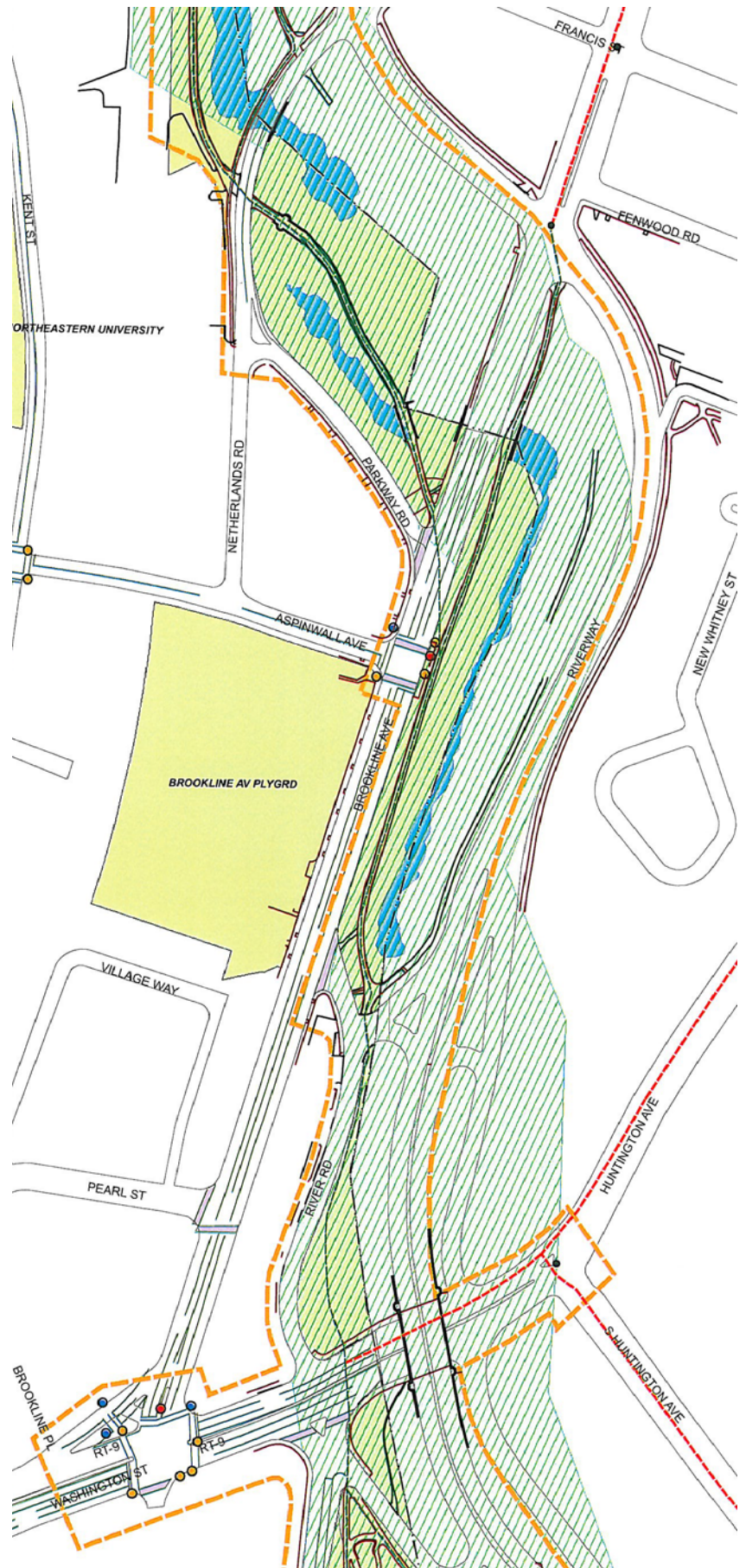


Figure 4 - Emerald Necklace Crossing Map

CONCEPT DEVELOPMENT

Netherlands Road

Along Netherlands Road, the team was tasked with providing a connection from the existing pathway west of Netherlands Road to the Riverway Park existing path as well as providing an enhanced, grade separated ADA compliant pathway to ultimately connect to the existing pathway along Brookline Avenue. As the planning phase developed it became clear that there were two basic alternatives for Netherlands Road between Parkway Road and the Riverway. Alternative 1 included converting Netherlands Road between Riverway and the Town of Brookline Water Department's access drive to a one-way southbound flow and Alternative 2 – examined the potential to completely close this same section of Netherlands Road.

It was critical that the Town maintain two-way access along the portion of Netherlands Road from Parkway Road to the Water Department driveway, as the large vehicles utilized by the Water Department are not permitted on the Riverway. The following is a summary of the findings and recommendations resulting from the planning process:

Alternative 1

Netherlands Road one-way southbound from Riverway to the Brookline Water Department Driveway

The following is a summary of the characteristics associated with the one-way southbound restrictions:

- One-way southbound travel allows the provision of a two-way cycle track along the northerly portion of Netherlands Road while maintaining full access to the Water Department
- A full 10' Shared Use Path can be provided along the easterly side of Netherlands Road to connect to a raised path along the northerly side of Parkway Road as well as to connect with the existing footpath (and stairway) through Riverway Park.
- A raised crosswalk/crossbike would be provided just north of the Water Department driveway to provide a clear crossing path for pedestrians and cyclists as well as to act as a traffic calming element along Netherlands Road and emphasize the location and importance of the crossing to motorists.
- During the morning peak hour, approximately 300 vehicles per hour (vph) would be diverted from Netherlands Road to Brookline Avenue to turn left onto Riverway.
- The additional left turn traffic along the Brookline Avenue northbound approach will increase delays at the traffic signal at the Brookline Avenue/Riverway intersection.
- Modifications to the signal timing and potential lane use modifications and/or restrictions can be implemented to mitigate the impacts of the additional northbound traffic.
- Any modifications to the Riverway/Brookline Avenue intersection will require ongoing coordination with BTM.

APPROXIMATE CONSTRUCTION COST: \$200,000



Figure 5 Alt. 1 – One Way SB

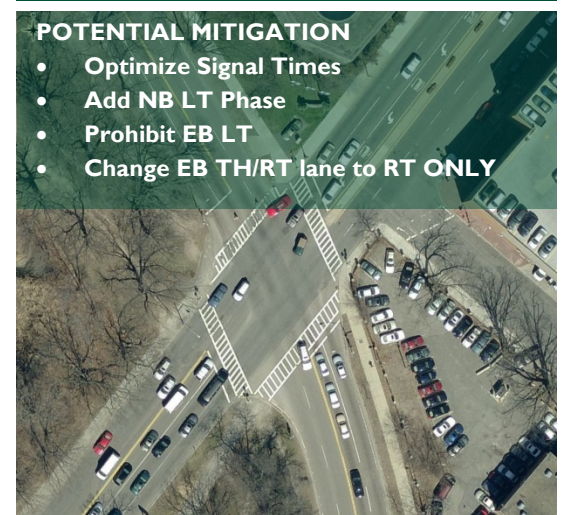


Figure 6 – Brookline Ave at Riverway

Alternative 2

Closing Netherlands Road from Riverway to the Brookline Water Department Driveway

- Alternative 2 examined the potential benefits and impacts associated with completely closing Netherlands Road north of the Water Department Driveway.
- This concept was initially recommended as part of the Emerald Necklace Master Plan; however the closure of Netherlands Road would divert approximately 300 vehicles from Netherlands Road through the already congested intersection of Brookline Avenue at Riverway during the evening peak periods.
- This option would create approximately 8,500 sf of additional park area.
- Cut through traffic along Netherlands Road and Parkway Road would be virtually eliminated.
- A path system connecting a future Riverway path and the path in Brookline would be created.
- More significant mitigation would be required to accommodate additional vehicle traffic at the Brookline Road/Riverway Road intersection.
- Traffic mitigation could include creation of an eastbound dedicated right turn lane along Riverway approaching Brookline Avenue.
- The creation of an additional eastbound travel lane would require converting approximately 5,000 sf of parkland to roadway.
- DCR and Boston Parks are not in favor of impacting the park by converting park area to road use.
- The use of the land for a potential travel lane, would eliminate future use of the bridal path for a pathway along the Boston side of the Muddy River.



Figure 7 - Alt 2 - Full Closure

APPROXIMATE CONSTRUCTION COST: \$300,000

Preferred Alternative – Alternative 1

- It should be noted that the Riverway Island Neighborhood Association (RINA) favors the full closure of the northerly section of Netherlands Road; however, based on the feedback from the Advisory Committee, City of Boston and DCR Alternative 1 (one-way southbound) was ultimately recommended as the Preferred Alternative.
- The one-way option preserved the parkland area adjacent to the Riverway while allowing for a continuous paved path to connect from the existing paved bike path west of Netherlands Road to the proposed pathway system that was developed through this study for Parkway Road and continuing to Olmsted Park.
- Pressley Assoc. has determined that an additional lane would not be consistent with the Emerald Necklace Master Plan - *“This [construction of additional lane approaching Brookline Ave] is not acceptable for two reasons the amount of park land is reduced and the opportunity to have a continuous multi-use*



Figure 8 - Preferred Option (Alt 1)

path is lost. The Emerald Necklace is first and foremost a park system and anything that diminishes its ability to function as a continuous park or that diminishes its historic integrity is not acceptable.” – M. Pressley

Parkway Road – Netherlands Road to Brookline Ave

The Town of Brookline recently implemented striped contra-flow bike lanes along Parkway Road. As part of the Emerald Necklace Bicycle and Pedestrian study, the team was tasked with the goal of providing a continuous, grade separated path connecting the Riverway path west of Netherlands Road to Olmsted Park. The following is a summary of the findings and recommendations resulting from the planning process:

- Because of the topography on the Riverway Park side of the wall on Parkway Road, it would not be feasible to provide a path on the north side of the wall. Therefore, after consultation between Pressley Associates and the Town of Brookline it was determined that a grade separated, 10' path was feasible on the south side of the wall.
- While this would require removal of the trees in the area, it was determined that the trees were in poor condition, and more substantial landscape enhancements that would be more appropriate with the park character, could be provided on the northerly side of the wall to compensate for the removal.
- The proposed cross section would maintain the parking on the southerly side of Parkway Road, provide a 20 ft one-way eastbound travel lane and a raised 10-11 ft path adjacent to the roadway.



Figure 9 - Parkway Road



Figure 10 – Existing Parkway Rd Looking East



Figure 11 – Proposed Parkway Rd Looking East

APPROXIMATE CONSTRUCTION COST: \$450,000

Parkway Road/Aspinwall Avenue Crossing of Brookline Avenue



Figure 12 - Bus Stop and Path at Aspinwall Ave/Brookline Ave

While there is an existing pathway through the Emerald Necklace on the easterly side of Brookline Avenue from River Road north to Riverway, with a signalized pedestrian crossing at the Aspinwall Avenue/Brookline Avenue intersection and the addition of the contra-flow bike lanes along Parkway Road, there is a desire for both pedestrians and cyclists to cross Brookline Avenue in this area. However, there is currently no compliant connection from the pathway system to the crosswalks and/or bus stops in the area and pedestrians and cyclists are forced to traverse across an unpaved slope with significant vertical obstructions as well as a vertical curve along Brookline Avenue. The team was tasked with exploring potential alternatives to provide a safe and efficient crossing of Brookline Avenue in this area. The following is a summary of the findings and recommendations resulting from the planning process:

- In exploring alternatives for this crossing, the impacts of a dedicated path system within Boston along the westerly/southerly side of the Riverway were raised by both Committee and Public participants.
- While a path along the Riverway in Boston may reduce the demand for a crossing of Brookline Ave at this location (it would be assumed that path traffic would utilize the traffic signal at Brookline Avenue/Riverway to cross Brookline Avenue), discussions with the City of Boston indicated that such a path is not planned for the near future. Furthermore, the goal of this project is to provide an interconnected pathway through the Emerald Necklace within Brookline, connecting Olmsted Park with Riverway Park. Therefore, alternatives to provide a safe and efficient crossing at this location were developed.
- The team explored both signalized and unsignalized crossing options, with the committee and public favoring the added protection of a signalized crossing. Because the pathway is proposed to cross Brookline Avenue at the Parkway Road intersection, it was necessary to examine the entire Aspinwall Avenue/Brookline Avenue/Parkway Road area as one signalized intersection.
- While both intersections would be signalized, the operations would be controlled by one traffic controller, resulting in the intersections and crossings functioning as a single traffic signal system, providing pedestrian accommodations to cross Brookline Avenue.
- Based on available survey provided by the Town of Brookline, with minor reconstruction of the sidewalk in the vicinity of the crosswalks, fully compliant ADA access can be achieved throughout this area.
- While the grade separated path will provide access for pedestrians and cyclists using the Emerald Necklace pathway system, there will likely still be cyclists desiring to travel along Brookline Avenue. To accommodate on-street cyclists desiring to cross Brookline Avenue at this location, consideration



Figure 13 - Signalized Crossing of Brookline Ave

could also be given to incorporating a “bike box” and “crossbike” treatment as part of the reconstruction.

- Based on a review of the traffic operations as well as the geometrics of the area, a fully ADA compliant, signalized crossing could be provided at this location.
- Based on the need to provide a safe and efficient crossing of Brookline Avenue, signalizing the Parkway Road intersection to provide an enhanced bicycle and pedestrian crossing is recommended.
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.



Figure 14 - Cross Bike Crossing Treatment

APPROXIMATE CONSTRUCTION COST: \$350,000

River Road/Brookline Avenue/Riverway On and Off Ramps

Currently pedestrians and cyclists are utilizing River Road as a path to connect from Route 9 (Olmsted Park) to the existing path on Brookline Avenue. One of the most significant conflict areas occurs at the on and off ramps from River Road to the Riverway. With the existing geometry of the ramp system in combination with the geometry of the Brookline Avenue/River Road intersection and the presence of a long pedestrian/cyclist crossing, contribute to a confusing area. The team was tasked with exploring alternatives to improve the safety and efficiency of the pathway system through this area; including the feasibility of potentially closing one or both ramps to provide a continuous pathway system. The following is a summary of the findings and recommendations resulting from the planning process:

- GPI collected traffic counts under existing conditions and determined that there is minimal traffic (less than 20 vehicles during the peak periods) utilizing the off-ramp from the Riverway to River Road.
- Based on a review of the Gateway East plans, because of the proposed elimination of the westbound to eastbound U-turn movement at the intersection of Route 9 at Brookline Avenue, westbound vehicles on Route 9 will no longer be able to access the Riverway southbound via the Pond Avenue on-ramp and will need to utilize River Road and the River Road on-ramp for this access.
- Temporary ramp closures were conducted in April 2012 and traffic operations were observed. It was determined that the closure of the off-ramp had minimal impacts on existing traffic volumes and travel patterns.



Figure 14 – Existing River Rd/Brookline Ave/Riverway Intersection

- Discussions with DCR indicated that they would support closure of the Riverway SB off-ramp to River Road.
- Reconfigure the Brookline Avenue/River Road/Riverway on-ramp area to reduce the pavement area, slow the turning movements, reduce the pedestrian crossing area and create a more traditional “T” intersection at both intersections.
- The recommended plan includes closure of the SB Off-ramp from Riverway to River Road
- Additional parkland and greenspace can be provided.
- The additional greenspace can also be examined for future stormwater treatment options such as detention ponds, rain gardens, drainage swales, etc.
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.

**Figure 15 - Reconfigured Intersection**

APPROXIMATE CONSTRUCTION COST: \$300,000

River Road – Route 9 to Riverway On Ramp

River Road currently functions as a default path connecting Olmsted Park on the south to the Brookline Ave pathway to the north. As evident by the worn dirt paths on the westerly side of the park wall, pedestrian and cyclists are demonstrating a clear desire to have an enhanced pathway system along the roadway. The team was tasked with exploring the existing character, land uses, parking, traffic circulation and geometric constraints along River Road to determine the feasibility of providing a formal pathway within the corridor. The following is a summary of the findings and recommendations resulting from the planning process:

- River Road provides access for approximately 300 vehicles during the peak hours
- One-way circulation was explored for both southbound only and northbound only movements.
- The businesses along River Road communicated that two-way traffic is currently needed and that parking for customers and employees is critical.
- Restricting to northbound only travel was not feasible since there would be no reasonable way for vehicles from the west, traveling eastbound to access River Road.
- Restricting to southbound only was not feasible for several reasons including;

**Figure 16 - Existing River Road**

- Rerouting the 300 vehicles per hour through the traffic signal at Brookline Avenue at Route 9 resulted in significantly increased delays and queues along the westbound approach.
- Southbound only access would prohibit large vehicles from having access to Route 9 eastbound as the U-Turn at Brookline Avenue is proposed to be eliminated under the Gateway East project and trucks are prohibited from utilizing the Riverway.
- Town officials had discussions with the abutters on River Road who expressed support for the development of a path and park improvements along the corridor but were concerned about changes to the 2-way traffic pattern and the loss of parking along the corridor.
- The right of way along River Road transitions to a pinch point of approximately 38 ft just south of the Riverway on-ramp.
- The recommended plan for River Road would maintain on-street parking and two way travel.
- The 38 ft right of way pinch point would allow for two-way flow with two, 10 ft travel lanes, a 7 ft parking lane and an 11 ft pathway adjacent to the stone wall.
- As the right of way increases south of this pinch point additional park space and landscaping can be provided between the River Road pavement surface and the proposed path adjacent to the wall.
- Landscaping and visual enhancements along this corridor were identified as critical concerns during the public process and the Advisory Committee expressed their concern that more parkland should be reclaimed along the Riverway as part of the improvements. Therefore it is also recommended that the Town assess the impacts of reducing parking for approximately 200' (10 spaces) south of the Riverway on-ramp to provide a landscaped buffer between the roadway and the proposed path.
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.



Figure 17 - Proposed River Road Path

APPROXIMATE CONSTRUCTION COST: \$325,000

Riverway Bridge over Route 9 & Pond Avenue/Jamaica Way Ramps

The Riverway Bridge over Route 9 has been discussed for years as an alternative to provide a connection of the Emerald Necklace path system across Route 9. While the bridge is not located within the Town of Brookline and is owned and maintained by MassDOT, the team was tasked with exploring the feasibility of utilizing the bridge to provide pedestrian and/or bicycle access over Route 9 while connecting the Olmsted Park path system with the pathway system (existing and/or proposed) north of Route 9 and ultimately to connect with the Riverway Park system. The following is a summary of the findings and recommendations resulting from the planning process:

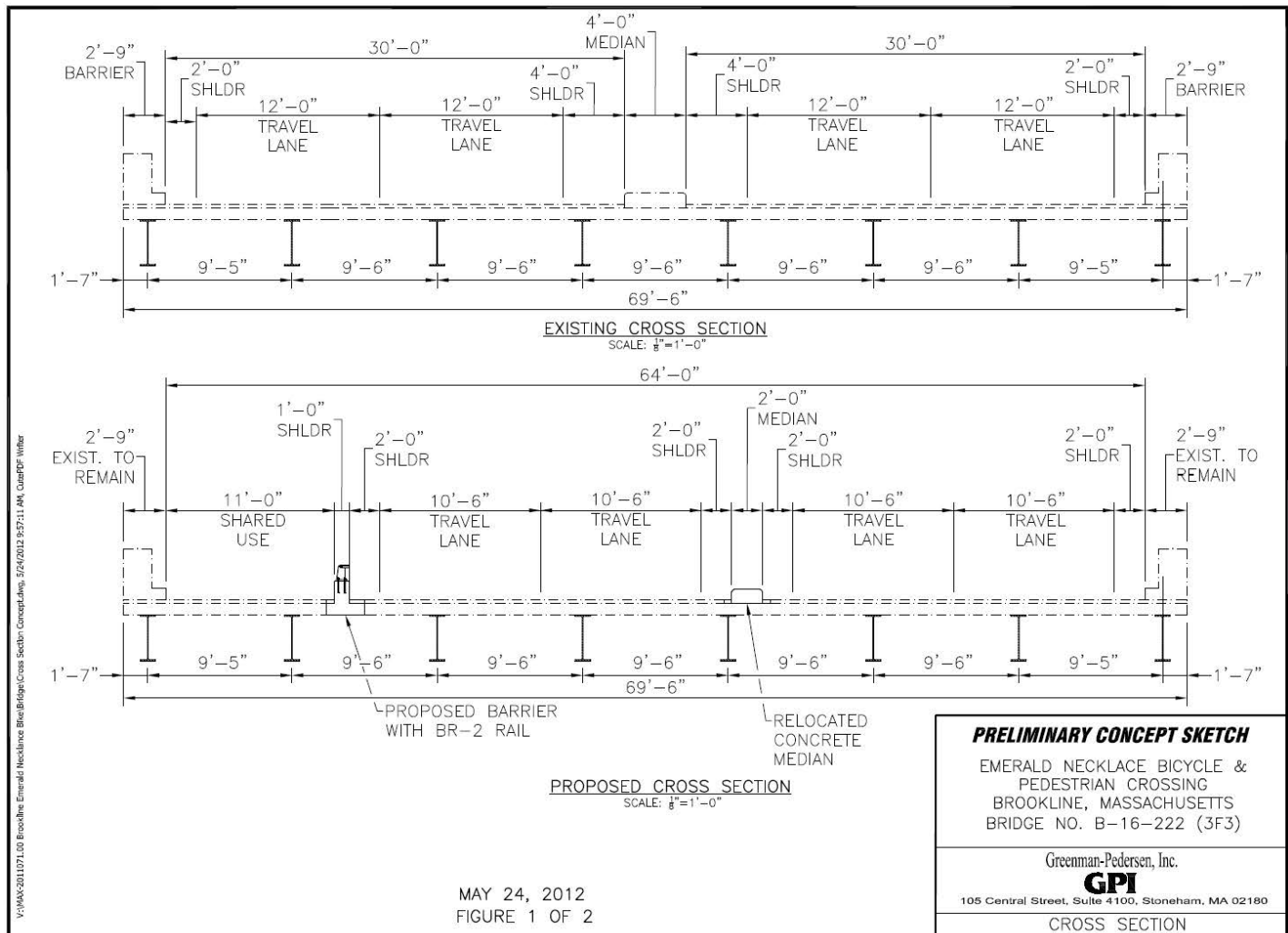


Figure 18 - Existing and Proposed Bridge Cross Section Views

- Based on available data from MassDOT the bridge is actually a steel beam bridge with a stone façade to simulate an arch stone bridge.
- Based on the available bridge plans, the curb to curb distance on the bridge is approximately 64 ft consisting of 2 ft right shoulders, 2-12 ft travel lanes, 4 ft left shoulders and a 4 ft raised median.
- Without altering the width of the travel way, the 64 ft could be reconfigured to provide 2 ft right shoulders, 2-10ft 6 inch travel lanes, 2 ft left shoulders and a 2 ft raised median. This would allow for construction of an 11 ft shared use path on the westerly side of the bridge with a 1 ft raised crash barrier separating the path from the road.

- Because the condition of the bridge deck and bridge substructure is unknown it is difficult to accurately estimate the costs associated with the reconfiguration of the bridge.
- If the bridge deck and substructure are all in useable condition with minor rehabilitation, the above lane configuration could be constructed for approximately \$90,000.
- If the substructure is suitable but the entire deck requires replacement, the costs could increase to approximately \$2.5 million.
- Finally, if the entire substructure is deficient and the entire bridge requires replacement, the costs to increase to nearly \$20 million.
- If a path were feasible over the bridge, the connection to the Olmsted Park pathway system and the pathway system along the Jamaica Way would require a crossing of the on and off ramps to Pond Avenue. The safety of this crossing was a major concern to both members of the public and Committee members.
- The team evaluated the potential to close both on and off ramps between the Jamaica Way and Pond Avenue or at a minimum to close the off-ramp to reduce conflicts between exiting vehicles and path users.
- Temporary ramp closures were implemented and traffic patterns and volumes were observed along the area roadways in April 2012. Closure of these ramps resulted in additional delays and congestion along the Jamaica Way, particularly at the intersection of Jamaica Way at Willow Pond Road where southbound queues in the afternoon extended to the Brookline Avenue intersection. The southbound Jamaica Way approach to Willow Pond Road experienced an increase in traffic of approximately 70% and Willow Pond Road experienced an increase in traffic of approximately 26% during the evening peak hours with the Pond Avenue off ramp closed.
- Based on the traffic impacts to area roadways and intersections resulting from the Pond Avenue ramp closures as well as the fact that the path crossing the upper (Jamaica Way) portion of the ramps would not be constructed until a path across the bridge becomes feasible, it was recommended that the Pond Avenue Ramps remain open.
- Should a path across the bridge become feasible, the closure of the ramps as well as potential mitigation at additional area intersections should be reexamined.



Figure 19 - Potential Path Across Bridge

Route 9 At-Grade Crossing

The primary focus of this project was to establish a safe and efficient crossing of Route 9 to provide the first phase of a continuous pathway system to connect the Emerald Necklace Park system from Olmsted Park on the south to the Riverway Park to the north. The current at-grade crossing of Route 9 is deficient in numerous ways including; lack of defined crosswalk, lack of ADA compliant access, lack of sufficient storage and refuge areas, and lack of proper designation as a pathway crossing associated with the Emerald Necklace.

The team was tasked with developing concepts to establish a true crossing at this location that would not negatively impact the planned Gateway East project to the west nor negatively impact the operations of the Huntington Avenue/South Huntington Avenue traffic signal just to the east in the City of Boston. The following is a summary of the findings and recommendations resulting from the planning process:

- Traffic data including vehicle and pedestrian counts were completed at the Brookline Avenue, Pond Avenue and Huntington Avenue/South Huntington Avenue intersections to assess the impacts of both a signalized and unsignalized at-grade crossing on the existing traffic signals along Route 9.
- The proposed Gateway East 25% Design Plans and traffic signal operations as well as future traffic signal timing changes planned for implementation by BTM at the Huntington Avenue intersection were reviewed to assess the impacts of a signalized and unsignalized at-grade crossing.
- The geometrics of the Pond Avenue/Jamaica Way Ramps and Washington Street intersection were reviewed.
- The corporate boundary between the Town of Brookline and City of Boston was reviewed to determine jurisdiction and project limits.
- The existing Olmsted Park pathway system was reviewed to ensure an at-grade crossing could connect with the existing infrastructure and be consistent with the Emerald Necklace Master Plan.
- Based on a review and analysis of traffic operations, geometric conditions and Master Plan recommendations; two alternatives were developed for an at-grade crossing. Alternative 1 provides a signalized crossing and Alternative 2 provides an unsignalized crossing. Both alternatives provide essentially the same geometric layout.



Figure 20 - Existing Rte 9 Crossing



Figure 21 - Proposed Rte 9 Crossing

- As part of the at-grade crossing it is recommended that the Pond Avenue intersection with Route 9, as well as the Jamaica Way on and off ramps, be reconstructed.
- The preferred option includes shifting Pond Avenue to the west to the maximum extent possible. This provides the greatest separation between vehicles turning right from Pond Avenue and the proposed crosswalk location.
- Realignment of the Jamaica Way Ramps to the south provides a clear separation from Route 9 and allows for a smaller crosswalk area and the potential to provide a raised crosswalk across the ramp.
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.
- Aesthetics and continuity are a critical concern along the Emerald Necklace path system; therefore, it is desirable to have any new traffic signal equipment consistent with the recent pedestrian signal installation at the Jamaica Way/Elliott Street intersection in Jamaica Plain. If approved by MassDOT, the signal will be designed to accommodate use by both pedestrians and bicyclists and provide similar black, ornamental signal equipment with “count down” pedestrian signals.

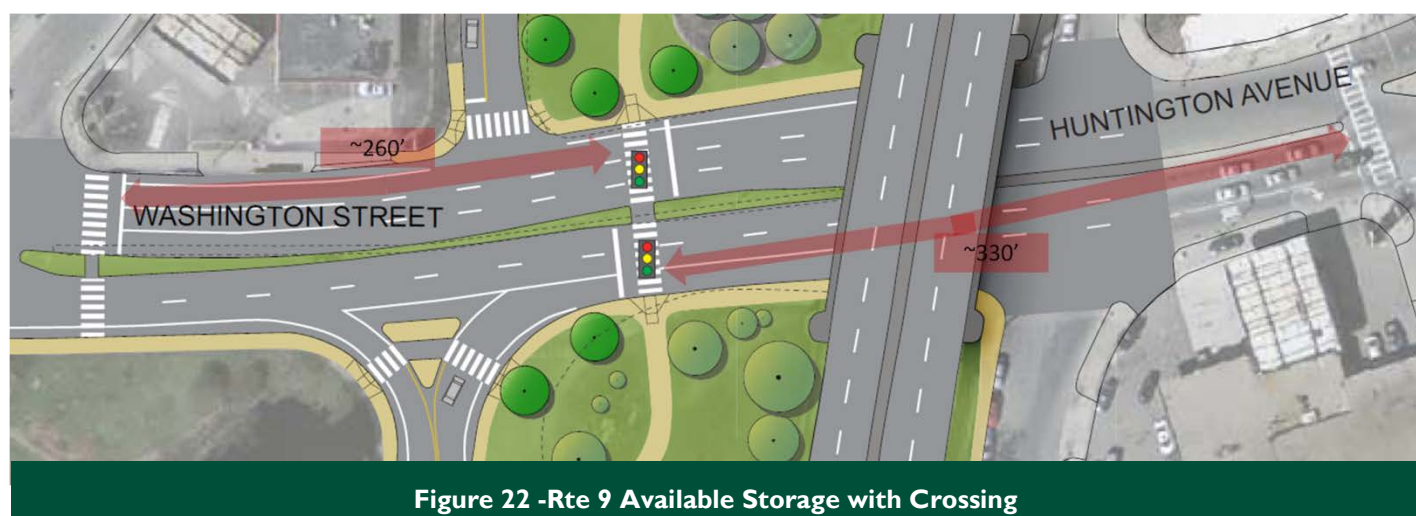


Figure 22 -Rte 9 Available Storage with Crossing

Direction	Approaching	Available Storage	AM Queue		PM Queue	
			Ave	95 th %	Ave	95 th %
WB	Brookline Ave	260	132	173	340	393
EB	S. Huntington Ave	330	307	437	222	265
EB	Crosswalk	260	~330 ft	153	15	81
WB	Crosswalk	330		152	178	m168

- Analysis of the traffic operations indicates that the expected queuing of vehicles along Route 9 between Brookline Avenue and South Huntington Avenue can generally be accommodated within the available area with the installation of a pedestrian actuated traffic signal just east of Pond Avenue.
- The proposed Route 9 crossing has been discussed with the City of Boston's Transportation Department. They are supportive of the concept and have reviewed the initial traffic analysis.
- The project will be coordinated with BTM throughout the design phase.
- Traffic signal operations will continue to be modified throughout the design as the plans for Gateway East are further designed and refined and as the City of Boston modifies operations along Huntington Avenue.

APPROXIMATE CONSTRUCTION COST INCLUDING POND AVENUE RELOCATION: \$900,000

OVERALL RECOMMENDATIONS

Netherlands Road and Parkway Rd

- One-Way southbound to Water Department
- Raised 10-11' path along north side of Parkway Rd
- Coordination with BTD on Riverway/Brookline Ave signal modifications
- Grade separated path between roadway and wall
- Explore landscaping enhancements on north side of wall
- Construction cost: \$450,000



Parkway Road at Brookline Avenue

- At grade signalized crossing at Parkway Rd/Brookline Ave intersection
- Aspinwall Ave and Parkway Rd will operate as one signal
- Continue coordination with City of Boston on potential Riverway Path
- Construction cost: \$350,000
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.



River Road Ramps

- Close off-ramps to River Rd and reconfigure River Rd/Brookline Ave/Riverway intersection
- Construction cost: \$300,000
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.



River Road

- Maintain 2-way flow and parking
- Provide 11' minimum multi-use path adjacent to wall
- Consider removal of limited parking to provide landscape buffer
- Construction cost: \$325,000
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.



Pond Ave Ramps

- Maintain on/off ramps to/from Pond Ave and reexamine closure/other alternatives when a path becomes a reality over the bridge

Rte 9 Crossing

- Advance signalized crossing of Rte 9 to MassDOT 25% Design Stage
- Continue coordination with BTM
- Construction cost: \$900,000
- This area also offers opportunities for reducing impervious cover and improving stormwater management, helping protect the Muddy River.



