T·Y·LIN INTERNATIONAL

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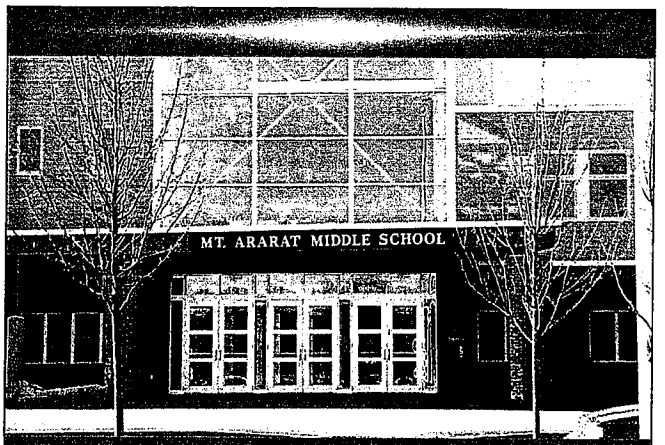
I. EXECUTIVE SUMMARY

The Topsham Trails Feasibility Study evaluates the feasibility of developing an integrated, shared-use trail system connecting the existing Androscoggin River Bikeway ending on Route 24 near the Coastal Connector to the Mt. Ararat Schools and the Topsham Fair Mall. The study was initiated by the Town of Topsham and was funded by the Maine Department of Transportation (MDOT) through Federal Enhancement funds with a 20% match shared by the Town. This study analyzes the advantages and disadvantages of many on-road and off-road routes connecting Route 24 to the schools and the mall, details the recommended alignment and develops cost estimates for future project engineering and construction funding. It is the result of a rigorous effort that reviewed a number of different alignment corridors, polled the public through workshops and public meetings, and worked closely with Municipal leaders, State officials and abutters.

Existing Path on Route 24

Based on the results of the Public Workshop portion of the study, the most important criteria for alignment selection were safety (avoiding conflicts with drives and roads), connecting the path to existing paths/trails, neighborhoods/schools/athletic fields, security, and serving the maximum number of users. The alignment recommended in this report reflects these desires as well as the importance of aesthetics, construction costs and ease of maintenance. It uses primarily off-road facilities from the existing Merrymeeting Bridge on the Coastal Connector to Main Street along a corridor that is generally south and west of the railroad line and Coastal Connector roadway. From Main Street to the Topsham Fair Mall the alignment is also south of the existing Route 196 roadway. Also included are connections on the north side of the Coastal Connector to the Highlands Green development on Village Drive and the Topsham Crossing development. The Town of Topsham, based on the results of the Public Workshop and Second Public Meeting, determined that this alignment best satisfies the project criteria. The alignment selection was then confirmed at the third public meeting.



Mt. Ararat Middle School

The entire transportation path would be approximately 17,500 linear feet (3.3 Miles) in length. From the Merrymeeting Bridge to Main Street the path would generally be comprised of a 10 foot wide, shared-use, paved pathway with a few critical areas reduced to 8' in width. From Main Street to the Topsham Fair Mall the path would vary from 8 to 10 feet and would be separated from the roadway by a 3 to 5 foot grass/landscaped buffer. The Public Workshops concluded that the pathway should be constructed to serve pedestrians, bicyclists, in-line skaters and wheelchair users. The pathway was considered to be important for both commuters and recreational users. The estimated cost for the entire path is approximately $3.3 to $3.9 million. During final design however, the construction costs will have to be re-evaluated based on project survey and the results of preliminary design.

The majority of the pathway system can be constructed within the existing public rights-of-way, on land owned by the Maine Department of Transportation, on land

Topsham Fair Mall

that will be obtained by the Town in the future, or on land in which the owners have expressed a desire to work with the Town in allowing the trail to be on their property. The recommended path would connect to the existing Androscoggin River bikepath in Brunswick via the Merrymeeting Bridge, the existing striped bikelanes and/or side-walks on Elm Street, Main Street, Route 196, Middlesex Road and Foreside Road, the existing sidewalks and trails within the Highlands and Highland Green developments, residential neighborhoods, commercial districts, schools and recreational facilities. It would provide an extension of existing recreational and alternative transportation routes currently available in Brunswick and Topsham.

Besides the path itself, the following elements will be significant parts of the path design and construction:

A. Construction of the path under the existing Merrymeeting Bridge

B. A tunnel under the existing rail line near Elm Street

C. Construction of a new bike/pedestrian bridge over Elm Street just west and parallel to the railroad trestle

D. Retaining walls at various locations

E. Construction of a new bike/pedestrian bridge over the Coastal Connector east of the existing Village Drive/Community Drive intersection

F. Installation of a culvert and a significant amount of fill at a stream just west of the existing Wright-Pierce building

The Feasibility Study Report is broken into the following sections:

- Introduction
- Feasibility Study
- Recommendations
- Appendices for Background Information, Concept Plans, Cost Estimates, Environmental Constraints Assessment Report, and Public Meeting Minutes.

Section II

T·Y·LIN INTERNATIONAL

II. Introduction

A. Purpose and Need

The existing Androscoggin River Bicycle Path opened in 1998 and connects Topsham to downtown Brunswick and the Cook's Corner area via the Merrymeeting Bridge. This award-winning, multi-use facility has enjoyed more widespread and enthusiastic public acclaim than any other public facility in Brunswick's recent history. The bike path is used by approximately 2000 members of the public each week from spring through fall. It is plowed in the winter when usage is estimated at approximately 1200 per week. This path has played a major role in connecting these two towns and has provided a safe and attractive transportation alternative to walking or riding on busy local roads.

The extension of the path through Topsham would provide similar opportunities for a greater population and provide safer, non-motorized facilities throughout a greater area. The purpose of this study is to determine if

Image 3

Existing Androscoggin Trail in Brunswick

the extension of the path is feasible, based on an evaluation of user-demand, safety, economics, environmental impact, and aesthetics. It will also determine the preferred alignment and provide cost estimates for future design and construction phases. The study has generally focused on the Coastal Connector (Route 196) corridor. See Study Area graphic illustrated on the next page. The railroad corridors, the Highlands and Highland Green roadways, the Fairgrounds, Municipal Building and Williams-Cone School properties, the Mt. Ararat Schools and BNAS Annex roadways, and the proposed connector road between Monument Place and the Topsham Fair Mall were also reviewed. The Purpose and Need Statement was used in the establishment of the planning process and the selection of alternative alignments. The path is intended to integrate into the natural environment while providing recreational and alternative transportation options to residents, schoolchildren and local employees.

The purpose and need statement for this project demonstrates the importance of the project, the benefits resulting from its construction and provides a context for the review of potential impacts. It is consistent with the MDOT's vision statement which is to create and maintain a safe, efficient and economical transportation system that is cost effective, energy efficient, environmentally sound and responsive to the diverse needs and values of the people of Maine. The Statement of Purpose and Need for the Topsham Trails Transportation Path project is as follows:

1) Purpose

(a) Provide a multi-use, four-season, non-motorized, transportation and recreational path serving local residents and visitors, usable as a link in the East Coast Greenway, and enhancing the existing pedestrian and bicycle corridor by providing more connections within the urban area of Topsham and between Brunswick and Topsham.

(b) Investigate alternative path routes that would safely and logically connect residential, recreational, commercial and social destinations including the existing Brunswick Androscoggin River Bikepath, the Mt. Ararat Middle and High Schools and the Topsham Fair Mall.

(c) Provide a path that will realize the benefits associated with reduced traffic congestion, increased health and wellness of path users, increased availability of recreational facilities and enhanced air quality.

(d) Provide connections to existing trails, sidewalks, recreation areas, schools, highly concentrated residential areas and shopping districts (e.g.

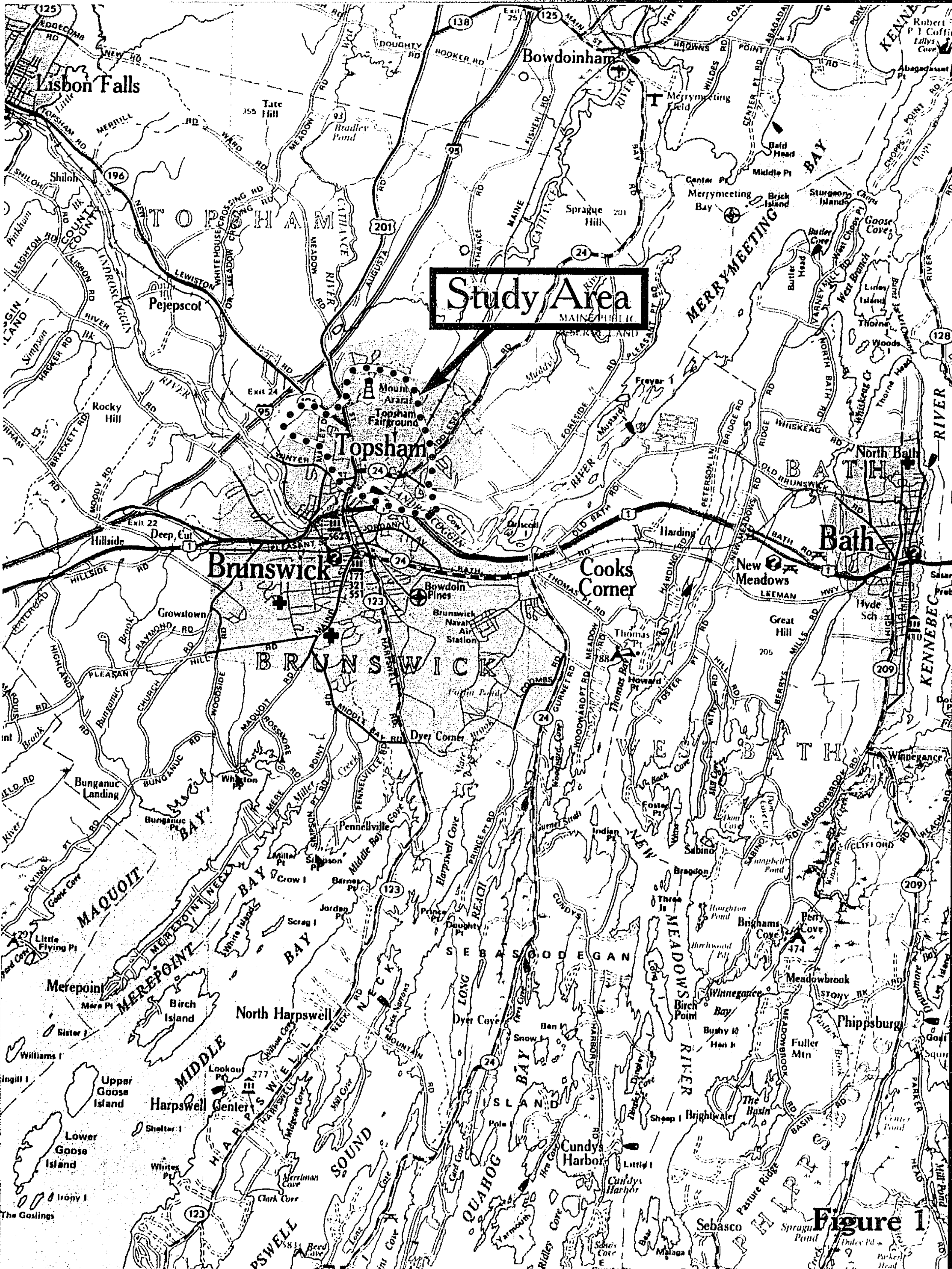

Study Area
Topsham
Brunswick
Bath
Lisbon Falls
Bowdoinham
Cooks Corner
North Harpswell
Harpswell Center
Merepoint
Phippsburg
Pejepscot
Mount Ararat
Topsham Fairground
Brunswick Naval Air Station
Bowdoin Pines
Merrymeeting Bay
Figure 1

Figure 1

Androscoggin River Bike Path, Topsham Fair Mall, The Highlands, Highland Green, Topsham Crossing, The Barrows Neighborhood, the Main Street corridor, the historic Elm Street area, the Library and playing fields on Foreside Road, etc.).

(e) Design a path that would accommodate all potential user groups, meeting the recommendations of the Americans with Disabilities Act.

(f) Identify a path alignment, determine design criteria, complete engineering and construction cost estimates, and suggest construction phasing.

(g) Minimize impact on private properties and existing land uses.

(h) Minimize environmental impacts.

(i) Meet the environmental permitting requirements for state and federal agencies.

(j) Provide an attractive, visually interesting experience that is easily maintained.

(k) Coordinate the path alignment with other Town plans.

(l) Provide a public forum for open participation and discussion.

(m) Review the potential for taking advantage of Scenic Vistas, and developing the need and location for Trailside Amenities, Trail Signage and Trail Lighting.

(n) Avoid conflicts with existing ATV trails.

2) Need

(a) The trail will connect to the network of multi-use trails in the United States and Canada by becoming part of the East Coast Greenway.

(b) The trail system will provide a safer alternative connection between Topsham and Brunswick and throughout the Town of Topsham for users of all ages and abilities. Existing connections are characterized mostly by unofficial, on-road facilities with numerous drive-way/sidestreet crossings, and few provisions for walking or cycling. Along Route 196 existing striped, on-road bikelanes are present, but these roadways are high volume and, in some locations, high speed arterials conducive only to experienced cyclists.

B. History

In 1998 the existing Androscoggin River Bike Path opened providing the region with an off-road facility where it is safe to walk or cycle. The existing path extends to Topsham via the Merrymeeting Bridge ending on Route 24 next to the Coastal Connector Bridge over Route 24. Currently there are no safe, designated bike and pedestrian facilities connecting this pathway endpoint to the Elm Street area, the Mt. Ararat Middle and High Schools, the large Highland communities and the Topsham Fair Mall shopping district. Over the years a number of studies have noted the importance of this type of connection. Some of these include:

1) The "March 2004 Comprehensive Plan Update". This report's objectives include a need to "increase the number of bicycle and/or pedestrian connections between neighborhoods, commercial centers, schools, and community facilities." Construction of the recommended alternative from this Feasibility Study will meet the objectives of this report.

2) The Merrymeeting Council of Governments' 1998 "Bath-Brunswick-Topsham Regions Multi-Modal Transportation Plan". This Multi-Modal plan discusses the need to connect the sidewalk and bikelanes on the Coastal Connector to the Mt. Ararat Schools and the Topsham Fair Mall. Although it does not specifically show the recommended alternative as a recommended improvement, the concept does match the overall goals of the study.

3) The September 2003 Topsham Visioning Session. Some of the issues that were important to the attendees at this session included providing "accessibility through bike paths/walking, sidewalk improvements, other ways to get around, and an extension of bike path to schools".

4) The "April 1998 Topsham Shoreline Access Project". This effort was funded partially through a 1997 Public Access Discovery Grant and followed up on a 1996 study commissioned by the Town of Topsham entitled "The Main Street Vision". The 1996 study included the "underutilization of the waterfront" as one of the areas needing attention during future improve-

ments in Town. The 1998 project worked toward increasing the opportunity for public utilization of Topsham's waterfront along the Androscoggin River. The portion of the recommended alternative that extends beneath the Merrymeeting Bridge does provide a small section of riverfront access and could provide a first step in future projects along the riverfront.

C. Planning Process

In December of 2003 the Town of Topsham distributed a request for proposals for an engineering/feasibility study for a multi-use path connecting the current bikepath terminus on Route 24 to the Mt. Ararat Middle and High Schools and the Topsham Fair Mall. The $50,000 project was funded through the Maine Department of Transportation's (MDOT's) Enhancement Program which includes 20% matching funds from the Town.

1) Feasibility Study Advisory Committee

A committee was formed to oversee the Feasibility Study Process. The Feasibility Study Advisory Committee was comprised of officials Topsham, as well as local residents. The following members served on the Committee during the course of this study:

- ***Richard Roedner***
  Topsham Planning Director
- ***David Fuller***
  Executive Director - Topsham Development, Inc.
- ***Pam LeDuc***
  Topsham Parks and Recreation Director
- ***Wes Thames***
  Topsham Public Works Director
- ***Dana Carey***
  Topsham Resident and Bicycle Coalition of Maine Member
- ***Gary Fogg***
  Topsham Resident and Planning Board Member

2) Study Team

The study was conducted by T.Y. Lin International, transportation engineers in Falmouth, with support from Terrence J. DeWan & Associates, landscape architects, Yarmouth, and Woodlot Alternatives, Inc., environmental scientists, in Topsham.

3) Objectives

The study team was responsible for working with the Feasibility Study Advisory Committee, the Department of Transportation, abutters and the general public to determine alternative routes, evaluate environmental impacts, determine engineering and construction costs, review property issues, review safety concerns and recommend a preferred alternative.

4) Study Process

The Topsham Trails Feasibility Study process was based on a thorough investigation of existing conditions, an understanding of current environmental regulations, and an appreciation for private properties along the route. It was conducted in three phases:

(a) Phase I - Project Initiation and Scoping

The original Feasibility Study contract included the review of a path from the Merrymeeting Bridge through the town of Topsham to the Mt. Ararat Middle Schools and then to the Topsham Fair Mall. This phase of work included review of existing conditions along the above mentioned corridors, confirmation of the underlying project needs, development of design criteria, and review of any additional pertinent existing data required for the path. This process included coordination with the Feasibility Study Advisory Committee, other Local Officials, MDOT and Topsham residents.

Opportunities and constraints for both on-road and off-road path alignments were reviewed. Potential path segments were identified, verified using existing mapping and aerial photography, and then field checked. Particular attention was paid to issues such as environmental and right-of-way constraints, and to issues that would increase permitting requirements or project costs. The first phase also included establishment of the public involvement process. This took the form of a Public Workshop with attendees addressing key issues such as "who are the primary path users for whom we should be designing", "what are the priorities for the path", and "what are the pros and cons of the various corridors".

Figure 2

Phase I

MDOT/Municipal Coordination

Public Workshop

Identification of Potential Trail Alignments

Field Inventory

Base Mapping/ROW Review

Determination of Enviornmental Constraints

Phase II

Review of Selected Trail Segments

Development of Trail Access/Parking

Review of Drainage/Structure Needs

Environmental Impact Review

Cost Estimates

Development of Recommendations

Second Public Meeting

Phase III

Third Public Meeting

Development of Final Report

Mapping

Cost Estimates

Study Process

(b) Phase II - Alternatives Analysis/Preliminary Recommendations

This phase of work included a more detailed review and analysis of the potential trail segments identified in Phase I. Based on the comments received at the initial public workshop, it was decided by the Feasibility Study Advisory Committee that alternate corridors should be studied southwesterly of the Coastal Connector. The corridors studied were predominantly on Town, MDOT railroad, Topsham Fairgrounds, SAD #75 (Williams-Cone School) and Highlands properties. A number of field reviews, meetings with abutters, meetings with MDOT and coordination with the Feasibility Study Advisory Committee were required during the study of these additional alternatives.

The trail segments were evaluated based on their ease of implementation, relative safety, relative cost, environmental impact, and on how well their location met the needs of the potential users (i.e. the Purpose and Need for this project). Details such as trailhead parking, drainage needs, right-of-way requirements and construction costs were reviewed. The resulting trail system was detailed on aerial mapping and a second public forum was held. The Second Public Meeting outlined the results of the Phase II study and requested comments regarding a preferred alternative. The Feasibility Study Advisory Committee analyzed the results of the second Public Meeting and determined that the corridor outlined in the recommendation section of this report was preferred by a great majority of the attendees and best met the criteria for this study.

(c) Phase III - Final Recommendations and Report

The third phase of work encompassed the development of this report which provides detailed descriptions of the proposed conceptual path alignment including photographs and mapping. Both on and off-road alignments are outlined including conceptual cost estimates and potential environmental permitting requirements. The report outlines the trail alignment, typical section, drainage needs and the locations requiring new bridges or tunnels. In addition, sections of this report address Trailside Amenities, Scenic Vistas, Trail Signage and Trail Lighting. A final Public Meeting was held to provide an overview of the recommended alignment.

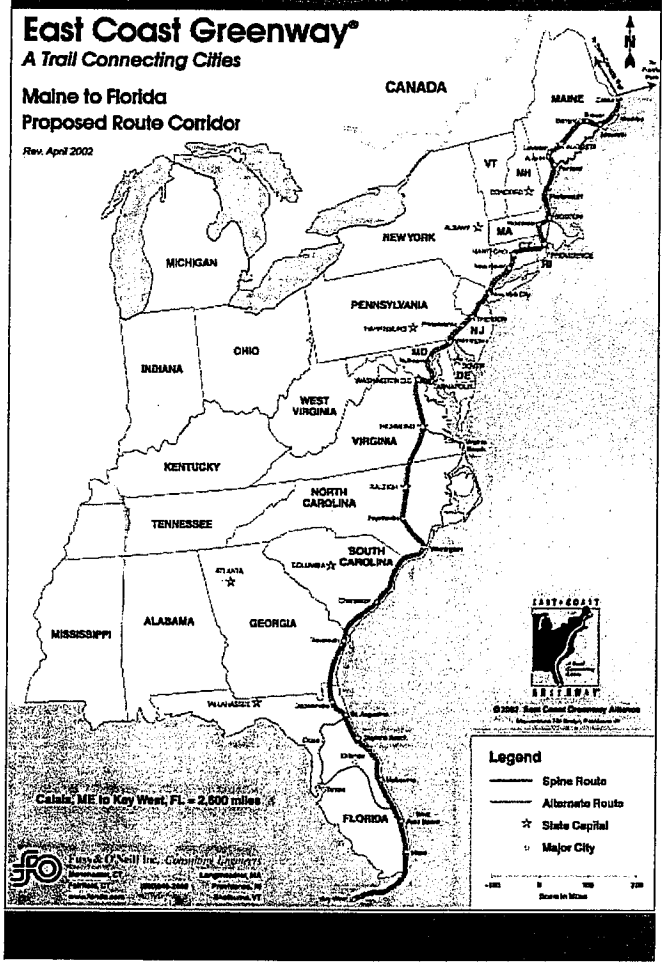
Throughout the study process, State Involvement was ensured through coordination with MDOT. John Balicki, MDOT's Bicycle and Pedestrian Coordinator was at the public meetings, attended some of the Feasibility Study Advisory Committee meetings and field walks, and was active in the review of conceptual alignments.

D. Significance and Benefits

1) Regional Connections

The East Coast Greenway (ECG) is a national trail system that is proposed to extend over 2,100 miles from Key West, Florida to Calais, Maine. The ECG Alliance website indicates that their goal is "to connect

Figure 3



existing and planned trails that are locally owned and managed to form a continuous, safe, green route easily identified by the public through signage, maps, user's guides, and common services".

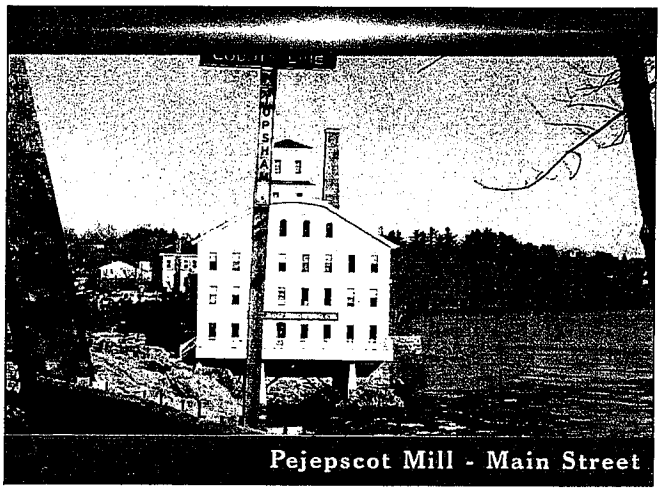
The existing Androscoggin River Bikepath is a link in the ECG. The River Route for the ECG is currently mapped along the Coastal Connector (Route 196) from the Merrymeeting Bridge to the Lisbon town line. After construction of the recommended alternative outlined in the Topsham Trails Feasibility Study it is reasonable to assume that the ECG might be redesignated along that corridor. This extension will further this national vision while connecting Maine's coastal communities.

2) Local Connections

The extension of the path through Topsham would provide safe, off-and on-road access to many commercial areas, residential areas, recreational facilities, schools, parks and open spaces in town (See Figure 4 on next page for illustration of included areas). In addition, Brunswick and Bath are also planning an extension to the existing Androscoggin River Bikepath that would ultimately provide additional connections to Bath, West Bath and the Cooks Corner area.

(a) Commercial Areas

- Topsham's Main Street and Route 196 Commercial areas



Pejepscot Mill - Main Street

- Cook's Corner
- Topsham Fair Mall Area
- Downtown Brunswick

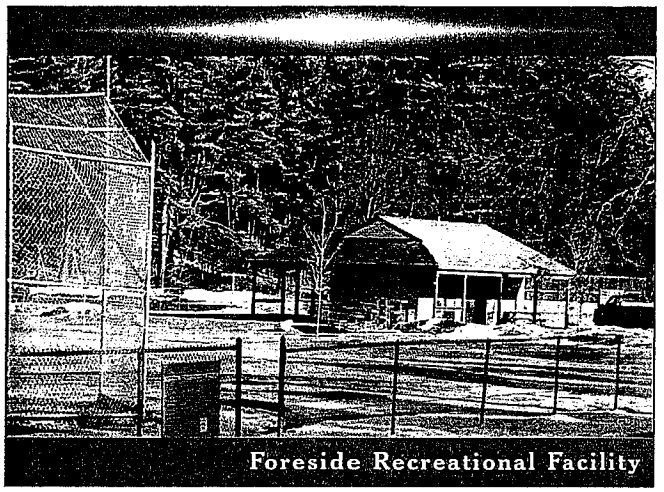
(b) Residential Areas

- Topsham Village
- Elm Street Area
- The Highlands
- Highland Green
- Topsham Crossing
- The Woodside Neighborhood

- BNAS Housing
- In-Town Brunswick

(c) Parks and Open Spaces

- Foreside Road Recreation Facility trails and fields


Foreside Recreational Facility

- Open Spaces along the Androscoggin River Bike Path in Brunswick
- Picnic Area on Grover Lane in Brunswick

(d) Schools and Libraries

- Mt. Ararat Middle School
- Mt. Ararat High School
- Williams-Cone Elementary School
- Woodside Elementary School
- Topsham Public Library

(e) Athletic Fields and Playgrounds

- Foreside Road Recreation Facility fields and playground
- Playing fields at Mt. Ararat Middle and High School
- Playing fields at the Topsham Fairgrounds

(f) Recreation Facilities

- Androscoggin River Bike Path in Brunswick

3) Community Benefits

The pathway will provide a safe alternative to traditional ground transportation. The trail's construction will result in more pedestrian and bike traffic, will reduce the number of cars on the road and will provide an alternative, non-motorized connection between more areas within Topsham and between these areas and Brunswick. More residents will have direct access to the overall path network without having to drive to one of the trailhead parking areas.

4) Health Benefits

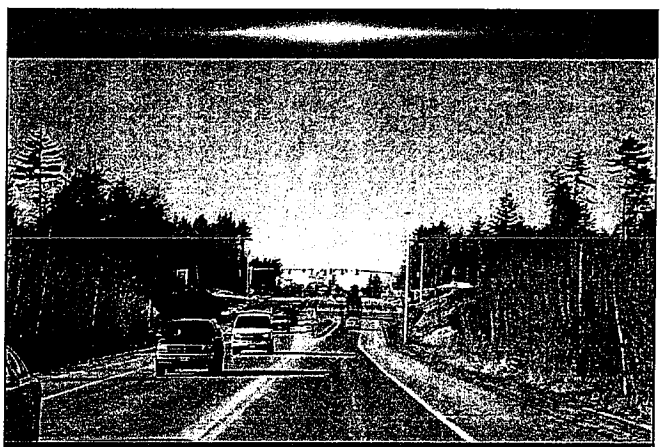
A vast majority of people using the existing Androscoggin River path system do so for exercise or recreational reasons. This extension of the path through portions of Topsham will greatly expand the region's sidewalk and trail network and provide many opportunities for residents and visitors to walk and bike in a safe environment. In addition, due to the large number of connections the proposed path would make within Topsham the trail is also expected to be used for non-recreational trips between residential areas and work, school and commercial areas.

5) ADA Compliance

The path will be constructed in compliance with the Maine Human Rights Act and the Americans with Disabilities Act, similar to the existing Androscoggin River Bike Path. It will provide a safe opportunity for all people to enjoy the path system.

6) Transportation Benefits

The existing connections within the project area consist of Route 196/the Coastal Connector (a high volume and, in places, high speed arterial), Main Street, and


Coastal Connector

Elm Street. The Coastal Connector has an eight foot shoulder (and in some cases a 4 foot bikelane) for use as a bike route from the Merrymeeting Bridge to the Topsham Fair Mall, but due to the volume and speed of traffic, it is felt by many to be unsafe for all but the most experienced cyclists. Elm Street and Main Street have lower traffic speeds and sidewalks, but cyclists must share the road and both cyclists and pedestrians contend with numerous driveway openings and sideroads as well as poor existing sidewalk conditions in some areas. Elm Street also contains a constriction under the existing railway overpass where there are no shoulders and a very narrow (approximately 2.5') sidewalk. The construction of the Topsham Trails path will provide an efficient, safe and alternative means of transportation within the study area and to Brunswick.

7) Environmental Benefits

The environmental conditions along the recommended path alignment could be enhanced by the development of the pathway. The project provides an opportunity to decrease the dependency on the automobile as a primary form of local transportation. The construction of the path could also include the installation of native plants to increase the habitat available for wildlife and to create an inviting place in which to recreate and commute.

8) Air Quality Benefits

The expansion of alternative transportation opportunities should encourage more people to walk and bike to work, school and shop. The State of Maine Department of Environmental Protection Air Quality Bureau references the Transportation Equity Act for the 21st Century (TEA-21) and the "Congestion Mitigation and Air Quality Improvement Program" (CMAQ) as a program created specifically to fund projects that improve air quality. The Bureau supports the development of transportation alternatives such as public transit, shared-ride programs, bicycle and pedestrian facilities, and employer trip reduction programs as a way to decrease dependence on the automobile. This project falls in line with these goals.

Section III

III. Feasibility Study

A. Design Criteria

All applicable Federal and State design criteria were used to evaluate the feasibility of the proposed path. See *Appendix A* for a complete discussion of design criteria including design standards, right-of-way, environmental impacts, costs and aesthetics/experience.

B. Evaluation Of Alternatives

This study reviewed several alternative routes that evolved from the requirements of the initial "Request for Proposals", further discussions with the Feasibility Study Advisory Committee, field review, and input from the community. The following paragraphs generally describe the routes reviewed and the reasons they were not selected as the preferred alternative.

1) Alternatives Studied

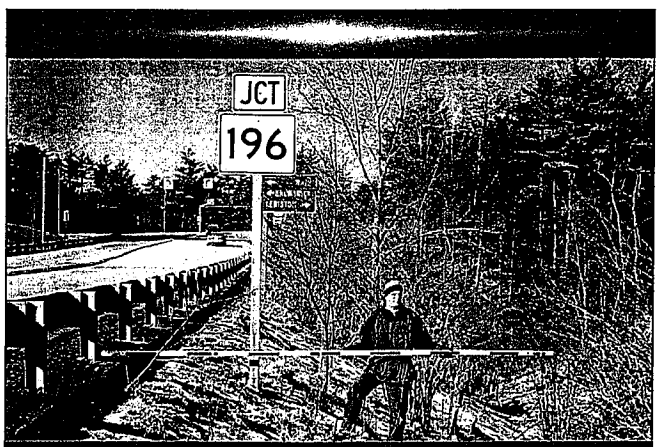
Within the general corridors previously discussed, a number of different alignments were reviewed (Refer to Figure 4 in the main report):

(a) Along the easterly and northerly side of the Coastal Connector from the Merrymeeting Bridge to Village Drive - crossing Route 24 with a new bridge, crossing Bypass Drive at grade and ending at a proposed bridge over the Coastal Connector just east of the Village Drive/Community Drive intersection. This alignment was reviewed in the field and shown at the first Public Workshop and at the Second Public Meeting. Those in attendance indicated that they did not like having the path so close to the Coastal Connector and were concerned with safety at the Bypass Drive crossing. It was strongly indicated that routes to the south and west of the Coastal Connector were preferable to this alignment.

Coastal Connector - At RR Tunnel

(b) Along the easterly and northerly side of the Coastal Connector from the Merrymeeting Bridge to Village Drive - crossing Route 24 and Bypass Drive at grade and ending at a proposed bridge over the Coastal Connector just east of the Village Drive/Community Drive intersection. In addition to the comments outlined under (a) above, the public was also concerned with an at-grade crossing of Route 24. Sight distance at this point is limited and the crosswalk would be at the bottom of relatively steep roadway grades in both directions (causing concerns of vehicles being unable to stop for those in the crosswalk during winter months)

(c) Starting at the existing path terminus at Route 24, following Route 24 northeasterly to Bypass Drive, then following Bypass Drive to the Coastal Connector, then following the north and easterly side of the Coastal Connector to Village Drive and ending at a proposed bridge over the Coastal Connector just east of the Village Drive/Community Drive intersection. Along with the concerns about being too close to the Coastal

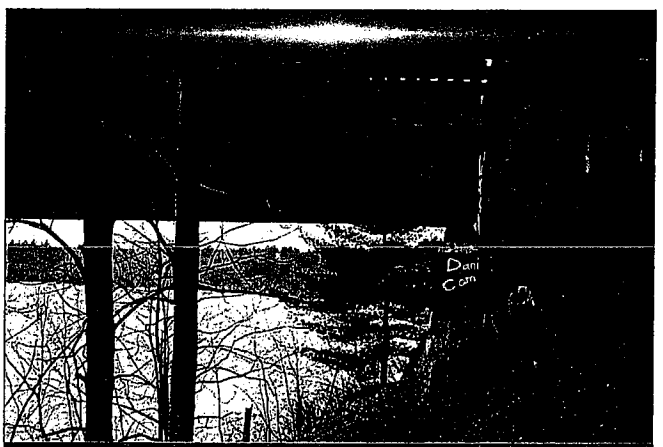


Bypass Drive

Connector outlined in (a) above, there were also concerns with placing the pathway along these busy roads. There is also minimal available room to construct the path without significant impacts to abutters. Crosswalks at the Bypass Drive/Route 24 intersection were thought to be dangerous due to the lack of a traffic signal at this location, the high turning volumes and difficult sight distance in some directions.

(d) Starting at the existing path terminus at Route 24, following Elm Street westerly (including a replacement railroad trestle) to Elm Street near the Maine Natural Gas property. The Maine Department of Transportation indicated that the existing bridge is in fairly good condition and they don't plan on replacing the structure in the foreseeable future. They have little budget for rail maintenance, and would not be able to fund this bridge replacement. A very rough cost estimate completed by MDOT indicates that replacement of the structure with a longer trestle allowing a reasonable width for travel lanes and bikepath underneath could be as much as $1,000,000, which MDOT considered to be too expensive.

(e) Beginning at the Merrymeeting Bridge, passing beneath the Merrymeeting Bridge and the railroad trestle over the Androscoggin River, then to Elm Street using the Maine Natural Gas property. This option would be extremely difficult and very expensive due to the very steep and potentially unstable slopes around the existing northerly abutment of the Androscoggin River railway trestle. The steep slopes are not only on the river side of the northerly abutment, but also wrap around the westerly side of the abutment and extend toward Elm Street for some distance. This makes construction of any trail parallel to the rail line very difficult. Impacts to abutting properties would most likely be required as well.

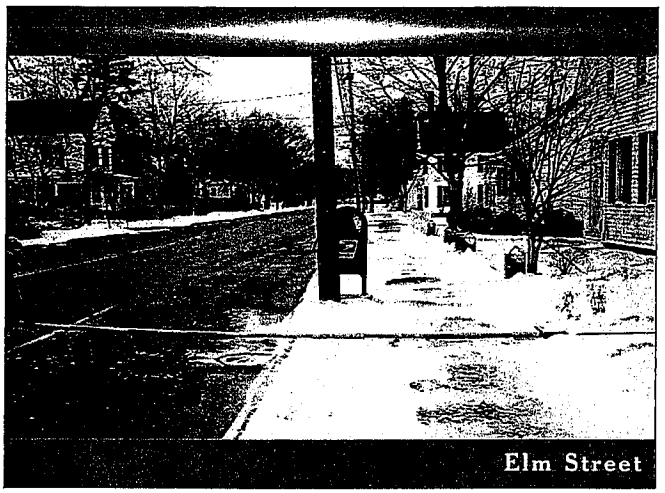


Under RR Bridge over Androscoggin River

(f) From the Maine Natural Gas property on Elm Street, using the easterly Fairgrounds access road, passing south of the grandstand and heading easterly along the property line to the railway right of way (ROW). Then turning northerly following the railroad ROW to the MDOT property. Continuing through the MDOT property and along the easement through the Fairgrounds north of the football field to a proposed bridge over the Coastal Connector just east of the Village Drive/Community Drive intersection. This option was not possible due to abutter concerns. The path would impact the Topsham Fairgrounds and/or the property located on the corner of Elm Street and the Fairground Access Road. The Town and project team worked with both of these owners to find an acceptable solution, but none could be found that would satisfy both owners. Impacts to property value, privacy, security at the Fairgrounds and construction impacts to their property were all concerns that could not be overcome at the time of this study.

Topsham Fair Grandstand

(g) From the Maine Natural Gas property on Elm Street options were studied to extend westerly on Elm Street and then pass through either the westerly side of the Fairgrounds, the Highlands, or the Municipal Building/Police Station and

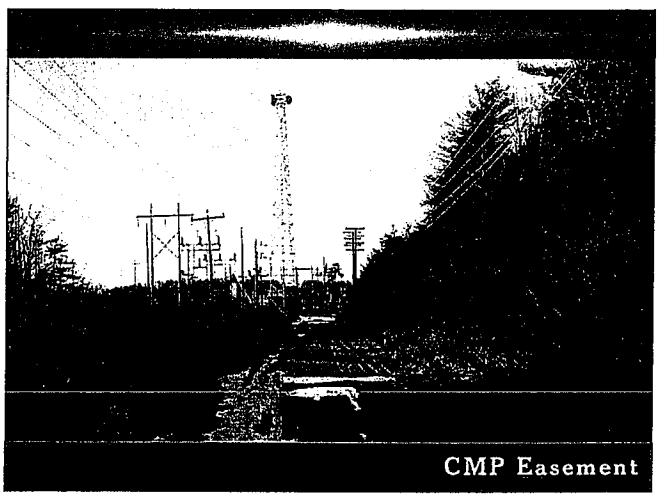

Elm Street

Williams-Cone School to access a proposed bridge over the Coastal Connector just east of the Village Drive/Community Drive intersection. A number of different routes were studied within this general area. Many difficulties arose in conceptualizing a path in this area. These difficulties include utilities, large trees and homes constructed close to the roadway on Elm Street. Removal of parking to narrow the shoulder and make more room for the bikepath was not thought to be something of which residents would be in favor. The Fairgrounds was not willing to allow a pathway along the westerly side of their property and the Highlands did not want formalized, signed pathways through their parcel. A pathway through the Municipal Building, Police Station and Williams-Cone School properties would be difficult due to limited available space to construct the path near the Municipal Building, and steep grades and sharp curves near Elm Street. In addition it was felt that this alignment was too far out of the way and would not be used nearly as much as a more direct route. It's typical section would also vary widely throughout the various sections leading to a fragmented feeling, not giving the impression of a continuous corridor.

(h) Starting at the existing path terminus at Route 24, following Route 24 northeasterly to Tedford Road, then following Tedford Road to the entrance to Topsham Crossing, then following the Central Maine Power easement (or a route parallel to the easement on private property) westerly to Village Drive and ending at a proposed bridge over the Coastal Connector just east of the Village Drive/Community Drive intersection. This alignment was not selected as the preferred corridor due to limited right-of-way along the existing, narrow Tedford Road which did not allow room for the construction of either bikelanes and sidewalk or a multi-use pathway. In addition, it was determined by the Advisory Committee and the public that use of the Central Maine Power corridor should be avoided as much as possible so that conflicts with ATV's will not occur.

(i) Starting at the existing path terminus at Route 24, following Route 24 northeasterly to Tedford Road, then following Tedford Road to Audubon Way (a road currently under construction as part of the Highland Green project), then following Audubon Way westerly to Village Drive. This alignment had the same concerns as outlined in the previous corridor along Tedford Road.

(j) From Village Drive in a westerly direction parallel to the Central Maine Power (CMP) easement to Main Street. Then either (i) across Main Street, continuing along the CMP easement to a point just west of Union Park, then southerly to Route 196 near the Hamilton Court intersection crossing Route 196 at the signalized intersection, (ii) across Main Street, continuing along the CMP easement to a point just east of Crooker's, then


CMP Easement

southerly to Route 196 near the Mallet Drive intersection crossing Route 196 at the signalized intersection, or (iii) across Main Street, then

turning south along the west side of Main Street to Union Park Drive, then westerly along Union Park Drive, along the property line between the VIP and McTeague, Higbee Law Office to the powerline, then southerly along the powerline to Route 196 crossing Route 196 at the Hamilton Court signalized intersection. Based on comments received at the public meetings, alignments south of the Coastal Connector were preferable to this corridor. Central Maine Power Company has historically not been accepting of multi-use paths within its easement. In addition, the powerline would not be aesthetically pleasing for path users, conflicts could result with ATVs, and any of the Route 196 crossing locations were thought to either cause additional traffic delays or be dangerous even with the signalized intersections due to the volume of traffic existing along this corridor.

(k) From Village Drive near the Coastal Connector an option was reviewed that would upgrade the existing sidewalks along Village Drive and the proposed sidewalks on Mountain Road to meet the requirements of bikepaths. Then pass through onto Brunswick Naval Air Station Annex and upgrade sidewalks along Canam Drive to the Mt. Ararat Middle School. As the project evolved it was decided that this connection would be left as an unofficial alignment that

Village Drive

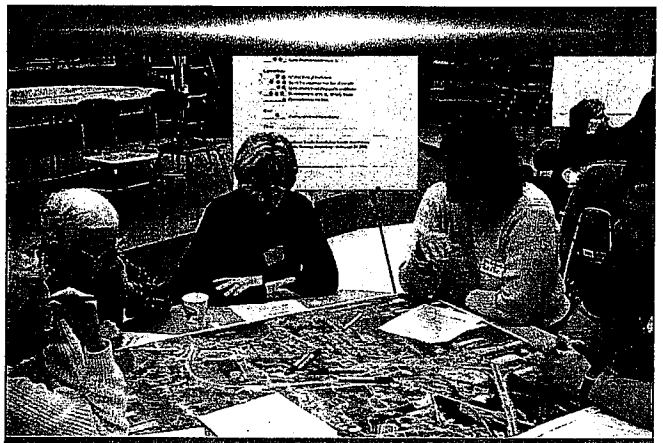
can be used temporarily until other phases of the project are complete. It was thought to be acceptable as is due to low traffic volumes and speeds.

Section IV

T·Y·LIN INTERNATIONAL

IV. RECOMMENDATIONS

Based on the results of this study and the Public Meetings held in February, May and June of 2004, a 3.3 mile long, multiple-use pathway connecting the Merrymeeting Bridge to the Topsham Fair Mall using a



Public Workshop

corridor southwesterly of the Coastal Connector is being recommended to meet the project goals. Additional connections are also included in the preferred alternative that will form temporary and/or future connections to the Mt. Ararat Schools. Approximately 0.6 miles of this trail will be an off-road path separated from public roads by a narrow grass buffer strip. The remaining 2.7 miles of the path system will be an off-road path with a greater separation from the roadway. Of all of the options studied, this alternative has the most acceptance by both the public and the Feasibility Study Advisory Committee. It accomplishes all of the project goals while meeting necessary design standards. As the design and construction of each trail segment is begun, re-evaluation of current circumstances (including design standards, environmental regulations and current land use) should be completed to ensure that the recommendations made in this report are still valid, and that additional opportunities have not arisen.

This study has only identified the conceptual feasibility of the path system within the study area. It is essential that the design phase of work for each segment confirm the recommendations made in this report based on topographical survey, right-of-way research, and a review of current conditions at the time of design.

A. PHASES

The pathway has been divided into a number of phases as shown on Figure 5. It is anticipated that each phase would be incorporated into a separate design and construction contract, with each contract constructed in different years. The order of implementation of these phases may or may not match the phase numbers. Prioritization of the phasing should be reviewed and revised as necessary in the future based on current opportunities and/or constraints.

Figure 6

Phase	To-From	Length (Miles)	Estimated Cost
I	Topsham Crossing to Village Dr. to Community Dr. to Main St.	1.02	$1,584,500
II	Main St. to Topsham Fair Mall	0.62	N/A
III	Merrymeeting Bridge to Community Dr.	1.24	$1,903,300
IV	Village Dr. to Eagles Way	0.44	$271,600

Recommended Path Phasing

Several factors were used in the development of these phases. The project was broken into phases that are of a design and construction cost that meets a reasonable spending limit that will enable the municipalities to provide the 20% match. Each phase has a logical beginning and ending point that connects to existing paths, sidewalks, neighborhoods, or other significant destinations. The phasing allows connectivity and continuity of the trail system as additional phases are constructed. For the purposes of this study, it is assumed that the MDOT Transportation Enhancement Funds (requiring 20% local matching) would be the most likely funding source. Each phase is described in more detail below including photos and typical sections. The Concept Plans showing the path alignment for each phase can be found in the appendix.

B. COST ESTIMATES

A preliminary opinion of cost was developed for each phase by applying current unit prices to the quantities of materials anticipated. Since the cost projections are

based on year 2003 construction costs, they should be revised at the time of future funding applications to bring them in line with current unit prices.

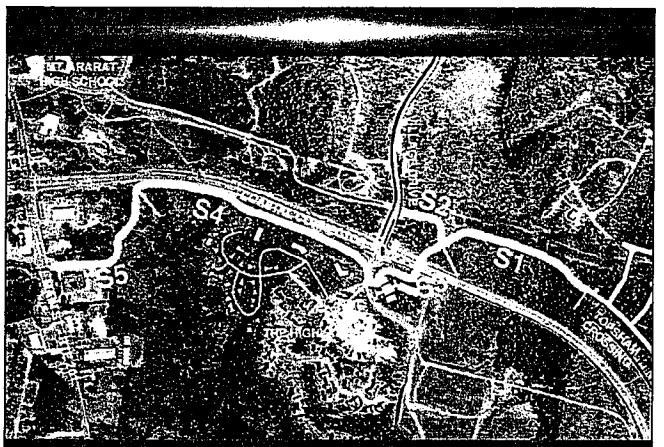
The cost estimates provided are based upon preliminary information. Final design may require the following additional data to design a pathway that meets the requirements of ADA as well as local, state, and federal environmental agencies:

1) Detailed topographic survey
2) Utilities and physical features survey
3) Boundary surveys (right-of-way, property lines)
4) Wetland delineation and function and values assessment
5) Additional ecological studies
6) Soil core samples to identify existing subgrade conditions

The detailed cost estimates for each phase can be found in *Appendix* C. The cost estimate for the entire project outlined in this study totals approximately $3.3 to $3.9 million.

C. Phase I - Community Drive To Main Street Following The Southerly Side Of The Coastal Connector, Including A Bridge Over The Coastal Connector And Path Connections To Village Drive And Topsham Crossing

Phase I contains the construction of about 1.0 miles of multi-use path and includes the construction of a pathway bridge over the Coastal Connector at a point east of the Village Drive/Community Drive intersection. It also includes the construction of a path from the bridge to Main Street following an alignment generally parallel and to the south of the Coastal Connector. The connection with Main Street would occur at the Monument Place intersection. Also included would be paths from the bridge to Village Drive and Topsham Crossing on the northerly side of the Coastal Connector. Construction of this Phase will connect the large Highlands, Highland Green and Topsham Crossing neighborhoods to Main Street. Using unofficial links through the Highlands development safe connections



Phase I

can also be made to Elm Street and then to the existing Androscoggin River Bikeway. Using Republic Drive, connections can also be made to the High School. Similarly, using the existing sidewalks and low speed/low volume Village Drive, Mountain Road and Canam Drive, safe connections will be available to the Middle School. The bridge will also allow residents at the Highlands and Highland Green pass safely back and forth across the Coastal Connector. This Phase has been broken up into 5 Segments as follows.

1) Segment 1

Location:

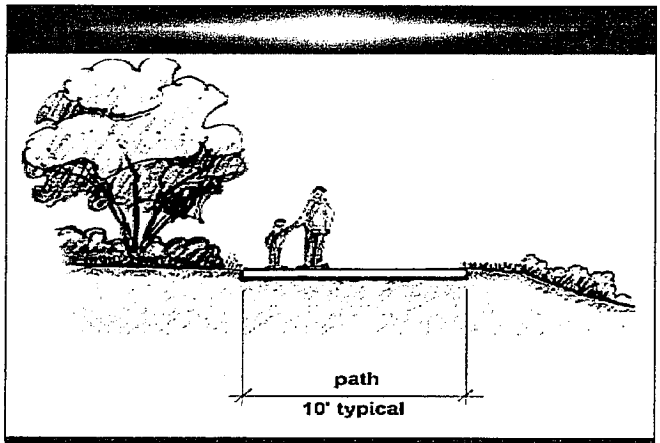
This segment encompasses the area from Topsham Crossing extending westerly to a point where a new path intersection will be constructed. This intersection will connect to one trail leading further west to Village Drive and another leading southerly to the proposed bridge over the Coastal Connector.

Length:

1150 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail with necessary fencing near areas of steep sideslope.
- Prohibit Golf Carts from this portion of the trail.
- Provide fencing to discourage ATV's crossing from the CMP Corridor to the trail.
- Provide signage to identify the pathway location



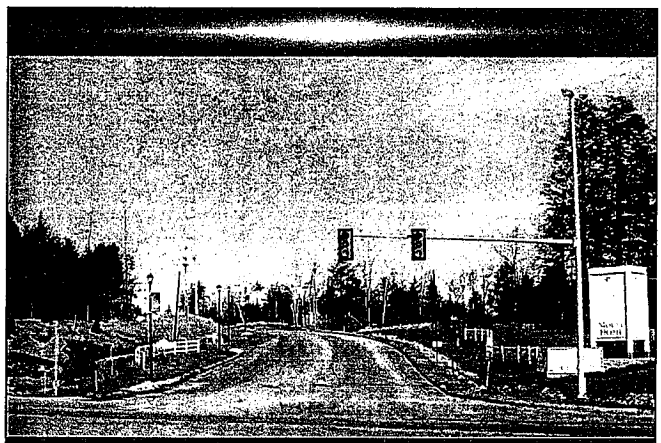
Typical Section - Off Road

and use (including the areas where golf carts are restricted).

2) Segment 2

Location:

From the westerly end of Segment 1 to Village Drive.



Village Drive at Highland Green

Length:

482 feet

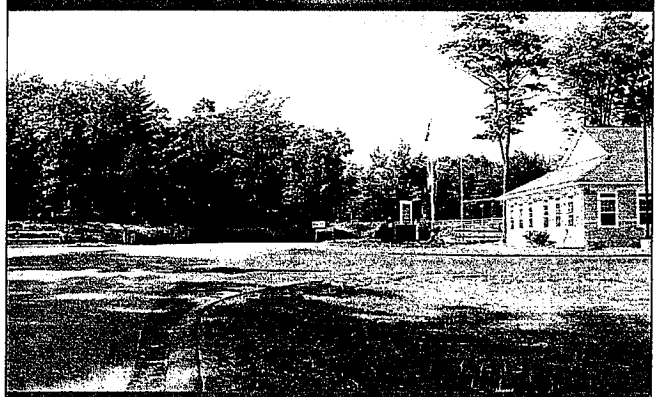
Major Recommendations

- Construct a 10' wide, paved, multi-use trail with necessary fencing near areas of steep sideslope
- Provide fencing to discourage ATV's crossing from the CMP Corridor to the trail.
- Provide signage to identify the pathway location and use (golf carts would be allowed on this Segment).

3) Segment 3

Location:

From the westerly end of Segment 1 to a proposed bridge over the Coastal Connector. This segment includes the bridge itself and the additional connection on the southerly side of the Coastal Connector to the proposed crosswalk near the Community Drive/Governor's Way intersection.



Community Drive near Governor's Way

Length:

708 feet

Major Recommendations:

- Construct a 10' wide, paved, multi-use trail.
- Construct a bridge for the multi-use path and golf carts over the Coastal Connector.

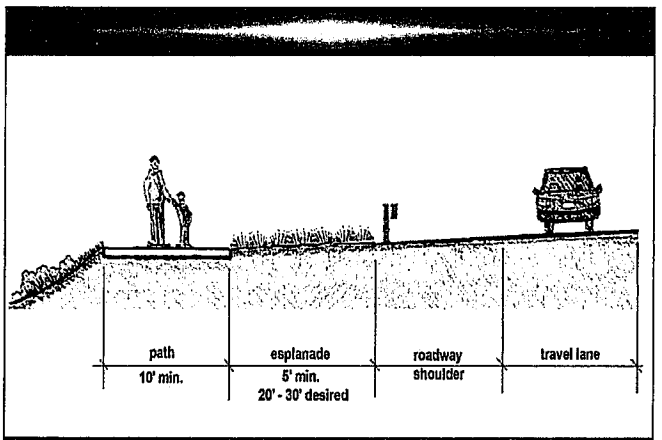
Photosimulation of Bridge over Coastal Conn.

- Provide a crosswalk across Community Drive with appropriate signing.
- Provide signage to identify the pathway location and use (golf carts would be allowed on this segment).
- Construct a Pedestrian Plaza on northerly side of bridge. Plaza to be surfaced with concrete pavers, contain four benches and include landscaping.

4) Segment 4

Location:

Continuing westerly from the Community Drive/Governor's Way intersection in the buffer area between the Coastal Connector right-of-way and the proposed commercial buildings at the Highlands to the westerly Highland property line. From this point to the west the path will be within the Coastal Connector right-of-way to a point near the easterly Lee Toyota property line.



Typical Section Near Coastal Connector

Length:

1944 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail with necessary fencing near areas of steep sideslope.
- Add backfill in ravine areas and extend existing drainage pipes under the Coastal Connector where necessary. Areas adjacent to deep ravines to be reduced to 8' in width.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).
- Install lighting for safety.

5) Segment 5

Location:

From the easterly Lee Toyota property line the path will turn to the south within the wooded area to the current Wright-Pierce property. A stream crossing in a deep ravine will be required with either a bridge or a culvert and large amount of backfill.

Ravine East of Wright-Pierce Parcel

Length:

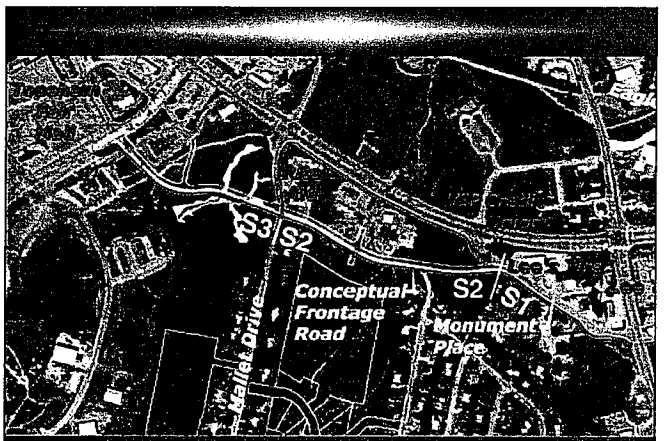
1048 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail with necessary fencing near areas of steep sideslope.
- Add a culvert with a significant amount of backfill in deep ravine area.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).
- Install lighting and emergency phone for safety.

D. Phase II - Main Street To The Topsham Fair Mall Following The Proposed Connector Road South Of Route 196

Phase II includes approximately 0.6 miles of trail and extends from Main Street to the Topsham Fair Mall along a corridor south of Route 196. Based on the results of an ongoing traffic study, the Town may construct a connector road from Main Street at the Monument Place intersection to the Topsham Fair Mall via a corridor south of the existing commercial buildings on Route 196 (Dunkin Donuts, Subway, Rite Aid, Five County Federal Credit Union, and Gas Station). If the connector road project is implemented, an 8 or 10



Phase II

foot pathway would be constructed as a part of that project. The pathway would be separated from the roadway by a 3-5 foot grass buffer strip. Connections would be made to Hamilton Court and Patricia Drive to provide access to these commercial and residential areas.

Should this connector road not be pursued after the results of the ongoing traffic study are finalized, alternatives will have to be reviewed. One potential alternative would use Monument Place, and then widen the existing sidewalks along Route 196 from Monument Place to Mallet Drive. Then a new path along the easterly side of Mallet Drive would be constructed to a point just south of the Rite Aid building. At this point the path would cross Mallet Drive and follow the same alignment as suggested for the connector road to the Mall. Enhancement Funding would be requested through MDOT for this work, if required. Difficulties with this alternative include many impacts as a result of widening the sidewalk including utility poles, hydrants, traffic signal controllers, street trees, existing drainage and steep sideslopes.

This Phase has been broken up into 3 sections as follows:

1) Segment 1

Location:

From Main Street westerly along Monument Place.

Length:

877 feet

Major Recommendations

- If this is built as part of the connector road project, funding would come from other sources and would not be part of this transportation path project.

Monument Place

- Remove a portion of the existing pavement and construct an 8 foot wide, paved, multi-use trail. Monument Place was previously a portion of Route 196 and is wider than currently necessary. The pathway would be separated from the roadway by a 3-5 foot wide grass buffer strip.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).

- A traffic signal at the Main Street/Monument Place intersection is anticipated to be added by a separate project that would be part of the redevelopment of the Wright-Pierce site. Costs for the signal have therefore not been included in this study, but the signal would have to be constructed with the appropriate pedestrian phase, signal heads and push buttons.

2) Segment 2

Location:

From Monument Place to Mallet Drive along a corridor generally parallel to Route 196 but south of the commercial buildings along Route 196.

Length:

1350 feet

Major Recommendations

- If this is built as part of the connector road project, funding would come from other sources and would not be part of this transportation path project.

Near Rite Aid on Mallet Drive

- Construct an 8 foot wide, paved, multi-use trail. The pathway would be separated from the connector roadway by a 3-5 foot wide grass buffer strip.
- Provide connections to Hamilton Court and Patricia Drive.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).

2) Segment 3

Location:

From Mallet Drive to the Topsham Fair Mall along a corridor generally parallel to Route 196, connecting to the Topsham Fair Mall Road near the signalized intersection in front of the Tire Warehouse. This will provide connections for a much larger part of town through existing sidewalk connections within the mall, and existing and/or proposed sidewalk connections along Winter Street.

Length:

1050 feet

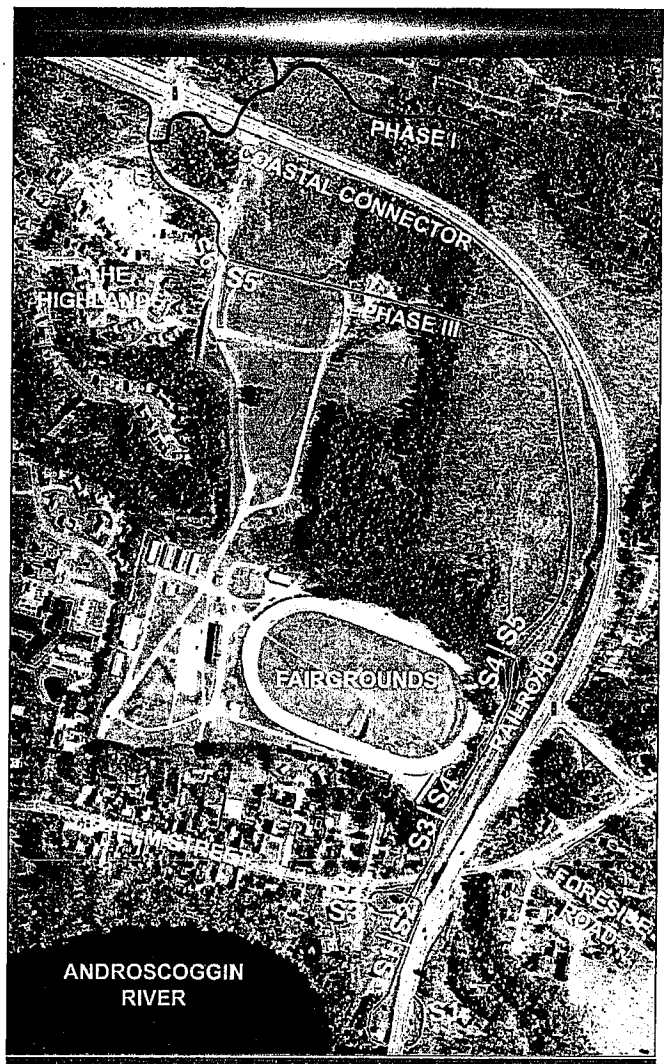
Major Recommendations

- If this is built as part of the connector road project, funding would come from other sources and would not be part of this transportation path project.
- Construct an 8 foot wide, paved, multi-use trail. The pathway would be separated from the connector roadway by a 3-5 foot wide grass buffer strip.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).

E. Phase III - Merrymeeting Bridge To Community Drive Including A Path Under The Merrymeeting Bridge, A Tunnel Under The Railroad And A Bridge Over Elm Street

Beginning at a point approximately 220' north of the Merrymeeting Bridge abutment on the Topsham side of the Androscoggin River a new path would be constructed on the easterly side of the existing path. This path would extend southerly to a point where it could pass

under the Merrymeeting Bridge in a westbound direction. Somewhere near this location, a river overlook and interpretive panel may be appropriate to discuss the influence of the river on Topsham's history. The path would then turn northerly and be constructed between the Coastal Connector and the MDOT Rail Line. The path would extend northerly to a point approximately 100 feet south of Elm Street where it would turn to the west and pass through a proposed tunnel under the railroad tracks. When reaching the westerly side of the rail line the path would turn southerly and connect with a potential trailhead parking lot. From the parking lot the trail would ramp up to the rail line elevation in a northerly direction and pass over a proposed bridge at Elm Street. This new bridge would be located immediately west of the existing rail trestle. From this point the path would stay within the railroad right of way until reaching the MDOT parcel. If MDOT constructs new



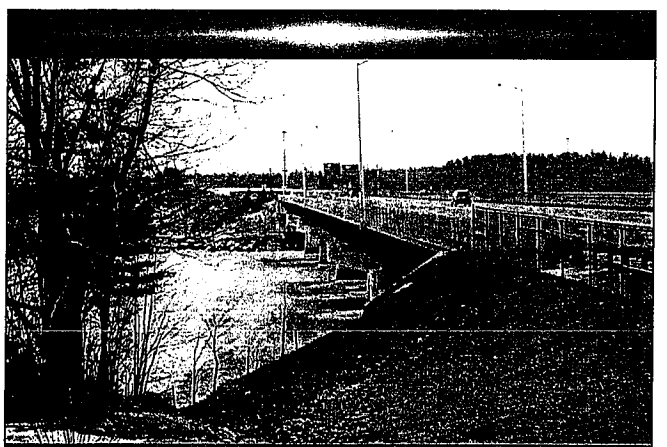
Phase III

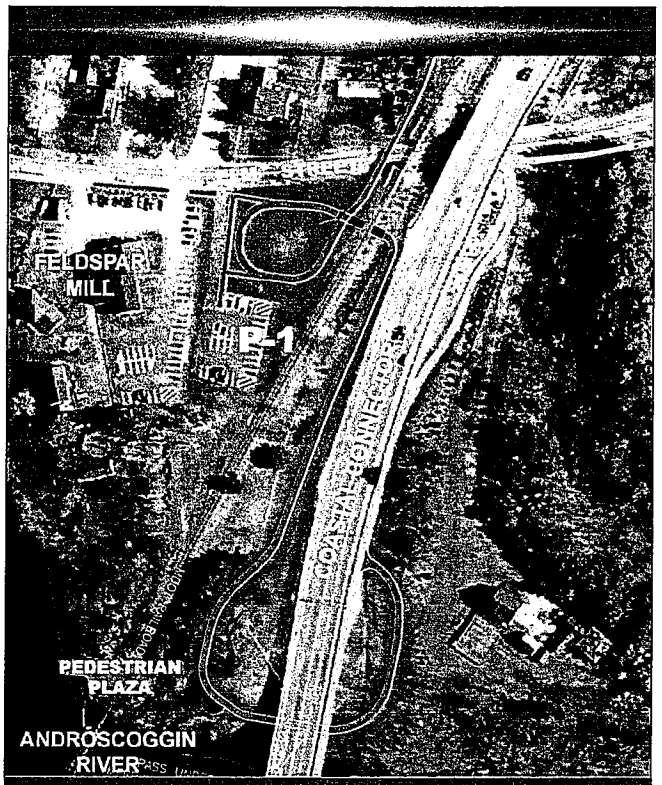
infrastructure on this lot, they have indicated that they would include the pathway from this point to Community Drive as part of their project. The path would be designed to minimize impact on their project and to stay on MDOT property (including the access road easement across the Fairground property north of the football field). Should MDOT decide not to construct improvements to the property, negotiations with new property owners should take place to secure the proposed right-of-way. If negotiations cannot determine an appropriate location for the path it could be moved to the railroad and Coastal Connector right of way. Cost estimates and analysis of impacts regarding this shift of alignment to the Coastal Connector ROW have not been completed as part of this study. West of the MDOT access road, additional trail will have to be constructed as part of this project from the MDOT access road to the intersection of Community Drive and Governor's Way where it will match Phase I. This would be accomplished by widening the existing sidewalk on the southerly side of Community Drive. The overall length of Phase III is approximately 1.2 miles.

1) Segment 1

Location:

From a point 220' north of the Merrymeeting Bridge, passing under the Merrymeeting Bridge, and extending northerly between the Coastal Connector and the MDOT Railroad until a point approximately 210 feet south of Elm Street.


Merrymeeting Bridge



Phase III - Segments 1 to 3

Length:

942 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail with necessary fencing near areas of steep sideslope. Use maximum ADA slopes when ramping down to pass under the bridge and when ramping back up on the other side. Avoid any significant excavation over existing natural gas lines.
- Provide fencing as necessary.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).
- Provide river-side overlook and interpretive panel. Location to be determined during preliminary design.

2) Segment 2

Location:

Extends north from the end of Segment 1 to a point approximately 100 feet south of Elm Street. At this point the trail turns toward the west and passes beneath the existing rail line through a proposed tunnel. The trail then continues westerly almost to the Feldspar Mill parking area, where it turns to the south and ends in a location where the proposed trailhead parking area could be constructed.

Length:

495 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail. Avoid any significant excavation over existing natural gas lines.
- Coordinate with Maine Natural Gas to acquire the necessary easements for construction of the path.
- Construct tunnel beneath the existing rail line (include coordination with MDOT).
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).
- Provide interpretive signing for the Historic Elm Street area, restroom facilities and the proposed parking area on Maine Natural Gas property (costs included in this study, but not in this phase)
- Coordinate with MDOT to determine if the current situation with the use of the rail line would allow an at-grade crossing of the rail line (elimi-

Elm St Photosimulation

nating the need for the tunnel). This would save approximately $300,000 for this segment.

3) Segment 3

Location:

Segment 3 would begin at the end of Segment 2 near the proposed parking lot, would ramp up to the rail line elevation and continue northerly over a proposed bridge crossing Elm Street. The bridge would be immediately west of the existing trestle. Segment 3 ends 100 feet north of the proposed Elm Street bridge.

Length:

500 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail. Avoid any significant excavation over existing natural gas lines. Provide fencing as necessary along areas of steep sideslope.
- Coordinate with Maine Natural Gas to acquire the necessary easements for construction of the path.
- Construct bridge over Elm Street immediately west of the existing railroad trestle.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).

4) Segment 4

Location:

Segment 4 begins at the northerly end of Segment 3 and continues northerly within the MDOT railroad right of way. The path would be constructed as far to the west within this right of way as possible. The MDOT rail division requested a 30' offset from the nearest track as well as vertical grade differences to discourage access to the tracks. Section 4 ends at the property line between the Fairgrounds and the MDOT parcel.

Existing Railroad ROW

Photosimulation Railroad ROW

Length:

950 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail. Provide fencing as necessary at areas of steep sideslope.
- Coordinate with MDOT Railroad Division to acquire the necessary approvals for construction of the path.
- Construct retaining wall near the stream and ravine at the northerly end of this segment.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).
- Provide interpretive signing for the Historic Fairground area.

- Areas with steep grades are to meet ADA standards.
- Provide landscaping (trees and bushes) to buffer the pathway from the road.

5) Segment 5

Location:

Segment 5 begins at the northerly end of Segment 4 and continues northerly and then westerly through the MDOT parcel and the access road right of way across the Fairground property (just north of the football field). This Segment would end where the access road connects to Community Drive.

MDOT Easement near Fairground Football Field

Length:

3100 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail. Provide fencing as necessary at areas of steep sideslope.
- Coordinate with MDOT regarding their plans to construct infrastructure on this lot and to ensure the path is included as part of their plans. If unable to negotiate an acceptable path location with the current owners of this parcel, relocate the alignment to be within the Railroad and Coastal Connector ROW.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).
- Areas with steep grades are to meet ADA standards.
- Provide landscaping at locations to be determined during preliminary design.
- If MDOT constructs most of Segment 5, the project costs would be approximately $300,000 less.

6) Segment 6

Location:

From the westerly end of Segment 5, this segment extends further west along the southerly side of Community Drive to the intersection of Community Drive/Governor's Way (connecting to Phase I).

Length:

750 feet

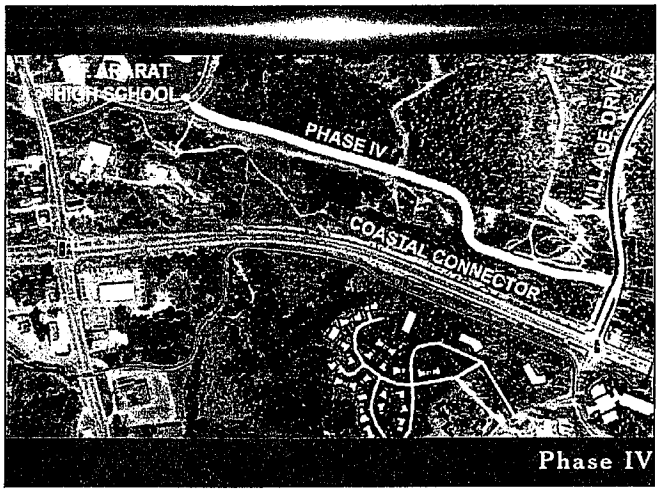
Major Recommendations

- Construct a 10' wide, paved, multi-use trail on the northerly side of Community Drive for approximately 190'. Provide a crosswalk across Community Drive and continue with an 8' path on the southerly side of Community Drive to Governor's Way. This 8' section will be constructed by widening the existing 4' sidewalk in this location.
- Provide signage to identify the pathway location and use. Also install appropriate signing for the East Coast Greenway alignment (if so designated).

F. Phase IV - North Side Of Coastal Connector From Village Drive To Mt. Ararat High School

Location:

This phase includes about 0.44 miles of trail connecting Village Drive to the access road to the Mt. Ararat High School. The path generally parallels the Coastal Connector and CMP easement.



Phase IV

Length:

2340 feet

Major Recommendations

- Construct a 10' wide, paved, multi-use trail.
- Avoid conflicts with existing ATV trails when crossing the CMP right of way.
- Coordinate with CMP when crossing the power line easement
- Provide fencing as necessary
- Coordinate with Mt. Ararat High School on the path's connection with Eagle Way (the access road from Main Street to the school).
- Provide signage to identify the pathway location and use.

CMP Easement and Eagle Drive

G. Future Phases - Connections To Mt. Ararat Middle School, Williams-Cone School, Woodside School, Within Highland Green

Major Recommendations

- After the primary trail system is complete, there are other connections that could be formalized as links to the trail system. These include the following:
- Additional striped bikelanes or separate multi-use paths between the Mt. Ararat Middle and High Schools along Republic Avenue.
- Upgrading of the existing sidewalks on Village Drive, Mountain Road and Canam Drive to multi-use path standards
- Construction of a multi-use path from the Williams-Cone School to the Highlands from where they can use existing, low-speed roadways to access the trail system, or a path directly from the school to Phase I of the path west of the Highlands.
- Construction of a multi-use path from the Woodside School to Phase II of the path near Hamilton Court.
- More formalized path connections from the path near the Merrymeeting Bridge to the Library and Foreside Recreation Facility (possibly upgrading the existing bike/ped shoulder).
- Long Term: A loop has been discussed in the past which would extend from the path near the Merrymeeting Bridge in Topsham to the Library, past the Foreside Recreation Fields, along the Foreside Road corridor (or along the riverfront) then crossing the Androscoggin River using Cow or Cornish Islands to connect back to the existing Androscoggin River Bikeway.

These future phases are anticipated to be far in the future and have not been included in the cost estimates at this time.

H. STRUCTURES

Structure Type Selection\Key Bridge Issues

TYLI has inspected the proposed bridge sites and researched design issues for each of the proposed crossings. Based on these investigations, we have identified several key factors that effect the structure type selection for each of the proposed crossings. Some of these factors are technical, some financial, and others more subjective, but they are all inter-related. A brief discussion of the key bridge issues follows:

Vertical Clearance

Minimum vertical clearance requirements are established to provide safety at grade separated crossings and may have a significant impact on the amount of approach work required for bridge projects. The minimum vertical clearance of the overpass structures over the Coastal Connector and over Elm Street are assumed to be 15'-6" and are based on guidelines provided in the Maine Department of Transportation (MDOT) Bridge Design Guide. Minimum overhead vertical clearance for the tunnel is assumed to be 10' and is based on guidelines provided in the American Association of State Highway and Transportation Officials Guide for the Development of Bicycle Facilities.

Span

Required span length is a function of the geometric alignment of the crossing and topography of the bridge site. The span length influences the optimal structure type and bridge cross section to use. Both the superstructure and supporting substructure elements affect the cost of the optimal span configuration, but other factors such as maintenance and aesthetics are also considered.

Geotechnical

Subsurface conditions and the ability of the underlying soil to support structural loads effect the selection of foundation type and may influence the optimal span configuration. For these feasibility studies, no geotechnical investigations have been conducted. For purposes of this study, we have assumed that all conventional foundation types may be considered feasible.

Constructability

The bridges should be simple and cost effective to construct. Temporary disruption of traffic (highway and rail) is considered and should be minimized. The method of construction should be common and familiar to a wide selection of contractors to result in a truly competitive bid.

Maintainability

To reduce any potential future cost, low or no maintenance structure types are considered. The materials used in the construction of the bridges are evaluated not only for aesthetic appeal and functionality, but they must be able to age gracefully with little or no maintenance throughout the expected service life of the bridge. Materials are selected to provide long-lasting, low maintenance bridges.

Aesthetics

The visual appeal of the bridges, particularly if they are in harmony with their environment, will be the basis of how people react to, and judge the success of this project. The bridges are significant and highly visible components of the project. Careful consideration of general characteristics such as style, type, textures, and materials is warranted. All conventional bridge characteristics can be made to look good with careful detailing and consideration of context.

Cost

Construction funding is not unlimited so the cost of the bridges is an important consideration; all the other evaluation factors will affect cost. The total cost, including life-cycle cost is the basis for recommending the preferred bridge type.

A brief discussion of how these key factors were applied to this study for each crossing and the resulting structure type recommendations follows. These recommended structure types should be considered for development of the design for each crossing.

Bridge over Coastal Connector

The width of this structure matches the approach pathway, and the multi-use structure will accommodate golf

carts in addition to pedestrians and cyclists. The bridge will cross perpendicular to the Coastal Connector. Route 196 is designed to accommodate a future widening of the roadway, and abutments are set beyond the clear zone of the potential future travelway. Based on this criterion, a minimum bridge length of approximately 130 feet is required. At the 130 foot span length, full height walls (about 15'-6") will be required to retain approach fill slopes. TYLI also reviewed an alternative with a longer span that would set the abutments near the top of the existing slope. The required span length for this alternative is approximately 160 feet and would minimize the height of the walls required to retain fill slopes. Based on a comparative cost analysis for the assumed foundation conditions, cost saved by eliminating the walls is offset by the additional cost of extending the bridge length. The difference in cost was not significant and these two alternatives may be considered equal in terms of cost. Other factors could also influence the choice of span length. The addition of retaining walls will dramatically affect the appearance of the bridge, and exposed walls are subject to graffiti (a potential future maintenance cost). These factors in addition to actual subsurface geotechnical conditions at the crossing should be considered in the future development of the design for the proposed bridge crossing. A span length of 130' has been used to establish cost for this study. The bridge will provide a minimum of 15'-6" vertical clearance over the Coastal Connector.

Based on a review of the Route 196 roadway plans for the area of the crossing and the exposed bedrock near the location of the crossing, it is likely that the bridge structure may be supported on shallow spread footings. Because geotechnical borings have not been conducted for this study and detailed geotechnical information is not available, we have conservatively assumed that short piles may be required to support the bridge structure. We have assumed these piles would bear on shallow bedrock located approximately 20 feet below the existing grade and that the required pile length would not exceed 35 feet. Using these assumptions, we estimate the added cost of the pile supported foundation will be about $35,000. This cost is included in the estimated bridge cost to be conservative, but it is likely that pile foundations will not be required.

A prefabricated steel truss bridge structure (half-through H-section) is proposed for the Connector Road Bridge. This type of structure offers several significant advantages over other types of structures:

- Minimizes structure depth and limits of associated approach work by locating a portion of the main load carrying components above the top of the deck.
- Light weight minimizes substructure loads.
- Superstructure may be assembled on-site and placed in one single operation, minimizing temporary traffic impact to roadway below.
- Use of unpainted weathering steel eliminates the need for future maintenance painting.
- Use of a cast-in-place (CIP) concrete deck provides a durable low maintenance travel surface, protects the structural elements below the bridge, improves safety, and allows for the control of drainage over the structure. Other types of deck materials, such as timber planks allow leakage through the deck. During winter, leakage could result in icicles forming and falling on the roadway below the bridge.
- Available in a variety of truss configurations that can enhance appearance of the bridge.
- Low cost.

Specific recommendations for the Bridge over the Connector Road are as follows:

- Bridge length = 130'
- Bridge Width = 12' (clear travelway)
- Superstructure - Prefabricated steel truss bridge (half-through H-section) fabricated with unpainted weathering steel. Use CIP concrete deck and vertical picket safety rails. Provide a 54" rail height above the deck. Based on discussion with MDOT, the top of the structure need not be covered and cost for protective screening is not included in the cost estimate.
- Substructure - CIP concrete stub abutment located on retained fill slopes and supported on steel H-piles. Prefabricated mechanically stabilized earth (MSE) walls will retain fill slopes.

Bridge over Elm Street

The width of this structure matches the approach pathway, and the structure will accommodate pedestrians and cyclists. The bridge span is skewed approximately 32° to Elm Street at the proposed crossing location. The bridge length is assumed to match the span length of the adjacent Route 196 Bridge over Elm Street . The bridge length is extended to simplify fabrication by eliminating the need to fabricate a skewed bridge span. The additional bridge length required is only about 10 feet. Simplifying the fabrication offsets the cost increase for the additional bridge length. The proposed span length is 85 feet. This span length will require full height walls (about 15'-6") to retain approach fill slopes. TYLI also reviewed an alternative with a longer span that would set the abutments near the top of the existing slope. The required span length for this alternative is about 130 feet and would minimize the height of the walls required to retain fill slopes. Based on a comparative cost analysis for the assumed foundation conditions, cost saved by eliminating the walls is offset by the additional cost of extending the bridge length. The difference in cost was not significant and these two alternatives may be considered equal in terms of cost. Similar to the Connector Road Bridge, other factors such as aesthetics, potential future maintenance cost, and actual subsurface geotechnical conditions could also influence the choice of span length. These factors should be considered further in the future development of the design. A span length of 85' has been used to establish cost for this study. The bridge will provide a minimum of 15'-6" vertical clearance over Elm Street.

Subsurface investigations have not been conducted for this study and detailed geotechnical information is not available. Geotechnical conditions are assumed similar to the adjacent Route 196 Bridge. Plans for this bridge indicate abutments are supported on 60' piles. For purpose of establishing project cost, we have assumed similar foundations will be required and piles will bear near the same elevation as the Route 196 Bridge.

A prefabricated steel truss bridge structure (half-through pony section) is proposed for the Elm Street Bridge. At this location, this type of structure offers the same advantages identified for the Connector Road Bridge.

Specific recommendations for the Bridge over Elm Street are as follows:

- Bridge length = 85'
- Bridge Width = 10' (clear travelway)
- Superstructure - Prefabricated steel truss bridge (half-through pony section) fabricated with unpainted weathering steel. Use CIP concrete deck and vertical picket safety rails. Provide a 54" rail height above the deck. For the reasons stated above for the Connector Road Bridge, we assume protective screening is not required and not included in the cost estimate.
- Substructure - CIP concrete stub abutment located on retained fill slopes and supported on steel H-piles. Prefabricated mechanically stabilized earth (MSE) walls will retain fill slopes.

Tunnel under MDOT Railroad

The width of this structure matches the approach pathway, and the structure will accommodate pedestrians and cyclists. The tunnel will cross perpendicular to the MDOT Railroad. The required length of the tunnel is a function of the width of the railroad embankment and required difference in elevation between the crossings. Based on the site topography and proposed vertical profile, as required to provide adequate overhead vertical clearance through the tunnel and minimum cover over the structure, the minimum tunnel length is about 65 feet.

Subsurface investigations have not been conducted for this study and detailed geotechnical information is not available. Geotechnical conditions are assumed similar to the adjacent Route 196 Bridge. Plans for this bridge indicate that soils are likely capable of supporting a proposed tunnel structure without the need for deep pile foundations. Due to the low height of the existing railroad embankment, it is likely that the proposed substructure will not significantly change the stresses induced in the supporting soils. For purpose of establishing project cost, we have assumed the tunnel may be founded on existing soils and that deep pile foundations will not be required. Detailed geotechnical investigations will be needed to verify these assumptions for future design development.

A prefabricated precast concrete box with beveled ends

is recommended for the Tunnel under MDOT Railroad. This type of structure offers several significant advantages over other types of structures:

- Minimum total structure depth and cover required to carry rail loading decreases difference in crossing grades resulting in reduced limits of approach work.
- Use of precast concrete sections allows for rapid construction, minimizing temporary traffic impact to railroad above.
- Precast concrete provides a durable, low maintenance structure.
- Exposed precast concrete surfaces may be colored or textured to enhance aesthetics.

Specific recommendations for the Tunnel under MDOT Railroad are as follows:

- Tunnel length = 65'
- Tunnel width = 10' (clear travelway)
- Tunnel height = 10' (clear)
- Structure - Prefabricated precast concrete box with beveled ends and MSE retaining walls along approaches.

I. Funding

Construction of this project will most likely take many years to complete. The actual schedule will be based on the people's desire to see the pathway extended, available funding sources, the municipalities' success at securing the necessary funds, and their willingness to raise the necessary matching funds.

A variety of private and public funding sources should be pursued. Some of the likely sources could include:

1) Federal Highway Administration's Transportation Enhancement Program

FHWA

This funding program helps communities expand their transportation and livability choices, and is probably the most common method municipalities in Maine have used recently to fund these types of projects. These funds are highly competitive with other communities throughout the state. In the 2002/2003 funding cycle the program had approximately $7 million and received requests for over $15 million. For further information see: www.state.me.us/mdot/com-munity-programs/223.php.

2) Recreational Trails Grants

Bureau of Parks and Lands

These funds are administered by the Maine Bureau of Parks and Lands and provides funding for trail development and trailhead parking. Up to $30,000 is available to any applicant. A 20% local match is required. For further information see: ww.state.me.us/doc/parks/programs/community/trailsfund.html.

3) Roadway Improvement Projects

Any recommendations made in this report for the on-road phases could be constructed as part of potential local or state roadway improvement projects scheduled for these streets. For instance, based on the results of an upcoming townwide traffic study, the Town may construct a connector road from Main Street to the Topsham Fair Mall. If this roadway were constructed a path separated from the road by a narrow grass buffer would be part of that project.

4) Private Donations

Private donations could take the form of money towards the path construction, land for the path or associated trailhead parking areas, or materials/labor for the path construction. For example, Rich Cromwell (developer of Topsham Crossing) has already donated $50,000 to this project.

5) Municipal Funds

Raised through the Town annual budgeting process these funds can be used to fund portions of the trail or to match other funding opportunities.

6) Private Development

For some of the on-road segments of the trail the Town could require developers of adjacent properties to construct the portion of the path in front of their property as

part of the approval of the development plans. Depending on timing, this could be possible for future Highlands development along the Coastal Connector. Also, MDOT is considering building on a lot they currently own near the Topsham Fairgrounds. If this project goes forward, they might be willing to construct a portion of the pathway at their expense as part of that project.

In addition, there are potential opportunities to reduce costs through the use of volunteer labor and/or donated materials. Scout groups, the Navy SeaBees, and other civic organizations frequently volunteer time and funding for community projects.

Suppliers may be willing to donate lumber or sand and gravel for the project while construction companies may be willing to donate time, materials and equipment to the project (as was the case in the construction of the original segment of the Beth Condon Pathway in Yarmouth).

J. Additional Information

As part of this study, a review of the existing natural resources was conducted as well as an estimate of potential environmental impacts and permitting needs. Also, analyses of the opportunity and need for trailside amenities such as rest rooms, benches and drinking fountains, stopping areas to take advantage of scenic vistas, requirements for trail signing and lighting were all completed. See *Appendix A* for additional information on Environmental Regulatory Assessments, Trailside Amenities, Scenic Vista Assessments, Trail Signing and Trail Lighting Assessments.

APPENDIX A - BACKGROUND INFORMATION

This appendix includes more detailed information on some of the topics that were only discussed briefly in the main report.

A. DESIGN CRITERIA

The design team and the Feasibility Study Advisory Committee went through a lengthy process to evaluate the advantages and disadvantages of the various alternatives for the extension of the Androscoggin River Bike Path. The key Design Criteria were determined to include:

- Safety
- Aesthetics
- Security
- Privacy (Impact on Abutters)
- Connections to existing facilities
- Construction Costs

One of the primary concerns for those attending the public meetings during this study was safety of the users. Each route was examined for possible vehicular conflicts at sideroad intersections and driveways. The need for fencing, retaining walls or guardrails was examined in situations requiring significant grade changes or where the path is in close proximity to high speed roadways.

1) Design Standards

A number of current references were used in the development of the design criteria for the pathway, including: the AASHTO Guide for the Development of Bicycle Facilities, 1999; the AASHTO Roadside Design Guide, 2002; and the MDOT Maine Highway Design Guide, December 2001.

The recommended path alternative will be a shared-use path accommodating pedestrians, cyclists, in-line skaters, and wheelchair users. The paved surface will provide a safe surface for all of these users while requiring a minimum of maintenance. As recommended by AASHTO the path will be designed for a design speed of 20 to 30 miles per hours, a minimum horizontal curve radius of 100', and a maximum grade of 5 percent. For short sections of path where a grade greater than 5 percent is necessary due to the existing terrain, the suggestions developed by AASHTO will be followed. There will generally be two different typical cross-section configurations depending on the location along the path. These sections are as follows:

(a) Phases I, III and IV

Paved Path - A 10 foot paved surface with 3" of bituminous pavement is proposed for these phases of the project. AASHTO guidelines use a minimum width of 10 feet for multi-use facilities. The paved portion of the path will have a maximum cross slope of 2% to maintain drainage and meet ADA requirements. In certain critical areas MDOT has allowed paths to be reduced to 8' in width.

The Vertical Clearance for the pathway will be a minimum of 10' as recommended by AASHTO. This clearance will be required for areas passing under roadside trees and when the pathway passes under the railroad track through the proposed tunnel.

Shoulders - Vegetated 2 foot wide shoulders will be provided on both sides of the path. These shoulders will have a cross slope of 1:6 and will increase to a minimum of 3 feet where the path is adjacent to trees, poles, walls, fences, guardrails or other obstructions as recommended by AASHTO. Where steep side-slopes are encountered a 5 foot clear zone from the edge of pavement to the top of the slope will be provided.

Such path elements as bridges, railings, fencing, retaining walls, and guardrail will meet AASHTO design standards where feasible.

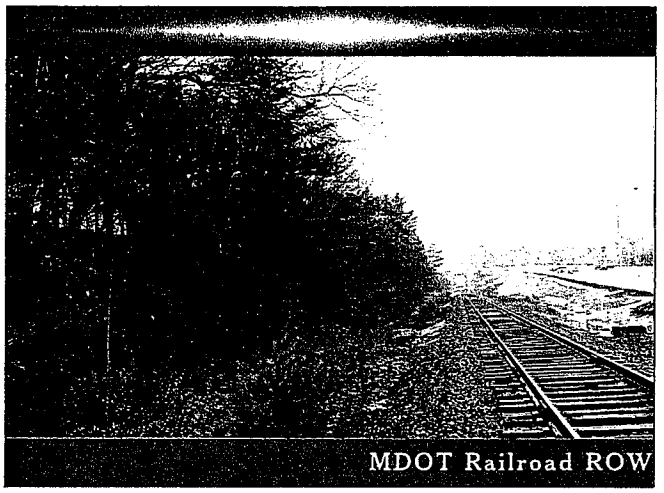
(b) Phase II

This typical section will be similar to the one outlined above, but will parallel public roadways. Between the path and the roadway, a vegetated buffer of at least 5 feet will be provided.

2) Right-of-Way

Portions of the recommended alignment would be con-

structed within the public right-of-way (Coastal Connector, Monument Place, MDOT Railroad) on either state or town owned property with no additional impact on the abutting private property or existing land use. Other portions of the trail would be on land which the Town may acquire (the Maine Natural Gas proper-



MDOT Railroad ROW

ty on Elm Street, the current Wright-Pierce property, the proposed connector road corridor from Main Street to the Topsham Fair Mall). The remaining trail sections will require easements from property owners (Topsham Fairgrounds, MDOT, the Highlands, Highland Green, Mt. Ararat School). The Right-of-Way information used in this study was obtained from the Maine Department of Transportation and from local GIS databases. The right-of-way lines shown on the mapping contained in this report are approximate; actual boundaries will have to be determined in more detail during the final design process.

Portions of the pathway will have to have temporary easements for access and/or grading during the construction of the path. In a few instances, permanent easements or acquisitions may be required.

3) Environmental Impacts

Environmentally sensitive areas were defined by a reconnaissance-level assessment performed by Woodlot Alternatives, Inc. Woodlot also requested a review of the Federal and State databases of protected resources. The Topsham Trails Multi-Use Path Natural Resource Evaluation Summary; Topsham, Maine provides a detailed description of these resources and the potential permitting requirements required to construct the path. The results of their assessment indicate that the path is feasible from an environmental standpoint, provided that

Coastal Connector

wetland impacts are avoided and minimized and that certain locations such as vernal pools and the MDOT Coastal Connector wetland mitigation site are avoided. A copy of the complete environmental report is included in the *Appendix*.A summary of the report will be included here.

4) Costs

It is anticipated that the engineering and construction funding for the project will be provided by Federal funds administered by the MDOT. These funds typically require a 20% match from the local communities. In addition, the local communities will be responsible for trail management and maintenance activities, to ensure a safe and high quality experience for all users. Maintenance is expected to include such items as plowing, sweeping, trimming, and patching of the trail surface.

With this in mind, each alternative was examined to compare the construction and maintenance costs to their perceived public value and safety. A preliminary opinion of cost was prepared for each of the segments for the recommended path alignment. Prior to construction, these costs will have to be reviewed and updated with current unit prices, based on the final design configuration.

5) Aesthetics and Experience

The path as viewed by abutting roadways and properties, as well as the views from the path itself will have to be carefully considered during the final design phase. The sections of this report on trail amenities, scenic vistas, signing and lighting contain suggestions that will enhance the aesthetics of and from the trail, and the experience of the trail users. The alignment of the path was developed to take advantage of existing scenic vistas and maximize the ability of the trail to fit into the existing environment. It was also sited to minimize any negative aesthetic impacts caused by construction of the path itself as compared to the existing views from the roadway or abutting land uses. Part of this mitigation would be in the form of project landscaping.

B. Environmental Regulatory Assessment

The following information is provided as an overview of local, state and federal permitting requirements for the pathway project. This information is based on the preliminary evaluation of mapping, aerial photography, agency contacts, and field review for the wetland areas or sensitive areas that might be impacted by the proposed pathway. See the Topsham Trails Multi-Use Path Natural Resource Evaluation Summary; Topsham, Maine by Woodlot Alternatives, Inc. for a detailed description of permitting (included in the *Appendix*).

Ravine near Railroad ROW

1) State and Federal Regulations

Once the final location and design of the pathway is determined, a wetland delineation should be performed as all wetland, stream and river areas. The need for environmental permitting can only be determined after the wetland delineation has been completed. There will be wetland impacts as a result of the project that are regulated by both the Maine Department of Environmental Protection (MDEP) and by the Army Corps of Engineers (Corps). It is anticipated that an NRPA Tier 3 permit (with Corps review) would be required for this project.

The Maine Historic Preservation Commission (MHPC) will also want to review the plans for the project during the design process. They have indicated that the Topsham Fairgrounds Grandstand, a portion of the Topsham Historic District, and a portion of the Purinton Family Farm are all within the study area and additional studies would be required after the exact location and impacts associated with the path are known. A copy of the MHPC response is also included in the *Appendix*.

2) Local Regulations

The Town of Topsham has established a Shoreland Zone that includes the portion of the project within 250 feet of the Androscoggin River or freshwater wetlands. In addition, there is also a Stream Protection District and a Resource Protection Overlay District within the Town. The appropriate coordination with the Town will have to occur during the design phase regarding impacts to these areas. Additional detail can be found in the *Appendix*.

C. Pathway Amenities

Pedestrian and bicycle amenities along the Topsham Trails pathway should be designed to optimize and promote more intensive use of the bike path, provide for a safer pathway, and provide for emergency situations. Because of the pathway location, often visible from a heavily traveled roadway, aesthetics along the path should be regarded as a high priority. To increase the user experience a variety in amenities such as signage, lighting, furnishings, art, and plantings are recommended.

Figure 7

Potential Trailhead Parking Locations

Location	Potential Improvements
P1 - Maine Natural Gas Site off Elm Street	Construct Parking Lot
P2 - Chamber of Commerce/Red Cross	Signing
P3 - Wright-Pierce Parcel	Signing/Coordination with Potential Future Municipal Building Parking Lot
P4 - Mt. Ararat High School	Signing
P5 - Topsham Fair Mall	Signing/Coordination with Mall owner

Potential Trailhead Parking

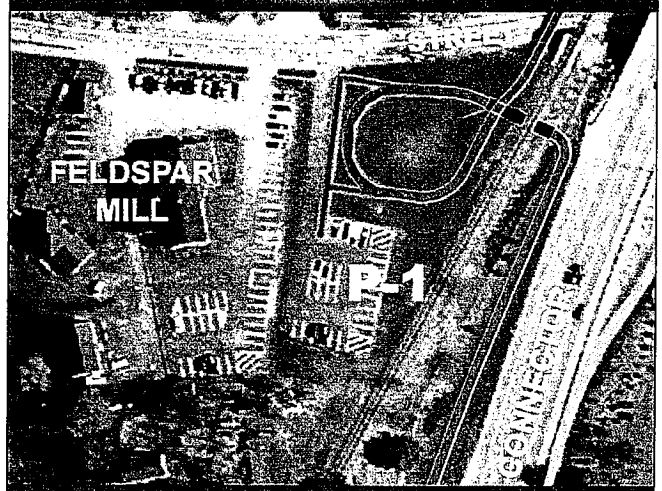
Trailhead Parking

Trailhead parking provides points of access for all pathway users that do not have a direct connection to the path. It is anticipated that some path users will drive to the path to walk or bike. It is also desirable that there be a number of different parking areas so that users can utilize shorter sections of the pathway. In an effort to meet these needs, a number of trailhead parking opportunities have been identified as part of this study. Many of these locations are existing, public areas that can be used for access to the path system. Final location and design of these parking areas should be coordinated closely by the Town, and abutting property owners.

Construction of any new parking areas, and upgrade of any existing parking areas, should be coordinated with the construction of the various path segments so that the parking facilities are available when the path opens. The following areas, as labeled on the final maps, have been identified as potential parking areas that could be available for pathway users:

- P-1. Currently not a parking lot nor is it Town owned land but this area has been discussed as a potential trailhead parking area. This parking area would be designed and constructed as part of the Pathway Segment that connects Elm Street to the Merrymeeting Bridge. The attached graphic shows approximately 26 spaces of parking. It is also recommended that a restroom, parking lot lighting, pathway lighting, seating, landscaping, and interpretive signage be provided on this Segment. A modest restroom facility, lighting, seating, landscaping, and signage for this Segment are included in the cost estimate. It was suggested that the interpretive sign near the parking area include information about the architectural history of Elm Street. Another appropriate location for an interpretive sign and pedestrian plaza is the edge of the Androscoggin River. Interpretation might include the history of the river and Merrymeeting Bay with respect to Topsham's early industries.

Figure 8



Potential Phase III Trailhead Parking

- P-2. American Red Cross Building and future Chamber of Commerce on Community Drive - Highlands. It may be possible to use the American Red Cross Building / Chamber of Commerce parking lot and restroom facilities. Specific use agreements will be needed between the Town and the Owner. No improvements to this facility are proposed as part of this Study.
- P-3. Future Town Office and Public Safety Building, currently Wright-Pierce Engineers site. Once this location becomes the new Town Office, the parking lot and restroom facilities will be available to the pathway users. Cost estimates for improvements to this facility are not included in this Study.
- P-4. Mt. Ararat High School and Mt. Ararat Middle School. There are several opportunities for pathway user parking at the local schools and

athletic field lots. Specific agreements will be needed between the Town and the school. No improvements to these facilities are proposed as part of this Study.

- P-5. Topsham Fair Mall. There are numerous opportunities for pathway user parking at the Topsham Fair Mall, e.g., MeDOT park and ride lot. Specific agreements will be needed between the Town and the owner. No improvements to these facilities are proposed as part of this Study.

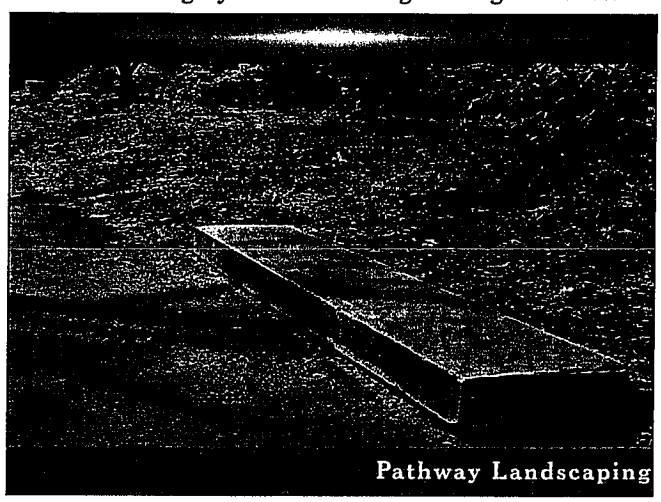
Crosswalks and Intersections

The following guidelines should apply to all places where the pathway crosses a road or major commercial driveway.

- Crosswalks should be marked with permanent reflective pavement paint.
- Crosswalks should be a minimum of ten feet in width. Painted bars should be two feet in width, spaced one foot apart.
- Adequate sight distance must be provided at all crossings.
- Vegetation should be managed to maintain clear safe sight distance at all crossings.
- Crossings should be as close to 90 degrees as possible.
- The pathway alignment should force cyclists to slow down as they approach the roadway.

Landscaping

Landscaping cost estimates are included in the "10% for amenities" category of the final engineering estimates.



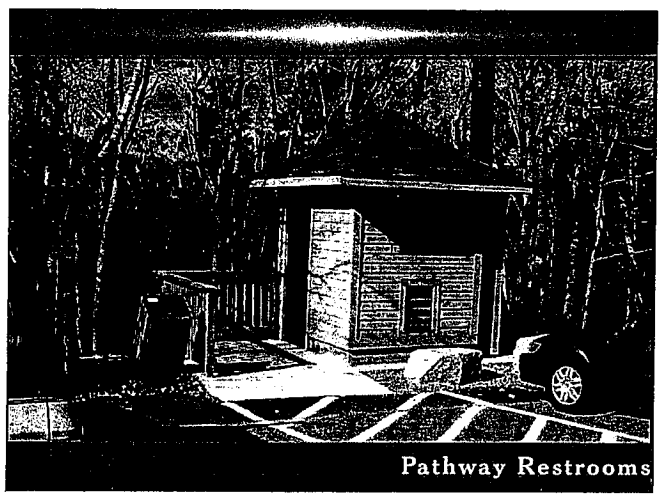
Pathway Landscaping

During preliminary and final design each segment should be reviewed for specific landscaping needs. The design of the pathway should consider several types of landscape treatments:

- Screening in certain locations to provide a sense of safety and preserve residential privacy with out interfering with visibility.
- Pruning of existing trees and shrubs to provide a minimum 10 foot over-head clear zone and 12 foot width along the pathway.
- In highly visible locations, e.g., in-town areas, at pathway/roadway intersections, planting should include flowering shrubs, ornamental grasses, and perennials to add color and visual interest to draw awareness to pathway and add a sense of pedestrian scale.
- Adding large masses of native trees and shrubs to help minimize the noise and visible activity along the Connector Road, where feasible.
- Around proposed interpretive signage areas, rest stops, and pedestrian plazas to provide interest and identity to Topsham Trails.

Rest Areas

The pathway should provide resting areas in the form of



Pathway Restrooms

benches, flat slabs of elevated granite, seating walls, etc. preferably every 500 to 1000 feet. For Phase I, the Study recommends a pedestrian plaza with seating on the north side of the proposed overpass.

D. Scenic Vistas

The Topsham Trails pathway's scenic resources can be described in terms of its physical and cultural characteristics. Physical character considers landform, vegetation, and water features. The cultural character includes the cultural and historical elements of the town, the design of structures and landscapes, the state of upkeep, and the symbolic value and meaning of the town's location. The following areas were identified as having scenic, historic, natural or cultural qualities:

Androscoggin River

A very small portion of the proposed pathway is close the Androscoggin River. On the Merrymeeting Bridge that connects Topsham to Brunswick, there is an existing sidewalk. The proposed extension of the Pathway loops under the Merrymeeting Bridge and parallels the Androscogin River for a very short distance. This location would provide for an ideal spot for an Interpretive Sign explaining the importance of the river in Topsham's history.

E. Pathway Lighting Assessment

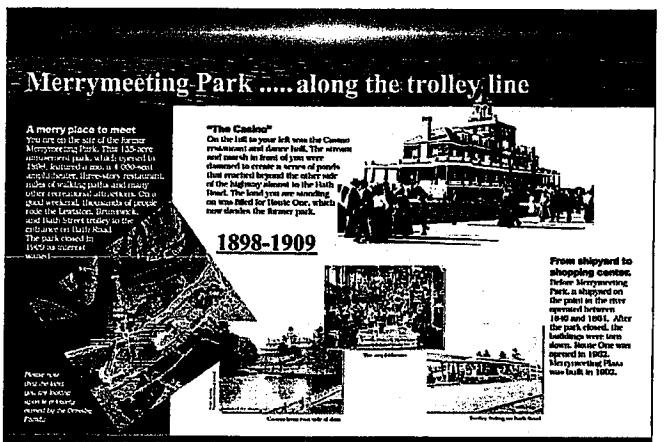
This Study calls for lighting areas where there is a concern for the safety and security of the users, e.g., at road crosswalks, underpasses, tunnels, on bridges, parking areas/trailheads, and other areas of higher risk, e.g., through the wooded segment north of the Highlands to the future Town-Office building. Continuous lighting along the entire shared-use pathway is not proposed at this time, due to cost considerations. During final pathway design, the consultants should re-evaluate the need and desirability of lighting especially in areas where safety is an issue. Proposed lighting is shown on the Final Plans and included in the cost estimates for that specific segment.

F. Pathway Signage

Signage is an amenity that can create an exciting identity for Topsham's pathway and its pedestrian and bicycle system while maintaining its relationship with other local and regional trails. It may be appropriate or desirable that some of the signage, e.g. warning signs, regulatory signs to be consistent with those of the Brunswick's Androscoggin River Bicycle Path.

A signage system consisting of the following should be built, maintained and extended to promote the safe use of the pathway network. Much of the recommended information can be:

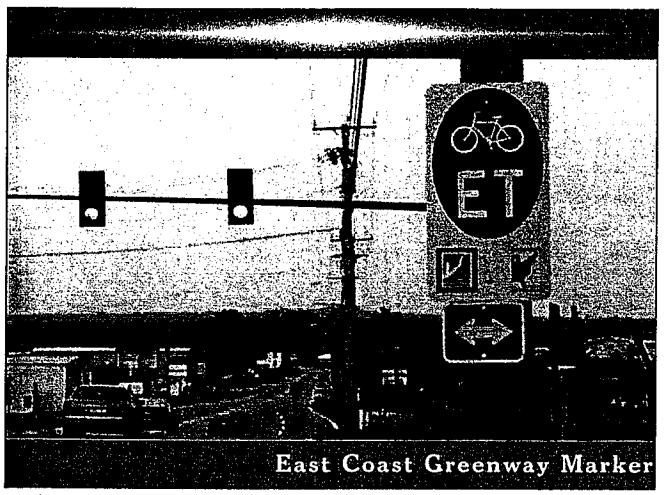
- Signage for safety, distances and direction.
- Regulatory signs (such as Shared Pathway, and End Shared Pathway) for shared pathway designations. These should will help alleviate conflict between motorists and cyclists, and pedestrians and cyclists;
- Warning signs, used where a hazard is not obvious to approaching cyclists or pedestrians. e.g., stop signs on the pathway to stop users at all driveway, side road, and street crossings, and/or to alert motorists to pedestrians crossing the roadway; these should also include signage to show attention to steep slopes to warn those in wheelchairs. Additionally, if improvements to existing facilities, e.g., Village Drive sidewalk widening, cannot be made immediately, it is recommended that signage be provided at all path intersections. This information should clearly convey objective information to pathway users, including information about shared use, width, grade, and surface.
- Guide signs, which specify the directional and distance to key destinations - next rest stops, interpretive areas, shopping district areas, recreation al facilities;
- Orientation signs such as maps. These may be located at trailhead parking areas to indicate the extent of the pathway and connections to attractors such as the Cooks Corner, Downtown Bath,



Interpretive Sign - Androscoggin River Path

Bath waterfront, and the existing Androscoggin River Bike path.

- Interpretive signs to introduce the natural, cultural, and historic resources along or adjacent to the path. Refer to the appendix for additional detailed information on Interpretive and Informational Signage.



East Coast Greenway Marker

- East Coast Greenway markers, if the extension is accepted as a link.

Refer to the appendix for additional detailed information on Interpretive and Informational Signage. AASHTO's Guide for the Development of Bicycle Facilities, latest edition, should be used as the basis for regulatory signage, and for roadway signage associated with path intersections.

Detailed Information For Interpretive And Informational Signage

Siting the Signs

It will be important in all situations to develop a design context for the signs so they do not appear to float in the landscape. A semicircular space - defined by a stone wall, row of boulders, shrub hedge, wooden bollards, seating, etc. - is recommended as a design motif that can be adapted to most wayside stops along the pathway. Signs should be orientated away from the direct sun exposure if possible.

Signage Kiosk

A kiosk can be used to house orientation signs, interpretive signs, as well as all extraneous informational signs under one roof. These might include distance information, scenic view-points information, warnings about Lyme disease, safety information, and rules for use of the pathway.

Materials used in the kiosk should be consistent throughout the pathway. Timber framed structures are recommended for their ability to relate to indigenous architectural forms commonly seen in barns and outbuildings.

- Pathway Map. An overall map of the pathway that shows major points of interest, towns and villages, and the location of other interpretive and scenic areas. Mileage between stops should be incorporated into the sign, using both standard and metric distances. Universal symbols for restrooms, side trails, and other services should be shown. The specific location should be highlighted ('you are here').
- Regional Map. A small map of the East Coast Greenway should be provided to show how the pathway fits into the larger vision and encourage additional support for the pathway.
- Additional Logos. A band at the base of the panel could be designed to display other agencies and organizations that have been involved in the pathway planning and construction. This could include the Maine Department of Transportation, East Coast Greenway Alliance, etc.

Sign Layout, Dimensions And Color

Because signage is such an important element in the use and experience of the pathway, it is recommended that a graphic artist be employed for the final sign design. The Final design should consider such things as:

Template

The template gives the framework for the width for columns of type, borders, position of headlines, locations of credit, etc. (See the graphic layout template at the end of this report.)

Flexibility and Creativity

Each sign should be thought of as an individual, stand-

along interpretive graphic, designed for the specific site and message. The designer is urged to use a variety of graphic devices to add interest and maintain a fresh quality.

Horizontal Layouts

Most of the interpretive signs should be laid out in a horizontal (landscape) format, to make it easier for the user to look over the sign and into the landscape, where appropriate. This is also the more natural way that most people read (i.e., left to right).

Vertical Layouts

There may be some situations where vertical signs might be appropriate. For example, where a majestic pine grove creates strong vertical lines that are a prominent part of the landscape. A vertical sign at this location may be appropriate to emphasize the unusual nature of the resource. However, it may demand an equally unique mounting system designed for the particular site.

Dimensions

The standard height of interpretive panels should be 24". The only exception would be for the occasional vertical sign. In this case, the width would be 24". Using the graphic template will result in signage that typically will be 24" x 36" or 24" x 48".

Color

One way to reinforce continuity with multiple signs from site to site would be to use the background colors as topic cues. For example, green could be used behind or with graphics relating to natural or ecological topics; blue for cultural topics and maroon for historical topics. Creativity in design must ensure a balance of colors used so no one panel or groups of panels would be overwhelmed with a singular color.

Text

Length

As a general rule, the signs should have approximately 75-100 words of text for the main interpretive message for a standard (24" x 36" panel). Additional information can be provided in captions or callout boxes. As a basic rule of thumb, approximately 1/3 of the panel should consist of text and the remainder made up of graphics and blank space.

Message Triad

People will generally look at signs and decide to spend either three seconds (reading just the headlines and looking at the illustrations), 30 seconds (reading the headlines, captions and the introductory text), or a full three minutes (reading the entire panel). The sign should be leave a message with a visitor no matter how long they choose to spend in front of it.

Engage the readers

Direct them to touch, look, explore, listen, and participate in the site. Ask questions. Minimize the use of flowery adjectives. Use comparisons and common metaphors to explain complex ideas. Use humor appropriately (and sparingly). Use catchy phrasing, but avoid sounding dated. Answer commonly asked questions and clear up misinformation.

Organize the information

Organize the information in a clear, logical manner: chronological, problems/solutions, cause/effect, etc. Above all... tell an interesting story, leave people with several ideas to take away with them.

Writing style

Text for the interpretive signs should be aimed at an audience with average reading abilities, i.e., 7-8th grade level. Sentences should be relatively short. Passive sentences should be avoided.

Type

Fonts

- As a general rule, there should be no more than two font families used on any one sign.
- Vary the emphasis and add visual interest by using italics, bold, and roman attributes.
- Use upper and lower case throughout for maximum legibility.

- Do not indent paragraphs.
- Use upper and lower case.
- Avoid hyphenation.

Signage Artwork

All artwork, illustrations, and other scanned images should be cropped, enlarged/reduced, adjusted for contrast, etc. in the program in which they were created, and not the page layout program.

It will be important to coordinate all aspects of the sign layout and design with the selected sign manufacturer to avoid problems in production. Most manufacturers have websites that provide specifications to assist the designer.

Each panel may have one photograph or illustration that sets the theme. All other elements should help to reinforce the theme.

All illustrations selected for the panels should help interpret the theme, the place, and the overall story line. Graphics should be high contrast, easily legible, without excessive detailing.

Original illustrations should be considered to help explain historic events, progressive site development, hidden natural phenomenon, or other elements of the area that are not apparent to the casual visitor. While this type of illustration may add to the cost of the sign, creative graphics can add immeasurably to the visitor's understanding of the place.

The use of historic photographs is strongly encouraged to help provide a sense of authenticity and continuity to the interpretive effort. Where possible, the selected photographs should include people to help animate the panel. Most of the historic photographs will be black and white images (and gray), which could produce a rather drab, monochromatic effect, if used exclusively. It may be effective in many cases to digitally convert these photographs to sepiatone images to convey a greater sense of history and provide richness to the panel. Background colors should then be selected to complement the photographs.

Photographs or illustrations of artifacts can add another dimension to the panels by focusing on the intimate level of the story. Panels should generally include at least one object where the attention is drawn to the detail level. These can include letters from historic figures, postcards from a historic era, tools used in woodworking or lumbering operations, animal tracks, bird eggs, etc.

Credits to all illustrations and photographs should be verified.

Illustrations and photography should be selected for their dynamic quality. They should animate the sign and provide freshness and movement, with out appearing overly busy.

Avoid

- Illustrations that are only used to fill space or to decorate the panel.
- Photographs that are out of focus, illegible, or poorly composed.
- Maps and other graphics with excessive amounts of information.
- Excessive mixing of photographs and illustrations on a single sign.

Signage Systems

There are many signage systems on the market which are currently used for interpretive signs. Signage for the pathway must be appropriate for a wide range of installations - from forestlands, city streets, and parks.

The signage system selected for the pathway must meet a set of rigorous criteria:

Graphics

- High quality resolution of graphic image
- Color reproduction
- Range of colors available
- Resistance to fading over time
- Environmental compatibility
- Surface attractiveness (tactile quality)

Durability

- Ten year life expectancy
- Resistance to warping, cracking, delamination
- Resistance to scratching, and cigarette burns
- Resistance to vandalism and abuse (rock throwing)

- Adaptability to various mounting systems
- Ease of replacement

Life Cycle

- Relatively low initial production cost (less than $500 per sign)
- Ease of maintenance (graffiti removal)
- Minimal annual maintenance
- Good overall perceived value

While the ideal product has not yet been developed, there are several systems available which meet these criteria. These are presented in order of preference.

Digital High Pressure Phenolic Resin Laminates

This material was introduced into the marketplace in the mid 1990's and has proven to be a very cost effective, stable, attractive media for many types of outdoor signage. Signs look and feel similar to the countertop material commonly found in contemporary kitchens with non-glare, slightly textured, matte surface. Other finishes include a pebble surface and a smooth surface that is best for showing details.

Interpretive signs made of this material can be designed to fit into a standard frame or can be 1/2" to 1" thick, which is self supporting. Signs produced of this material are fire retardant, graffiti resistant (removable with solvents), unaffected by temperature extremes, and fade-resistant.

Images are printed directly from computer files, eliminating much of the printing process and results in considerable cost savings. Color rendition and detailing from color ink-jet printers is very good. The production costs for a 24" X 36" signs should be in the range of $300 - 400. Additional colors do not add to the cost of the panel.

The self-supporting aspect of the system opens up many creative possibilities. Signs can be integrated into a variety of support structures, or attached to fences, walls, or buildings. The edges of the signs can be finished as square, rounded, cove, or 45° chamfer. Self supporting signs eliminate the need for aluminum framing systems, which will greatly decrease the overall cost of the signage program.

Companies that produce Digital Laminate Composites include:

- Folia Industries Inc.
  5 York Street
  Huntingdon, Quebec
  www.folia.ca
- KVO Industries
  4724 Prospect Avenue
  Santa Rosa, CA 95409
  www.kvoindustries.com
- Fossil Graphics Corporation
  44 Jefryn Bouldevard
  Deer Park, NY 11729
  www.fossilgraphics.com
- CellEx
  Grand Visuals
  7332 S. Alton Way
  Building 13, Suite F
  Englewood, CO 80112
  www.grandvisuals.com

Digital Fiberglas Embedment

In this process, digital artwork is embedded in a 0.03" to 0.25" layer of Fiberglas, forming rigid, waterproof sign. This is the process that has been commonly used by the National Park Service over the past decade.

Fiberglas signs require a support and framing system due to their relative thinness. Life expectancy is generally up to ten years, but fading and yellowing may occur if the signs are mounted in sunlight. If this system is used, several copies of the artwork should be ordered at the time of the initial fabrication to facilitate replacement at a later date. A typical 24"X36" sign can cost $450 - 750.

A recent improvement in this process is Zed, which uses a polyester print media embedded in an optically clear polyester resin, resulting in a more stable product with better color reproduction.

Companies that produce Digital Fiberglas Embedded signs include:

- Pannier Graphics
  345 Oak Road

Gibsonia, PA 15044-9805
www.pannier.com

- GS Images
  355 South Potomac Street
  PO Box 1288
  Hagerstown, MD 21741-1288
  www.gsimages.com
- KVO Industries
  4724 Prospect Avenue
  Santa Rosa, CA 95409
  www.kvoindustries.com

Porcelain Enamel

Porcelain Enamel panels are made by fusing glass and pigments onto a steel sheet at extremely high temperatures, producing a very durable, permanent sign. This is among the most expensive of the signage systems, with typical 24"X36" panels costing upwards of $3,000 when full-color photos are used.

Their advantage is their longevity and overall quality. However, as a ceramic material, they are susceptible to chipping and cracking if subjected to direct blows. This material is shown for comparative purposes, but its cost will most likely be prohibitive for the Pathway interpretive signage program.

Companies that produce Porcelain Enamel signs include:

- Winsor Graphics, LLC
  312 Columbia Street Northwest
  Olympia, WA 9501-1031
  www.winsorgraphics.com
- Sea Reach Ltd.
  Rode Lodge, OR 97372
- Interpretive Graphics
  3590 Summerhill Drive N
  Salt Lake City, UT 84121
  www.interpretivegraphics.com
- KVO Industries
  4724 Prospect Avenue
  Santa Rosa, CA 95409
  www.kvoindustries.com

The KVO Industries website outlines the advantages and disadvantages of each of the above signage systems. KVO produces all three types of sign systems.

Frames

Unframed Panes

The first option is to use a signage system that does not require frames, such as the HP Laminate. As noted earlier, panels can be fabricated that are self-supporting, generally requiring a thickness of at least 1/2". Edges can be square, rounded, or supplied in a number of moulding styles.

There are a number of advantages to this approach:

- Greater flexibility in design.
- Some reduction in overall costs, although thicker panels will add somewhat to the initial panel cost.
- Ability to have a free-form edge treatment.
- Graphics can be taken to the edge of the panel.
- Panel can be inserted into wooden frames (see above).

There are disadvantage of this approach:

- Greater susceptibility to damage.
- Very contemporary look, which may seem somewhat out of place along the pathway.

Framing Systems

With some types of signage systems, the use of anodized aluminum frame, is highly recommended to protect the edge and provide a crisp way of creating a border. Frames can be provided by the sign manufacturer or custom-built by a reputable framemaker.

Wooden Frames

Anodized aluminum frames may seem somewhat out of character in many of the locations along pathway. Custom designed wooden frames should be considered as an attractive and cost-effective alternative for many, if not all locations.

Some of the advantages to wooden frame include:

- Visual compatibility with site detailing (fencing, railings, orientation kiosk, benches, etc.).
- Versatility and adaptability to a variety of situations.
- Relatively low cost.

- Ability to contract with local carpenters, utilizing Maine labor and products.

There are a number of disadvantages which should be considered:

- Higher maintenance costs.
- More easily damaged by scratching, carving, and vandalism.

Mounting

Mounting Height

The typical sign should be mounted at a 30° angle above the horizon, which is the accepted standard throughout the country for accessible signage. The lower edge of the sign should be 32" above the ground surface. For vertical mounting, the bottom of the sign should be 28" above the ground.

Mounting Systems

There are a number of standard and custom mounting systems that would be appropriate for the various situations on the pathway. The supports must be designed to be attractive, durable, and appropriate for the character of the site.

- Standard Frames. Many of the sign manufacturers offer extruded metal frames that can be adapted to a variety of situations. These can be specified with a powder coat finish, painted, or as self-oxidizing steel.
- Wooden Supports. These could consist of customized supports that feature mortise and tenon joinery. The tops of the posts could be finished off by a copper cap or carved by a local artisan. Heavy timbers (e.g. 8-10" square) should be used for the vertical members to achieve a sense of ruggedness.
- Fence mounts. Many of the standard mounting systems enable signs to be mounted on deck railings or sturdy fences in a way that makes them more integral with the landscape detailing.
- Stone Walls. The use of granite blocks and stone walls is encouraged throughout the pathway as a way of celebrating the geologic heritage of this region of the state and adding a note of permanence to the sites. There are a number of ways that signs can be incorporated into stone walls. The framing system can be embedded into the stonework so the sign appears to float above the top of the wall (which will typically be 18-24" in height). For some situations, it may be appropriate to embed the signs directly into the surface of the wall.
- Granite Bases. Granite can be an effective way to support the signs and achieve the proper visual fit. Single posts will be suitable for the smaller signs, while a pair of posts may be required to support signs that are greater than four feet in width. The surface of the bases should be split and/or thermal finished to achieve a more rugged appearance.
- Surface Mounts. In some instances the signs might effectively be mounted on existing structures as a way of minimizing clutter. The design of the frame in these instances should relate to the existing structure and not detract from it. i.e., an anodized aluminum frame mounted on a weathered outbuilding would be an inappropriate juxtaposition of materials.

General Corridors

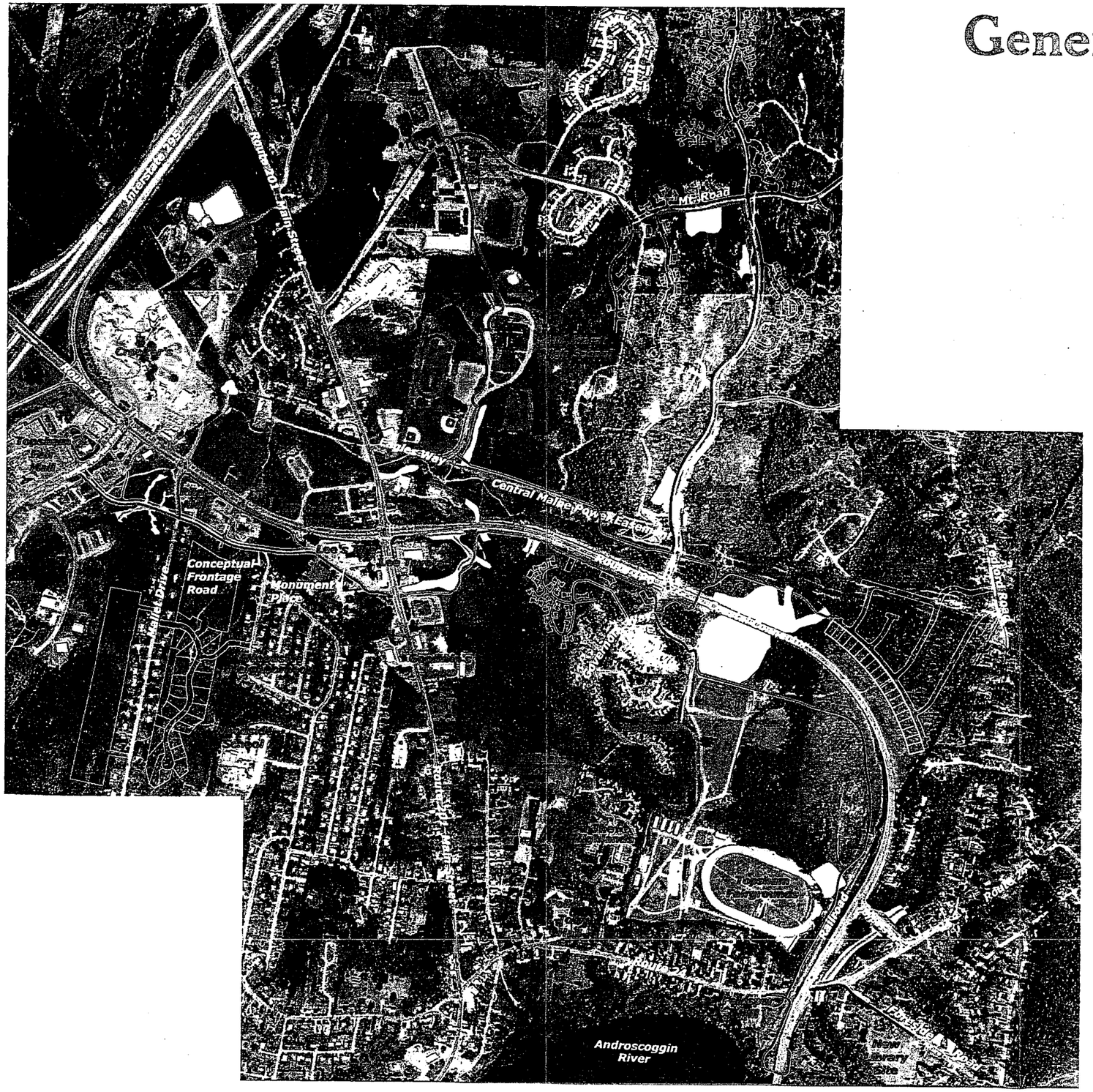


Figure 4

Phase Locations

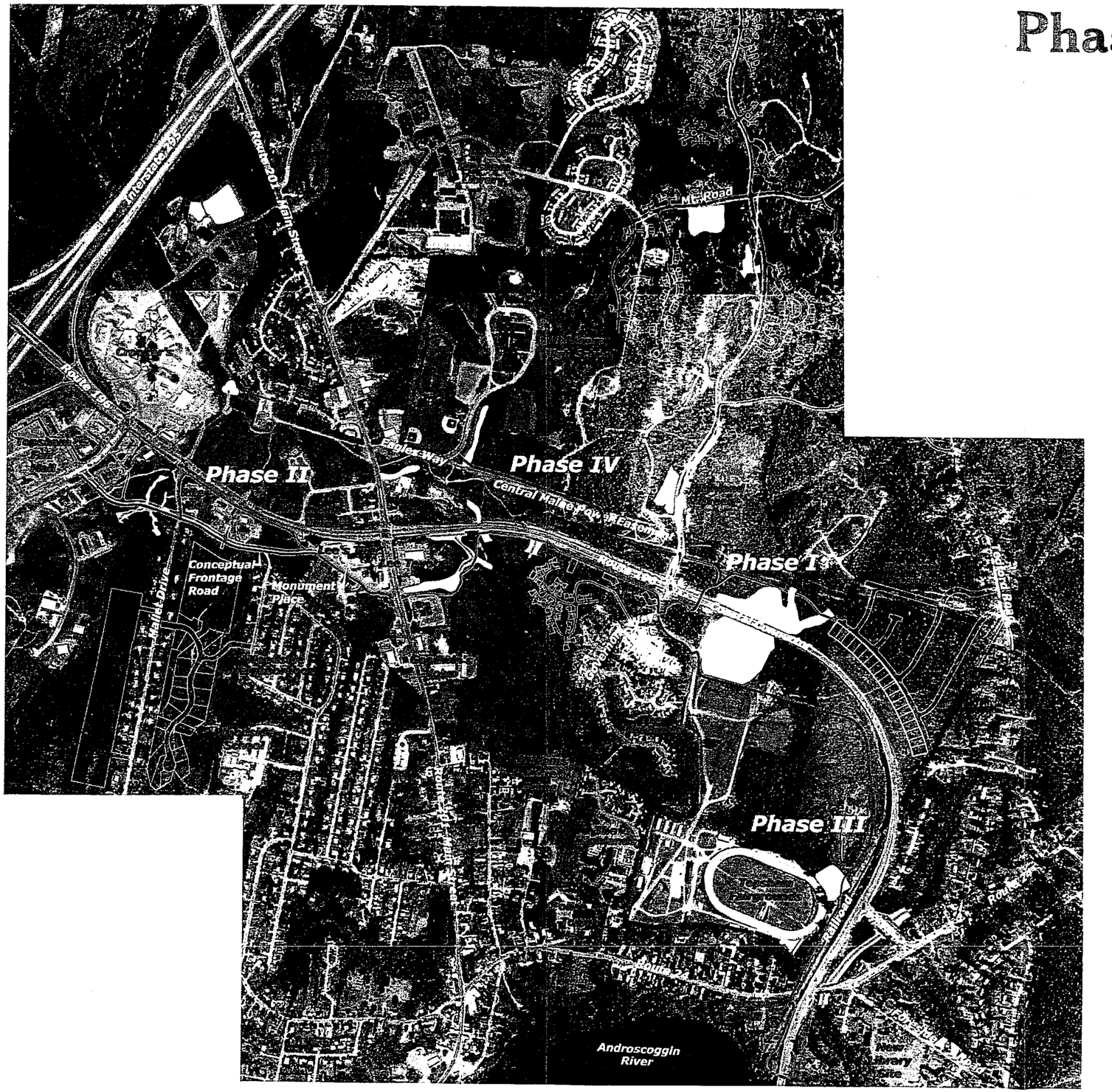


Figure 5