Wakefield/Lynnfield Rail Trail Feasibility Study

Towns of Wakefield and Lynnfield, MA

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September 2007

Executive Summary

The goal of this Feasibility Study was to determine the feasibility of developing a rail trail (shared-use path) along the former Boston & Maine Railroad corridor in the towns of Wakefield and Lynnfield. The Massachusetts Bay Transportation Authority (MBTA) now owns the corridor. The 4.4-mile Wakefield/Lynnfield Rail Trail begins at the Galvin Middle School on Main Street in Wakefield and extends to the Lynnfield/Peabody Town line. Approximately 1.9 miles of the trail is located in Wakefield and 2.5 miles in Lynnfield. It is important to note that this corridor is the southern section of the former Newburyport Railroad and, by connecting to Peabody, is planned to be part of the regional Border to Boston Trail, a proposed 30-mile trail linking eight Essex County communities – Danvers, Wenham, Topsfield, Boxford, Georgetown, Newbury, Newburyport and Salisbury.

The Study outlines the corridor's potential as a rail trail and assesses the key design issues involved with the conversion process, including anticipated project impacts, required environmental clearances and rail trail design related issues.

The major issue identified and addressed as part of the Study in Lynnfield is the challenge created by utilizing the existing rail bed to cross Reedy Meadow. In Wakefield, in addition to the design of the intersection of the trail with local roadways, the major issue is addressing proposed parking at the southern trailhead.

Reedy Meadow is part of the Saugus River watershed. This area has exhibited a natural eutrophication process that caused the marsh to fill in over time and has become overgrown as a meadow. This process has been accelerated by development in surrounding areas. Portions of the rail bed in Reedy Meadow flood during large storm events. This is caused in part to culverts under the rail bed being clogged. Several viable solutions have been developed for this area to minimize the environmental impacts and make this outstanding natural area accessible to the public.

In Wakefield, one of the main concerns was potential parking areas for rail trail users. The existing parking in the Main Street/ Water Street (Rte 129) area is already strained in the downtown business area. Utilizing 40-scale mapping, two parking areas were developed, one at Richardson Street adjacent to Main Street, and one at Water Street. Due to the availability of Town owned property, both of these lots can be expanded based on future demands.

The environmental screening completed as part of the Study closely mirrors MassHighway's 25% Design Early Environmental Coordination for Design Projects checklist. The screening evaluated wetland & water resources, cultural & historic resources, and hazardous materials along the project corridor. Critical areas identified during this screening included wetland resource areas, endangered species, and a cluster of known contamination issues in the vicinity of Water Street (Route 129) in Wakefield. Such critical areas warrant the need for location specific solutions and the implementation of mitigation measures designed to avoid/minimize impacts as a result of trail development. This approach will respect the concerns of regulatory agencies and streamline the permitting process.

Based on a review of this information, a conceptual rail trail design was developed which includes the proposed trail cross sections, at-grade intersection treatments, parking facilities and access points, mitigation measures and trail enhancements. The preliminary construction cost estimate for the 4.4-mile rail trail is approximately $4.4 million.

Collectively, the existing conditions information presented in the Study supplemented with the consultant's design recommendations will assist both Towns in developing an implementation plan for designing, permitting, and constructing the rail trail.

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1 Introduction

1.1 Regional Overview

The Wakefield/Lynnfield Rail Trail corridor is the southern section of the former Newburyport Railroad that connected Wakefield to Newburyport. It is important to note that this corridor connects, via Peabody and Danvers, to the Border to Boston Trail, a proposed, 30-mile rail trail (or shared use path) linking eight Essex County communities – Danvers, Wenham, Topsfield, Boxford, Georgetown, Newbury, Newburyport and Salisbury, Massachusetts. As envisioned, this trail will connect areas of cultural, economic, social and natural significance along the multi-community corridor and provide a non-motorized transportation alternative for residents, workers and tourists of all ages and abilities.

1.2 Project Area Description

The proposed Wakefield/Lynnfield Rail Trail extends from the Galvin Middle School in Wakefield north to the Lynnfield/Peabody Town Line, a distance of approximately 4.4 miles, as shown on the Locus Map on the following page. Approximately 1.9 miles of the trail is located within Wakefield and 2.5 miles in Lynnfield.

As the proposed terminus of the trail is at Galvin Middle School in Wakefield, the section of abandoned railroad corridor between Bennett Street and the active Massachusetts Bay Transportation Authority (MBTA) commuter rail will not be used.

The proposed trail follows the former Boston & Maine Railroad corridor, which is now owned by the MBTA. According to the Rail Road Valuation Maps, the existing corridor varies in width from 40 to 80 feet wide along its length.

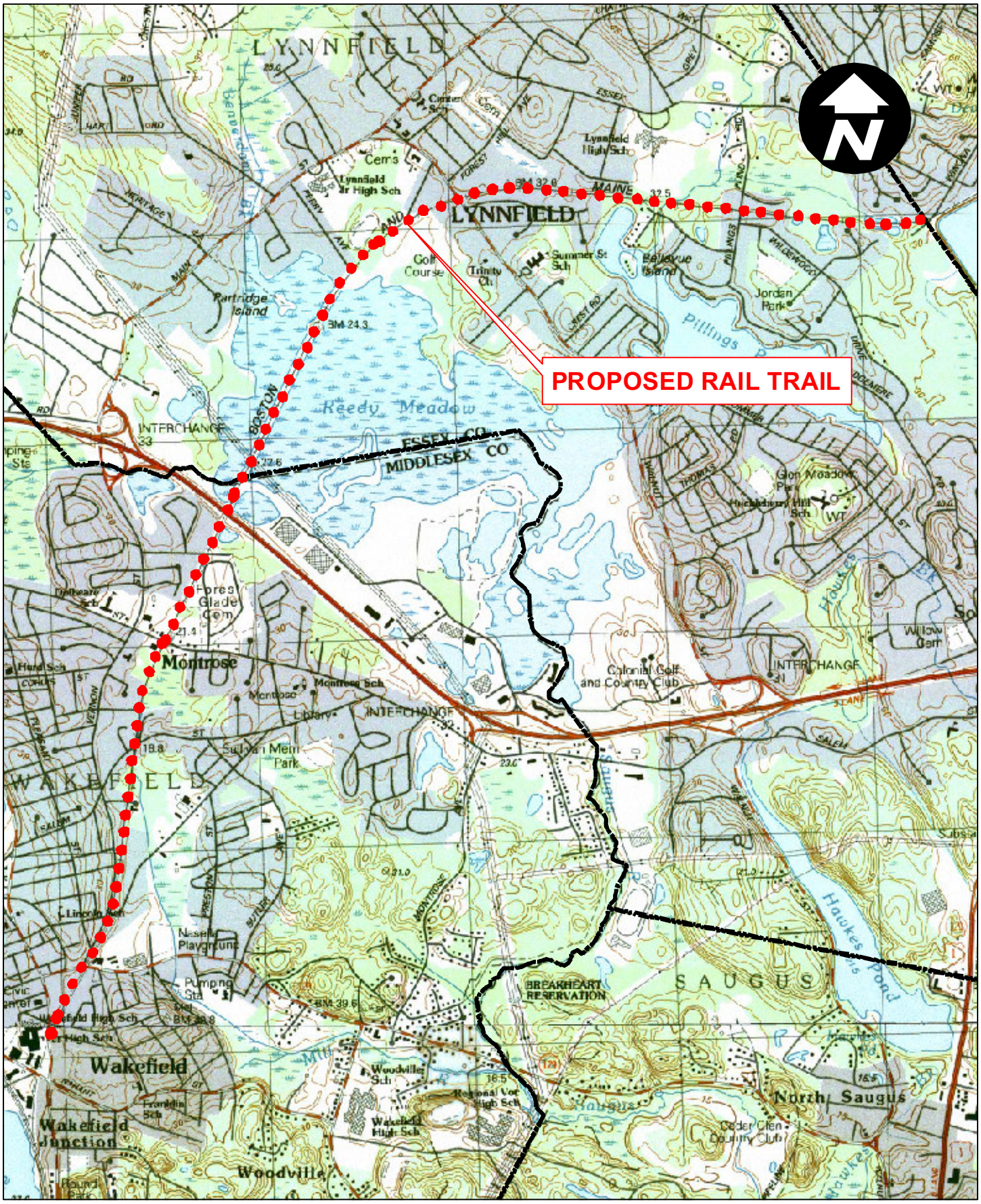
Detailed base mapping of the project corridor is included in Appendix A.

1.3 Connections

The proposed rail trail will connect residential neighborhoods with commercial areas and provide improved bicycle and pedestrian access to the following destinations:

- Galvin Middle School, Wakefield
- MBTA Commuter Rail Station, Wakefield
- Elizabeth E. Boit Retirement Home, Wakefield
- Dolbeare Elementary School, Wakefield
- Reedy Meadow National Natural Landmark, Lynnfield
- Reedy Meadow Golf Course, Lynnfield
  Lynnfield Middle School, Lynnfield
- Summer Street Elementary School, Lynnfield
- Lynnfield High School, Lynnfield

It is important to highlight that the trail improves access to five (5) schools along the project corridor. This access matched with safer crossings will enable more children to safely walk and bike to school – a major step towards establishing a safe route to school (SRTS) program.



Boston North and Reading USGS Quads

Scale: 0 1,250 2,500 Feet

LOCUS MAP
Wakefield/Lynnfield Rail Trail
Wakefield & Lynnfield, Massachusetts

1.4 Study Purpose

The purpose of this study is to determine the feasibility of developing a rail trail (or shared use path) along the Wakefield and Lynnfield portions of the former Boston & Maine Railroad corridor.

The primary goals of this study are to:

- Assess existing conditions along the corridor
- Evaluate and document potential environmental impacts
- Discuss key design and constructability related issues
- Develop design and construction cost estimates

Ultimately this study will assist Town officials and residents to determine their willingness, readiness and fiscal ability to proceed with the rail trail project.

2 Railroad History

The project corridor was part of the Newburyport Railroad which ran between Wakefield and Newburyport. The following is a brief historical perspective on the role the railroad once played in Essex County.

Shortly after the initial trio of Massachusetts railroads (the Boston & Lowell, the Boston & Worcester, and the Boston & Providence) were chartered in the early 1830s, a fourth rail line which would connect Boston with Salem was proposed. This proposal was met with stiff opposition from existing stagecoach, freight wagon, and packet boat operators, and the attempt to obtain a charter was rejected in 1833. In an effort to broaden support for the railroad, its backers next proposed a line from Boston through Salem to Newburyport, Portsmouth, and Portland. This strategy proved to be successful, and the Eastern Railroad was chartered in 1836. Construction began late that year. The line reached Salem in 1838, Ipswich in 1839, and Newburyport in 1840. Later that same year, service began to Portsmouth, New Hampshire, with the ultimate destination of Portland being achieved in 1842.

Only a few years later in the mid 1840s, Newburyport residents sought an alternative to the monopolistic practices of the Eastern Railroad through the construction of a new railroad that would provide them with a second connection to Boston and other destinations. The railroad that resulted from this desire to introduce competition was built as three separate lines. The first of the three was called the Newburyport Railroad, receiving its charter in 1846 to construct a line westward from Newburyport to the community of Georgetown. Construction of this initial 8.5-mile section of railroad was initiated at Pond Street in the center of Newburyport in 1849 and completed to Georgetown in 1850. The Newburyport Railroad crossed the main line of the Eastern Railroad at a location south of Newburyport's center below Parker Street.

In 1851, the second of the three railroads, called the Danvers & Georgetown Railroad, was chartered to extend the line south to Danvers, a distance of 12 miles. Construction began in 1853 and was completed in 1854. Agreement was reached for the Newburyport Railroad to operate this latter line even before it opened. In 1855, the Danvers & Georgetown officially merged into the Newburyport Railroad.

The third and final component of the new line was chartered in 1852 as the Danvers Railroad. It constructed, beginning in 1853, a 9.5-mile line from Danvers to a connection with the Boston & Maine Railroad at Wakefield Junction. The Boston & Maine leased the Danvers before operation of the Danvers began. The goal of an alternative route to Boston was realized in 1854 when the Newburyport Railroad and the Boston & Maine Railroad began operation of through passenger and freight service over the route in competition with the Eastern Railroad. Shortly thereafter, the Boston & Maine took control of the Newburyport, and formally leased it in 1860.

Competition between the Boston & Maine and the Eastern continued for years. Both railroads evolved into rail systems as they gained control of other railroads. The rivalry ended in 1875 when the Eastern effectively went bankrupt. After years of negotiations, court battles, and political intrigue, the Boston & Maine leased the entire Eastern system in December 1884. Even after this point, service was still provided over both routes from Newburyport to Boston.

The Boston & Maine first proposed complete abandonment of the Newburyport in 1924. Faced with opposition from passengers and shippers, the railroad withdrew its application for abandonment, but cut service to two daily round-trip passenger trains between Newburyport and Boston. By 1940, the Boston & Maine petitioned to the Interstate Commerce Commission to abandon that portion of the Newburyport north of Topsfield. Approval was received and the line was officially abandoned between Topsfield and the crossing of the former Eastern main line in Newburyport in December 1941. The MBTA has owned the Wakefield/Lynnfield portion of the rail corridor since 1976.

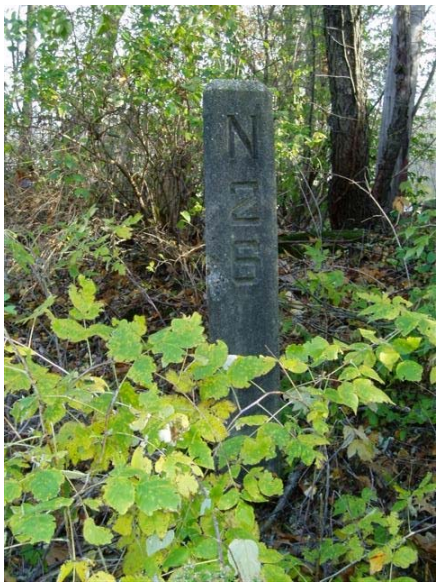


Figure 1: Newburyport Railroad Mile Post (Distance to Newburyport)

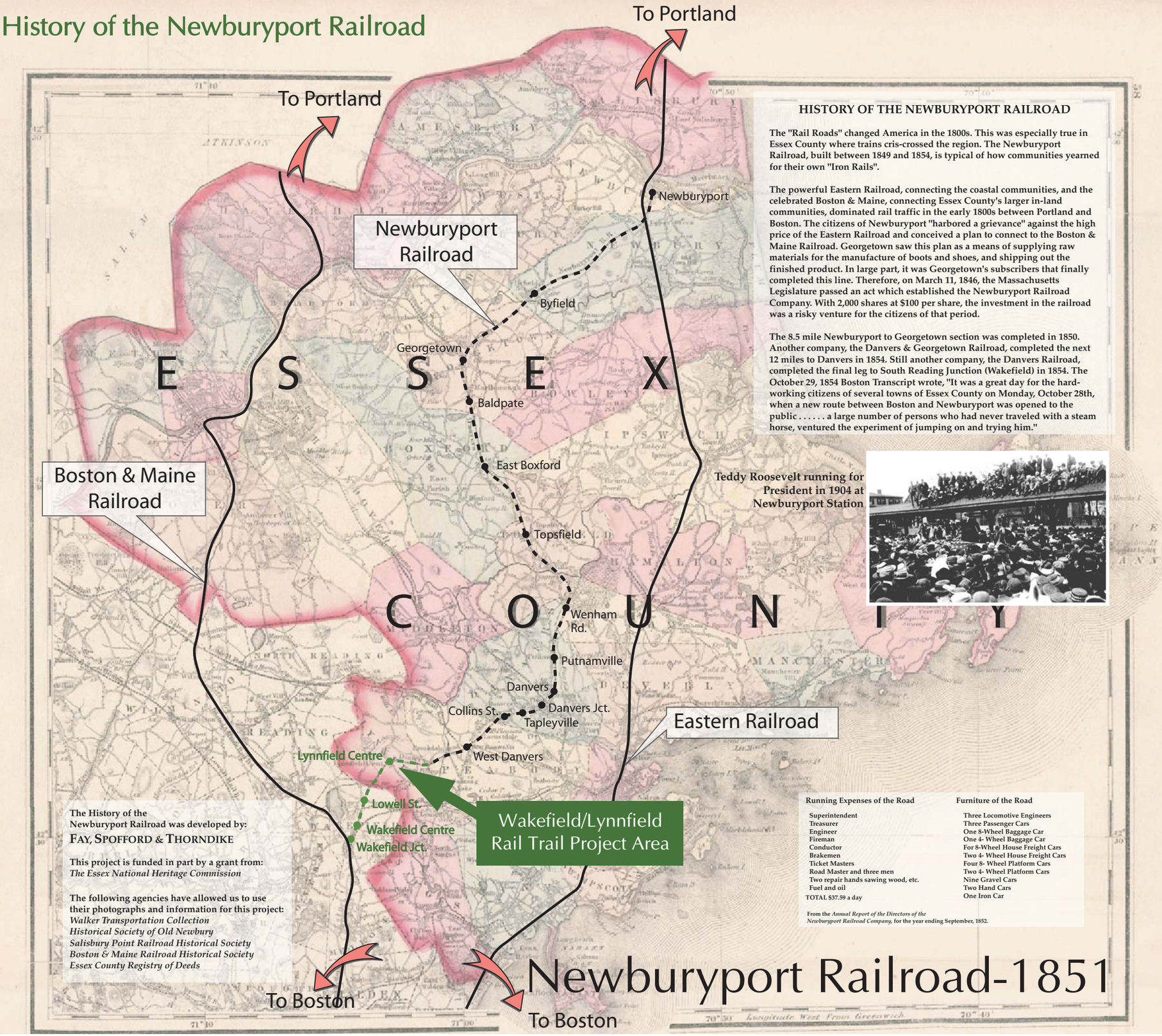
Figure 2: Newburyport Railroad Mile Post (Distance to Boston)

The Newburyport Railroad mile post, shown in Figures 1 and 2, identifies that this location is 25 miles from Newburyport and 14 miles from Boston.

Shown on the following page is a graphic that illustrates the history of the railroads in Essex County. This graphic highlights the history of the Newburyport Railroad on an 1851 map.

The history of the railroads should be told to the public in the form of interpretive trailside exhibits along the corridor.

History of the Newburyport Railroad



HISTORY OF THE NEWBURYPORT RAILROAD

The "Rail Roads" changed America in the 1800s. This was especially true in Essex County where trains cris-crossed the region. The Newburyport Railroad, built between 1849 and 1854, is typical of how communities yearned for their own "Iron Rails".

The powerful Eastern Railroad, connecting the coastal communities, and the celebrated Boston & Maine, connecting Essex County's larger in-land communities, dominated rail traffic in the early 1800s between Portland and Boston. The citizens of Newburyport "harbored a grievance" against the high price of the Eastern Railroad and conceived a plan to connect to the Boston & Maine Railroad. Georgetown saw this plan as a means of supplying raw materials for the manufacture of boots and shoes, and shipping out the finished product. In large part, it was Georgetown's subscribers that finally completed this line. Therefore, on March 11, 1846, the Massachusetts Legislature passed an act which established the Newburyport Railroad Company. With 2,000 shares at $100 per share, the investment in the railroad was a risky venture for the citizens of that period.

The 8.5 mile Newburyport to Georgetown section was completed in 1850. Another company, the Danvers & Georgetown Railroad, completed the next 12 miles to Danvers in 1854. Still another company, the Danvers Railroad, completed the final leg to South Reading Junction (Wakefield) in 1854. The October 29, 1854 Boston Transcript wrote, "It was a great day for the hard-working citizens of several towns of Essex County on Monday, October 28th, when a new route between Boston and Newburyport was opened to the public . . . . . a large number of persons who had never traveled with a steam horse, ventured the experiment of jumping on and trying him."

Teddy Roosevelt running for President in 1904 at Newburyport Station

Running Expenses of the Road	Furniture of the Road
Superintendent	Three Locomotive Engineers
Treasurer	Three Passenger Cars
Engineer	One 8-Wheel Baggage Car
Fireman	One 4- Wheel Baggage Car
Conductor	For 8-Wheel House Freight Cars
Brakemen	Two 4- Wheel House Freight Cars
Ticket Masters	Four 8- Wheel Platform Cars
Road Master and three men	Two 4- Wheel Platform Cars
Two repair hands sawing wood, etc.	Nine Gravel Cars
Fuel and oil	Two Hand Cars
TOTAL $37.59 a day	One Iron Car

From the *Annual Report of the Directors of the Newburyport Railroad Company,* for the year ending September, 1852.

The History of the Newburyport Railroad was developed by:
FAY, SPOFFORD & THORNDIKE

This project is funded in part by a grant from:
The Essex National Heritage Commission

The following agencies have allowed us to use their photographs and information for this project:
Walker Transportation Collection
Historical Society of Old Newbury
Salisbury Point Railroad Historical Society
Boston & Maine Railroad Historical Society
Essex County Registry of Deeds

Lynnfield Center Station

Wakefield Center Station

Lowell Street Station, Wakefield

Lowell Street Station, Wakefield

3 Environmental Resources

The purpose of this section is to identify potential environmental issues early in the rail trail development process.

LEC Environmental Consultants (LEC) of Wakefield conducted a field investigation to confirm information from existing source materials and expand the natural resource database associated with the rail trail corridor. A discussion of the environmental resources associated with the rail corridor and regulatory information pertaining to these resources is presented in the following sections.

Development of this corridor into a rail trail will require measures to avoid and minimize impacts to adjacent environmental resources. Site-specific designs aimed at the protection of these resources will be needed to enable a rail trail to coexist within this diverse resource base. This corridor provides an excellent opportunity to educate its users about the importance of natural resources conservation.

3.1 Wetland Resources

A number of Wetland Resource Areas protectable under the Federal Clean Water Act, Massachusetts Wetlands Protection, and the Lynnfield Wetlands Protection Bylaw[1] are present along the length of the proposed rail trail in Wakefield and Lynnfield. These Wetland Resource Areas include:

- Bordering Vegetated Wetlands (BVW)
- Isolated Vegetated Wetlands (IVW)
- Bank associated with Intermittent and Perennial Streams
- Land Under Waterbodies and Waterways (LUW) associated with perennial streams and ponds
- Riverfront Area associated with perennial streams, including the Saugus River and Beaver Dam Brook
- Bordering Land Subject to Flooding (BLSF), otherwise known as the floodplain.

Commencing at Wakefield Center, the Mill Brook, an unnamed Perennial Stream, and associated BVW and Riverfront Area are located east of the rail bed roughly between Finch Court and the Forest Glen Cemetery. BVW, Riverfront Area, and BLSF associated with the Saugus River are located within the Reedy Meadow, an expansive wetland system that extends from Route 128 to the terminus of Perry Avenue. The outer limits of several additional BVWs and/or IVWs and Riverfront Area associated with an unnamed Perennial Stream occur between Pillings Pond and the Lynnfield/Peabody town line (see Figure 3).

Figure 3: Perennial Stream to Pillings Pond

[1] The town of Wakefield does not have a home rule Wetlands Protection Bylaw and therefore the local Conservation Commission enforces the Massachusetts Wetlands Protection Act.

While culverts associated with the Saugus River, Beaver Dam Brook, and other channels within the Reedy Meadow are present beneath the rail bed, due to the subsidence, water frequently flows across the rail bed and in response to spring high water and/or storm events. Figures 4 and 5 show the flooded trail following the 2006 "Mother's Day" storm. This situation is exacerbated by lack of maintenance to the culverts and beaver activity within Reedy Meadow.

Figure 4: Flooded Corridor North of Route 95/128

Figure 5: Saugus River Overflow Towards Wakefield Under the Route 95/128 Bridge

3.2 Wildlife Habitat

FST contacted both the United States Department of Interior Fish and Wildlife Service (USFWS) and the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (DFW-NHESP) regarding the known presence of any federally or state-listed rare species along the rail trail corridor. The response letter from each agency is included in Appendix B.

In a letter from USFWS dated July 12, 2007 the USFWS stated that "based on information currently available to us, no federally-listed proposed, threatened or endangered species or critical habitat under the jurisdiction of the US Fish and Wildlife Service are known to occur in the project area(s)."

Correspondence received from the DFW-NHESP dated July 6, 2007 indicates that Priority and Estimated Habitat for four state-listed species occurs within the "project site or a portion thereof." These species include the common moorhen (Gallinula chloropus), a Species of Special Concern; the king rail (Rallus elegans), a Threatened Species; and the American bittern (Botaurus lentiginosus) and glaucous sedge (Carex livida), two Endangered Species. The habitat for these species occurs at two locations: 1) within the Reedy Meadow and 2) within a BVW south of Underhill Road in Lynnfield Center. Review of the Natural Heritage Atlas and the MassGIS NHESP Data Layer indicate that both certified vernal pools (CVP) and potential vernal pools (PVP) are located within wetlands adjacent to the proposed rail trail. No CVPs of PVPs are located in close proximity to the rail trail in Wakefield; however, several CVPs and PVPs are located within close proximity to the portion of the rail trail located within Lynnfield. These CVPs and PVPs are located within the Reedy Meadow, southeast of the Lynnfield High

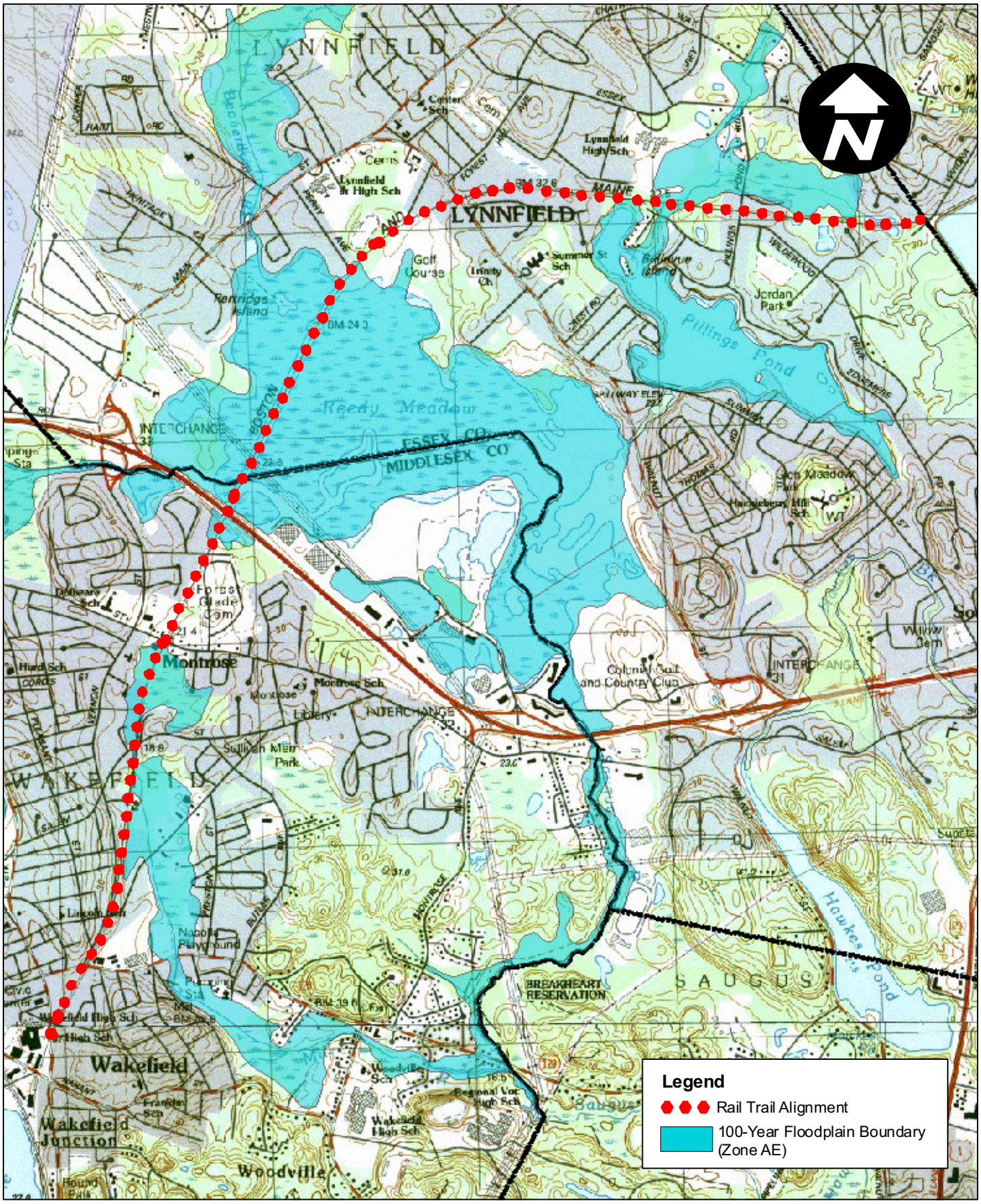
School, at the terminus of Northway Street, south of the rail trail, and just before the terminus of the rail trail at the Lynnfield/Peabody town line.

Habitat for generalized wildlife not afforded protection under the federal or state endangered species statutes also occurs within Reedy Meadow and the wetlands along the length of the rail trail. Further detail regarding the importance of this habitat will be described in the following section.

Boston North and Reading USGS Quads

Scale: 0 1,250 2,500 Feet

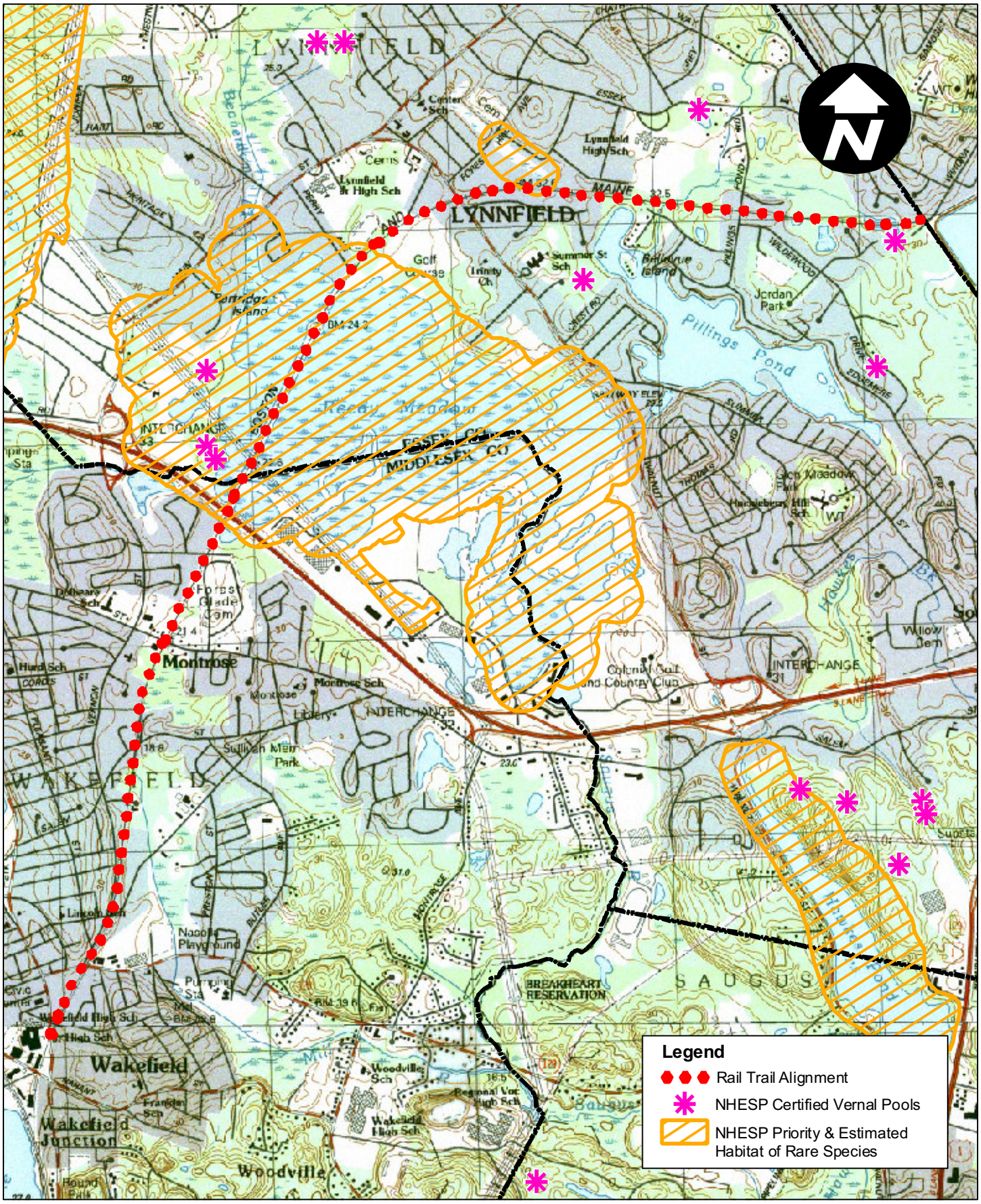
WETLAND RESOURCES MAP
Wakefield/Lynnfield Rail Trail
Wakefield & Lynnfield, Massachusetts



Boston North and Reading USGS Quads

Scale: 0 1,250 2,500 Feet

FLOODPLAIN MAP
Wakefield/Lynnfield Rail Trail
Wakefield & Lynnfield, Massachusetts



Boston North and Reading USGS Quads

Scale: 0 1,250 2,500 Feet

WILDLIFE HABITAT MAP
Wakefield/Lynnfield Rail Trail
Wakefield & Lynnfield, Massachusetts

4 Environmental Permitting

As documented in the previous section, the project corridor parallels and traverses several environmentally sensitive areas. Accordingly, the project will require environmental permit applications to be filed in accordance with local, state and federal statutes and regulations.

The following is a list of the anticipated environmental permits.

- National Environmental Policy Act (NEPA)
- Massachusetts Environmental Policy Act (MEPA)
- Massachusetts Wetlands Protection Act (MGL. c. 131 s 40), its implementing *Regulations* (310 CMR 10.00), and Lynnfield Wetlands Protection By-Laws
- Federal Clean Water Act (33 U. S. C., part 1344) and Regulations (33 CFR and 40 CFR)
- Massachusetts Clean Water Act (MGL, c. 21, §.26-53) and Regulations (314 CMR 4.0)
- Massachusetts Endangered Species Act (MGL. c. 131A., MESA) and its implementing Regulations (321 CMR 10.00) [2]
- NPDES General Permit for Discharges from Construction Activities

The proposed rail trail will require permits and/or review with regulators to determine if a permit is required for all of these statutes and regulations.

4.1 National Environmental Policy Act (NEPA)

As most rail trail projects involve Federal funds (TEA-21), compliance with NEPA will be required. However, since bikeway construction infrequently results in significant environmental impacts, it automatically is classified as a Categorical Exclusion (CE). Therefore, except in unusual circumstances, rail trail projects do not require Federal Highway Administration (FHWA) approval. With specific respect to this project, FHWA approval is not anticipated to be required.

[2] The regulatory standards under the Massachusetts Endangered Species Act and Regulations do not specify thresholds that automatically require a permit; rather NHESP has established a Project Review process whereby a determination is made on project-by project-basis if a permit is required.

4.2 Massachusetts Environmental Policy Act (MEPA)

The MEPA office is part of the Executive Office of Environmental Affairs (EOEA). The purpose of MEPA is to provide an opportunity early in project design for state regulatory agencies to comment on a proposed project prior to the filing of permits. An Environmental Notification Form (ENF) or Environmental Impact Report (EIR) is required to be submitted to MEPA if:

- The project is subject to MEPA review (e.g. the project is undertaken by an Agency [of the Commonwealth]
- Involves State Agency Financial Assistance or requires an Agency Action/Permit); and
- Environmental impacts or review thresholds as referenced in the MEPA regulations are exceeded.

Although there are many review thresholds for all types of projects from airports to electric generating facilities, the two most common thresholds to trigger an ENF for rail trails are as follows:

- Creation of 5 or more acres of impervious area. This translates to 4.2 miles for a 10-foot wide trail. The surface area quantity will increase if the two proposed paved parking areas in Wakefield are included as part of the project.
- Alteration of 5,000 or more square feet of bordering or isolated wetlands. Trail construction is not expected to impact greater than 5,000 square feet of vegetated wetlands.

Accordingly, the need to file an ENF primarily will depend upon the presence/absence of financial assistance from the Commonwealth, the need for State agency permits, width of the proposed trail surface along the 4.4-mile corridor, and inclusion of impervious parking areas as part of the project.

Although a determination can not be made until a preliminary design has been established, we do not anticipate the filing of a Draft and Final Environmental Impact Report (DEIR/FEIR) under the Massachusetts Environmental Policy Act (MEPA).

4.3 Massachusetts Wetlands Protection Act and the Lynnfield Wetlands Protection Bylaw

Based on a preliminary review of the site and traversing portions of the rail trail bed, the majority of the proposed work will occur within the Buffer Zone to BVW and/or IVW, within 100-feet of Vernal Pools. This work will require the filing of a Notice of Intent (NOI) Application with the Wakefield and Lynnfield Conservation Commissions. The most significant permitting hurdle will be construction of the rail trail within the BVW, Riverfront Area, and BLSF (floodplain) to Reedy Meadow and within the Riverfront Area to the Mill River and the unnamed Perennial Stream. Significant sections of the rail trail throughout the Reedy Meadow have subsided over time and the rail bed is no longer elevated above the BVW or BLSF (floodplain).

If the project proposes to fill BVW, which seems unavoidable, then an alternatives analysis must be conducted to avoid, minimize, and mitigate (310 CMR 10.55) and it is likely that the Conservation Commission and/or DEP will require completion of a wildlife habitat evaluation in accordance with the Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands (March 2006). If the amount of BVW alteration exceeds 5,000 square feet, the proposed project would be required to meet the criteria to be deemed a limited project under 310 CMR 10-53 (3).

In this case with the presence of a BVW, the Regulations state that "where a Bordering Vegetated Wetland occurs, it extends from said wetland" [310 CMR 10.57 (2) (a)]. However, filling within the BVW must also protect the interests of all other wetlands including the function of flood storage; therefore, filling within the floodplain must be addressed either way. Additionally, if greater than 5,000 square feet of BLSF is altered, then a wildlife habitat evaluation is also required for work within the BSLF looking at habitat criteria similar to that of the BVW.

Work to create the rail trail will occur within Riverfront Area associated with the Mill River, the Saugus River and Beaverdam Brook (Reedy Meadow), and an unnamed Perennial Stream; a minimum of three locations along the rail trail. This work is unavoidable if the rail trail is to be constructed within the footprint of the existing rail bed right-of-way. The rail trail within the vicinity of the Mill River and the unnamed Perennial Steam is more or less in tact; however, the portion of the rail trail within Reedy Meadow is overgrown in many areas functioning in a nature capacity to provide Riverfront Area functions. An Alternatives Analysis evaluating cost, existing technology, proposed use, and logistics [310 CMR 10.58 (4) (c) 1.] must be conducted to avoid, minimize, and mitigate impacts to Riverfront Area to prevent adverse impacts to the Riverfront Area.

Work within Bank and Land Under Waterway will also be required to repair or replace culverts to allow continued flow of the Saugus River and other streams throughout the length of the rail trail. This work will also require a wildlife habitat analysis for the alteration of Bank as the total length of such work would exceed the threshold for such an analysis of 50 linear feet [310 CMR 10.54 (4) (a)5.]. It is highly unlikely that such an analysis would be required for the alteration of Land Under Waterway as this threshold is 5,000 square feet or 10% whichever is greater [310 CMR 10.56 (4) (a) 4.]

Recommendations:

There are a number of wetland resources that will be impacted as part of the proposed rail trail as well as associated performance standards and evaluations to be conducted in order for the rail trail to be permitted under the Wetlands Protection Act. Careful attention should be granted to these wetlands and evaluations to ensure the project can comply with the requirements, by avoiding, minimizing, and mitigating for such impacts. Early in the design process, pre-application meetings should be scheduled with both the Wakefield and Lynnfield Conservation Commissions to review and discuss the proposed rail trail and obtain their input.

4.4 Federal Clean Water Act and Massachusetts Clean Waters Act

If the proposed work exceeds certain thresholds, primarily that associated with greater than 5,000 square feet of BVW alteration, an application to obtain 401 Water Quality Certification with the Department of Environmental Protection and a 404 Programmatic General Permit with the Army Corps of Engineers will be required. 401 Water Quality Certification adds an additional level of state review and requires an alternative analysis similar to those already required under the Wetlands Protection Act. Additionally, the Army Corps of Engineers standards for providing wetland replacement are more stringent than those under the Massachusetts Wetlands Protection Act and would require a greater level of documentation to ensure the wetland replacement area will effectively become a wetland and increased post establishment monitoring (5 years instead of the 2 years under the Wetlands Protection Act).

Recommendations:

As noted above, careful attention to construction measures to avoid, minimize, and mitigate for such impacts should be evaluated early in the process. Additionally, a joint pre-application meeting should be scheduled with DEP and ACOE within the same time frame as meeting with the local Conservation Commissions.

4.5 Massachusetts Endangered Species Act (MESA)

At a minimum, Project Review with the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species Program (DFW-NHESP) would be required in order for the NHESP to make a determination if the project will result in a “take” of any of the state-listed species associated with the project site. A “take”, in reference to an animal, means to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, or to disrupt nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct. In reference to plants, a “take” means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct.

Based on the mapping of four listed-species for this site, the NHESP would likely select one of two avenues for authorization of the project under the Massachusetts Endangered Species Act. The NHESP could determine that based on incorporating certain conditions, that the project would not result in a take and issue a Conditional No-Take Letter. If the NHESP were to determine that the project will result in a “take” then a Conservation and Management Permit would be required in order to ensure that impacts to the local population of the species were avoided, minimized, and mitigated and that the project would result in a net benefit to the species in Massachusetts.

Recommendations:

Coordination with DFW-NHESP is critical at the beginning of the design phase for the rail trail project. Based on the state listed species contained in the DFW-NHESP correspondence, it seems unlikely that an initial field survey would be required for any of the state listed birds; however, a field survey will likely be required to determine if the glaucous sedge is present within or nearby the footprint of the proposed work. These types of vegetative field surveys must be conducted while the species is in bloom and/or seeds in order to positively determine presence/absence to the species level. Early coordination with DFW-NHESP would include review of the proposed improvements, discussion of measures to avoid, minimize, and mitigate potential long or short term impacts to the listed species, a determination if a presence/absence survey for glaucous sedge would be required, discussions regarding any potential long or short term impacts to the species of its habitat, and input from NHESP at the early design stage to address rare species concerns early in the process.

4.6 NPDES General Permit for Discharges from Construction Activities

Phase II of the National Pollutant Discharge Elimination System (NPDES) Stormwater program was published in the Federal Register on October 8, 1999. As outlined in Phase II, any construction activity that will disturb one or more acres and has the potential to have a discharge of stormwater to a water of the United States must either have a permit or have qualified for a waiver. Construction activity refers to actual earth disturbing construction activities and those activities supporting the construction project such as construction materials or equipment storage, maintenance, measures used to control the quality for stormwater associated with construction activity, or other industrial stormwater directly associated with construction activity.

Construction of the rail trail would exceed the 1-acre disturbance threshold set forth under NPDES and therefore require a permit. In order to apply for permit coverage the operator (Town or contractor) will need to submit an NOI, Stormwater Pollution Prevention Plan (SWPPP), and documentation of eligibility to the Environmental Protection Agency (EPA). The SWPPP details construction activities, erosion control measures, and inspection schedules to be implemented during construction to ensure that the construction activities do not have an adverse impact on wetlands and waterways.

Both Wakefield and Lynnfield have a partially regulated small municipal separate storm sewer system (MS4). Phase II requires operators of regulated small MS4s to implement and enforce a program that will address stormwater runoff from new development and redevelopment projects that disturb greater than one acre and discharge to the municipal system. As part of this minimum control measure, the Town performs a preconstruction review of proposed stormwater management BMPs. Accordingly, this project will be reviewed to determine if the proposed stormwater BMPs are adequate.

Recommendations:

It is recommended that input from each Town's Department of Public Works and Conservation Commission be solicited during the preliminary design phase regarding proposed stormwater BMPs.

5 Reedy Meadow Marsh

The purpose of this section is to discuss the design issues and recommendations associated with aligning the rail trail through Reedy Meadow Marsh.

Without doubt, the biggest issue facing the Wakefield and Lynnfield Rail Trail Committees is utilizing the existing rail bed to cross Reedy Meadow. However, this will also be the most rewarding, as this will provide the trail user with tremendous views as well as access to a vibrant marsh system.

Unfortunately there are hydraulic issues that face not only the Reedy Meadow Marsh, but also the existing Saugus River watershed area, which crosses the marsh. Fortunately, one of the recommendations to correct the flooding issues will dovetail perfectly with the construction of the rail trail. That is, create new drainage channels through to rail bed to alleviate the flooding upstream of the railroad bed dam. It is also recommended that the elevation of the rail bed at the Route 128 underpass be raised. This will eliminate the "backwater affect" flooding of the Saugus River Watershed into Wakefield.

To address this issue, the Saugus River Watershed Committee was formed who commissioned the "Saugus River flood Control Improvements Report" in March 1992. As this is a rail trail feasibility study and not a hydraulic report, we have summarized pertinent portions of the report to give the reader a general overview of the issues. We should note that after our review of the report, there are clearly several outstanding issues dealing with the existing rail bed

- There are only three culverts under the rail bed, which must carry all flows from the 7.5 square mile drainage area upstream of the rail bed. Not only are these inadequate, but also they are typically clogged with debris.

- The culvert carrying Beaverdam Brook under the rail bed, is 4.6 feet lower than the spillway at the Saugus River Dam. This is also well below the normal water level of the marsh.

- The results of the hydraulic issues are reduced flow capacity at the rail bed, flooding in this area of the marsh, and backwater flow through the Route 128 bridge causing flooding in Wakefield.

Following are pertinent excerpts from the "Saugus River Flood Control Improvements Report":

"FINDINGS:

The results of our evaluation of the Saugus River data, flooding history, and causes of the flooding problems is consistent with many of the findings of the previous flood studies, but different in many respects as well. The overall character of the flooding is well documented and generally found to be as follows:

1. *Most of the Saugus River may be characterized as being very flat and sluggish flowing with several large marshy areas that have the ability to store large volumes of flood waters. These areas include the area above the Reading drainage canal, Reedy Meadow, areas along the Mill River, and areas both upstream and downstream of Route 1. This storage capacity is a critical element of the watershed hydrology that helps maintain flows throughout the system at relatively low rates.*

2. *The area surrounding the majority of the Saugus River waterway is heavily developed. In many areas the development has encroached into land that was originally floodplains -- the low-lying land adjacent to the waterways or marches that are periodically subject to flooding. Development in areas such as Perry Avenue in Lynnfield, Paon Boulevard in Wakefield, and Route 1 in Saugus is often most subject to flooding, drainage problems, or high groundwater levels due to the fundamental nature of the land it is built on.*

3. *The Saugus River dam is located at the outlet of Reedy Meadow, at the Colonial Hilton. Operation of the two sluice gates on the dam control the release of water downstream and subsequently affect water levels upstream of the dam in the meadow. The sluice gates allow the passage of water in two directions: diversion into Hawkes Pond for Lynn's water supply, or directly downstream to the Saugus River. The diversion capacity is currently limited by the flat grade of the diversion canal, and inability to regulate Hawkes Pond water levels for flood control purposes.*

4. *The Reedy Meadow area in Wakefield and Lynnfield is exhibiting a natural eutrophication process that causes a marsh to fill in over time and become overgrown as a swamp or meadow. This process has been accelerated by development activities in the surrounding area that produces heavy nutrient and sediment loadings. This is a slow, insidious process that will continue over time to reduce the flow carrying capacity of the stream channels passing through the marsh.*

5. *The channel system through Reedy Meadow has become restrictive to flows due to a clogging of the culverts through the B&M Railroad embankment which bisects the meadow, and through clogging of the stream channels with sediments and vegetation. These factors greatly contribute to the normally high water levels that occur in the upper reaches of the meadow.*

6. *The lack of consistent channel maintenance to keep the channels at an appropriate flow section is a problem throughout much of the Saugus River system. This appears to be due, in part, to the multi-jurisdictional the nature of this watershed. The Saugus River receives storm runoff from 8 communities that comprise the watershed, and the Saugus River itself forms the corporate boundary between two of the communities for a significant portion of its length. Additionally, a critical link in the system is the Saugus River Dam, which is*

operated and controlled by the City of Lynn for purposes other than flood control. The need for a multi-community entity to oversee the flood control improvements and future maintenance of the system will be vitally important to the success of the program.

7. *The flooding problem in the upper Mill River area beginning near Fosters Lane is due to overflows coming in from interconnections with the Reedy Meadow in the area of the Route 128-Railroad underpass. While these inflows also contribute to flooding downstream on the Mill River, the flooding downstream of New Salem Street is primarily due to a backwater affect extending back along the virtually flat slop of the river from its confluence with the Saugus River.*

RECOMMENDED IMPROVEMENTS:

<u>Beaverdam Brook Area</u>
This area consists of developed areas in Lynnfield adjoining Reedy Meadow and Beaverdam Brook. Several areas along Main Street to the west and in the Wirthmore Lane and Perry Avenue area to the east directly abut the meadow's wetlands and in some cases appear to include former floodplain lands that were filled in the past as the town developed. Chronic problems with high water tables and with flooding were reported to be increasing in frequency, until channel restoration work by the town in the mid-1980's seems to have had a beneficial affect.

This area shows that the potential for continued high surface and groundwater levels are due to the very slight differences in grade from this side of Reedy Meadow to the outlet at the Saugus River Dam at the Colonial Hilton, and to the damming effect of the B&M railroad embankment that crosses the entire meadow from Route 128 to Lynnfield Center. The invert of the 5' x 2.6' Beaverdam Brook culvert at Main Street is at an elevation of 71.9', the same elevation as the spillway at the Saugus River Dam which provides very little channel slope over the mile distance to the dam through the meadow. Heavy vegetation and silted stream channels create an inconsistent slope through the meadow. The invert of the 54" diameter CIP culvert at the railroad embankment is at elevation 67.3 feet, which is well below the normal water level in the marsh.

Our field observations have shown that all three B&M railroad culverts located in the marsh, including those in the Beaverdam Brook area, have been operating at greatly reduced flow capacity due to clogging with debris and sediment. These culverts must carry all flows from the 7.5 sq. mi. drainage area contributing to this portion of the marsh above the railroad. The result of the diminished flow capacity has been significantly increased flooding potential in the areas adjoining Beaverdam Brook. While it is apparent that the representatives from B & M Railroad have recently worked on these culverts, and the Beaverdam brook culvert appears clear and free flowing, the other two B&M culverts remain heavily obstructed. Recent field investigations have confirmed that backwater conditions under normal and storm conditions greatly affect the water levels upstream of the railroad. Therefore, it is imperative that all three of these culverts be kept clear and well maintained. In that the B&M has offered to install increased culvert capacity along this section of railroad, it is recommended that an equivalent culvert section be installed at the Beaverdam Brook and Saugus River crossings to improve the capacity at these locations and as insurance against future clogging. It should be noted, however, that the analysis of this area indicates that this improvement alone will not substantially reduce upstream flooding, as the backwater condition would still exist, limiting the passage of flow.

The only way to overcome this adverse condition is to clear and restore obstructed portions of the stream channel between the railroad culvert and the meadow outlet at the Saugus River Dam. This will be quite costly and difficult to secure the necessary

approvals, but it is a required element of any long-term solution to the water problems in this area. Since this aspect would be conducted in conjunction with a similar need for the Saugus River channel through the marsh, it is further discussed and included in the next section.

The recommended improvements in this area, therefore, consist of the following measures:

- *Strict enforcement of erosion control measures to prevent further sedimentation of the culverts and stream channels,*
- *Enforcement of existing regulations to prevent further floodplain encroachment and the resulting loss of flood storage capacity,*
- *Clean-out of the B&M railroad culvert at Beaverdam brook, and maintenance of the approach and discharge channels on either side of the culvert, install an additional, identical culvert at that location, and*
- *Clean-out and repair of the B&M railroad drainage ditch culvert located 1200'south of the Beaverdam Brook culvert, and maintenance of the approach and discharge channels on either side of the culvert."*

5.1 Alternative Rail Trail Designs

Based on a review of the above "Saugus River Flood Control Improvements Report", and on experience on similar rail trail conditions, we offer the following alternative designs for the trail at Reedy Meadow.

5.1.1 Alternative A – Boardwalk

This alternative calls for elevating the rail trail on a boardwalk, thereby minimizing impacts to the wetland/floodplain in this area.

This approach has been used successfully on other projects for short lengths of trail. However, a review of the Floodway Study completed for the marsh as well as the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps reveals that approximately one (1) mile of the existing rail bed is within the 100-year floodplain. This length may be reduced once a topographic survey is performed during the design phase but it will still be extensive.

As the cost of this boardwalk alone could double the overall cost of this project, we have eliminated this alternative.

5.1.2 Alternative B – Construct Rail Trail at Current Rail Bed Elevation

Any filling within the 100-year floodplain will require compensatory flood storage within the watershed. If the bikeway were to be built below the 100-year floodplain, but built to withstand occasional flooding without damage, this would decrease or eliminate the volume of compensatory flood storage. This design has been used successfully on the Blackstone River Bikeway in Cumberland, Rhode Island and is recommended by the U.S. Forest Service (USDA Forest Service Trail Construction and Maintenance Handbook).

Figure 6 illustrates is a proposed typical section of the rail trail that would be utilized at Reedy Meadow. The details of this typical section (including materials) are further discussed in Section 9.2.2 of this Study.

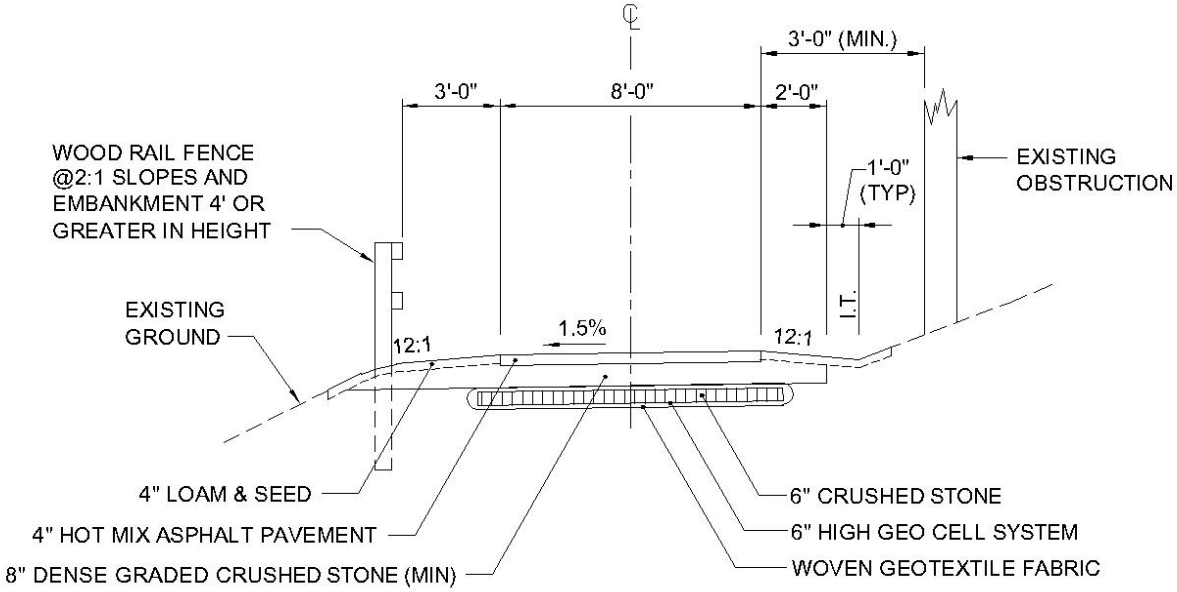


Figure 6: Typical Section Within Floodplain

In addition, we would remove the railroad embankment and provide boardwalks (lengths to be determined during design) at both the Saugus River and the Beaverdam Brook culverts. This should help alleviate both the flooding of the trail and the flooding upstream of the rail bed.

As an alternative, larger culverts could be constructed. However, with the large amount of beaver activity in Reedy Meadow, it is likely that these culverts would quickly become clogged.

5.1.3 Alternative C – Raise Rail Trail Grade Above 100-Yr Floodplain Elevation

For the trail user, this would be the best alternative. The trail would stay dry during storm events and the flooding through Route 95/128 bridge into Wakefield would be eliminated. Of course, floodplain compensation would be required to permit this alternative. There are many town-owned properties along the watershed, which would facilitate the compensation area. Depending on soil conditions of the rail bed, the typical section shown above will also be used for this alternative.

Again, as with Alternative B, we would provide boardwalks at the Saugus River and Beaverdam Brook culverts.

5.1.4 Alternative D – On-Road Route to Avoid Reedy Meadow Marsh

This alternative would require the user to follow an on-road route from Fosters Lane to Vernon Street in Wakefield. The user would cross under Route 128 onto Main Street in Lynnfield and eventually connect back to the trail via Summer Street. It is our opinion that this alternative is too dangerous for a large percentage of the trail user and would cut the Wakefield section of the trail from the regional Border to Boston Rail Trail.

5.1.5 Alternative E – Rail Trail Spur to Audubon Road

Figure 7: Spur Line to Audubon Road

The spur line, shown as a dashed line in Figure 7, to the former Newburyport Railroad was originally a connection to the Pleasure Island Amusement Park. The park was in business from 1959 to 1969. The Edgewater Office Park is now in the approximate location of the abandoned park. Only the western end of the spur remains. Until recently, the spur tracks connected to properties owned by Wakecon Associates and Pkg Inc. Reynolds Food according to the Town of Wakefield assessor's information. A connection to the Edgewater Office Park was discussed with the committee. The connection would travel through three Town of Wakefield Conservation Commission properties as well as property owned by the National Grid USA (New England Power Company). As the rail bed has been replaced by commercial establishments prior to reaching Audubon Road, the rail trail spur would be required to travel through designated wetland areas. Because of right of way and wetland issues, it was determined that this connection would not be included in this project.

To get a better understanding of the design issues along the corridor, FST has taken aerial photos using a helicopter. The graphics on the following pages give a visual picture of some of the issues discussed in this Section.

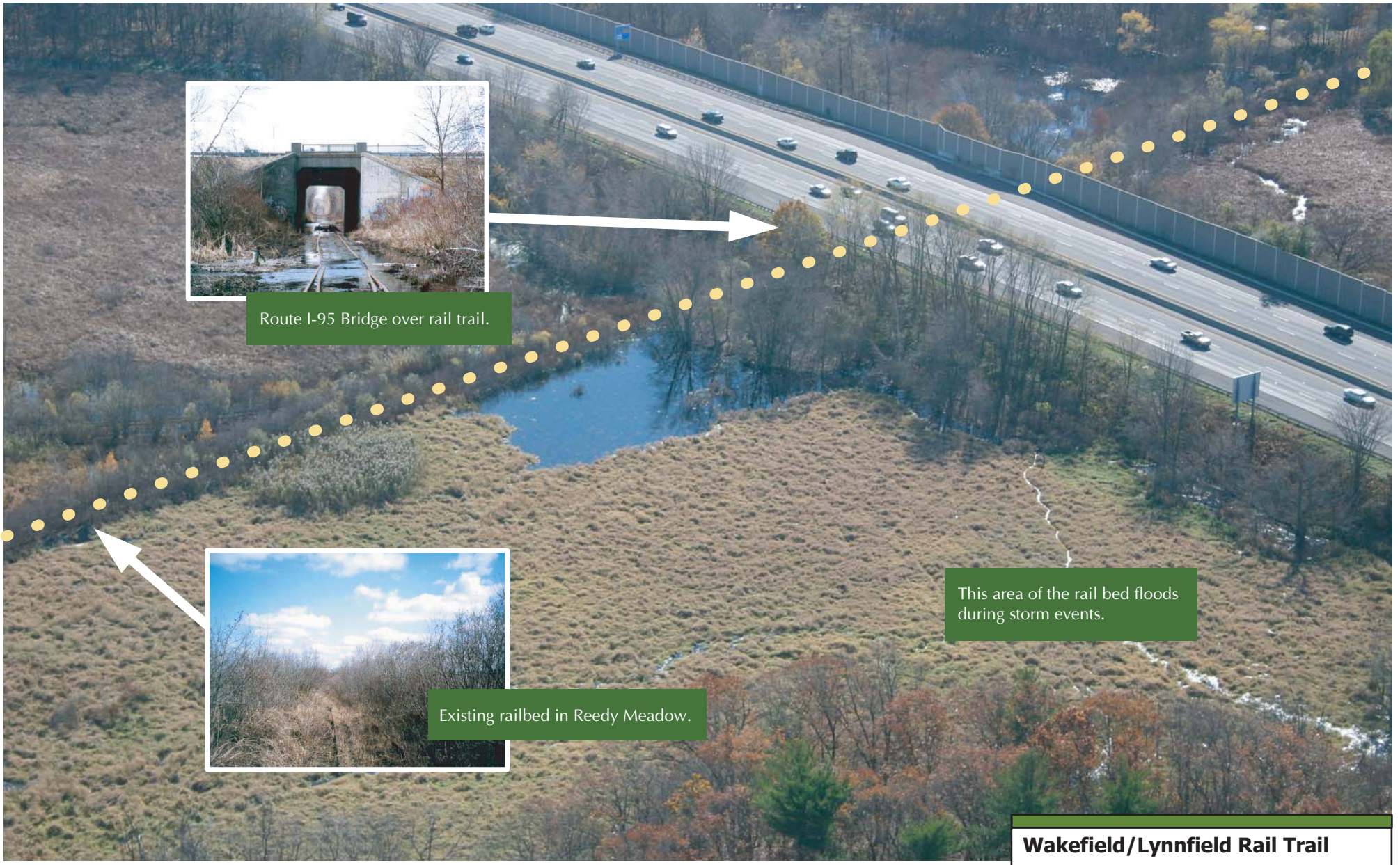
An upland area in the middle of Reedy Meadow will provide a rest/picnic area for the trail user.

Saugus River

Beaverdam Brook

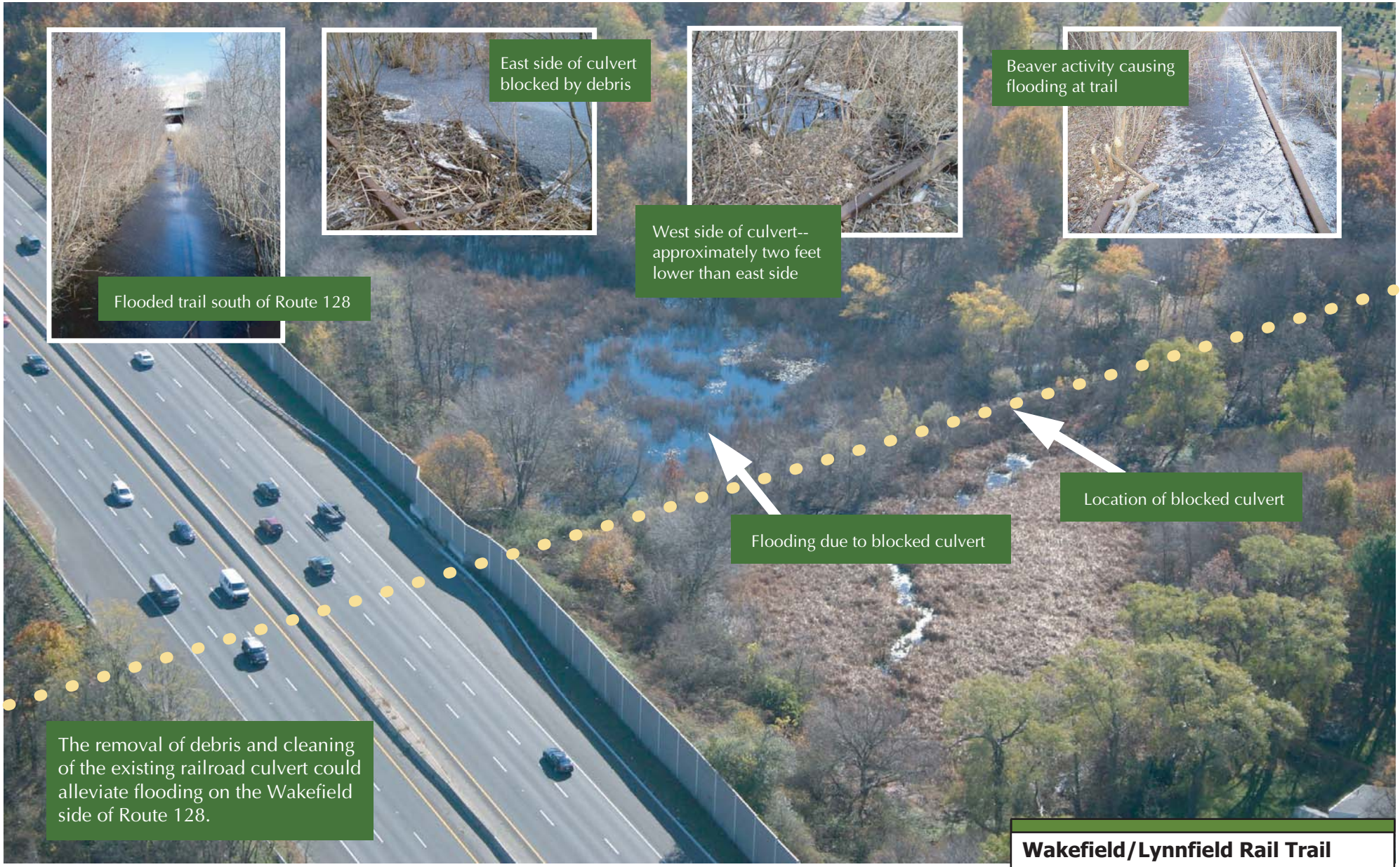
Wakefield/Lynnfield Rail Trail

Overview photo of Reedy Meadow



Wakefield/Lynnfield Rail Trail

Design Opportunities:
Reedy Meadow



Wakefield/Lynnfield Rail Trail

Design Opportunities:
Correct drainage issue along trail south of 128

6 Cultural & Historic Resources

The purpose of this section is to identify cultural or historical resources along the project corridor.

The Massachusetts Cultural Resource Information System (MACRIS) was reviewed to identify known historic and cultural resources in proximity to the project corridor. MACRIS data includes but is not limited to, the Inventory of Historic Assets of the Commonwealth, National Register of Historic Places nominations, State Register of Historic Places listings, and local historic district study reports.

Based on this review, the Wakefield Center Depot (now used as a restaurant) is the one known historic property within the project corridor. In addition, there are five known historic properties abutting the project corridor as listed below:

Figure 8: Historic Properties Abutting Corridor

MHC Inventory No.	Property Name	Address	Year Built
WAK.126	Wakefield Center Depot	57 Water Street	1887
WAK.48	Single Family Dwelling House	125 Vernon Street	1842
WAK.49	Single Family Dwelling House	121 Vernon Street	1900
WAK.50	Single Family Dwelling House	11 Fitch Court	1853
WAK.145	E.E. Boit Home for Aged Women	5 Bennett Street	1878
LNF.33	Dea. Nathaniel Bancroft House	165 Summer Street	1774

Source: Massachusetts Cultural Resource Information System (MACRIS) Database, August 2007.

Figure 9: Wakefield Center Depot

It is unlikely that any historic or archaeological sites will be affected by the rail trail project given the nature of the proposed work.

Should the project have the potential to impact cultural or historical resources, a full review will need to be conducted in compliance with the regulations governing Section 106 of the National Historic Preservation Act of 1966 as amended (36 CFR 800) as part of the preliminary design phase. Appropriate avoidance or mitigation measures will need to be implemented, if warranted, to protect these resources.

7 Contamination Issues

The purpose of this section is to identify potential contamination issues within or in close proximity to the project corridor.

Contamination along a former rail corridor is typically the result of either residual contamination from railroad operations or contamination associated with adjacent uses along the corridor.

The most common contamination found along a rail corridor is residual contamination from railroad operations. According to the Rails-to-Trail Conservancy's study on "Understanding Environmental Contaminants" (October 2004), the most commonly reported contaminants along rail corridors include arsenic, which was used as an herbicide to control weeds, metals and constituents of oil or fuel (petroleum products), which likely dripped from the rail cars as they passed over the corridor. Coal ash is also considered residual contamination. In addition, any existing railroad ties along a corridor were likely treated with creosote and therefore need to be removed and transported in accordance with local, state, and federal hazardous waste disposal requirements.

There is also the possibility that use histories of adjacent properties may have resulted in contamination along the corridor. Such histories could include improper disposal actions along the rail corridor or a release of oil or hazardous material on an adjacent site. A preliminary hazardous waste and contaminated materials screening was conducted for the project corridor. The preliminary screening is a general review to identify properties in close proximity to the project area that could either contain or be a source of hazardous wastes or contaminated materials. The screening was limited to conducting a brief visual inspection along the corridor and reviewing the following searchable databases:

- Massachusetts Department of Environmental Protection (DEP) Bureau of Waste Site Cleanup (BWSC) database for sites where a release of oil or hazardous material (OHM) has been reported to DEP. At the time the search was run, the DEP maintained site/reportable release database was current as of July 30, 2007. This search was supplemented with the DEP Tier Classified Oil or Hazardous Material Sites (MGL c. 21E) datalayer obtainable from MassGIS.

- Comprehensive Environmental Compensation Liability Act (CERCLA) List (Federal Superfund Site List) for sites. The EPA's Superfund Query Form was used to retrieve data from the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database.

- DEP Solid Waste Facility (landfills, transfer stations, and combustion facilities) datalayer obtainable from MassGIS.

Sites abutting the corridor were reviewed and documented as part of this screening. The approximate location of each site was determined using available base mapping in conjunction with the Town's assessor database. Each site was evaluated for potential project impact based on the information provided in the databases including use histories, the type of site and proximity to the project. This screening aims to evaluate

more general issues along the corridor and does not involve details on any one property. Sites of known contamination are a greater concern than sites with potential contamination.

7.1 Screening Results

The following table and accompanying text present sites of concern identified during the preliminary screening. The sites are listed from south to north relative to the project corridor.

Figure 10: Preliminary Screening Results

Site Name	Address	Site Status	Phase / Class	Release Tracking #
Kytron Circuits Corp Fmr	25 North Avenue Wakefield	RAO	B1	3-0000443
Terrace Condominimums	3 Richardson Street Wakefield	UNCLSS		3-0026883
Condo Complex	12 Richardson Street Wakefield	RAO	A3	3-0013906
Mill River	500 Main Street Wakefield	RAO	III/A2	3-0019296
Arco Gas Station	30 Water Street Wakefield	REMOPS	V	3-0000033 3-0019413 3-0022024
At Crescent Street	48 Water Street Wakefield	RAO	III/A2	3-0021698 3-0022568
BP Gasoline Station	49 Water Street Wakefield	DEPNDS		3-0000034
East Coast Concrete Pumping	79 Water Street Wakefield	RAO		3-0001412
Fahey's Tire Center	18/28 New Salem Street Wakefield	DEPNDS		3-0004292
Hancock Machine Inc.	415/416 Lowell Street Wakefield	RAO	A2	3-0001210
Pole 15-5 15KVA Transformer	Summer St. and Westover Lynnfield	RAO	A2	3-0023194

Source: Massachusetts DEP Bureau of Waste Site Cleanup Searchable Sites Database, July 30, 2007.

Kytron Circuits Corp. Fmr: The former Kytron Circuits Corp. site is located at the corner of Main Street and North Avenue and abuts the railroad corridor to the west. . This site is located south of the proposed project terminus at Main Street (Galvin Middle School). However, this site has been included in this screening because it is a Superfund site according to the CERCLIS database (MAD985277953). The site is not listed on the National Priority List (NPL). According to the DEP's database, the site is currently classified as a Class B1 RAO. This classification indicates that a level of "no significant risk" exists. Should the project limits be extended southerly from Main Street in the future, the DEP files on this site should be fully evaluated to determine if the site has the potential to impact the project.

Terrace Condominiums: The Terrace Condominiums site is located both parallel and adjacent to the project corridor between Richardson Street and Water Street in Wakefield. The site is currently Unclassified following the release of fuel oil from an underground storage tank. A written action plan was submitted to DEP and following agency review, the site will receive a tier classification based on the site's complexity, the type of contamination, and the potential for human or environmental exposure to the contamination.

Condo Complex: Based on the listed address, this site is located southeast of the project corridor along Richardson Street in Wakefield. According to the DEP's database, the site status is listed as Class A3 RAO. A RAO Statement asserts that the response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards have been eliminated. An A3 Class indicates that a permanent solution has been achieved, but contamination has not been reduced to background. Further, an Activity and use Limitation (AUL) has been implemented to limit future exposure to contaminants remaining at the site.

Mill River: This site abuts the project corridor just north of Richardson Street in Wakefield. The site is currently classified as a RAO status, Phase III Class A2 site. This status means that a Response Action Outcome Statement (RAO) was submitted. A RAO Statement asserts that the response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards have been eliminated. Phase III indicates that cleanup options have been assessed and a cleanup plan selected. A Class A RAO means that a permanent solution has been achieved with Class A1, A2, and A3 indicating the subsequent level of contamination. A Class A2 RAO indicates that contamination levels are above background but below cleanup standards.

Arco Gas Station: This site is located along Water Street in Wakefield, approximately 225 feet northwest of the project corridor. The site is currently classified as REMOPS status, Phase V. REMOPS (Remedy Operation Status) means that a remedial system which relies upon Active Operation and Maintenance is being operated for the purpose of achieving a Permanent Solution. Phase V indicates that long-term treatment processes have been implemented and monitored to track cleanup progress. Additional research will be required to determine the extent and location of contamination at this site.

At Crescent Street: This site is located at the intersection of Water Street and Crescent Street in Wakefield, approximately 75 feet northwest of the project corridor. The site is currently classified as a RAO status, Phase III Class A2 site. This status means that a Response Action Outcome Statement (RAO) was submitted. A RAO Statement asserts that the response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards have been eliminated. Phase III indicates that cleanup options have been assessed and a cleanup plan selected. A Class A RAO means that a permanent solution has been achieved with Class A1, A2, and A3 indicating the subsequent level of contamination. A Class A2 RAO indicates that contamination levels are above background but below cleanup standards.

BP Gasoline Station: This site is located along Water Street in Wakefield, approximately 50 feet northwest of the project corridor. The site is currently classified as DEPNDS (DEP Not a Disposal Site) meaning that DEP has determined that this location did not require reporting and is not a disposal site. Therefore, there is no indication that this site would affect the project given available information.

East Coast Concrete Pumping: This site is located along Water Street in Wakefield, approximately 25 feet east of project corridor. The site's RAO status indicates that the response actions were sufficient to achieve a level of "no significant risk."

Fahey's Tire Center: This site abuts the project corridor near the intersection of Vernon and New Salem Streets in Wakefield. The site is currently classified as DEPNDS (DEP Not a Disposal Site) meaning that DEP has determined that this location did not require reporting and is not a disposal site. Therefore, there is no indication that this site would affect the project given available information.

Hancock Machine Inc.: This site is located along Lowell Street in Wakefield and abuts the project corridor to the west. According to the DEP's database, the site status is listed as Class A2 RAO. This status means that a Response Action Outcome Statement (RAO) was submitted. A RAO Statement asserts that the response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards have been eliminated. A Class A2 RAO indicates that contamination levels are above background but below cleanup standards.

Pole 15-5 15KVA Transformer: According to DEP's database, this site is located at the intersection of Summer Street and Westover Drive in Lynnfield. The site is currently listed as a Class A2 RAO. This status means that a Response Action Outcome Statement (RAO) was submitted. A RAO Statement asserts that the response actions were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards have been eliminated. A Class A2 RAO indicates that contamination levels are above background but below cleanup standards.

7.2 Recommendations

A review of various database searches did not indicate any overt sources of contamination within the limits of the corridor itself. However, the review did reveal current or past environmental contamination issues on sites located directly adjacent or in close proximity to the project corridor.

Of potential concern is the corridor section between Main Street and Water Street (Route 129). There are a number of active release reports on abutting properties and this area has been characterized by industrial use for a long time. As a precautionary measure, it is recommended that DEP's files on the sites in the vicinity of this section of project corridor be reviewed during the next phase of the project to determine if the design should consider any related contamination issues.

The Wakefield Center Depot at Water Street (Route 129) also poses a concern based on the history and operations occurring at this site. According to the DEP's "Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails," these relatively small stretches along a right-of-way would be expected to have contamination elevated over the residual levels, due to more frequent/intense use of

pesticides to improve sight lines and greater frequency/intensity of human activities. Again, a more detailed investigation may be needed during the preliminary design phases and/or necessary environmental precautions required during construction.

Also, of recent concern across the state has been the presence of coal ash along former railroad corridors. Coal ash is residual contamination from former railroad operations. This by-product is exempt from the Massachusetts Contingency Plan (MCP). The MCP (310 CMR 40.0000) is the set of regulations that governs the reporting, assessment and cleanup of oil and hazardous material spills in Massachusetts. While, it is acceptable to both leave and re-use soil containing coal ash along a corridor, the DEP's anti-degradation policy restricts off-site reuse to a similar setting. Consequently, leftover materials may need to be transported to an approved landfill at additional costs to the Contractor, which ultimately increases the overall cost of the trail project to the Town. It is therefore important for the trail design to balance cut and fill volumes to minimize any transportation of material off-site. This policy does not apply to contamination "hot spots" where contamination other than residual contamination is present. For example, if an oil or hazardous material spill has contaminated the soil along a portion of the corridor, this soil cannot be left or place or re-used and must instead be cleaned up under the MCP.

8 Structures Assessment

The purpose of this section is to identify the existing culverts along the project corridor and discuss the existing Route 95/128 roadway bridge / rail trail underpass in Wakefield.

8.1 Culverts

Along the right-of-way alignment, several existing culverts convey natural waterways and drainage to either side of the rail bed embankment.

The Boston & Maine Railroad Valuation Maps were used as a guide for identifying culverts along the corridor. As the maps date back to 1915, it can be expected that adjacent land uses have changed significantly over time. Consequently, some of the culverts may have been replaced or removed since the time the railroad was in operation.

The following list of culverts was developed based on the Boston & Maine Railroad Valuation Maps:

Figure 11: Culvert Listing

#	Val Map Station	Size / Material	Location Description
1	40+89.5	Unknown	Br # 146 - At intersection of Old Vernon St. and New Vernon St.
2	59+24.4	2'x2' Wood Box	#146A – North of Fitch Court
3	64+91.3	4' Stone Box	#146B – Crossing Salem Street
4	Approx. 64+90	16" Vitrified Clay Pipe	Crossing Salem Street
5	66+52.6	48"x2' Rail Cov. Box	#146C – North of Salem Street
6	87+15.5	3'x3' Stone Box	North of Lowell Street
7	95+57.8	2' Vitrified Clay Pipe	#146E – North of Lowell Street
8	101+46	Unknown	#146F – North of Foster Lane
9	111+41.6	54" C.I. Pipe	Br #147 - At Wakefield/Lynnfield Town Line
10	114+33.4	3'x3' Rail Top	#147A – North of Wakefield/Lynnfield Town Line
11	131+42.9	48" C.I. Pipe	Br #148
12	144+91.7	54" C.I. Pipe	Br #149

Given that trail development should not significantly alter the hydrologic characteristics of the watershed area tributary to each crossing, these culverts will remain. However, it should be noted that the rail bed may have settled in some areas of Reedy Meadow. Such settlement may have compromised the integrity of the culverts and/or hydrologic characteristics in this area. During the next phase of the project, the topographic survey should locate the invert elevation of each culvert and the engineers should perform an on-site inspection.

8.2 Bridge

The existing Route 95/128 roadway bridge over the former rail corridor provides adequate vertical and horizontal clearance for the proposed rail trail (See Figure 12). As vegetation will not grow under the bridge, crushed stone should be placed between the trail surface and bridge abutments. Also, the existing graffiti should be removed and a graffiti resistant coating should be applied to the abutments.

Figure 12: Route 95/128 Bridge Over Rail Corridor

9 Cross Section

The purpose of this section is to provide an overview of design elements that need to be considered when selecting a typical rail trail (shared use path) cross-section.

MassHighway and the Federal Highway Administration (FHWA) require that a shared use path designed or constructed with state or federal funds follow the design standards of the American Association of State Highway & Transportation Officials (AASHTO). However, the new MassHighway Design Guide also acknowledges that site-specific conditions often warrant the need to take a more flexible and accommodating design approach. The guidelines set forth in AASHTO constitute the starting point for the design. Deviations from AASHTO can be justified based on site-specific conditions. All projects are looked at by MassHighway on a case-by-case basis.

The conceptual design for this project is based on the following guidelines and regulations:

- MassHighway Project Development & Design Guide (2006)
- AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities (2004)
- AASHTO Guide for the Development of Bicycle Facilities (1999)
- The Rules & Regulations of the Massachusetts Architectural Access Board (521 CMR)
- Americans with Disabilities Act Accessibility Guidelines (ADAAG)
- Manual on Uniform Traffic Control Devices (MUTCD)

9.1 Design Elements

The rail trail cross section is typically governed by the existing corridor right-of-way, “rail bed” width and the location of adjacent environmental resource areas. Another major issue for this project is the location of existing utility poles along the length of the corridor.

Important factors to consider when developing the typical section include:

- Surface width
- Shoulders
- Side clearance
- Physical barriers
- Vegetation

9.1.1 Surface Width

Under most conditions a surface width of 10 feet is recommended. This recommendation is consistent with AASHTO and MassHighway guidelines. In rare instances, an 8-foot surface can be adequate where the following conditions prevail:

- Low bicycle traffic
- Low ped traffic
- Good horizontal and vertical alignment
- Low use by maintenance vehicles that could potentially cause edge damage

According to the MassHighway Design Guide, a reduced width of 8 feet may also be acceptable where there are severe environmental, historical, and/or structural constraints. MassHighway's Bicycle - Pedestrian Accommodation Engineer noted that a reduction in width is typically considered for a small stretch of corridor where there are such constraints. Such a design decision is usually discussed during the formal review process, at which time the designer is often asked to provide justification for the reduction in width.

Regardless of the width, the trail should have a 1.5% cross slope in one direction to aid in drainage. The direction of the cross slope can vary along the corridor depending upon the topography and adjacent land use. A 1.5% cross slope is the same as a typical sidewalk and meets ADA accessibility guidelines.

9.1.2 Shoulders

A minimum 2-foot wide graded clear shoulder should be maintained adjacent to both sides of the trail. This shoulder is not considered part of the traveled way. The shoulder is typically graded to a slope of 1 vertical to 12 horizontal (1:12) to enhance proper drainage to prevent erosion as well as provide a recovery zone for trail users. It is commonly constructed using soft surface materials such as grass, gravel borrow, stone dust, or other stabilized materials.

9.1.3 Equestrian Path

A 4 to 5 foot widened shoulder is included on some projects for use by equestrians, and also by trail runners, walkers and mountain bikers. Due to proximity of several environmental resource areas along this corridor, it is not recommended that a 4 to 5 foot wide soft shoulder be developed along one side of the rail trail.

9.1.4 Horizontal Clearance

A minimum 3-foot clearance should be maintained from the edge of the trail to signs, trees, poles, walls, fences, guardrails, or other obstructions.

9.1.5 Vertical Clearance

A vertical clear zone of at least 12 feet above the finished grade at the proposed trail must be maintained. The 12-foot clearance accounts for the size and physical limitations of the construction equipment.

9.1.6 Physical Barriers

A wood rail fence needs to be installed along the trail to prevent users from traversing the sideslopes, as shown in Figure 13. A 5-foot separation from the edge of the trail surface to the top of slope is desirable in areas where the trail is located adjacent to ditches or slopes steeper than 1 foot vertical to 3 feet horizontal (1:3). If this offset cannot be achieved, then a physical barrier such as a railing, dense shrubbery or a chain link fence, should be installed along the top of slope to protect trail users. In general, the greater the height of the

Figure 13: Example Wood Rail Fence Installation

drop-off, the greater the need for protection. According to AASHTO guidelines, the fence should be set at a height of 3.5 feet (42 inches). Rub-rails are recommended at a height of approximately 3-feet from grade to prevent snagging of handlebars. All fences should be smooth and free of protruding objects such as bolts.

9.1.7 Root Barrier

It is recommended that existing low-lying vegetation located within 6 feet of the edge of the paved trail be cleared and grubbed. In addition, based on recent rail trail designs, it is recommended that a high-density polyethylene root barrier be installed along sections of the project corridor where future tree root or vegetative growth may threaten the long-term integrity of the paved surface. Due to its price, root barrier should only be installed in areas where root damage can be anticipated.

9.2 Recommended Cross Sections

Two different cross sections are recommended along the Wakefield / Lynnfield project corridor – Typical Section and Typical Section Within Floodplain.

Both sections are illustrated on the following pages.

9.2.1 Typical Section

The typical section proposed along the majority of the project corridor consists of a 10-foot wide hot mix asphalt surface with 2-foot shoulders adjacent to both sides of the trail, as shown in Figure 15. This section will meet MassHighway guidelines for the recommended surface width, shoulder width and offset to obstructions.

The section consists of a:

- 4” hot mix asphalt surface
- 8” dense graded crushed stone base material

9.2.2 Typical Section Within Floodplain

Along the project corridor, the proposed rail trail will pass through the 100-year floodplain. These areas are primarily located as follows:

- South of the Route 95/128 Bridge north through Reedy Meadow in Wakefield and Lynnfield (approx. 1 mile)
- South of Lowell Street in Wakefield (2,500 linear feet)
- South of Pillings Pond Road near the High School in Lynnfield (700 linear feet)

It is recommended that the hot mix asphalt trail surface width be reduced from 10 feet to 8 feet through these areas to minimize the construction footprint. Two (2) foot shoulders will be provided adjacent to both sides of the trail. This typical section will still meet MassHighway guidelines for the minimum allowed surface width, shoulder width and offset to obstructions.

In addition, the trail must be built to withstand occasional flooding without damage. Therefore, it is recommended that a stabilized base be included in the trail section through these areas.

The section, as shown in Figure 16, consists of a:

- 4" hot mix asphalt surface
- 8" dense graded crushed stone base material
- 6" geocell grid system filled with crushed stone
- 2 layers of geotextile fabric for separation

Geocells are usually made from polyethylene strips bonded to form a honeycomb structure. As shown in Figure 14, each of the cells is filled with the crushed stone backfill and compacted to provide subsurface reinforcement.

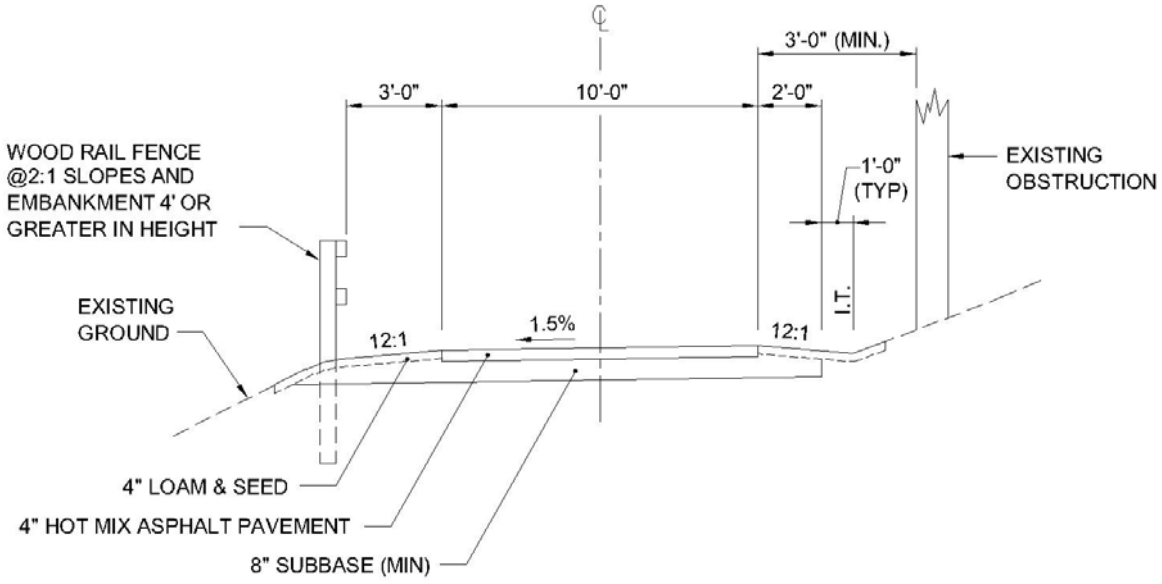
Figure 14: Geocells with Stone Backfill

Geocells are good for reinforcement because they have high tensile strengths, and because coarse aggregate (i.e. crushed stone) can interlock in the grid structure.

The geocell system should be wrapped in geotextile fabric to provide physical separation between the subbase soil beneath the fabric and the dense graded crushed stone placed on top of the geotextile. The geotextile fabric can allow water, but not soil, to seep through. This construction (geotextile) fabric comes in rolls and is cut to fit the site application.

As previously noted, this design has been used successfully on the Blackstone River Bikeway in Cumberland, Rhode Island and is recommended by the U.S. Forest Service (USDA Forest Service Trail Construction and Maintenance Handbook).

❖ CROSS SECTION

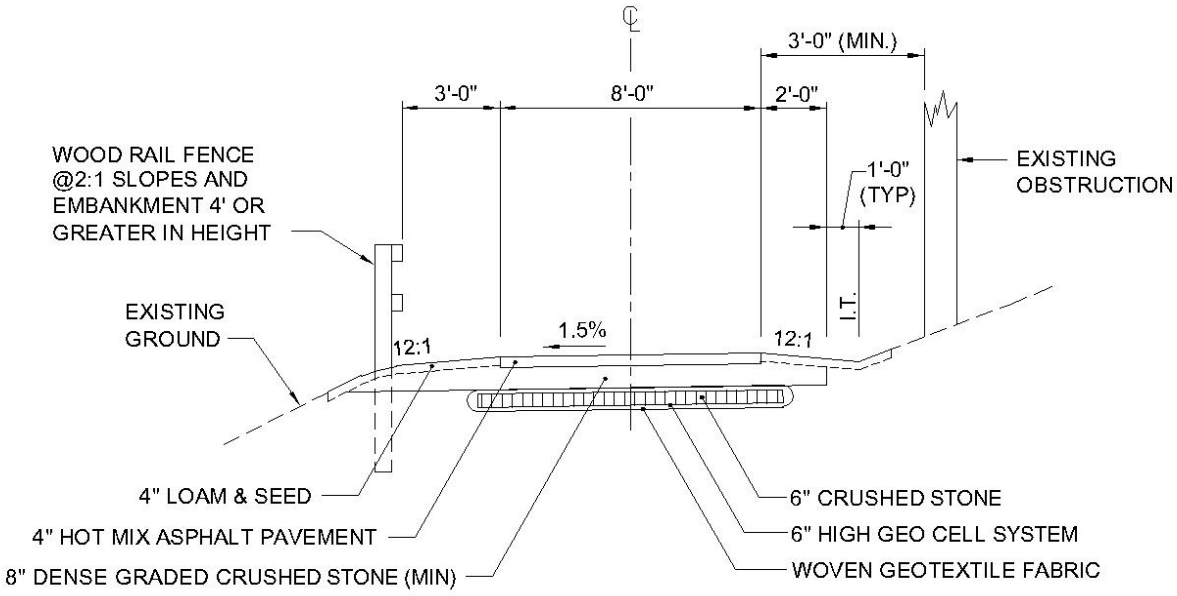


Proposed Trail Cross Section

Existing Condition

Figure 15: Typical Section

❖ CROSS SECTION



Proposed Trail Cross Section

Existing Condition

Figure 16: Typical Section Within Floodplain

10 Roadway Crossings

The purpose of this section is to discuss the engineering design issues that need to be taken into consideration where the project corridor crosses roadways at-grade.
Along the project corridor, there are a total of ten (10) at-grade roadway crossings.

Figure 17: Roadway Crossings

Intersecting Roadway		Town
1	Main Street	Wakefield
2	Richardson Street	Wakefield
3	Water Street (Route 129)	Wakefield
4	New Salem Street	Wakefield
5	Fitch Court	Wakefield
6	Salem Street	Wakefield
7	Lowell Street	Wakefield
8	Fosters Lane	Wakefield
9	Summer Street	Lynnfield
10	Pillings Pond Road	Lynnfield

Introducing a trail crossing at each of these locations presents operational and safety issues for both vehicles and trail users.

10.1 Design Considerations

The primary design goal will be to develop a consistent strategy to improve intersection safety at each trail / roadway intersection. Design elements include alignment, approach, sight distance, access, signage & pavement markings and traffic control.

10.1.1 Alignment & Approach Treatment

The project corridor can be characterized by long, uninterrupted stretches that are straight and relatively flat. Although this alignment creates a trail that is easy for users of all ages/abilities to enjoy, it also tends to reduce the awareness of an approaching roadway and encourages some individuals to disregard stop signs.
Considering site constraints and the characteristics of the intersecting roadway, two alternate alignment options have been considered at each trail / roadway intersection.

- Type 1: Reverse Curve Alignment
- Type 2: Straight Alignment

Type 1 Alignment: This alignment option introduces short, reverse curves (e.g. 'S' curves) to divert the trail from the current alignment and reposition the user at the preferred crossing location. At skewed crossings, it is recommended that a short section of trail be realigned in advance of the intersection to create as close to a 90 degree crossing as possible while maintaining minimal disturbance to surrounding areas. Benefits of such a realignment include a shortened crossing and increased awareness by users of a change in conditions (e.g. an approaching intersection). This short alignment change requires bicyclists to reduce speed. Recognizing the benefits of this approach treatment, it is also recommended for consideration at locations where the existing crossing is already at 90 degrees. This option typically requires additional vegetative clearing and grading to realign the trail. Therefore, while the Type 1 Alignment is the preferred treatment for safety reasons, it must be weighed against the impact upon abutting properties.

Type 2 Alignment: This alignment option keeps the trail along the current track alignment. This option is typically used where realigning the trail may not be feasible or necessary. These are primarily locations where either site constraints are too restrictive (e.g. proximity of wetland resource areas, private property or utility poles) or where the cross street is a low volume/speed roadway. At these locations, a Type 2 Alignment is recommended.

The alignment options discussed above can be combined with different approach treatments to further define the location of trail / roadway crossings to both users and motorists. Two such approach treatments have been considered along this corridor.

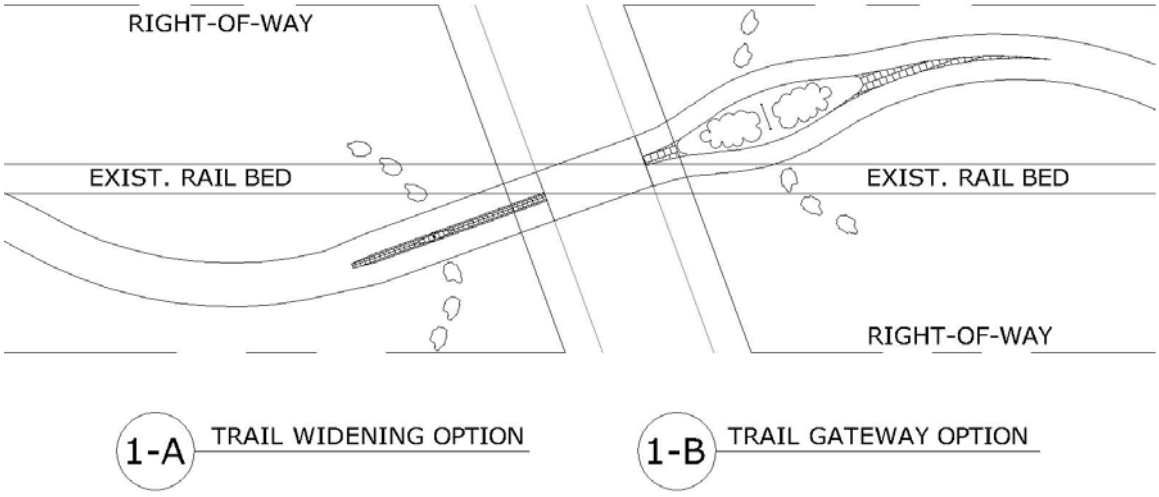
- Type A: Widened Approach Treatment
- Type B: Gateway Approach Treatment

Type A Approach: This approach treatment involves the introduction of a flush, 2-foot wide divisional island on the approach to the intersection. The flush island can consist of textured pavement (e.g. Imprint) in a brick pattern, for example, or simply pavement markings. The island in effect splits the trail into two, one-way routes, a measure that also tends to reduce the speed of bicyclists approaching the intersection. This treatment requires minimal widening beyond the proposed typical section and is well suited for applications where site constraints restrict the extent to where the trail can be realigned.

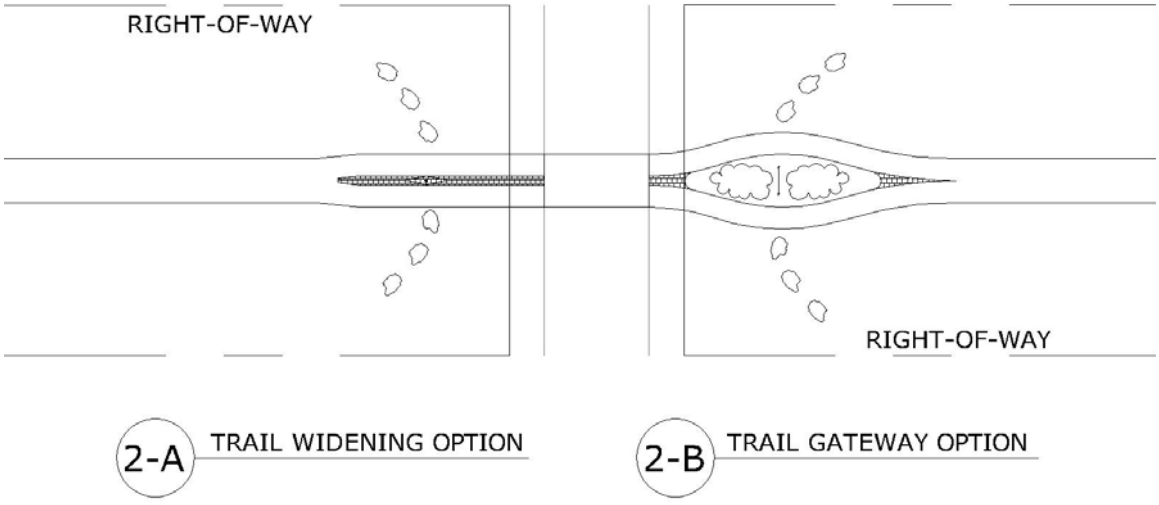
Type B Approach: This approach treatment consists of replacing a narrow flush island with a wider median island and/or gate, where site conditions are less restrictive. Only low-lying vegetation should be planted in the island such that it will not impair sight distance. This "gateway" treatment functions similar to the flush island (Type A) but offers an additional opportunity to further enhance the appearance of the trail through pavers or landscaping.

When the alignment options and approach treatments are combined together, there are a total of four intersection designs that can be considered at each at-grade crossing, as shown in Figure 18:

- 1-A: Reverse Curve Alignment - Widened Approach Treatment
- 1-B: Reverse Curve Alignment - Gateway Approach Treatment
- 2-A: Existing Alignment - Widened Approach Treatment
- 2-B: Existing Alignment - Gateway Approach Treatment



Revised Alignment



Existing Alignment

Figure 18: Trail / Roadway Intersection

10.1.2 Sight Distance

Sight distance is the length of roadway visible to a motorist and in this case, also a trail user. Appropriate sight distance is related to driver and pedestrian safety and smooth traffic operations. Sight distance is affected by road geometry; such as grades and curves; roadside vegetation or other objects (signs, stone walls, fences, and so forth). Sight lines must be kept free of obstructions that might interfere with the ability of a motorist or trail user to verify that the roadway is clear.

Vegetative clearing will be required along all roadways to improve sight distance both for users (stopped at the intersection waiting to cross the roadway) and motorists (approaching the crossing). In general, the clearing limits at the crossing will call for the selective clearing and thinning of vegetation approximately 8 feet back along the trail in order to provide a 200-foot stopping distance from the center of the travel lane on the intersecting roadway (See Figure 19). This distance will vary depending on the curvature of the roadway and speed of the approaching vehicle. A detail of these clearing limits is included on the following page.

The cutting of living shade trees will be subject to the Massachusetts Environmental Policy Act (MEPA). Cutting five (5) or more living public shade trees of 14 or more inches in diameter at breast height within the public right-of-way will exceed MEPA thresholds and require the filing of an Environmental Notification Form (ENF).

The design of each trail / roadway intersection should strive to balance maximum sight lines and minimize associated roadside impacts.

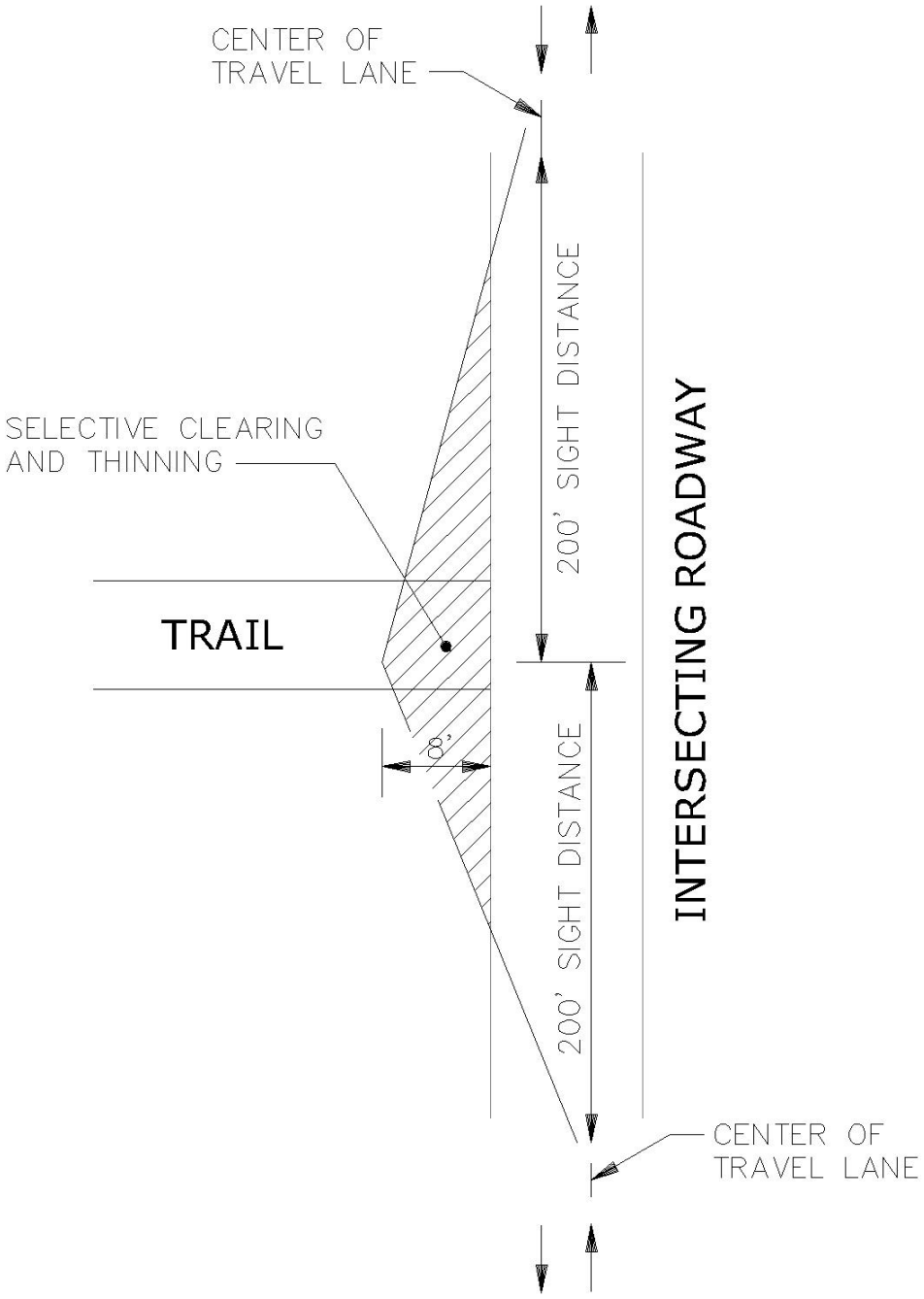


Figure 19: Clearing Limits for Sign Distance

10.1.3 Signage & Pavement Markings

Proper warning and regulatory signage and pavement markings will be utilized to improve safety conditions for both trail users and drivers as outlined in the MUTCD. It is recommended that trail users be required to stop prior to crossing the intersecting roadway at each at-grade intersection along the corridor.

In addition, for user safety and emergency response actions, it is recommended that a mile marker and signage program be developed to assist users in identifying their current location along the trail.

This program should include:

- Post mile markers located consistently and correctly along one side of the trail that identifies the town where the marker is located
- One half-mile markers located along the trail surface between the mile markers
- Street name signs mounted on top of the stop signs at each trail/roadway intersection

10.1.4 Traffic Control

A traffic control system improves the safety of an intersection by providing additional warning of the approaching intersection to both vehicles and trail users. As noted in the MassHighway Project Development & Design Guide, traffic signals shall be considered where a trail crosses a roadway with volumes greater than 10,000 vehicles per day. Motor vehicle speeds along the crossing corridor are also an important factor in this analysis.

According to the EOT Road Inventory database, Main Street approaches or exceeds 10,000 vehicles per day and warrants consideration for a traffic signal. Water Street (Route 129) also exceeds the threshold, but is already a signalized intersection. A pedestrian phase will need to be added the existing signal at Water Street to accommodate the rail trail crossing. The other project area roadways exhibit lower volumes and speeds and therefore were not considered for signal installation.

The following types of traffic control systems shall be considered at the Main Street crossing:

- Intersection control beacon
- Cross Alert system
- Push button actuated traffic signal

These devices supplement the proper warning and regulatory signage and pavement markings along the trail and roadway approach.

A typical intersection control beacon consists of a four way, single section traffic signal head supported over the center of a roadway on a mast arm. The signal flashes yellow for the vehicles approaching on the roadway and red for shared use trail approaches. One drawback of a flashing beacon is that motorist become desensitized to its constant flashing. Standard installation of beacons requires a continuous power source to maintain a flashing indication at all times. Installation costs are approximately $25,000 per location.

A Cross Alert system is an alternative to a traditional beacon installation. This system runs on solar power and flashes roadside signals only when an approaching bicycle/pedestrian is detected. This system offers a benefit in terms of reduced energy costs. However, one drawback is that it does not offer the same visibility for approaching motorists of an overhead mounted signal. Installation costs are approximately $25,000 per location. This system was recently installed along the Cape Cod Rail Trail and on bike paths in Rhode Island.

A push button actuated traffic signal consists of two signal heads for each roadway approach, typically supported on a mast arm, and pedestrian signals for the trail approach. The signal would display green (solid or flashing) for the vehicles approaching on the roadway and red for trail approaches. When a trail user reached the crossing, s/he would press the pedestrian button to change the signal to green for users and red for vehicular traffic.

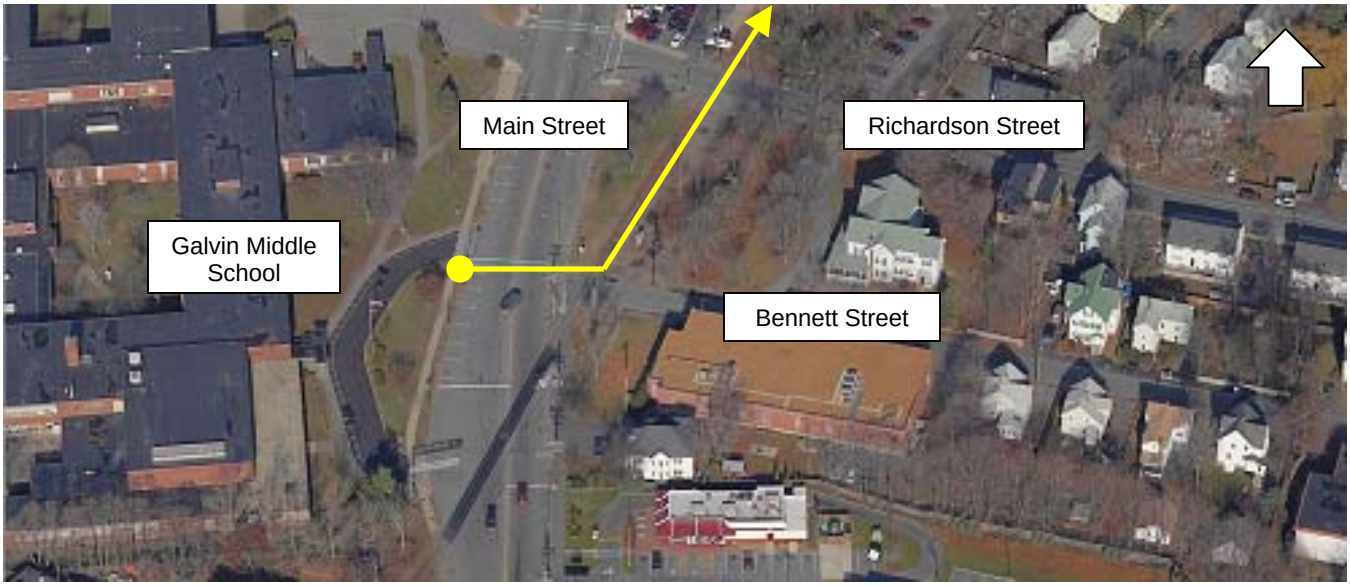
In order to install a signal, a traffic signal warrant analysis needs to be conducted and one or more of the warrants satisfied. The justification for a traffic signal will be based on the volumes processed by the intersection (both trail users and vehicles) and the number of gaps available in the traffic stream that will allow users to safety cross the roadway. If it is determined that a sufficient number of gaps in vehicle traffic will not be available for trail users to cross the roadway, consideration should be given to installing a push button actuated traffic signal at the crossing. As the trail is not yet constructed, user counts could be based on use at a similar facility (e.g. Assabet River Rail Trail). In the past, MassHighway has recommended that a Town first apply for a crosswalk permit and then revisit the need to install a signal once the shared use trail had been constructed. However, recent conversations with MassHighway indicated the agency's recognition of need to develop a standardized approach to addressing traffic control as part of the preliminary design phase.

10.2 Intersection Improvements

The following Section discusses each crossing in more detail and outlines the deficiencies and general characteristics of each intersecting roadway.

Data presented in this section was compiled from the Commonwealth of Massachusetts Office of Transportation Planning Road Inventory Database (2006) and supplemented with field observations.

10.2.1 Main Street - Wakefield



Source: Microsoft Windows Live Local

Description: Main Street is a major north/south thoroughfare connecting Wakefield to the north and Melrose to the south.

Type of Roadway:	Urban principal arterial
Posted Speed:	30 mph
Jurisdiction:	Local
Est. Volume (ADT):	12,000 vehicles
Surface Width:	43 feet

Issues:

- Relatively high speeds and volumes.
- Requiring users to cross Main Street may warrant installation of a traffic signal.

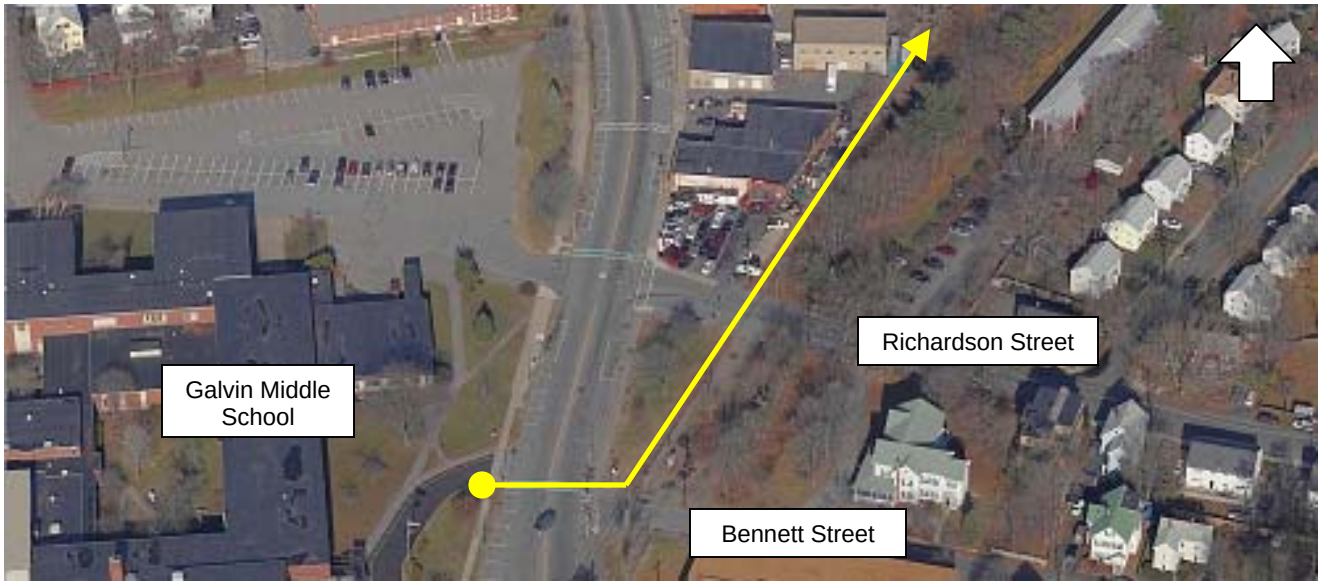
Recommendations:

- Consider installing a push button actuated traffic signal at this location.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Main Street.
- Remove existing railroad tracks, signals and pavement markings.

Wakefield/Lynnfield Rail Trail

Design Opportunities:
The Galvin Middle School/Trailhead

10.2.2 Richardson Street - Wakefield



Source: Microsoft Windows Live Local

Description: Richardson Street is a low volume, low speed local roadway.

Type of Roadway:	Local
Posted Speed:	-
Jurisdiction:	Town
Est. Volume (ADT):	700 vehicles
Surface Width:	30 feet

Issues:

- Rail corridor in close proximity to commercial property and proposed parking.
- Limited space for reverse curve alignment.

Recommendations:

- Install advanced warning signs and pavement markings along Richardson Street.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.

10.2.3 Water Street (Route 129) - Wakefield

Source: Microsoft Windows Live Local

Description: Water Street (Route 129) is a major east/west thoroughfare connecting Wakefield to the west and North Saugus to the east.

Type of Roadway:	Urban principal arterial
Posted Speed:	-
Jurisdiction:	Town
Est. Volume (ADT):	13,600 vehicles
Surface Width:	40 feet

Issues:

- Rail corridor has adjacent parking lots on either side on south side of intersection.
- Busy signalized intersection.

Recommendations:

- Modify the existing signal to include a push button activated pedestrian phase.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Water Street.

Trail realignment, along with pavement markings and signage, will make this a safer intersection for trail users. A pedestrian signal phase should also be added at the existing signal.

Parking with trail amenities is proposed in this town owned property.

Wakefield/Lynnfield Rail Trail

Design Opportunities:
Parking area and rest stop

10.2.4 New Salem Street - Wakefield

Source: Microsoft Windows Live Local

Description: New Salem Street is a low volume, low speed local roadway.

Type of Roadway:	Urban collector
Posted Speed:	25 mph
Jurisdiction:	Town
Est. Volume (ADT):	3,000 vehicles
Surface Width:	30 feet

Issues:

- Rail corridor densely vegetated on roadway approach.
- Close proximity to sand and gravel plant with possible high volume of truck traffic.

Recommendations:

- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Otis/New Salem Street.

10.2.5 Fitch Court - Wakefield

Source: Microsoft Windows Live Local

Description: Fitch Court is a low volume, low speed local roadway that dead ends just east of the rail bed at a commercial building and with a large parking lot.

Type of Roadway:	Local
Posted Speed:	-
Jurisdiction:	Town
Est. Volume (ADT):	700 vehicles
Surface Width:	18 feet

Issues:

- Rail corridor densely vegetated on roadway approach.
- Rail corridor has adjacent private parking on east side.
- Rail corridor passes across driveway entrance to a landscaping company.
- No space available on south side of intersection for reverse curve alignment due to close proximity to parking lot and residential property.

Recommendations:

- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Install guardrail/wood rail fence at sections along parking lots.

10.2.6 Salem Street - Wakefield

Source: Microsoft Windows Live Local

Description: Salem Street is a major east/west thoroughfare connecting Wakefield to the west and Lynnfield to the east.

Type of Roadway:	Urban minor arterial
Posted Speed:	25 mph
Jurisdiction:	Town
Est. Volume (ADT):	7,700 vehicles
Surface Width:	24 feet

Issues:

- Limited space for reverse curve alignment due to close proximity to a brook and residential properties.
- Rail corridor densely vegetated on roadway approach.

Recommendations:

- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Salem Street.

10.2.7 Lowell Street - Wakefield

Source: Microsoft Windows Live Local

Description: Lowell Street is a major thoroughfare.

Type of Roadway:	Urban minor arterial
Posted Speed:	-
Jurisdiction:	Town
Est. Volume (ADT):	3,000 vehicles
Surface Width:	31 feet

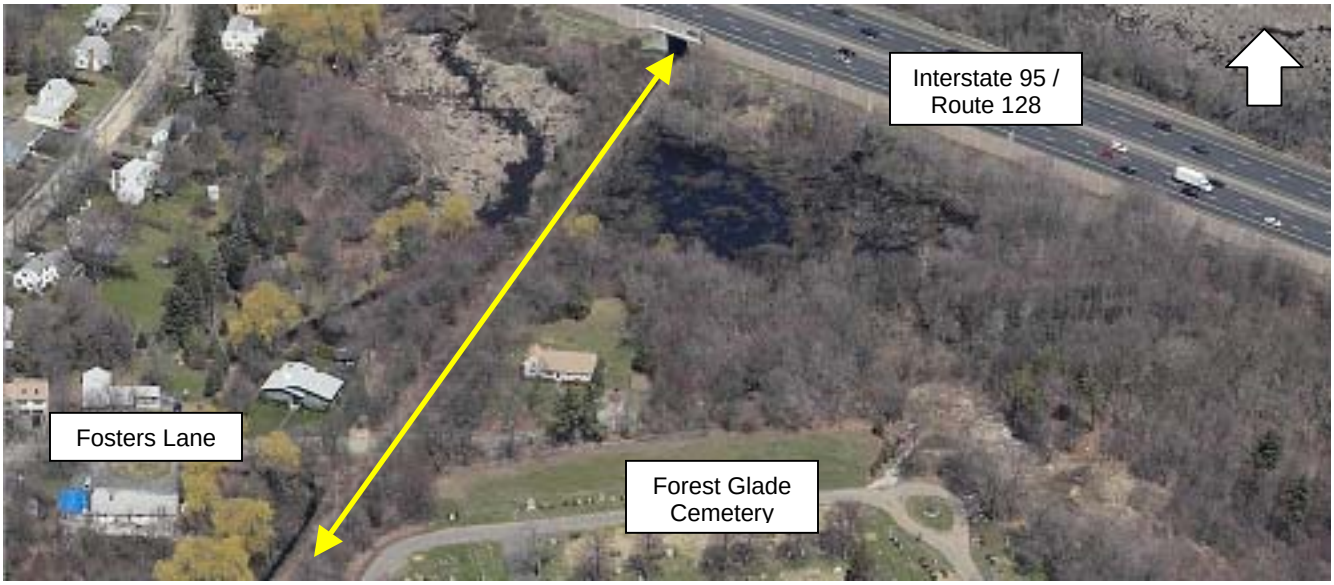
Issues:

- Limited space for reverse curve alignment due to close proximity to a brook and open paved area on southwest side.
- Rail corridor densely vegetated on roadway approach.

Recommendations:

- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Lowell Street.

10.2.8 Fosters Lane - Wakefield



Source: Microsoft Windows Live Local

Description: Fosters lane is a low volume, low speed residential dead end road.

Type of Roadway:	Local
Posted Speed:	30 mph
Jurisdiction:	Town
Est. Volume (ADT):	700 vehicles
Surface Width:	23 feet

Issues:

- Rail corridor densely vegetated on roadway approach.
- Fosters lane becomes a gravel road at rail crossing.

Recommendations:

- Pavement may need to be extended on roadway where gravel exists to accommodate rail trail.
- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Install advanced warning signs and pavement markings along Fosters lane.

10.2.9 Summer Street - Lynnfield

Source: Microsoft Windows Live Local

Description: Summer Street is a major thoroughfare that travels from Main Street in the north to I-95 in the south.

Type of Roadway:	Urban minor arterial
Posted Speed:	35 mph
Juisdiction:	Town
Est. Volume (ADT):	7,200 vehicles
Surface Width:	30 feet

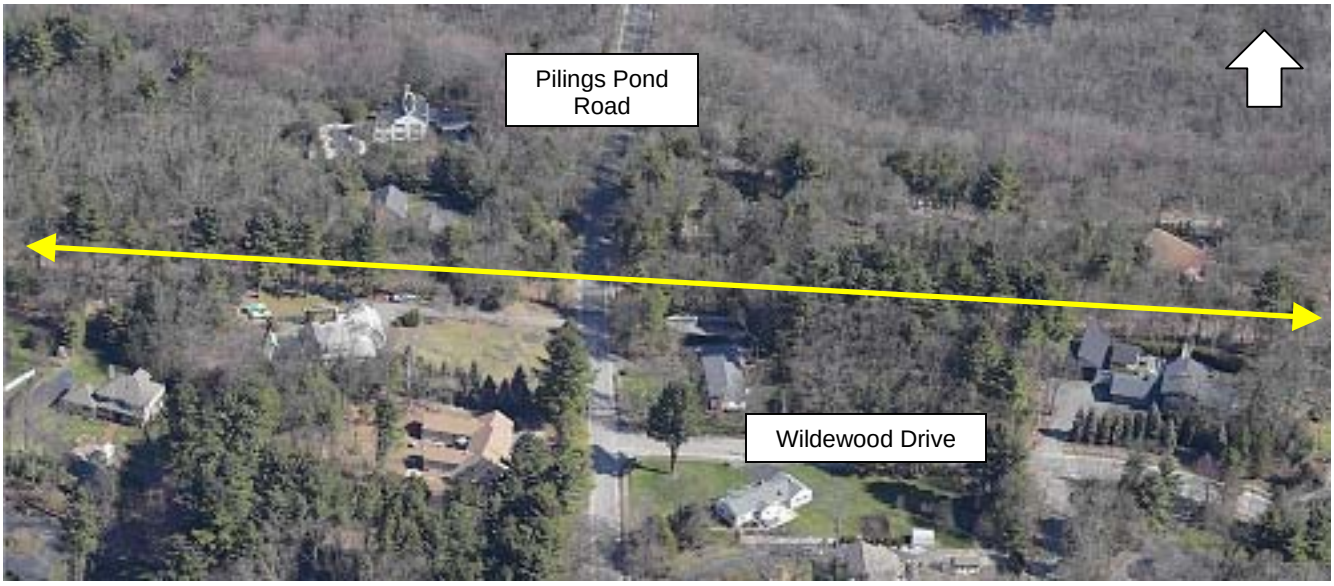
Issues:

- Rail corridor densely vegetated on roadway approach.
- Limited space for reverse curve alignment on south side due to close proximity to church parking lot and steep slope to golf course.

Recommendations:

- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Summer Street.

10.2.10 Pillings Pond Road - Lynnfield



Source: Microsoft Windows Live Local

Description: Pillings Pond Road is a low volume, low speed local roadway.

Type of Roadway:	Local
Posted Speed:	-
Jurisdiction:	Town
Est. Volume (ADT):	700 vehicles
Surface Width:	20 feet

Issues:

- Rail corridor densely vegetated on roadway approach.

Recommendations:

- Selectively clear and thin existing vegetation to provide sufficient sight distance.
- Consider painting a bright color or using textured surface treatment (e.g. Imprint) between the crosswalk lines to raise awareness of the crossing.
- Install advanced warning signs and pavement markings along Pillings Pond Road.

11 Mitigation Measures

The purpose of this section is to outline potential measures to mitigate the impact of trail development on abutting properties and sensitive resource areas.

The mitigation measure that is selected is based on location specific conditions and the input of the abutting property owner. One abutter may request a stockade wood fence whereas another may prefer evergreen trees. The design consultant and Town will work with individual abutters to develop a mitigation design that addresses their concerns.

There are three primary mitigation measures that are typically used to control and block unwanted access from a rail trail to abutting properties. These measures can retain the privacy of abutting properties, without sacrificing the overall visual quality of the corridor.

These measures include:

Signage: Signage identifying where the adjacent land is private property is a basic measure that can be used to deter trespassers. Signage used in combination with the other mitigation measures listed below will improve its effectiveness in controlling unwanted access.

Fencing: The installation of a 3.5-foot high wood rail fence or post and rail fencing along the corridor can discourage users from traversing an adjacent side slope or wandering outside the right-of-way in search of a new vista. Low growing, native plantings could be massed in natural forms along the fencing to further discourage unwanted access. Six (6) foot high chain link fences also provide a physical barrier between the trail and adjacent property but are unattractive in comparison to more natural looking materials. Another fence option that is typically used is a wood stockade fence.

Vegetation: One of the primary design goals is to maintain the natural vegetative buffer between the rail trail and abutting properties. Typical clearing limits call for trees to be removed within 5 to 7 feet on each side of the 8 to 10 foot rail trail surface. The actual railroad right-of-way ranges from 40 to 80 feet wide. Therefore, there is ample opportunity to retain a vegetative buffer between the trail and abutting properties. However, in areas where there is limited vegetation, landscaping can be planted to further retain the privacy of adjacent uses. Enhancing the vegetative buffer with additional evergreen trees can help address abutters concerns about maintaining privacy.

As the project advances, abutters will have multiple opportunities to request mitigation measures. At the current study phase of the project, any requests should be directed to the rail trail committee. During the design phase, there will be a Local Issues Meeting and a 25% Design Public Hearing conducted as part of the public outreach process. At these meetings, abutters can request specific measures. These measures will be added to the design plans and included as part of the construction cost estimate.

MassHighway will pay for the construction of all reasonable mitigation requests. However, the Town will ultimately be responsible for maintaining all such mitigation measures located within the rail corridor. In some instances, MassHighway will consider constructing measures on private property as part of a project, which would then become the maintenance responsibility of the private landowner.

12 Trail Amenities

The purpose of this section is to discuss opportunities to enhance the corridor through the proper siting of trail amenities including parking areas, site furnishings, signage, scenic vistas, and landscaping.

The design and location of any amenities should complement the project setting, while maintaining the safety and mobility of users.

12.1 Parking Areas

Trailhead parking provides points of access for rail trail users. These access points will not only accommodate people from the immediate area, but those who have traveled further to use the trail. Although a number of residents will likely walk or bike to the trail from their homes, it can be anticipated that many people will also choose to drive.

Each of the parking options discussed below will need to be further explored as part of the Preliminary Design Phase when more detailed survey is available in order to further assess lot size, feasibility, practicality, permitability and safety issues.

12.1.1 Existing Facilities

Along the project corridor, there are limited locations where existing Town facilities could be utilized for rail trail parking. However, it is recommended that parking be considered at each of the five (5) schools in close proximity to the rail trail corridor.

It is recommended that the each Town's School Committee be contacted regarding the potential use of school property for rail trail parking. The school parking areas are used on weekdays when school is in session and on weekends for school activities. Pending approval, rail trail use would only be allowed during off-peak times including after school, on weekends and over the summer months. Additional warning, regulatory and directional signage and pavement markings may be needed to safety connect users to the rail corridor from the school facilities.

12.1.2 Proposed Parking

Based on a preliminary assessment, it is recommended that two new parking areas be investigated during the preliminary design phase. The areas to be considered include:

- Richardson Street in Wakefield
- Water Street in Wakefield

A 1"=40' scale plan of each proposed parking area is included on the following pages. The plans were developed using the Town of Wakefield's planimetric data. Both of the proposed parking areas could be expanded to accommodate additional parking spaces in the future.

Richardson Street: The proposed Richardson Street parking area would be located on two undeveloped parcels under public ownership and be separated from the proposed rail trail by a 10-foot grass strip. The Town of Wakefield owns the eastern parcel while Boston & Maine Railroad (MBTA) owns the western parcel. The parking area would be accessible from Richardson Street and provide 23 standard spaces and 4 handicap accessible spaces for a total of 27 parking spaces.

Water Street: Like the Richardson Street parking area, the Water Street parking area would also be located on parcels owned by the Town of Wakefield and Boston & Maine Railroad (MBTA) separated from the rail trail by a 10-foot grass strip. There is an existing gravel lot at this location, which appears to be used by the restaurant in the former railroad station building. The proposed parking area would be accessible from Water Street and will provide 18 standard spaces and 2 handicap accessible spaces for a total of 20 parking spaces.

Other Areas Considered: Two other potential parking locations were studied as part of this study, although neither is recommended at this time. Should the Towns and/or Committee feel the additional parking is necessary, both areas can be reconsidered in the future.

In Lynnfield, providing parking within the railroad right-of-way on the north side of the Summer Street intersection was considered. At this location the railroad right-of-way widens towards Westover Drive (See Appendix A – Corridor Base Map, Sheet 7 of 9). However, the Committee felt that the neighbors in this area would strongly object to a parking area and therefore this location is not recommended for implementation.

Providing parking within the railroad right-of-way along Vernon Street in Wakefield was also studied. Rather than providing parking at this location, it is instead recommended that the Richardson Street or Water Street parking areas could be expanded should additional parking be needed.

12.1.3 Private Property

In some cases, private businesses or non-profits (i.e. churches) may also be willing to negotiate a public access agreement, recreational easement or land gift with restrictions with the Town(s). The Towns would need to meet with these entities to determine their willingness to entertain rail trail parking on their properties during off-peak hours.

n/f
TOWN OF WAKEFIELD

20 SPACES

n/f
B&M RAILROAD

FMR. RAIL STATION

WAKEFIELD/LYNNFIELD RAIL TRAIL

WATER ST (RTE 129)

WAKEFIELD/LYNNFIELD FEASIBILITY STUDY
WAKEFIELD PARKING/TRAILHEAD ALTERNATIVE

FAY, SPOFFORD & THORNDIKE, LLC

HOR. SCALE IN FEET

0 40 100 200

n/f
TOWN OF WAKEFIELD

n/f
B&M RAILROAD

RETAIN PINE TREE

PICNIC TABLE (TYP.)

18'

24'

18'

27 SPACES

11' 5' 11'

11' 5' 11'

10' GRASS STRIP

10' BIT. CONC. RAIL TRAIL

10'

RICHARDSON ST

BENNETT ST

n/f
ELIZABETH E. BOIT

n/f
B&M RAILROAD

n/f
TOWN OF WAKEFIELD

RETAIN TRACKS

TRAIL HEAD

WAKEFIELD/LYNNFIELD FEASIBILITY STUDY
WAKEFIELD PARKING/TRAILHEAD ALTERNATIVE

FAY, SPOFFORD & THORNDIKE, LLC

HOR. SCALE IN FEET

0 40 100 200

12.2 Site Furnishings

Site furnishings will enhance the comfort and enjoyment of trail users. These amenities could include:

- Benches
- Picnic tables
- Trash receptacles
- Information kiosks
- Directional signage
- Bike racks or lockers

Primary considerations for recommending amenities and other trailside items should include:

- Appropriateness
- Functionality
- Attractiveness of design
- Desired materials (i.e. natural and/or sustainable materials)
- Durability
- Maintenance requirements
- Cost

These amenities should be strategically placed in areas along the corridor where the Towns specifically want people to gather.

Examples of such site furnishings are included on the following page.

12.3 Scenic Vistas, Rest Areas and Interpretation

There are a number of scenic and historic views along the way which could be highlighted through controlled vista pruning and the careful siting of overlooks and rest areas. These vistas / areas can be a simple as a flat, paved pull off adjacent to the trail in the shade with vista pruning to reveal scenic views or as developed as a special location with interpretative signage, picnic tables, bike racks and other amenities. The placement of ground or rail mounted interpretive signage at these areas can give the trail a unique character and increase users appreciation of the corridor's railroad history and natural resources.

Two areas which were studied for this Study include trailhead amenities between Richardson and Bennett Streets and a rest area in an elevated woodland area in Reedy Meadow. The cost of these areas has been included in the construction cost estimate for this project.

During the preliminary design phase, it will be important to solicit input from local Town Boards, Committees and the public to determine where a overlooks and/or rest areas may be appropriate, and which features are chosen for interpretation along the trail.

Examples of such amenities are included on the following page.

Overlook at Point of Interest

Kiosk at Parking Area

Typical 10 ft Wide Trail

Typical Crossing at Major Roadway

Typical Crossing at Minor Street

Gateway/Parking Area at Trail Terminus

Wakefield/Lynnfield Rail Trail

Design Opportunities:
Typical Trail Amenities

12.4 Landscaping

Ornamental native plantings and screening will serve to strengthen visual connections along the railroad corridor. Uniform treatments and proper vegetative management will improve the visibility and overall appearance of the rail trail. Some recommendations include:

- Introduce new plantings to reinforce the trail entry points, enhance and support desirable views at scenic vistas and/or areas to rest.
- Strategically locate new plantings to buffer unwanted views and the rear of commercial/industrial buildings.
- Minimize the extent of disturbance to existing vegetation between private properties and the railbed. Install additional plantings, where needed, to retain the privacy of these owners.
- Selectively clear vegetation back from both sides of the trail at entry points, to increase visibility and sight lines and to cue both drivers and trail users of crossings and trail access points.

The goal of landscape design should be two-fold, to add to and enhance existing vegetation and introduce new, self-sustaining native species where needed along the corridor.

13 Cost Estimates

The purpose of this section is to provide a budgetary estimate of anticipated construction and project development costs for the 4.4-mile rail trail.

13.1 Construction Costs

The preliminary construction cost estimate is based on:

- Bids received from contractors on other MassHighway advertised rail trail projects across the state (as published in the CIM Construction Journal)
- Current MassHighway Weighted Average Bid Prices
- Similar work recently designed by the Consultant

The construction cost assumes:

- Use of the recommended *Typical Section* along majority of corridor (10-foot hot mix asphalt trail with 2-foot shoulders)
- Use of the recommended *Typical Section in Floodplain* (8-foot surface width with stabilized base) where the corridor is located within the 100-year floodplain
- Construction of wooden boardwalks at the Saugus River and the Beaverdam Brook culverts
- Installation of a wood rail fence along 2:1 slope areas
- Implementation of recommended intersection improvements (See Section 10) including a pedestrian activated signal at the Main Street crossing and addition of a pedestrian phase to the existing signal at Water Street (Route 129).
- Root barrier is needed along *approximately* 25% of the corridor based on lack of existing vegetation within the “rail bed” itself
- Track and tie removal will be completed under a separate construction contract

As noted above, it is assumed that track and tie removal will be completed under a separate construction contract. Removal of existing track is a labor intensive item that includes cutting the track into manageable sections for hauling purposes and removing tie plates, spikes, pins, rail anchors, and all other rail hardware. Disposal of the treated timber cross ties includes the cost of removing and stockpiling the ties and transporting the ties to an approved waste facility. Based on the current price of steel, the salvage value of the rail currently outweighs the cost of tie removal, thereby resulting in a cost-plus scenario. However, future steel prices will fluctuate based on market demands. It is unknown if the MBTA will remove the rails for salvage value before signing a property agreement with the Towns. This issue would be more fully developed in the context of the lease agreement.

A 10% contingency cost has been included to account for specific items of work that will be determined during the preliminary design phase. Also, the estimated cost has been escalated using a flat inflation rate (3%) and compounded annually to estimate for expected increases in the cost of construction before the trail may actually be built (a five year timeframe was assumed).

The construction cost estimate has been broken down by major items of work and presented in tabular form in Figure 20. This estimate is based on 2007 construction costs and does not include design costs. A more accurate estimate would need to be developed during the preliminary design stages of the project in order to program the necessary funding.

Figure 20: Construction Cost Estimate

Item	Work Description	Unit	Unit Price	Quantity	Cost
1	Clearing and Grubbing	Acre	$15,000	4	$60,000
2	Excavation	CY	$25	14,000	$350,000
3	Dense Graded Crushed Stone for Shoulders (8”)	CY	$50	4,500	$225,000
4	Hot Mix Asphalt Surface (4”) with dense Graded Crushed Stone Base Material (8”)	SF	$5	222,000	$1,110,000
5	Crushed Stone with Geocell System @ Reedy Meadow	SF	$6	53,000	$318,000
6	Boardwalk @ Saugus River	LF	$1,000	100	$100,000
7	Boardwalk @ Beaverdam Brook	LF	$1,000	100	$100,000
8	Push Button Activiated Pedestrian Signals	LS	$50,000	2	$100,000
9	Roadway Intersection Improvements	EA	$10,000	10	$100,000
10	Richardson Street Parking Lot	LS	$50,000	1	$50,000
11	Water Street (Route 129) Parking Lot	LS	$55,000	1	$60,000
12	Wood Rail Fence	LF	$40	6,000	$240,000
13	Root Barrier	LF	$5	12,000	$60,000
14	Loam Borrow for Shoulders (4”)	CY	$40	2,500	$100,000
15	Drainage	LS	$50,000	1	$50,000
16	Landscaping & Amenities	LS	$250,000	1	$250,000
17	Wetlands Protection	LS	$100,000	1	$150,000
18	Track Removal **	LF	-	-	-
	Subtotal				$3,405,000
	Contingencies (~ 10%)				$340,500
	Total Estimated Construction Cost				$3,745,500
	Inflation Adjustment (5 years)				$600,000
				Total	$4,345,500
				SAY	**$4.4 M**

** It is assumed that track and tie removal will be completed under a separate contract and therefore has not been included in the cost estimate.

Based on a more detailed estimate breakdown by Town, the Wakefield section of rail trail is approximately $1.9 million and the Lynnfield section approximately $2.5 million for a total estimated construction cost of $4.4 million. This cost assumes an economy of scale of this project being completed as one construction contract.

13.2 Project Development Costs

The engineering design and permitting fee is typically between 10% and 20% of the construction cost, with the variation being attributed to the complexity of design issues along the corridor, number of structures and extent of required permitting. The additional permitting costs for the Lynnfield section of project is a result of the anticipated floodplain compensation and wetland replication areas needed to cross Reedy Meadow.

For planning purposes, a ballpark fee for the 4.4-mile rail trail is as follows:

Figure 21: Project Development Cost Estimate

Description	Wakefield	Lynnfield	Combined
Engineering Design	$230,000	$270,000	$500,000
Permitting	$40,000	$60,000	$100,000
Total	$270,000	$330,000	$600,000

This fee estimate assumes an economy of scale of this project being designed and permitted under one contract. This approach will help reduce overall project costs by allowing tasks to be performed as a single effort rather than having to prepare two separate design plan sets and permit applications.

Assuming a MassHighway design process is followed, a 25% MassHighway Design (preliminary design) is typically between 40% to 50% of the total design fee. Therefore, the 25% Design fee for the Wakefield/Lynnfield Rail Trail would be approximately $300,000. This fee estimate is not based on detailed tasks and related work efforts but rather is a ballpark estimate intended for programming purposes.

The 25% Design phase, according to the MassHighway Project Development & Design Guide, includes a complete topographic survey including delineation of environmental resource areas, and preparation of preliminary alignment plans, profiles and typical cross sections for the trail. In addition, during the 25% Design, watershed mapping and hydraulic studies will need to be completed for the Reedy Meadow area. Based on this information, it is possible to determine the extent of actual impacts, if any, that a trail would have upon adjacent resource areas and private properties. During the 25% Design phase, the designer will determine which permits and approvals will be required for the project, and will initiate early coordination with those local and state agencies.

After the 25% Design is completed and approved by MassHighway, a Design Public Hearing is held in the community. The project can then advance to the final design phases (75% Design → 100% Design → Final Plans, Specifications & Estimates). All necessary permits are secured before the project is put out to bid for construction.

13.3 Maintenance & Public Safety Oversight

Many publicly owned and managed rail trails incur trail maintenance costs as part of their annual public works or parks & recreation programs and budgets. These entities typically do not keep a separate cost and activity record of the maintenance and management of the trail. Therefore it is difficult to identify the costs related to as-needed, seasonal and long-term maintenance activities

The Rails-to-Trails Conservancy (RTC) Northeast Regional Office recently completed a study of various trail maintenance and operations issues for more than 100 open rail-trails in the northeast region of the United States. Their findings have been compiled in a publication entitled "*Rail-Trail Maintenance & Operation: Ensuring the Future of Your Trail - A Survey of 100 Rail-Trails*." This publication is available on RTC's website [http://www.railtrails.org/]. The Town should consult this publication for valuable information on budgetary issues, staffing, equipment and various other needs related to the operation and maintenance of a rail trail.

13.4 Funding

Once the Towns are committed to moving the project forward, the first step is to complete a Project Need Form (PNF) and submit it to the MassHighway District 4 Office. This form should also be forwarded to the Boston Metropolitan Planning Organization (MPO) and the Metropolitan Area Planning Council (MAPC) for their files. The PNF can be prepared by the Town with or without the help of a consultant. A town official, such as the planner, engineer, or administrator, should take the lead and act as the principal point of contact for the project. MassHighway will review the PNF and evaluate the merits and readiness of the project. They will also provide the Town with advice on how to proceed, both in terms of the design process and available funding sources. Funding for the design and construction of the rail trail will need to be secured from local, state, and federal sources. The two most commonly used funding programs for rail trail projects are the Transportation Enhancement (TE) Program and Congestion, Mitigation and Air Quality (CMAQ) Program. Both programs were originally funded through the federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and continued via the Transportation Equity Act for the 21st Century (TEA-21). These programs are included in the current reauthorization of the Act, entitled The Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (SAFETEA).

Transportation Enhancement Program: In order for a project to be considered for the TE Program, a Town needs to apply for funding through a two step pre-application / final application administered by the MAPC Transportation Enhancement Selection Committee. The Committee is responsible for selecting which regional projects are eligible for consideration as TE Program funded projects. Selected projects are reviewed for eligibility and preparedness for implementation before a project is forwarded to MassHighway and the State Transportation Enhancement Steering Committee. Under this program, a Town must be prepared to provide a local funding commitment comprised of a cash match in the amount of 10% of the total project construction cost. The remaining project cost is funded 80% federal and 10% state. Most communities fund the engineering design to meet their cash match. At the time a TE Program application is submitted, the Towns should have completed or substantially completed the 25% Design phase; or the Towns should have committed in writing to fund the project development and 25% Design phase pursuant to MassHighway design standards.

Congestion Mitigation and Air Quality Improvement Program: A rail trail project often fits the eligibility requirements for both the TE Program and the Federal Congestion Mitigation and Air Quality Improvement Program (CMAQ) of SAFETEA. CMAQ is a transportation air quality improvement program that provides funding for both bike and pedestrian facilities that serve to reduce automobile travel. A Town must complete a CMAQ Air Quality Analysis Worksheet for Bicycle and Pedestrian Projects to document a quantifiable reduction in auto emissions and/or congestion to be eligible under this program. Under this program, the project cost is funded 80% federal and 20% state or local match. In some instances, the state has funded the entire 20% match. However, most commonlly, Towns are required to provide a cash match in the amount of 10% of the total project construction cost. Most communities fund the engineering design to meet their cash match. Similar to the TE Program, project funded under the CMAQ Program must adhere to MassHighway design standards.

According to the MAPC, most rail trail projects proceed through the TE Program, but sometimes end up being funded under CMAQ depending upon the availability of state and federal funding.

If the Towns decide to seek federal funding (i.e. Transportation Enhancement or CMAQ) and funds the entire design as its 10% local match, then the Town would act as the Project Proponent and administer the design contract. MassHighway would be responsible for constructing the project using the federal funding. The design would still be subject to MassHighway review and approval at each stage of design.

The Towns of Wakefield and Lynnfield are jointly pursuing various funding sources to serve as the 10% local match. Such sources include bond bill appropriations, matching grants and private fundraising. The goal is to advance the project with minimal financial impact to either community.

14 Project Implementation

As noted previously, the Wakefield/Lynnfield Rail Trail is planned to connect with the larger, regional Border to Boston Trail proposed through 8 communities.

Recognizing the difficulties faced by a decentralized approach and the importance of the proposed path network, the Massachusetts Highway Department (MassHighway) formed an official Border to Boston Task Force in 2006. The mission of the Task Force was to help guide the implementation process for designing, permitting, and constructing the entire 30-mile shared use path. Taskforce members include MassHighway, FHWA, Essex National Heritage Corridor Commission, National Park Service, Merrimack Valley Planning Commission, Metropolitan Area Planning Council, and representative from each Border to Boston community.

Since its inception, the Task Force has been meeting regularly to identify effective and efficient ways to focus resources on designing and constructing the path network. The Task Force is currently drafting a Preliminary Design Scope of Work. This Scope of Work will assess existing conditions and outline the proposed work and design/construction issues along the project corridor. The Preliminary Design will be funded using an $800,000 congressional earmark and the contract will be administered under the auspices of MassHighway. This funding was earmarked as High Priority Project #843 in the 2005 SAFETEA-LU legislation.

Unfortunately, the congressional earmark noted above did not include the remaining communities along the former Newburyport Railroad line that include Wakefield, Lynnfield, and Peabody. This also means that these communities will not be included in the preliminary design phase of the Border to Boston Trail. Therefore, the next recommended steps for Wakefield and Lynnfield are:

- Secure funding to develop a preliminary design, and
- Petition both the Boston Metropolitan Planning Organization (MPO) and MassHighway to become part of the Border to Boston Trail.

The Boston Metropolitan Planning Organization is one of the 13 Massachusetts regions established to carry out federally funded transportation plans and programs. It is made up of 101 cities and towns, including Wakefield and Lynnfield. The MPO recently completed a Regional Bicycle Plan that was conducted by the Metropolitan Area Planning Council (MAPC). This study describes the existing bicycle transportation network, evaluates progress in achieving the goals of previous plans, and proposes contemporary ones. This plan then lists priority projects and programs to guide future action. One key point in this report is that there are currently 96 miles of off-road shared use paths in the Boston region. “However, too few of the region’s paths connect to each other, and the paths do not form a system of connected off-road routes.” With the new statewide bicycle plan under development, the top priority projects for funding will be regionally connected projects. The Border to Boston Trail is Essex County’s regional trail.

It should be noted that the Wakefield and Lynnfield rail trail is shown as a “Long-Term” priority (10-20 years) where the Border to Boston Trail is rated Medium-Term priority (5-10 years). The chart on the following page shows the listing of the Wakefield and Lynnfield trails from the MPO report. We have also included the Off-Road Project Priorities map for this region.

Also, the MPO has developed a new Transportation Plan called Journey to 2030. The Plan is the MPO’s long-range, comprehensive transportation-planning document. This plan defines it’s “vision of the future for transportation, establishes principles and policies that will lead to the achievement of that vision, and allocates projected revenue to transportation programs and projects that reflect those principles and policies.” The North Shore representative of the East Coast Greenway commented on the segmentation of the Newburyport Railroad corridor. His comments and the MPO’s response are at the end of this section.

Off-Road Project Priorities

New/Improved/Extended Multi-use Paths

Priority[1]	Project	Location	Status	Length (miles)	Mention in Previous Plans[2]
	Minuteman extension	Bedford, Concord	Planned	5.4	MAPC (H), CC, SVY
Short	Bedford section		Under design	2.2	
Medium	Concord section		Planned	3.2	
Medium	Mystic River Path extensions (along Alewife Brook at west end, to Boston on east end)	Somerville, Arlington, Medford	Planned	3.5	MAPC (H), SVY
Short	Neponset River Trail Phase II	Boston, Milton	Under design	2.7	MAPC (L), CC, BPD, NRR, SVY
	North Suburban Bike Plan paths	Wakefield, Lynnfield, Wilmington	Planned	8.0	MAPC (M), SVY
Long	Wakefield section		Planned	1.5	
Long	Lynnfield section		Planned	2.5	
Long	Wilmington section		Planned	4.0	
Medium	Northern Strand (aka Bike to the Sea)	Everett, Malden, Revere, Saugus, Lynn	Planned	9.5	MAPC (H), SVY
Medium	Riverside connector	Newton, Wellesley	Conceptual	1.0	MAPC (H), FI
Medium	Salem Path extension (Salem Bike Path)	Salem	Planned	1.5	
Medium	Somerville Community Path extension	Somerville		2.0	MAPC (M), SVY
Short	Phase I		Under design	1.0	
Medium	Phase II		Feasibility study complete	1.0	

[1]Short = Short-term priority (0–5 years). Medium = Medium-term priority (5–10 years). Long = Long-term priority (10–20 years).

[2]See key at bottom of page 39.

Off-Road Project Priorities

NAME	AFFILIATION	COMMENT	MPO ACTION
John D. Keenan	State Representative, 7th Essex District, Salem	Supports new MBTA commuter rail parking garage and platform in Salem. Commuter rail is critical to Salem, which lacks direct highway access, and a key commuting option for thousands of residents. Existing parking facilities are insufficient to meet demand. The station lot fills by 7:30 AM, and overflow parking on city streets creates safety and traffic hazards. Revival of downtown is occurring with completion of major bypass road project, a redesigned intersection at the heart of downtown, and a new courthouse complex forthcoming. Safe and accessible public transit is required.	This project is included in the universe list of parking projects. There is some design work completed with a federal earmark associated with this project. It will be considered as one of the locations for the 1000-space park-and-ride SIP commitment projects.
John K. Hendrickson, P.E.	Vice President, Fay, Spofford & Thorndike, LLC, and North Shore Representative, East Coast Greenway	The North Suburban Bike Paths in Wakefield and Lynnfield will eventually connect to the Border to Boston Trail via Peabody. This connection should be shown in the Plan to emphasize that this is a regional trail system, not an isolated trail. The East Coast Greenway is the most important regional trail in Massachusetts and should be included in the Plan with a map of the 3,000-mile route from Maine to Florida and the routes used by the East Coast Greenway outlined.	The MPO funded a Regional Bicycle Plan, recently completed by the Metropolitan Area Planning Council. As part of that plan, this bike project has been listed as a long-term priority. The communities have obtained funding to conduct a recreational trail feasibility study. Once more information is available, this project can be included in the Universe of Projects list for the TIP. It does not specifically have to be included in the Plan before it is eligible for funding.
Edward Starr	Chair, Arlington Transportation Advisory Committee	The Transportation Advisory Committee is interested in seeing a reduction in the number of people who drive to work (67% of Arlington's workforce). It supports the Green Line extension from Lechmere to Medford. In order for Arlington residents to use this line, the terminus must be extended to the Mystic Valley Parkway (Route 16) and Boston Avenue. This location is preferable to the Medford Hillside terminus as it can be accessed by bus, walking, and bicycling, which is important because there is no parking at either location. Supports the suggestion of the Medford Green Line Neighborhood Alliance to put a station near the Mystic Valley Parkway (Route 16) between Boston Avenue and the Wild Oats grocery store.	The extension of the Green Line to Ball Square is included in the Plan. When the SIP commitments are finalized by EPA and DEP, the MPO will amend the Plan to include any changes to the commitments. This comment will be forwarded to the MBTA and the Executive Office of Transportation, which are currently developing an environmental impact report for the Green Line extension that will consider station locations.
Lisa E. Lepore, P.E.	Chair, Inner Core Committee	The ICC is concerned about the financial feasibility of the draft Plan and questions whether the funding split between maintenance and new projects is realistic. It suggests an elaboration on the Plan's assumption that past funding trends will not hold true in the future. The Transportation Finance Commission report should inform the Plan. The MPO should commit to funding alternative transportation, including bicycle and pedestrian programs and TDM. ICC is concerned that there are no transit projects after 2020. ICC is pleased to see a reference to the connection between land use and transportation, and the impact of land use on congestion, but it is concerned that projects are the same as in last Plan. The Plan is unclear about how land use and economic development visions and policies have influenced projects listed in Plan.	The funding for this Plan includes a projection of revenues through 2030 based on current allocations and trends and an allocation of how those funds will be spent over the next 23 years. In March, the Massachusetts Transportation Finance Commission issued a report, Transportation Finances in Massachusetts, that estimates a transportation-needs gap of $15 billion to $19 billion over the next 20 years. The Patrick-Murray administration has committed to work with the Legislature, the Transportation Finance Commission, and other stakeholders to develop a proposal to address these findings through comprehensive reform of the state's transportation-financing system. The MPO will participate in this process.

Appendix A – Corridor Base Mapping

Appendix B - Agency Correspondence

TOWN OF WAKEFIELD

MASSACHUSETTS

FIRE DEPARTMENT HEADQUARTERS

ONE UNION STREET
WAKEFIELD, MA 01880-2495

DAVID L. PARR

CHIEF

(781) 246-6435

FAX: (781) 246-6433
BUSINESS PHONE: (781) 246-6432
EMAIL – davidp@wakefield.ma.us

FIRE PREVENTION

(781) 246-6436

August 16, 2007

Mr. Paul Reavis, Town Planner
Town Hall
One Lafayette Street
Wakefield, MA.
01880

Dear Mr. Reavis:

I have received the invitation to attend the public information forum for the proposed Rail Trail, to be held on Monday evening at 7:00 PM. I am very supportive of this project and will try to attend the hearing in person. If I am unable to attend, I would appreciate if you would accept and forward my comments on the project.

The Wakefield Fire Department would request that if constructed, that the Rail Trail be of sufficient size (width) to accommodate a full size fire pumper and Emergency Medical – Ambulance. We would need access to the Rail Trail, especially the section crossing Reedy Meadow to respond to brush fires, medical emergencies, accidents, etc. Furthermore, to provide emergency vehicle access yet restrict other motor vehicle traffic, we would request that gate(s) and/or removable bollards be installed at each street access point to the Rail Trail.

I have discussed this project with the Lynnfield Fire Department and they agree with our recommendations.

Thank you for the opportunity to comment on this project. I do hope to attend the hearing, but would appreciate your submitting our written comments to the consultant. Please do not hesitate to call me with any problems or questions.

Very truly yours,

Chief David L. Parr
Wakefield Fire Department

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

July 6, 2007

Jennifer Shemowat
Fay, Spoffard, & Thorndike, LLC
5 Burlington Woods
Burlington, MA 01803

RE: Project Location: Wakefield-Lynnfield Rail to Trail Project
Town: Wakefield, Lynnfield
NHESP Tracking No. 07-22577

To Whom It May Concern:

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-listed rare species in the vicinity of the above referenced site. Based on the information provided, this project site, or a portion thereof, is located **within** *Priority Habitat 838 and 395* (PH 838, PH 395) and *Estimated Habitat 215* (EH 215) as indicated in the *Massachusetts Natural Heritage Atlas* (12th Edition). Our database indicates that the following state-listed rare species have been found in the vicinity of the site:

Scientific name	Common Name	Taxonomic Group	State Status
Botaurus lentiginosus	American Bittern	Bird	Endangered
Rallus elegans	King Rail	Bird	Threatened
Gallinula chloropus	Common Moorhen	Bird	Special Concern
Carex livida	Glaucous Sedge	Plant	Endangered

The species listed above are protected under the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (WPA) (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.00). Fact sheets for most state-listed rare species can be found on our website (www.nhesp.org).

Please note that projects and activities located within Priority and/or Estimated Habitat **must** be reviewed by the NHESP for compliance with the state-listed rare species protection provisions of MESA (321 CMR 10.00) and/or the WPA (310 CMR 10.00).

Wetlands Protection Act (310 CMR 10.00)

If the project site is within Estimated Habitat and a Notice of Intent (NOI) is required, then a copy of the NOI must be submitted to the NHESP so that it is received at the same time as the local conservation commission. If the NHESP determines that the proposed project will adversely affect the actual Resource Area habitat of state-protected wildlife, then the proposed project may not be permitted (310 CMR 10.37, 10.58(4)(b) & 10.59). In such a case, the project proponent may request a consultation with the NHESP to discuss potential project design modifications that would avoid adverse effects to rare wildlife habitat.

Division of Fisheries and Wildlife
Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7891
An Agency of the Department of Fish and Game

A streamlined joint MESA/WPA review process is now available. When filing a Notice of Intent (NOI), the applicant may now file concurrently under the MESA on the same NOI form and qualify for a 30-day streamlined joint review. For a copy of the revised NOI form, please visit the MA Department of Environmental Protection's website: http://www.mass.gov/dep/water/approvals/wpaform3.doc.

MA Endangered Species Act (M.G.L. c. 131A)

If the proposed project is located within Priority Habitat and is not exempt from review (see 321 CMR 10.14), then project plans, a fee, and other required materials must be sent to NHESP Environmental Review to determine whether a probable "take" under the MA Endangered Species Act would occur (321 CMR 10.18). Please note that all proposed and anticipated development must be disclosed, as MESA does not allow project segmentation (321 CMR 10.16). For a MESA filing checklist and additional information please see our website: www.nhesp.org ("Regulatory Review" tab).

We recommend that rare species habitat concerns be addressed during the project design phase prior to submission of a formal MESA filing, as avoidance and minimization of impacts to rare species and their habitats is likely to expedite endangered species regulatory review.

This evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. If you have any questions regarding this letter please contact Emily Holt, Endangered Species Review Assistant, at (508) 389-6361.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

July 12, 2007

Reference:	Project	Location
	Rail trail	Wakefield, Lynnfield, MA

Jennifer Shemowat
Fay, Spofford & Thorndike, LLC
5 Burlington Woods
Burlington, MA 01803

Dear Ms. Shemowat:

This responds to your recent correspondence requesting information on the presence of federally-listed and/or proposed endangered or threatened species in relation to the proposed activity(ies) referenced above.

Based on information currently available to us, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes our review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Anthony P. Tur
Endangered Species Specialist
New England Field Office

Appendix C – List of Online Resources

Description	Website Address
MassHighway Project Development & Design Guide	http://www.mhd.state.ma.us/default.asp?pgid=content/designGuide&sid=about
MA Executive Office of Transportation Bicycle Transportation Program	http://www.eot.state.ma.us//default.asp?pgid=BikeIndex&sid=level2
Massachusetts Bicycle Transportation Plan Update	http://www.massbikeplan.org/
Metropolitan Area Planning Council (MAPC) Transportation Alternatives	http://www.mapc.org/transportation/transportation_alternatives.html
MA Department of Conservation & Recreation (DCR) Bike Paths & Trails	http://www.mass.gov/dcr/recreate/biking.htm
MA Department of Conservation & Recreation Commonwealth Connections Greenway Vision	http://www.mass.gov/dcr/stewardship/greenway/pdfs/connections.pdf
Essex National Heritage Commission Border to Boston Trail Overview	http://www.essexheritage.org/bordertoboston/index.php
Massachusetts Bicycle Coalition	http://www.massbike.org/
WalkBoston - Safe Routes to School Program	http://www.walkboston.org/projects/safe_routes.htm
National Center for Safe Routes to School	http://www.saferoutesinfo.org/
Rails-to-Trails Conservancy	http://www.railstotrails.org
East Coast Greenway	http://www.greenway.org
National Transportation Enhancements Clearing House	http://www.enhancements.org/
FHWA Pedestrian Information Center	http://www.walkinginfo.org/
FHWA Bicycle Information Center	http://www.bicyclinginfo.org/

Appendix D – List of Acronyms

The following is a list of acronyms used throughout the study:

AASHTO	American Association of State Highway and Transportation Officials
ACOE	Army Core of Engineers
ADA	American with Disabilities Act
ADAAG	American with Disabilities Act Accessibility Guidelines
ADT	Average Daily Traffic
BLSF	Bordering Land Subject to Flooding (Floodplain)
B&M	Boston & Maine Railroad
BMPs	Best Management Practices
BWSC	Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup
BVW	Bordering Vegetative Wetland
CE	Categorical Exclusion Checklist
CERCLA	Comprehensive Environmental Compensation Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Program
CMR	Code of Massachusetts Regulations
CVP	Certified Vernal Pool
CY	Cubic Yard
DFW	Massachusetts Division of Fisheries & Wildlife
EA	Each
EH	Estimated Habitats for Rare Wildlife
EIR	Environmental Impact Report
ENF	Environmental Notification Form
EOEA	Massachusetts Executive Office of Environmental Affairs
EOT	Commonwealth of Massachusetts Executive Office of Transportation
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FST	Fay, Spofford & Thorndike (Consultants)
IVW	Isolated Vegetated Wetland

List of Acronyms (cont'd):

LB	Pound
LEC	LEC Environmental Consultants
LF	Linear Foot
LS	Lump Sum
LSP	Licensed Site Professional
LUW	Land Under Waterbodies and Waterways
MA	Massachusetts
MACRIS	Massachusetts Cultural Resource Information System
MA DEP	Massachusetts Department of Environmental Protection
MAPC	Metropolitan Area Planning Council
MassGIS	Massachusetts Geographic Information Systems
MBTA	Massachusetts Bay Transportation Authority
MCP	Massachusetts Contingency Plan
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MGL	Massachusetts General Laws
MHC	Massachusetts Historical Commission
MPH	Miles Per Hour
MPO	Metropolitan Planning Organization
MS4s	Municipal Separate Storm Sewer Systems
MUTCD	Manual on Uniform Traffic Control Devices
NEPA	National Environmental Policy Act
NHESP	Natural Heritage & Endangered Species Program
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
OHM	Oil or hazardous material
PH	Priority Habitat for Rare Species
PNF	Project Need Form
PVP	Potential Vernal Pool
RAO	Response Action Outcome Statement
REMOPS	Remedy Operation Status
RFA	Riverfront Area
ROW	Right-of-Way

List of Acronyms (cont'd):

RTC	Rails-to-Trails Conservancy
SAFETEA	Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003
SF	Square Foot
SRTS	Safe Routes to School
SWPPP	Stormwater Pollution Prevention Plan
TE	Transportation Enhancement Program
USGS	United States Geological Survey
USFWS	United States Fish & Wildlife Service
UST	Underground Storage Tank
WPA	Wetlands Protection Act



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