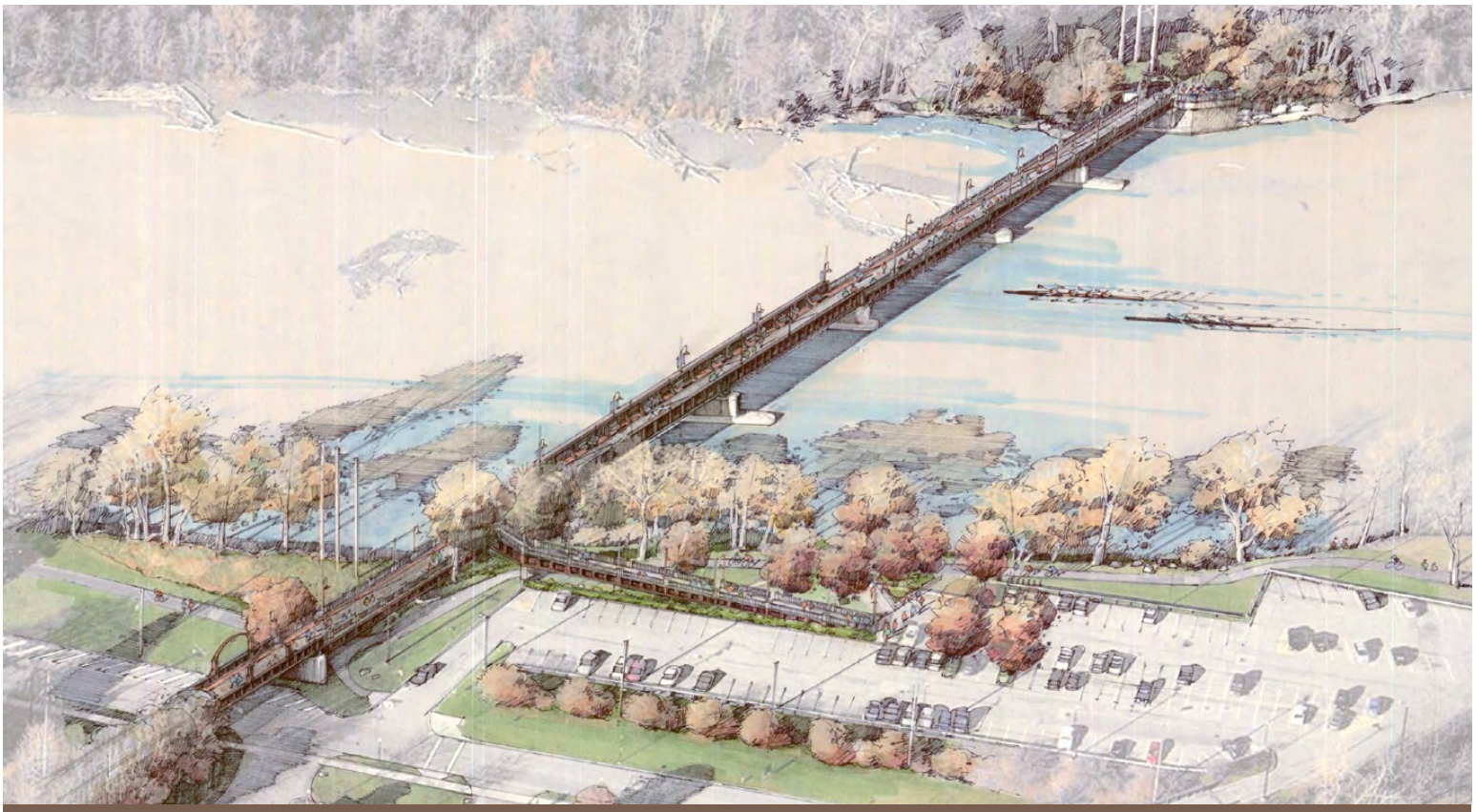


Erie-Lackawanna Railroad Bridge Rails-to-Trails Conversion Feasibility Assessment and Design Recommendations

Monroe County, New York

Prepared for:

The City of Rochester, NY

Genesee Transportation Council, Rochester, NY

Prepared by:

Environmental Design and Research,

Landscape Architecture, Planning,

Environmental Services, Engineering and Surveying, P.C.

September 2008

EDR

Erie-Lackawanna Railroad Bridge Rails-to-Trails Conversion
Feasibility Assessment and Design Recommendations

Prepared for:
The City of Rochester, NY
and
Genesee Transportation Council
Rochester, NY

Prepared by:
Environmental Design and Research,
Landscape Architecture, Planning, Environmental Services,
Engineering and Surveying, P.C.

September 2008

CONTENTS

APPENDICES

LIST OF FIGURES

Erie-Lackawanna Railroad Bridge Rails-to-Trails Conversion
Rochester, New York

Executive Summary

This report summarizes the objectives, procedures and products derived from the analysis and preliminary design studies of the proposed Erie-Lackawanna Railroad Bridge Rails-to-Trails Conversion. The Genesee Transportation Council (GTC) contracted with Environmental Design and Research to conduct site analysis and concept-level planning and design for a railroad bridge conversion that would connect the east and west bank Genesee Riverway Trails utilizing the abandoned historic Erie-Lackawanna Railroad Bridge over the Genesee River in Rochester, New York. Based upon these studies, guidelines for the design development, construction, and maintenance of the bridge conversion and trail system were prepared.

The Erie-Lackawanna Railroad (ELRR) Bridge is located approximately one and one-half miles south of downtown Rochester in an area known as the South River Corridor. This bridge dates from the early 1900s, but a railroad bridge has been in this location since the 1850s. Between 1907 and 1941, the railroad bridge carried passenger trains between Rochester and Livingston County. Freight service continued until about 1971, after which the tracks on the bridge were not in use. The bridge connects the Genesee Riverway Trail and the Plymouth/Exchange neighborhood on the west bank to the Genesee Riverway Trail, Bausch & Lomb Park, and the University of Rochester River Campus on the east bank. The Genesee River generally bisects the City in north-south direction, but the bridge occurs at a bend in the river and is oriented north-northeast/south-southwest.

The Genesee Riverway Trail is an urban multi-use trail adjacent to the Genesee River, used primarily by bicyclists, pedestrians, and cross-country skiers. As of 2007, approximately 18 miles of trail are complete. South of downtown, the trail is paved and continuous along both sides of the river within the South River Corridor. The main trail within the corridor has been completed, which has allowed the City to put its efforts towards strengthening the trail's presence by providing direct linkages to the various adjacent neighborhoods and business districts, and by enhancing existing and providing new river crossings, where possible. This project will further those efforts by linking the City's largest employer, the University of Rochester and Strong Memorial Hospital, located on the east bank, with several City neighborhoods on the west bank.

The ELRR Bridge and the immediate surrounding area were assessed for the suitability of converting the bridge to a trail connector. A preliminary structural assessment of the bridge was made, as well as an evaluation of the surrounding land uses, accessibility, vegetation, and other environmental features. The planning process for the ELRR Bridge conversion was based on the foundation laid by other planning studies and initiatives, and also utilized the knowledge of local residents, who attended public meetings and provided input to the Stakeholder Steering Committee. The ELRR Bridge conversion has been mentioned – directly and indirectly – in plans related to waterfront revitalization, preservation of railroad right-of-ways, comprehensive planning, and rail-based transit.

The feasibility of the bridge conversion was determined to be favorable, which led to the consideration of design objectives and schematic design alternatives. The ELRR Bridge is envisioned as an effective thoroughfare for bicycles and pedestrians, as well as an attractive meeting place and landmark destination. The bridge will be a place for spectators to view events on the Genesee River, such as rowing competitions and regattas. The bridge will connect different neighborhoods, local trails, and community resources.

The preferred design solution is detailed to respect the historic timeframe, and utilize the simple, industrial aesthetic of the existing steel structure. Metal archways are proposed as gateway features, providing both an aesthetic and safety element. The proportions of the metal archway

recall the proportions and geometry of a passenger railway car, and provide a location for affixing lights. The archway over Wilson Boulevard provides an opportunity for the University of Rochester to create a gateway feature that would be consistent with the aesthetic of the bridge.

The preferred design proposes a new steel structure at the south end of the bridge, adjacent to the parking lot north of Wilson Boulevard, and aesthetically compatible with the historic character. The steel structure, which would be ADA-accessible, would provide a clear physical and visual connection from the existing trail. The new ramp requires less grade change than other alternatives, and has easier parking access. This design alternative is most likely to attract the greatest number of users, and provides the most accessible, attractive option.

Benches and lighting are recommended for comfort and safety. On the west side of the river, the bridge terminus offers an ideal location for an overlook, with benches, railings, lighting, and a similar gateway feature. On the east side of the river, the transition between the ramp and the parking lot offers a location for a small pedestrian plaza. The plaza will be paved in brick, and will provide a small place for congregating and enjoying the view towards downtown. The bridge will be painted black, with the exposed beams embedded in the concrete also painted black. Standard beige concrete is recommended. Native plantings are recommended for both ends of the bridge, to reduce maintenance and increase survivability. Native plantings will augment the existing vegetation and wildlife habitat that exists along the river's edge.

Modifications to the existing structure have the potential to affect the historical value of the Erie-Lackawanna Railroad Bridge, and were carefully considered. The conceptual design uses a simple, industrial aesthetic, and respects the historic timeframe. The bridge is considered by the NYS Office of Parks, Recreation and Historic Preservation to be a cultural resource eligible for inclusion in the State and National Registers of Historic Places. Except for a few minor recommendations, the NYSOPRHP stated that the proposed improvements would have no adverse impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places.

Based on November 2007 costs, a preliminary construction cost for the proposed design is estimated at $1,254,119. The City of Rochester indicated from the beginning of the planning process that they do not wish to preclude the possibility of using the ELRR Bridge for alternative transportation uses in the future, which primarily includes light rail transit (LRT). Previous studies (completed in 1998 and 2002) assess the feasibility of developing light rail transit in Rochester. As of Summer 2008, there is not sufficient funding or regional support in developing light rail transit in this corridor, but the bridge design should strive to accommodate future transit routes.

I. Introduction

The Erie-Lackawanna Railroad Bridge is a connector in many fashions: a community connector, a trail connector for the Genesee Riverway Trail, and a connection to the Rochester region's history.

A. Genesee Riverway Trail

The Erie-Lackawanna Railroad (ELRR) Bridge is located approximately one and one-half miles south of downtown Rochester in an area known as the South River Corridor. As shown in Figure 1, the bridge connects the Genesee Riverway Trail and the Plymouth-Exchange neighborhood on the west bank to the Genesee Riverway Trail, Bausch & Lomb Park, and the University of Rochester River Campus on the east bank. The Genesee River generally bisects the City in north-south direction, but the bridge occurs at a bend in the river and is oriented north-northeast/south-southwest.

Genesee Riverway Trail and ELRR Bridge

The Genesee Riverway Trail is an urban multi-use trail adjacent to the Genesee River, used primarily by bicyclists, pedestrians, and cross-country skiers. As of 2007, approximately 18 miles of trail are complete. South of downtown, the trail is paved and continuous along both sides of the river within the South River Corridor. The main trail within the corridor has been completed, which has allowed the City to put its efforts towards strengthening the trail's presence by providing direct linkages to the various adjacent neighborhoods and business districts, and by enhancing existing and providing new river crossings, where possible. This project will further those efforts by linking the City's largest employer, the University of Rochester and Strong Memorial Hospital, located on the east bank, with several City neighborhoods on the west bank.

B. History of the Railroad Corridors from the *Lehigh Valley Corridor Feasibility Study*

In 1891, the Lehigh Valley Railroad was built between Rochester Junction and downtown Rochester to carry freight and passenger traffic from eastern Pennsylvania. Rochester Junction, in the Town of Mendon, was the transfer point for rail traffic to Rochester on the Lehigh Valley's Geneva to Buffalo mainline. Coal was the main commodity, transported from the Lehigh and Wyoming Valleys near Allentown, PA. A downtown passenger station was completed in 1907, and still stands on the corner of Court Street and South Avenue in Rochester, now housing the Dinosaur Bar-B-Que restaurant.

The railroad tracks are seen crossing East River Road near the University of Rochester campus. Rochester Municipal Archives, 1950

A major freight yard between downtown and Ford Street (formerly Clarissa Street) provided a connection with the former Rochester trolley system. Passenger operations ended in 1950 and tracks north of the University of Rochester were removed in the late 1970's. In 1970, the Lehigh Valley merged with seven other northeast railroads to become Conrail. Coal deliveries to the University of Rochester's steam plant ended in 1982. The tracks from the West Shore Branch to the University of Rochester were removed sometime after 1982.

The Erie-Lackawanna began as the Rochester and Genesee Valley Railroad and was completed in 1854. The railroad extended 18 miles from Rochester to Avon with a connection to the former Erie Railroad. A passenger station was built in

Rochester in 1897. The Erie Railroad electrified the track between Avon and Rochester from 1907 to 1934. Passenger service ended in 1941 and the passenger station was demolished in 1947. In 1960, as a result of a merger, the Erie became the Erie-Lackawanna. Traffic declined on the Rochester to Avon branch. Similar to the Lehigh Valley, in 1970, the Erie-Lackawanna merged with seven other northeast railroads to become Conrail. The tracks north of the West Shore Branch were removed by 1975. According to NYSDOT Bridge Inspector Charles Lowe, this bridge dates from the early 1900s, but a railroad bridge has been in this location since the 1850s.

The Pennsylvania Railroad approached Rochester from the southwest. The tracks were completed by 1890. Running along the west side of the Genesee River through what is today Genesee Valley Park, the Pennsylvania paralleled the Erie-Lackawanna from the bridge over the Genesee River just north of the University of Rochester to Ford Street. The tracks were removed in the 1970's.

II. Planning Process

The planning process for the Erie-Lackawanna Railroad Bridge Rails-to-Trails Conversion was based on the foundation laid by other planning studies and initiatives, and also utilized the knowledge of local residents, who attended public meetings and provided input to the Stakeholder Steering Committee.

A. Relationship to Other Plans and Studies

The Erie- Lackawanna Railroad Bridge Rails-to-Trails Conversion builds on the following previously completed planning initiatives:

Local Waterfront Revitalization Program Update, Rochester, New York (DRAFT)

The LWRP was undergoing an update in June 2007, but a draft of the document was reviewed for compatibility with the proposed project. The City of Rochester LWRP is guided by the following strategies:

1. Build stronger waterfront and urban neighborhoods.
2. Create new urban economic opportunities.
3. Improve connectivity between our water-related assets.
4. Establish a user-friendly waterfront.
5. Support water dependent and water enhanced uses.
6. Invest in public parks and infrastructure.
7. Foster public safety.
8. Preserve and enhance natural and cultural resources.
9. Create memorable places and experiences.
10. Utilize an integrated and strategic approach.

The conversion of the railroad bridge relates to project C.5 'Regional Trailways: Genesee River Trail, Genesee Valley Greenway, Erie Canal Heritage Trail, & Seaway Trail.' In this project, Recommendation V states, "For projects relating to the Genesee River Trail, provide the following: high quality trail amenities including parking at trail heads, information and safety signs, solid trail surface, landscaping & buffering, lighting where appropriate, visual access where possible, emergency access where possible, and interpretive/entertainment opportunities, among other elements. The "University of Rochester RR Bridge" is identified as a moderate priority segment of the Genesee River Trail to be completed.

The LWRP also identifies non-focus site projects, including Project 5.11, the 'Plymouth-Flint Redevelopment Project', on the west bank of the Genesee River from the Ford Street Bridge south to South Plymouth Avenue. Vacant and underutilized land exists along the riverfront in this area, and an opportunity exists to redevelop the area with water-enhanced uses. The analysis states that "This area has great potential to become an 'urban village' with a commercial center that contains neighborhood services and higher density housing at the center". Recommendation III for Area 4-Riverbend recommends "Renovate the existing railroad bridge for pedestrian use to interconnect the east and west banks of the river".

Regional Rights-of-Way Preservation Action Plan: Abandoned Railroads

This action plan was prepared in February 2005 by the Genesee Transportation Council. The plan identifies key existing and potential right-of-way preservation opportunities in the nine-county Genesee-Finger Lakes region for future transportation options, as well as coordinated, achievable, and cost-effective preservation/acquisition strategies on a regional basis to secure these opportunities. This action plan contains a prioritized list of feasible corridor preservation opportunities. The Erie Railroad – Attica Line is described in the inventory of Abandoned Railroad Rights-of-Way: "This mostly intact corridor runs from downtown Rochester to the active Livonia Avon & Lakeville rail line south of Jefferson Road in the Town of Henrietta. The bridge over the Genesee River has been recommended for rehabilitation as a pedestrian bridge".

Rail Based Transit Proposal for Rochester, New York
A rail-based transit proposal was prepared in April 2002 by Stone Consulting and Design, Inc. for the Rochester Rail Transit Committee. This study developed capital cost estimates for a simple and cost-effective light rail transit line in the Charlotte corridor. After exploring both a permanent electric light rail transit line and a short-term demonstration project, the study recommended semi-rapid light rail transit for the Charlotte corridor. The study also explored other corridors in the Rochester region that appear to be viable, including an extension of the Charlotte line to the University of Rochester and Henrietta. This extension proposed using either the Lehigh Valley right-of-way on the eastern bank of the river or the Erie Railroad right-of-way on the western bank, crossing to the University of Rochester along the Erie- Lackawanna railroad bridge.

South Genesee River Corridor Study, Rochester, NY
In May 2001, students and faculty from the Department of City and Regional Planning at Cornell University prepared land use and development plans for the Bureau of Housing and Project Development in the City of Rochester's Department of Community Development. The Corridor Study included land use plans that focus on the Plymouth Avenue Corridor and the Exchange Street Riverfront on the west side of the river, and Mount Hope Avenue and South Avenue in the Upper South Wedge on the east side of the river. The study identified target sites for concentrated efforts at revitalization, renovation, and new investment; developed recommendations for rehabilitation of existing uses and new development on these sites; and identified concrete measures for public and private investment. One concept for improving the Exchange Street Riverfront is enhancing the link between the west and east sides of the river by rehabilitating the railroad bridge for pedestrian traffic and making the bridge itself a recreational destination and a symbol of Rochester's history.

Rochester 2010: The Renaissance Plan
The 2010 Renaissance Plan, prepared in April 1998, is Rochester's first citywide comprehensive plan since 1964. To the extent possible, the plan incorporates the goals and visions of each of the ten sector plans that were prepared under the Neighbors Building Neighborhoods program. The plan uses three themes to articulate a renaissance of urban revitalization: renaissance of responsibility, renaissance of opportunity, and renaissance of community. The Renaissance of Responsibility seeks to renew Rochester's history of civic activism and philanthropy established by past famous residents, Frederick Douglass, Susan B. Anthony, and George Eastman. The Renaissance of Opportunity promotes and develops Rochester as the economic, social, cultural, transportation and institutional center of the county and region. The Renaissance of Community seeks to identify Rochester's downtown as a place that will be redeveloped and perceived as the region's Center City, and will include an exciting mix of housing, retail, services, cultural venues, entertainment and night life. The Renaissance Plan identifies eleven goals, or campaigns:

- Campaign One: Involved Citizens
- Campaign Two: Educational Excellence
- Campaign Three: Health, Safety, and Responsibility
- Campaign Four: Environmental Stewardship
- Campaign Five: Regional Partnerships
- Campaign Six: Economic Vitality
- Campaign Seven: Quality Service
- Campaign Eight: Tourism Destination
- Campaign Nine: Healthy Urban Neighborhoods
- Campaign Ten: Center City
- Campaign Eleven: Arts and Culture

Rochester Light Rail Transit Economic Development Feasibility Study: Final Report
In April 1998, Wilbur, Smith and Associates prepared a feasibility study for the City of Rochester that documented the findings of an investigation of the economic development impacts and potential of a proposed light rail transit system. The potential light rail transit line that was studied links Charlotte,

Downtown Rochester and the University of Rochester campus, utilizing a west bank alignment and the Erie-Lackawanna Railroad Bridge. The study found that there are significant economic development benefits that would be derived from an investment in light rail transit in Rochester. The following conclusions were reached:

1. If the state and federal government contributed more than 57 percent of the total capital cost, light rail transit would provide a positive economic return to the City of Rochester.
2. The demographic characteristics in the corridor studied would likely support an initial operating segment of a light rail transit line.
3. The proposed rail line should maximize the number of people living within easy walking distance of rail stations, and the alignment should be based on objective technical analysis.
4. The northern-most segments of the Broad Street Subway tunnel west of Plymouth Avenue are not needed for the Charlotte to U of R light rail alignment.

Lehigh Valley Corridor Feasibility Study: Draft Phase 1 Existing Conditions Report
Prepared for the Genesee Transportation Council in February 1995 by a consultant team led by Bergmann Associates, this feasibility study examined the corridor as to its current and future ability and the desirability for it to accommodate one of more potential transportation uses. The possible uses included: doing nothing, a bicycle/pedestrian trail, light rail transit, a roadway from Brighton-Henrietta Town Line Road to East River Road, or a busway from Brighton-Henrietta Town Line Road to downtown Rochester. The Phase 1 report consists of the inventory and preliminary analysis of existing conditions within the corridor in order to determine the potential for development. The study contains information about the condition of the Erie-Lackawanna Railroad Bridge, which is described in detail in the *Existing Conditions Assessment*.

Vision 2000: A Plan for Downtown
In December 1990, Lane, Frenchman and Associates completed a community-based strategy for downtown redevelopment. The document articulated a vision for downtown that was developed utilizing a great deal of public participation. The strategy had six focus areas, all located within the Inner Loop: St. Joseph's neighborhood, Washington Square/South River, Grove Place, East End, Manhattan Square Park, and West End/North River. One important goal of the plan was to reinforce the prominent and accessibility of the Genesee River in downtown. The plan addresses open space and the pedestrian environment, and articulates three key objectives related to open space:

1. Enable public access along trails on east and west sides of the river;
2. Create new parklands along the river while expanding existing open spaces and making them more usable; and
3. Encourage both public and private building along the river edge.

Genesee River South Corridor Land Use and Development Plan
In September 1986, a land use and development plan for the South River Corridor was prepared by Lane, Frenchman and Associates for the City of Rochester, Monroe County and the University of Rochester. The Plan recommends a coordinated series of improvements to improve the open space system, to insure appropriate public services, and to encourage private and institutional development that will be compatible with the river setting and supportive to abutting neighborhoods. The primary emphasis of the plan was to give priority to riverfront uses, which will be accessible to the public and will enhance adjacent areas. Major recommendations of the plan include:

1. Removal of roadways and rails that abut the River in favor of pedestrian, landscaped spaces;
2. Completion of the network of pedestrian and bicycle trails on both sides of the River;
3. Long-range expansion of parks and open lands, to be accessible to the public, on University-owned land adjacent to the River;
4. Improvements to transportation and utility systems to ensure efficiency and to enable maximum pedestrian use of the river's edge;
5. Creation of new housing development sites on both sides of the river; and
6. Enhancement of existing shopping and commercial areas.

Genesee River South Corridor Plan: Draft Generic Environmental Impact Statement
In September 1986, Lane, Frenchman and Associates prepared a draft generic environmental impact statement for the City of Rochester. This document outlined development strategies and resulting impacts for an area designated the Genesee River South Corridor. The environmental impact statement (EIS) focused on areas around a stretch of the Genesee River in the southern part of the City of Rochester, and is a sister document to the Genesee River South Corridor Land Use and Development Plan (see previous). The EIS identifies west bank residential development as the project component with the most potentially significant environmental impacts, but states that the major conclusion of the document is that positive impacts of the plan far outweigh the negative impacts. The plan provides a comprehensive framework that will guide land use and ensure that the best possible use is made of the river corridor. The plan promotes residential revitalization, expands the tax base, and takes advantage of the recreational opportunities for public enjoyment. The small, short-term adverse impacts that are produced can be adequately mitigated.

The Genesee River Plan: A Comprehensive Development Plan for the Genesee River in Rochester
This plan was prepared by the City of Rochester Bureau of Planning, between 1965 and 1969. The Comprehensive River Development Plan is a long-range plan that proposes specific land uses and transportation routes, and uses illustrative site plans to present the areas that have the most potential for development. Proposals were designed to emphasize the role of the river as a spine, with recreational uses and landscaped areas lining the banks and extending outward to link with adjacent areas. The plan recommends a rapid transit commuter rail facility in the Lehigh Valley Railroad right-of-way to link the University of Rochester, Monroe Community College, and Rochester Institute of Technology with the Central Business District. The plan also suggests creating hiking and bicycling trails along the riverbanks and across bridges. On the east side of the river, the trails would occur adjacent to the proposed transit line.

B. Public Input
The Erie-Lackawanna Railroad Bridge Rails-to-Trails Conversion planning process was informed by local residents who served on the stakeholder steering committee, as well as by the general public, who attended public outreach sessions.

Stakeholder Steering Committee Meeting – The Stakeholder Steering Committee convened on September 13, 2007 to discuss the proposal to convert the Erie-Lackawanna railroad bridge into a trail connection. Representatives from different neighborhood associations, the University of Rochester, the City of Rochester, and local recreational groups were invited to participate in an advisory role. Tom Hack, from the City of Rochester, provided a project overview, and Tom Robinson, of EDR, provided a project status report. The general consensus was that people were in favor of rehabilitating the bridge, and are eager to see the abandoned structure put to good use.

Public Outreach Sessions
Sector 6 meeting, October 8, 2007
EDR was invited to bring display boards and present to the Sector 6 steering committee regarding the bridge conversion. The Sector 6 meeting, held at the NET office on South Clinton Street, was attended by approximately 25 people from the various neighborhood associations in the City of Rochester NBN Sector 6 (Azalea Neighbors, Benton Street Block Club, Hickory NUTS Block Club, Highland Park Neighborhood, Lilac Neighbors, May Street Block Club, Pembroke Street Block Club, Sanford Street Block Club, South Wedge Neighborhood, Swillburg Neighborhood, Upper Mt. Hope Neighbors), as well as business associations (Business Association of the South Wedge Area, Mt. Hope Business Association, and South Clinton Merchants Association), and neighborhood preservation companies (South East Area Coalition, and the South Wedge Planning Committee). Attendees reviewed site analysis information and preliminary design ideas. The committee was very enthusiastic about the project, asked some questions, and asked EDR to attend the State of the Sector conference to let other residents know about the trail conversion. One or two people

expressed a little concern about connecting the west side of the river with the east side of the river, and wanted to make sure that safety issues were considered.

State of the Sector conference, November 3, 2007
EDR displayed site analysis and preliminary designs at the State of the Sector conference, held at School 12 on South Avenue. All the residents of Sector 6 were invited to attend this free, daylong conference, and had the opportunity to review the materials. EDR handed out outlines for the feasibility study, as well as business cards to allow residents to contact us with questions and concerns. A sign-up sheet was provided for people interested in getting more information about the bridge. EDR representatives were available to answer questions, listen to comments, and explain the project. People were very enthusiastic about the project, and liked the preliminary design concepts. Again, one or two residents expressed a little concern about connecting the west side of the river with the east side of the river, and wanted to make sure that the bridge will be safe and well-lit.

Public Meeting, April 30, 2008
The first public meeting was held at Saint Monica's Church on Genesee Street in the 19th Ward. EDR presented a draft version of the feasibility study to the public using a power point presentation and printed display boards. The presentation included information about the planning process, existing conditions, schematic design, crime prevention, alternative transportation benefits, trail construction standards, trail management, user guidelines, operations and maintenance, potential funding sources, and a preliminary cost estimate. The meeting attendees were given an opportunity to ask questions and discuss concerns. Most people were in favor of the proposed trail conversion. A few people expressed concern about their desire to see light rail transit in the bridge corridor instead of a pedestrian bridge. Representatives from EDR and the City of Rochester explained that light rail transit, as a possible future use, would not be precluded.

Public Meeting, June 25, 2008
EDR and the City of Rochester hosted an open house at Saint Monica's Church to provide an open discussion forum for the community to review the final feasibility study and provide comments. The proposed concept plans, as well as a number of other presentation boards, were displayed in the sanctuary of the church. The attendees were asked to walk around and review the plans, then discuss their thoughts with representatives from EDR, the City of Rochester, the Genesee Transportation Council, and NYSDOT. In addition to making verbal comments, meeting attendees were asked to place comments on post-it notes, large flip charts, or on individual comment sheets. Their comments can be found in Appendix C.

III. Existing Conditions Assessment

The Erie-Lackawanna Railroad Bridge and the immediate surrounding area were assessed for the suitability of converting the bridge to a trail connector. A preliminary structural assessment of the bridge was made, as well as an evaluation of the surrounding land uses, accessibility, vegetation, and other environmental features.

A. Site Context

After traversing the Genesee River, the south end of the Erie-Lackawanna Railroad Bridge crosses over the Genesee Riverway Trail and Wilson Boulevard on the University of Rochester river campus. The bridge terminates near the intersection of Wilson Boulevard and Intercampus Drive, disappearing into a hillside of overgrown brush. At this location, the bridge is about 8 feet above the trail and about 13 feet above the road. (See existing conditions images in Appendix B).

At the north end of the bridge on the opposite side of the river, the structure abuts the existing Genesee Riverway Trail at existing grade. The current trail alignment jogs to the west approximately 200 feet prior to reaching the bridge, leaving a short, overgrown trail spur to the bridge. If a trail user traveling south along the trail were to continue straight instead of detouring to the west, the trail runs right into the bridge. At approximately 50 feet from the northern bank, the distance from the surface of the river to the deck of the existing railroad bridge is approximately 19 feet to the top of the railroad ties, and approximately 18 feet to the top of the supporting steel deck.

Chain link fences, obviously intended to limit access to the bridge from both the north and south ends of the structure, have large holes that have been cut into the chain link mesh. Through these holes, access to the bridge is fairly easy for any pedestrian wishing to enter the bridge structure on foot. The holes are not immediately obvious from the trail, but to anyone searching for an entrance to the bridge, the entrance routes are rather easy to locate.

B. Preliminary Structural Assessment

Phil Klingler, a retired Professional Engineer and NYSDOT Bridge Maintenance Engineer, performed a preliminary assessment of the railroad bridge. His assessment is included here.

Two different bridge types are visible along the span of the structure: through girder bridge and deck girder bridge. The through girder bridge structure has significantly more steel than the deck girder bridge structure. The through girders, or main steel beams, are at the outside edges of the bridge. These girders support everything, with the lower member of the girder being where the tension load is carried. Two stringers run parallel to the through girders, and are spaced about seven feet apart from each other. On top of the stringers, there are floor beams that run perpendicular to the through girder, and are spaced every ten to twelve feet. The floor beams are interspersed with timber railroad ties that also run perpendicular to the girders and stringers.

The width of the bridge span changes when the metal side supports (through girders) end. At this point, the bridge ceases to be a through girder bridge and becomes a deck girder bridge with a cantilever system for railings. Instead of through girders, the deck girder bridge has steel beams that run below the deck of the bridge, supporting the floor beams. On the west side of the bridge, there is a wooden handrail and cantilever, and on the east side of the bridge, there is no handrail. The integrity of the wood cantilever is not good, and only the steel should be re-used, not the wood. The bridge type alternates a few times across the entire structure. From north to south, there are three deck-girder spans, two through-girder spans, two deck-girder spans, and one final through-girder span.

The timber beams that form the deck of the bridge are rotten. The other wooden parts of the structure are also in poor condition, and all of the wooden components will need to be removed. The steel structure, however, appears to be in very good shape. The bridge was originally designed to

carry the load of a train, and the bridge should be able to structurally carry the load of a pedestrian trail. A professional engineer or bridge inspector should visually inspect the structure to check for cracks, but from a preliminary inspection, the steel structure should not be a problem. The steel should also be able to carry the weight of a maintenance vehicle or ambulance, but the new deck will need to be designed to handle the load of vehicles, not just pedestrians.

In examining the structure, some rust was observed on the steel girders where it appeared that the steel was flaking away. As rust delaminates, it expands and looks much worse than it is. Thus, where big flakes of rusty steel were observed, the steel had really only lost a minor amount of material, and was not structurally compromised. The steel girders on the bridge should be sandblasted, primed and painted to reduce future rust. The steel floor beams potentially offer a good anchor point for railing posts.

Any bridge needs to move as it expands and contracts with temperature and as it bends under the weight of a load. If a bridge is too rigid, and did not bend, then the weight would tear out the bridge. One end of the bridge is designed to rock, and the other end is designed to move. Below the bridge, there are end diagonal steel beams that rest on concrete piers. The concrete work underneath the bridge bearing points needs some repair. The concrete should be fixed because if the concrete fails, then the steel will also fail. It is fairly straightforward to encase the deteriorating material with new and just re-pour the concrete.

C. Bridge Assessment from the 1995 *Lehigh Valley Corridor Feasibility Study*

The Lehigh Valley Corridor Feasibility Study: Phase 1 Existing Conditions Report provided an assessment of the Erie-Lackawanna Railroad Bridge, identified as BIN no. 4-44381-0. The Feasibility Study stated, “The bridge over Wilson Boulevard and the Genesee River is a 784-foot long, eight span structure. The bridge consists of three steel through-girder spans and five deck-girder spans. The general condition of the bridge was rated as 4 by the State in 1986 and is in fair condition. An underwater inspection was performed by the State in 1988, which rated the River piers between 5 and 6, finding the piers in good condition. The underwater inspection could not confirm the existence of piles.”

D. Surrounding Land Use

As shown in Figure 2, the ELRR bridge is surrounded by a variety of land use conditions. The University of Rochester River Campus is immediately adjacent to the south end of the bridge. The University is primarily concentrated on the east side of the Genesee River, but a number of university-related developments are underway throughout the study area. Riverview Commons is a large residential development under development on the west side of the river. Riverview will be home to 400 students, all within walking distance of the bridge. Brooks-Genesee Landing (BGL) is currently under construction, also on the west side of the river, further south along the river’s edge. BGL has a hotel currently under construction, and has planned improvements to the waterfront, which will include interpretive elements, public art, a waterfront promenade, and streetscape improvements. The project is also expected to have a restaurant and townhouses.

Most of the build-out planned for the University is internal to the campus, but on the east side of the river, campus-related development is planned along Mount Hope Avenue. The former Wegman’s Plaza (College Town) is expected to have mixed use development that includes a Borders bookstore, new residential, new office development, and academic support facilities.

Vacuum Oil is a large parcel adjacent to the north end of the bridge, on the west side of the river. Mobil Chemical will be performing a voluntary cleanup of the site, which is owned by the City of Rochester and has significant environmental contamination. The 33-acre site is likely to be used for a passive-recreation park, new public waterfront space, and new residential development. The ELRR bridge is a piece in a larger ongoing discussion about possible transit options, and needs to

be developed in a way that does not preclude future transit possibilities. The Vacuum Oil site is situated along the proposed transit route, and offers the possibility for transit-oriented development.

The ELRR Bridge is situated amongst a number of open space resources. The bridge spans the Genesee River, connects the Genesee Riverway Trail on both sides of the river, and is in walking distance of Genesee Valley Park. The Genesee Riverway Trail on the eastern side of the river is situated in Bausch and Lomb Park, and historic Mount Hope Cemetery is nearby. University of Rochester has a number of athletic facilities also in walking distance: tennis courts, a track and athletic fields.

E. Access

Both the Genesee Riverway Trail and the ELRR Bridge (as a trail connector) need to be accessible to people of all abilities and skill levels. The existing topography and layout of the study area allow for the proposed access to the bridge in a way that meets the standards of the Americans with Disabilities Act (ADA). ADA standards allow for a range of users; able-bodied commuters and recreational enthusiasts can enjoy the bridge, as well as children and people with lesser abilities.

In addition, as a connector between transportation routes, the bridge needs to be accessible to people using various modes of transportation. A bus stop is conveniently located at the intersection of Wilson Boulevard and Intercampus Drive, which offers connection to the RGRTA bus system. The bridge provides for a direct route between downtown and the University of Rochester River Campus. Beyond the bridge, the railroad grade continues back into the University of Rochester campus, just up a slope from Intercampus Drive. A sidewalk continues in the southwest direction up into campus, and presents a perfect connection for people traveling in that direction. Vehicular parking, both in a parking lot and on Wilson Boulevard, are in easy walking distance.

F. Vegetation

Adjacent to the bridge crossing, vegetation along both the north and south banks of the Genesee River is dominated by a mix of commonly found upland plant species. The north bank was found in undisturbed condition, while vegetation along the south bank appears to be regularly maintained, most likely by University of Rochester grounds maintenance staff.

Vegetation found along the north bank and adjacent to the foot trail approaching the bridge is dominated by common upland species such as staghorn sumac, cottonwood, young black walnut, and a couple of young pin oak trees in the overstory; black raspberry, honeysuckle and locust in the shrub layer; and orchard grass, poison ivy, common vetch, and wild grape in the herbaceous layer.

In late August, most of the vegetation along the south bank was less than 2 feet high (approximately knee height), and was dominated by common upland species such as wild grape, field thistle, cottonwood seedlings, black raspberry, orchard grass, timothy, and Queen Anne's Lace. Areas within the project site on the south side of Wilson Blvd., a potential entry/exit point to the trail, were in a more undisturbed condition and dominated by more mature and robust upland species including staghorn sumac, black raspberry, honeysuckle and locust.

The junction between two different ecological communities, such as the open water/river and upland shrubland communities found at this project site, are often some of the most heavily trafficked places in the outdoors. Here, animals from each community can be found together, along with so-called ‘edge species’ that specialize in these transition zones. The result is a community more diverse than either of the adjacent ones, and a good location to observe aquatic and terrestrial wildlife such as songbirds, small mammals, fishes, insects, and amphibians. The vegetation along the river offers a long edge ecosystem, which provides safe bird nesting, nursery, and foraging areas along with safe travel corridors that are essential for wildlife, especially when the river winds through miles of developed properties.

G. Wetlands

Both state (NYSDEC) and federal (NWI-National Wetland Inventory) wetlands were inventoried within the study area. The nearest state wetland, RH4, is approximately 1.5 miles away from the study location, near the location where I-390 crosses the river. The Genesee River itself is identified as a federal wetland, and classified as R2UBH. R2UBH indicates that the water body is [R] Riverine, [2] Lower Perennial, [UB] Unconsolidated Bottom, and [H] Permanently Flooded.

A Riverine System includes all wetlands and deepwater habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connective link between the two bodies of standing water. Lower Perennial subsystems are characterized by low gradients and slow water velocity, with a substrate of sand and mud, and no tidal influence. Unconsolidated bottom includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stone and a vegetative cover less that 30%. Permanently flooded refers to the fact that water covers the land surface throughout the year in all years (USFWS, 2007).

As shown in Figure 6, the next closest federal wetlands are two different freshwater ponds, located about ¼ and ½ away, respectively. One pond is ¼ mile away to the southeast, adjacent to Mount Hope Avenue, and the other is ½ mile to the east, adjacent to South Avenue. Both are outside the study area.

H. Other Environmental Features

Floodplain - Flood zones are geographic areas that the Federal Emergency Management Agency (FEMA) has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map, shown in Figure 7. Each zone reflects the severity or type of flooding in the area. In the study area, the FEMA 100-year floodplain is restricted to the banks of the Genesee River. According to the 1978 Flood Insurance Rate Map (FIRM) for the City of Rochester, NY, both ends of the bridge are outside this area, and above 100-year flood levels. Except for the river itself, the study area is classified as Zone C, which is a moderate-to-low risk area. Zone C is defined as, “Areas outside the 1-percent annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees” (FEMA, 2007).

Soils - The Natural Resources Conservation Service Soil Map for Monroe County, NY indicates that the soil type throughout the study area is classified as Ub, urban land. Soil surveys identify specific soil properties and help soil scientists make broad generalizations significant to farming and forestry practices. Urban land is a generalized soil classification that is given to urban areas where the soil is typically disturbed, and the land not appropriate for agricultural use.

Hazardous Materials – During future construction and design phases, hazardous materials should be considered. In the rehabilitation of other railroad bridges, hazardous materials were disturbed and/or discovered. Lead paint is likely to be an issue on the bridge, and will need to be contained in any stripping or repainting efforts. Any construction activity that disturbs the sediment in the water below the bridge may stir up toxic substances. On other bridge projects, asbestos has been a problem, but is not likely to be a concern because the ELRR Bridge does not have a utility conduit.

I. Historic Significance

According to NYSDOT Bridge Inspector Charles Lowe, a railroad bridge has been on this site since the 1850s. The current bridge dates from the early 1900s, and was likely modified between 1917 and 1920 when the Genesee River was canalized in this location to connect Rochester with the Barge Canal. Beginning in 1907, the railroad bridge carried electric cars and provided an interurban passenger service between Rochester, Avon and Mount Morris. The electric service ended in 1934,

and the passenger service ended in 1941. However, freight service continued to Rochester until about 1971, after which the tracks on the bridge were not in use. (Lowe, 2007)

In a recent information request, the NYS Office of Parks, Recreation and Historic Preservation indicated that the Erie-Lackawanna Railroad Bridge is considered a cultural resource eligible for inclusion in the State and National Registers of Historic Places (NYSOPRHP, 2008). The criteria for inclusion state that the bridge "embodies the distinctive characteristics of a type, period or method of construction; or represents the work of a master; or possesses high artistic values; or represents a significant and distinguishable entity whose component may lack individual distinction." The Resource Evaluation notes the following statement of significance:

> "The Erie Railroad Bridge across the Genesee River is a notable example of a large, multi-span, plate girder deck bridge of the early twentieth century. Originally constructed to carry the Rochester branch of the Erie Railroad, the heavy plate girder structure is carried on a series of cut stone piers. Enlarged ca. 1917-1920 when the Genesee River was canalized as part of the Erie Barge Canal, the bridge reflects standard engineering design and construction of the period applied to the challenge of spanning the Genesee River as canal. The bridge retains substantial integrity of design and materials, and is a well-preserved example of its type, period and method of construction in Monroe County." (NYSOPRHP, 2008)

J. Alternative Transportation

The City of Rochester indicated from the beginning of the planning process that they do not wish to preclude the possibility of using the ELRR Bridge for alternative transportation uses in the future, which primarily includes light rail transit (LRT). As previously described in the report section *Relationship to Other Plans and Studies*, two studies (completed in 1998 and 2002) assess the feasibility of developing light rail transit in Rochester.

The 1998 study evaluated the potential for a light rail transit line linking Charlotte, Downtown Rochester and the University of Rochester campus, utilizing a west bank alignment and the Erie-Lackawanna Railroad Bridge. The study found that there are significant economic development benefits that would be derived from an investment in light rail transit in Rochester.

The 2002 study developed capital cost estimates for a simple and cost-effective light rail transit line in the Charlotte corridor. The study also explored other corridors in the Rochester region that appear to be viable, including an extension of the Charlotte line to the University of Rochester and Henrietta. This extension proposed using either the Lehigh Valley right-of-way on the eastern bank of the river or the Erie Railroad right-of-way on the western bank, crossing to the University of Rochester along the Erie-Lackawanna railroad bridge.

As of Summer 2008, there is not sufficient funding or regional support in developing light rail transit in this corridor, but the bridge design should strive to accommodate future transit routes.

IV. Schematic Design

The Erie-Lackawanna Railroad Bridge is envisioned as an effective thoroughfare for bicycles and pedestrians, as well as an attractive meeting place and landmark destination. The bridge will be a place for spectators to view events on the Genesee River, such as rowing competitions and regattas. The bridge will connect different neighborhoods, local trails, and community resources. The design process was guided by eight design objectives, which led to several design alternatives, and a preferred conceptual design solution.

A. Design Objectives

The schematic design phase for the Erie- Lackawanna Railroad Bridge was guided by the following overall design objectives:

1. Maintain user safety
2. Offer a high-quality user experience
3. Provide connections between neighborhoods
4. Enhance and protect existing resources
5. Improve connections between trail and existing pedestrian infrastructure
6. Create a trail asset that is easily maintained
7. Utilize sustainable materials
8. Develop the bridge as a landmark destination along the trail network
9. Maintain potential for future alternative transportation systems

B. Design Alternatives

Using the design objectives, a number of alternate design solutions were considered for the Erie Lackawanna Railroad Bridge. The first option is to do nothing. Despite being the least expensive option, this alternative was quickly discarded from the list of viable possibilities. The structure is currently used in an uncontrolled, unsafe manner. The openings in the chain link fence at either end of the bridge provide evidence of this use. The bridge needs to be removed or improved.

The second alternative is to demolish the existing bridge and not replace the structure. According to the City of Rochester, this had been the preferred alternative in the early 1990's. However, the City and other interested parties had recognized the value of the bridge, both as an historic structure and as a transportation link, and the bridge was preserved.

A third design alternative would involve removing the existing bridge and replacing with a new structure. Again, the existing structure was deemed to have value, both historic and structural. The existing structure is reasonably intact, and would be cost prohibitive to replace. This alternative was not pursued, due to the desire to utilize the existing structure.

Both the fourth and fifth design alternatives (see Figures 3-5) utilized the existing bridge structure, and created ADA-accessible ramps to access the bridge from the Genesee Riverway Trail on the east side of the Genesee River. Access to the bridge from the west side of the river is the same in both the fourth and fifth design alternatives. Access to the west side of the bridge is much more straightforward, requiring a simple design solution to connect the existing trail to the existing bridge at grade.

The fourth design alternative, which was developed at the conceptual level, used the hillside above Intercampus Drive and Wilson Boulevard for an access route. Using switchbacks, an ADA-accessible ramp could be built into the hillside, meeting the existing railroad grade south of Wilson Boulevard. This option requires no structure, and is built into the existing grade. However, this access route is both physically and visually removed from the trail corridor, which would limit use and diminish safety. This alternative is limited by the existing topography, and requires a greater change in grade. Access to parking is less convenient, and views to the city are not maximized.

The fifth, and preferred design alternative, proposes a new steel structure at the south end of the bridge, adjacent to the parking lot north of Wilson Boulevard. The steel structure, which would also be ADA-accessible, would provide a clear physical and visual connection from the existing trail. The new ramp requires less change in grade than alternative four, and has easier parking access. The structure is likely to be more expensive than the hillside ramp, but is more user-friendly. The ramp structure is more aesthetically pleasing, and maximizes views to downtown. The ramp will reduce the existing parking by a small margin, but the proposed solution adds ADA-accessible parking to the existing parking lot. The solution will add another structure above the trail. However, the fifth design alternative is most likely to attract the greatest number of users, and is provides the most accessible, attractive option. The fifth alternative also aligns most closely with the design objectives.

C. Preferred Conceptual Design Solution

The preferred design solution is detailed to respect the historic timeframe, and utilize the simple, industrial aesthetic of the existing steel structure. Metal archways are proposed as gateway features, providing both an aesthetic and safety element. The proportions of the metal archway recall the proportions and geometry of a passenger railway car, and provide a location for affixing lights. The archway over Wilson Boulevard provides an opportunity for the University of Rochester to create a gateway feature that would be consistent with the aesthetic of the bridge.

The deck of the bridge will be exposed by removing the existing wooden railroad ties and all other wooden components. Corrugated metal will be attached to the steel structure, and used to create a base for a reinforced concrete deck. The width of the deck will be 19’ on the through-girder sections of the bridge, and 14’ on the deck girder spans. Existing steel beams will be exposed, with the concrete poured on a metal base in between each beam. The rhythm of the beams will echo the historic character of the railroad ties. Where the through girders end, decorative metal handrails with concrete posts will be anchored to the metal deck, or preferably, the existing steel structure of the deck girders.

The bridge offers a number of opportunities for signage: historic and interpretive signs related to the bridge, and wayfinding signs, related to the trail, surrounding neighborhoods, and the University. Benches and lighting are recommended for comfort and safety. On the west side of the river, the bridge terminus offers an ideal location for an overlook, with benches, railings, lighting, and a similar gateway feature. On the east side of the river, the transition between the ramp and the parking lot offers a location for a small plaza. The plaza will be paved in brick, and will provide a small place for congregating and enjoying the view towards downtown.

The bridge will be painted black, with the exposed beams embedded in the concrete also painted black. Standard beige concrete is recommended. Native plantings are recommended for both ends of the bridge, to reduce maintenance and increase survivability. Native plantings will augment the existing vegetation and wildlife habitat that exists along the river’s edge.

A conceptual cost estimate was developed for the conversion of the bridge. Please see Appendix A for an estimate of the preferred design solution, based on 2007 costs.

D. Historic Character

Modifications to the existing structure have the potential to affect the historical value of the Erie-Lackawanna Railroad Bridge, and were carefully considered. The conceptual design uses a simple, industrial aesthetic, and respects the historic timeframe. The bridge is considered by the NYSOPRHP to be a cultural resource eligible for inclusion in the State and National Registers of Historic Places. The conceptual design consists, but is not limited to, installing railings, piers, benches, and lighting necessary to convert the railroad bridge to a pedestrian bridge.

It is the NYSOPRHP's opinion that the proposed improvements will have no adverse impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places with the conditions that:

1. The new construction is easily identified as new and the historic fabric of the bridge is recognizable as the original bridge. This may be accomplished by dating the different elements of the bridge 2010 or later for new construction and 1890 or 1917 as appropriate for the girder plates.
2. If state or federal funds are obtained, designs are resubmitted to the NYSOPRHP for review.
3. The color black be reconsidered. The metal railings and girder plates will absorb the heat of the sun and become very hot. Lighter colors may be more practical.

E. Key Issues Related to Alternative Transportation

The desire to accommodate future alternative transportation possibilities, such as light rail transit, raises a number of issues. One issue is land use designation. Despite the conversion to a pedestrian bridge, the corridor will remain a transportation corridor. No legal change in land use designation will occur to prevent future rail use.

A second issue is that any improvements to the bridge will provide much-needed maintenance and protection of an historic resource. Apart from the portion above Wilson Boulevard, the bridge receives little to no maintenance. Putting a viable use on the bridge will provide protection through inspections, maintenance and use. A third issue is the existing bridge structure. Should LRT become viable, it is likely that the existing bridge structures and foundations could accommodate a structural extension for a mixed-use trail.

A fourth issue is one of modular systems. For the proposed pedestrian bridge, modular components are recommended in order for the materials to be disassembled and re-used. If LRT should become viable, the materials could be moved (rather than demolished) and used on another location for another project. A fifth issue is that of NYSOPRHP approval. New York State has already approved the landmark historic bridge concept. If LRT were to become viable, a revised conceptual design would need to be approved by New York State OPRHP.

V. Next Steps

Prior to the completion of this Final Report, the City of Rochester had already submitted a funding proposal to the New York State Department of State (NYSDOS) LWRP Grant Application Call using early versions of the materials found within this document. The letter announcing the funding was received by the City of Rochester on September 28, 2007. Rochester City Council approved the submittal of a grant application with 50-50 matching funds, and the grant was submitted to the NYSDOS in November 2007. The City of Rochester received word that the grant was approved on June 12, 2008. NYSDOS will provide $600,000 in funding, and the City of Rochester will match that with $600,000 of local funds. This will fund the entire project cost of $1,200,000.

As of September 2008, the City of Rochester is awaiting receipt of the official agreement from the NYSDOS that allocates funding, assigns administrative tasks and defines ultimate end products. The timetable for the project is contingent upon receiving the Department of State agreement and moving the local match ($600,000) up a year in the City's Capital Improvement Program. When the NYSDOS - City Agreement is signed, the City will undertake the following tasks on the preliminary timeline shown:

Tasks	Preliminary Timeline
State Agreement Processing	November 2008 - February 2009
RFP Process 1. Publicize Request for Proposals (RFP) 2. Assemble Selection Team 3. Receive submitted Proposals 4. Rate Proposals 5. Seek City Council authorization for local match and Consultant procurement	February 2009 - May 2009
Preliminary Design 1. Survey project site 2. Begin Preliminary / Final Design 3. Complete alternative analysis and design recommendation 4. Undertake Community / Public Meetings	May 2009 - September 2009
Final Design 1. Develop Construction Documents	September 2009 - December 2009
Bid and Award 1. Bid and Award Project	December 2009 - March 2010
Construction Phase 1. Administer Construction activities 2. Build bridge conversion 3. Ribbon Cutting and grand opening	March 2010 - October 2010

VI. Crime Prevention Through Environmental Design

Crime prevention through environmental design (CPTED) is a multi-disciplinary approach to reducing crime and increasing perceived safety. CPTED strategies depend upon the ability to influence offender decisions that precede criminal acts. These strategies seek to dissuade offenders from committing crimes by manipulating the physical environment in which those crimes occur, often using natural opportunities presented by the environment. Research into criminal behavior shows that the decision to commit a crime is more influenced by cues to the perceived risk of being caught than by cues to reward or ease of entry. Consistent with this research, CPTED-based strategies emphasize enhancing the perceived risk of detection and apprehension. As a result, it relies upon an understanding of what about the environment influences offenders.

Most implementations of CPTED are based solely upon the theory that the proper design and effective use of the built environment can reduce crime, reduce the fear of crime, and improve the quality of life. CPTED is most effective when involving environmental designers, land managers, community action groups, and law enforcement. If any of these four groups are removed, it is likely that a CPTED strategy will be less effective than it might otherwise be. Crime prevention through environmental design relies upon five overlapping strategies: surveillance, access control, territoriality, image/maintenance and activity support.

A. Surveillance

Natural surveillance increases the threat of apprehension by taking steps to increase the perception that people can be seen. The placement of physical features, activities and people can be designed in such a way as to maximize visibility and foster positive social interaction among legitimate users of private and public space. The surveillance, or casual observation, that naturally occurs in such settings causes potential offenders to feel increased scrutiny and limitations on their escape routes.

B. Access Control

Access control is focused on decreasing criminal opportunity by keeping unauthorized people out of a particular location if they do not have legitimate reasons for being there. Opportunities for crime are limited by taking steps to clearly differentiate between public space and private space. A successful access control strategy denies access to a crime target and creates the perception of risk to potential offenders. Natural access control occurs by selectively placing entrances and exits, fencing, lighting and landscaping to limit access or control flow.

C. Territoriality

Territorial reinforcement suggests that physical design can create or extend a sphere of territorial influence and potential offenders can perceive that influence. An environment that projects a clear identity, or that is designed to clearly delineate private space creates a sense of ownership. As social cohesion increases, owners have a vested interest and are more likely to challenge intruders or report them to the police. As a result, the sense of owned space creates an environment where strangers or intruders stand out and are more easily identified. Natural territorial reinforcement occurs when design elements are used to express ownership and define public, semi-public and private space.

D. Image and Maintenance

Care and maintenance allows for the continued use of a space for its intended purpose. Deterioration and blight indicate less concern and control by the intended users of a site and indicate a greater tolerance of disorder. Proper maintenance protects the public, health, safety, and welfare in all existing structures and on all existing premises by establishing minimum requirements and acceptable standards. Maintenance directly impacts the image that is presented by a place.

E. Activity Support

Activity support increases the use of a built environment for safe activities with the intent of increasing the risk of detection of criminal and undesirable activities. This concept originates in the observation that in a given community, resources capable of sustaining constructive community activities are often underused. Support of these activities can bring a vital and coalescing improvement to the community, along with a reduction of the vulnerable social and physical gaps that permit criminal intrusions. Natural surveillance by the intended users is casual and there is no specific plan for people to watch out for criminal activity.

VII. Alternative Transportation Benefits

Transportation accounts for more than 30 percent of U.S. carbon dioxide emissions (West, 2007). However, there are a number of alternative transportation possibilities, such as walking, bicycling, and taking public transportation. According to the American Public Transportation Association (APTA), public transportation in the United States saves approximately 1.4 billion gallons of gasoline and about 1.5 million tons of carbon dioxide annually (APTA, 2007). Walking and bicycling as a means of transportation reduces those figures even further. Walking, bicycling and public transportation offer benefits to the global environment as well as to personal health, finances, time, and stress.

A. Environmental Benefits

Only 14 million Americans use public transportation daily while 88 percent of all trips in the United States are made by car—and many of those cars carry only one person (West, 2007). Switching to alternative transportation reduces emissions of greenhouse gases and other pollutants that contribute to global warming, smog, and acid rain. Greenhouse gases are atmospheric gases, primarily carbon dioxide, methane and nitrous oxide, which trap the sun's heat, making the Earth a greenhouse. Emissions of greenhouse gases enhance the Earth's greenhouse effect contributing to climate change. Air pollution includes ground level ozone and fine airborne particles, as well as carbon monoxide, nitrogen oxides and sulphur oxides. This mix of substances is often called smog. (SES, 2007)

Half of the average person's greenhouse gas emissions are from transportation. Choosing alternative transportation is an easy way to reduce greenhouse gas emissions. Shorter trips, which are most suited to alternative transportation, are the least fuel-efficient and generate the most pollution per mile when a motor vehicle is used. (SES, 2007)

B. Health Benefits

The most valuable natural resource of any community is the health of the residents. In 2005, the Centers for Disease Control and Prevention (CDC) reported the following statistics:

- Obesity has risen significantly among adults in the last 20 years
- 30% of U.S. adults age 20 and older – over 60 million people – are obese
- The percentage of young people who are overweight has more than tripled since 1980
- 16% of young people age 6-19 years – over 9 million people – are considered overweight

Health care costs and insurance rates are escalating, causing serious impacts to the local economy. In 2000, health care costs associated with physical inactivity topped $76 billion (CDC, 2005). Lack of physical activity is a contributing factor to a growing number of serious illnesses and health problems among all age groups. Land use and building patterns exacerbate the problem by providing new neighborhoods that have few opportunities for walking or biking. Lifestyles have become increasingly sedentary in a post-industrial society.

Despite the proven benefits, more than 50% of American adults do not get enough physical activity to provide health benefits (CDC, 2005). With this in mind, opportunities for exercise and healthful outdoor activity are more than expendable extras. Parks, trails, and open space resources take on new meaning and value. Opportunities for recreation and active transportation support the health and wellness of local residents, and have significant and quantifiable economic impacts. Active transportation, such as walking and bicycling, provides an opportunity to incorporate regular physical activity into the daily routine.

Regular physical activity helps a person to not only look and feel better, but also reduces their risk of disease. Unhealthy diet and physical inactivity can cause or aggravate many chronic diseases and conditions, including type 2 diabetes, hypertension, heart disease, stroke, and some cancers (CDC,

2005). Regular physical activity is an important component of a healthy lifestyle, and aids in the prevention of many chronic diseases, disabling conditions and chronic disease risk factors (CDC, 2007). Walking or bicycling provides an opportunity to simultaneously obtain the benefits of transportation and physical exercise.

C. Financial Benefits

In additional to health-related costs, operating a personal automobile is very expensive. Of every dollar earned, the average household spends 18 cents on transportation, 94% of which is for buying, maintaining and operating cars, the largest source of household debt after mortgages (APTA, 2007). The average vehicular commuter spends over $7,500 per year on commuting expenses, which include the cost of gas, vehicle wear and tear, vehicle maintenance, and insurance. In contrast, the average transit rider spends between $200 and $2600 annually on public transportation, depending on mileage traveled and other factors, such as transfers, distance, and parking charges (APTA, 2007).

For some households, alternative transportation can even reduce the need for additional cars, which can be a yearly expense between $5,000 and $11,800 (APTA, 2007). With the money saved on a vehicle, or even just the additional parking, fuel and maintenance required to commute in a vehicle, an active commuter can pay for transit expenses, purchase a good quality bicycle, or buy new walking shoes, with money left over.

D. Time and Stress Benefits

Alternative transportation can save time and reduce stress. Carpooling or taking a bus allows commuters to use the HOV lanes and by-pass traffic. Carpooling and mass transit also provide the passengers a break from driving and allow them to use their time in other ways like sleeping, reading, or doing work. Riding a bicycle allows a commuter to choose a less busy route and by-pass traffic lights. Walkers and cyclists see more of their community than stoplights, white lines and car bumpers, and benefit from the stress relief that accompanies physical exercise.

Studies have shown that the longer the regular commute, the greater amount of stress that a commuter feels. Stress often leads to fatigue, headaches, and irritable moods, which can subsequently affect work performance and household dynamics. Active transportation increases social interaction with the community. It is easier and less expensive to park a bike than a car, which further reduces the stress of commuting.

VIII. Operations and Maintenance

Guidelines for operations and maintenance of the Erie-Lackawanna Railroad Bridge will help establish this bridge as a multi-use trail connector and landmark trail destination that can be managed and maintained safely and efficiently over the long term.

A. Operations

The operation of a trail consists of the day-to-day management of trail use. This includes law enforcement, marketing, special events, map and brochure updates, and other functional considerations. The specific policies regarding the operation of a trail will most likely be decided in advance of trail construction. After construction, a large part of trail operation consists of the day-to-day execution of those policies.

B. Maintenance

The maintenance of a trail includes the various activities involved in keeping the trail in a safe, usable condition. This includes numerous efforts ranging from mowing and brush removal to replacement of damaged signs or benches to reconstruction of the trail. Lifetime trail maintenance will place ongoing costs on the operating agency, and this should be considered during the trail planning and finding process.

In most cases, funding granted for trail construction cannot be applied to ongoing operations and maintenance. In order to maintain the quality of a newly constructed trail, local trail operators must plan for the continued maintenance of the facility.

C. Recommendations

These recommendations are designed to assist trail operators in the operation and maintenance of trail facilities, and should be viewed as guidelines. As guidelines, they have no legal requirement, and should be altered based on conditions specific to a particular operating entity or trail.

Establish an Operations and Maintenance Policy

Before the trail opens, the implementing group should set forth a policy document outlining specific rules pertaining to the trail and specific tasks that will be performed for its operation and maintenance. This policy will be the guide for the ongoing administration of the trail. The document should be unique to the particular community or trail to which it applies.

The Operations and Maintenance Policy may cover a wide range of issues. The following items should be major considerations in the policy.

- Permitted uses on the trail
- Whether user fees will be collected, and in what manner (e.g. pay-as-you-go, trail passes).
- Marketing of the trail. Some communities may desire to reap the economic benefits of trails by actively marketing their facilities. The costs associated with marketing can vary greatly, depending on the intended audience and the intensity of the campaign.
- Policing and security on the trail. This may include the creation of an emergency response plan; provision for trail patrols through existing law enforcement or with special community bike patrols; or a plan for other safety measures such as emergency phones or call boxes.
- Liability. In many cases, existing laws will determine liability. The operating agency should fully understand the liability associated with the trail and verify that insurance is adequate.

- Encroachment. Some local agencies may take ownership of a corridor that is being encroached upon by adjacent landowners. This is particularly true of railroad corridors bounded by agricultural uses. The implementing agency should set forth definitive policies relating to existing and future encroachments.

- Snow removal. In mild winters, some users will expect hard-surfaced trails to be plowed for use throughout the season. The operating agency should determine whether or not it will perform this maintenance.

- Seasonal maintenance. The operating agency should determine who will perform this maintenance. In many cases, volunteers or existing clubs can groom trails.

- Cooperative maintenance agreements. In some cases, trail owners may wish to explore the possibility of partnering with other government entities or private organizations in the operation and maintenance of a trail. Any operations or maintenance agreements should be articulated in the operations and maintenance policy.

- Use of volunteers. Volunteers can be a cost-saving benefit for trail operators. They do, however, need to be supervised, and liability prevents their use in certain situations.

- Evaluation of trail conditions. Every trail should be evaluated on a regular schedule to identify the need for major and minor repairs. The operations and maintenance policy should delineate haw often trail evaluations take place, preferably once a year.

- Short- and long-term maintenance program. See "Recommended Maintenance"

Recommended Maintenance

Different types of trails will differ greatly in their maintenance requirements. All trails however, will require a variety of maintenance activities at different points in their lives. Table 1 outlines some general guidelines for maintenance activities and the frequency at which they should be performed.

- "Frequency" refers to how often each maintenance item should be performed.
- "Maintenance" refers to the specific maintenance activity to be performed.
- "Performed by" refers to who may undertake the particular maintenance activity.

Table 1. Recommended Maintenance

Frequency	**Maintenance**	*Performed by*
As needed	Tree/brush clearing and mowing Sign replacement Map/signage updates Trash removal/litter clean-up Replace/repair trail support amenities (parking lots, benches, etc.) Repair flood damage: silt clean-up, etc. Patching/minor regrading/concrete panel replacement	Volunteers, trail operator, University of Rochester, City of Rochester

Seasonal	Snow plowing Planting/pruning/beautification Installation/removal of seasonal signage	Volunteers, trail operator, University of Rochester, City of Rochester
Yearly	Surface evaluation to determine need for patching and minor repairs Evaluate the need for repairs or replacements that will be part of the improvements made on a 5-year cycle	Trail operator
Frequency	**Maintenance**	*Performed by*
5-year	Repaint or repair trash receptacles, benches, signs, and other trail amenities, if necessary Sealcoat asphalt trails	Volunteers, trail operator, University of Rochester, City of Rochester
10-year	Resurface	Hired contractor, trail operator, volunteers
20-year	Replace / reconstruct trail	Hired contractor, trail operator, volunteers

The proposed Erie-Lackawanna Railroad Bridge will consist of both asphalt and concrete surfaces. Asphalt trails can be expected to hold up well under most conditions. They are susceptible, however, to freeze/thaw conditions and particular care should be taken to fix holes and cracks. Left without repair, holes and cracks in asphalt pavement get larger, eventually causing safety hazards. During the yearly evaluation, preferably in spring, special attention should be given to marking and repairing breaks in the surface.

Granular trails are less susceptible to freeze/thaw conditions, but may be severely impacted by runoff. After floods, heavy rains, or spring snowmelt, the trail surface may become rutted. If left alone, subsequent floods or rains will follow the same ruts, making them larger and more hazardous. The surface of granular trails should be periodically raked back into place to maintain a smooth surface for trail users.

D. Maintenance Costs

Maintenance costs will vary greatly depending on the type of trail, amount of volunteer labor, construction quality, and available services. These costs, however, must be considered during the trail planning process, to ensure that trail owners can pay for the ongoing maintenance of the trails they develop.

Maintenance costs are rarely broken down into specific tasks such as those listed in Table 1. Most trails are maintained by an existing agency, such as a local or state park, public works, or maintenance department. Estimated costs, therefore, are broken down by the type of maintenance performed. There are three basic types of maintenance. Routine maintenance includes all the

general activities, such as brush clearing, trash collection, and sweeping, that may take place on a regular basis throughout a season. Minor repairs refer to activities that can be expected every five years or so, such as amenity replacement, trail sealcoating, repainting, or re-striping. Major reconstruction refers to significant expenditures involving resurfacing or reconstruction. These activities are the most costly trail maintenance activities and should be planned for in advance.

Routine Maintenance
Typically, most of the routine maintenance of a trail facility will be performed by an existing agency or volunteer group. Local trail owners should be well equipped to include trail maintenance into their parks or public works maintenance budgets and activities. Activities that should be considered as routine maintenance include:

- Yearly facility evaluation to determine the need for minor repairs
- Tree and brush clearing
- Mowing
- Map/signage updates
- Trash removal and litter clean-up
- Repair of flood damage: silt clean-up, culvert clean-out, etc
- Patching, minor regrading, or concrete panel replacement
- Planting, pruning, and general beautification

The yearly cost for routine maintenance depends on the maintenance capabilities already in place with the bridge owner and the amount of volunteer labor used. In general, yearly routine maintenance costs for a surface trail can be estimated at $3,000 per mile, not including snow removal. Maintenance of the bridge is estimated at between $5,000 and $8,000 per year, depending on final bridge design.

Minor Repairs
The need for minor repairs should be determined by a yearly facility evaluation (see Routine Maintenance, above). Minor repairs may include the following activities:

- Replacement, repair, or repainting of trail support amenities, such as signage, benches, trash receptacles
- Replacement of a portion of the trail
- Re-striping of trails
- Sealcoating of asphalt trails

The cost for replacement, repair, or repainting of trail amenities is based on the initial cost of those amenities. Trail operators should maintain records of the general costs of trail amenities as a means of estimating future repair and replacement costs. If custom elements, such as lighting, decorative railings, or benches are used in trail design, the trail owner should consider ordering extra elements at the time of construction and storing them for future use, thereby defraying the cost of single-runs later.

Re-striping of trails will cost the same as the original striping. The trail owner should keep a record of the original bid to determine the price of re-striping a trail using contracted labor. In many cases, it is cost effective to perform re-striping along with other trail or highway maintenance. In such instances, the trail owner itself will be the best source of cost information.

Sealcoating of the asphalt trail approaches to the bridge should take place approximately every five years. This will increase the longevity of the trail and provide a quality trail surface. When performed, sealcoating will cost approximately $6,500 per mile for a 10-foot multi-use trail. A

periodic cost such as this should be included in the trail owner's Capital Improvement Program, in order to ensure that adequate funding is available.

Major Reconstruction

There are essentially two activities that are considered to be major reconstructions: 1) resurfacing of asphalt trails, and 2) complete replacement, regrading, and resurfacing of all trails. Asphalt trails will need to be resurfaced approximately every 10 years, depending on how well they have been maintained. Resurfacing typically involves placing an asphalt overlay on an existing asphalt surface in order to erase cracks and bumps. It is not a perfect solution, as weak underlying soils or tree root penetration will eventually affect this top layer, but it does offer a lower cost means of extending a trail's life. Asphalt surfacing costs approximately $3 per square foot for 4-inch depth. Asphalt overlays should have a depth of 1 to 2 inches.

Complete replacement of a trail involves removing the existing trail, regrading the trail base, and resurfacing the facility. This kind of comprehensive maintenance will be necessary every 20 years, regardless of trail type. Even natural surface trails may need to be fully regraded after 20 years of use. Trail costs for reconstruction can be considerable (and comparable to the initial construction cost) due to the additional cost of removing the existing trail and effects of inflation on materials and labor costs over time. As with any major trail project, however, a detailed cost estimate should be performed during the project planning stages. The best guide for estimating the replacement cost of a trail is to consider the original construction cost.

A major cost such as trail replacement should be considered well in advance. It may be more difficult to secure large state or federal grants for trail reconstruction. Therefore, a trail owner should consider the eventual cost of trail replacement and financially prepare for that significant maintenance activity.

IX. Potential Funding Sources

A. Federal Sources

SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, formerly TEA-21 and ISTEA) – This program is federally-funded, but administered by the New York State Department of Transportation for transportation-related bicycle and pedestrian facilities. The program enables funding for transportation projects of cultural, aesthetic, historic and environmental significance. Eligible projects must fall into one or more of the twelve Federal Highway Administration (FHWA) categories. Additionally, the project must have a transportation relationship with the surface transportation system and must be available for public access and use. Each project requires a minimum matching share of 20% of the total project cost. The Transportation bill expires in FFY 2009, and the continuation of these programs is contingent on federal action. Additional information may be found at: https://www.nysdot.gov/portal/page/portal/programs/tep.

B. State Sources

Erie Canal Greenway Program – Administered by the New York State Canal Corporation, eligible projects may receive a grant of up to 50% of the total project cost and are required to demonstrate consistency with the 2005 "Report on the Future of New York State Canals" and the 1995 Canal Recreationway plan. The overall goals of the Revitalization program have been to preserve the past, enhance recreational opportunities and promote community development. Additionally, in partnership with other State agencies, the Canal Corporation has helped implement more than $200 million in local Canal service port projects across the State. Additional information may be found at: http://www.nyscanals.gov/corporation/community.html.

Environmental Protection Fund (EPF) and/or Land & Water Conservation Fund (LWCF) – This is a 50% matching grant program for the acquisition or development of parks and recreational facilities for projects to preserve, rehabilitate or restore lands, waters or structures for park, recreation or conservation purposes administered by the New York State Office of Parks, Recreation and Historic Preservation. The Parks Development and/or Acquisition Application is to be used for projects to preserve, rehabilitate or restore lands, waters or structures for use by all segments of the population for park, recreation or conservation purposes, including such things as playgrounds, courts, rinks, community gardens and facilities for swimming, boating, picnicking, hunting, fishing, camping or other recreational activities. Funds may be awarded to municipalities or not-for-profits with an ownership interest, for indoor or outdoor projects and must reflect the priorities established in the NY Statewide Comprehensive Outdoor Recreation Plan (SCORP). Additional information may be found at: http://nysparks.state.ny.us/grants/programs/parks.asp.

Local Waterfront Revitalization Fund – This program is administered by the New York State Department of State, Division of Coastal Resources. Grants are awarded to communities through planning, preservation and redevelopment of important waterfront resources. Any municipality located on the State's coastal waters or on a designated inland waterway is eligible to receive funding for general program planning. Any municipality with an approved Local Waterfront Revitalization Program or with the relevant Local Waterfront Revitalization Program component substantially completed is eligible for construction projects. This program also requires a 50% match from the applicant. For more information, please go to http://www.nyswaterfronts.com/request.html.

Recreational Trails Program – The Recreational Trails Program is a State-administered, Federal assistance program to provide and maintain recreational trails for both motorized and non-motorized recreational trail use. This program is administered by the New York State Office of Parks, Recreation and Historic Preservation, but funds for the Recreational Trails Program are provided by SAFETEA-LU. The RTP legislation requires that States use 40% of their funds apportioned in a fiscal year for diverse recreational trail use, 30% for motorized recreation, and 30% for non-

motorized recreation. This grant requires a 20% matching fund commitment from the applicant at the time of application. http://nysparks.state.ny.us/grants/programs/recreation.asp.

Snowmobile Development & Maintenance – This program is also administered by the New York State Office of Parks, Recreation and Historic Preservation. This grant establishes a mechanism for allocating funds to local governmental sponsors that engage in the development and maintenance of snowmobile trails designated as part of the State Snowmobile Trail System. No trail will be eligible for funding unless it has been previously designated by OPRHP as being part of the State Snowmobile Trail System. OPRHP will assign all trail classifications. Trails designated by OPRHP for funding are based on how they relate to the statewide snowmobile system. Construction and/or maintenance of trails must have the permission and approval of landowners, administering agencies of the state, or other municipal entities charged with management of impacted lands. Corridor and secondary route trail markers and other appurtenant snowmobile trail signs approved by OPRHP must be used on trails receiving state funds. Placement of markers on Department of Environmental Conservation (DEC) lands may only be made with the written approval of the DEC Regional Land Manager. Secondary trails provide access to the corridor trail system. Those trails lead from repair services, food, lodging, fuel, and telephone services and should include the ability to connect with emergency services (police, fire & medical services). Location and a trail's enhancement of the corridor trail system determine trail-funding eligibility. For more information, please go to http://nysparks.state.ny.us/grants/programs/snowmobile.asp.

C. Local & Private Sources

Bonding – Bonds generate immediate financing and are appropriate for large-scale, permanent types of capital projects. General obligation bonds involve the taxing power of a municipality as it is pledged to pay the interest and principal to retire the debt.

Donations – Local clubs, interest groups, private developers and individuals should all be viewed as potential sources of money, services and labor for the development of new facilities and/or programs. The donor(s) determine what the funds would be used for. Property owners may also wish to donate land for public use/access for recreational purposes or for open space conservation.

Fees & Charges – The development, maintenance and operation of park facilities can be partially financed through revenues obtained through user fees and rental charges for the use of recreational facilities, such as picnic pavilions and gymnasium reservations for special events.

Real Estate Taxes – The acquisition, development, operation and maintenance of land and facilities may be partially supported by real estate tax revenue. Local tax revenues are the primary sources of maintenance and operating funds.

Sales Tax Increase – Municipalities may consider establishing a sales tax increase to generate general revenue for the acquisition and development of recreation areas. In most areas, a tax increase for this purpose would require a public referendum and voter approval. This increase could be short-term or permanent.

The Foundation Center – The Foundation Center is the primary source of information on private funding sources, with information on over 40,000 foundations offering private monies. Grant information is delineated by geography, types of support, affiliations to facilitate research. Corporate giving and government funding sources can also be researched through the Foundation Center. For more information, please go to http://foundationcenter.org.

Information on funding sources provided by Connie D. Miner & Co. Grant Consultants.

Sources

American Public Transportation Association (APTA), May 2007, *Public Transportation Fact Book,* 58th Edition.

American Public Transportation Association website, October 2007. http://www.apta.com/media/facts.cfm

Bergmann Associates, et al. February 1995. *Lehigh Valley Corridor Feasibility Study: Draft Phase 1 Existing Conditions Report*. Prepared for the Genesee Transportation Council.

City of Rochester, June 2007. *Local Waterfront Revitalization Program Update* (DRAFT). Revisions in progress.

City of Rochester, April 1998. *Rochester 2010: The Renaissance Plan*.

City of Rochester Bureau of Planning, 1969. *The Genesee River Plan: A Comprehensive Development Plan for the Genesee River in Rochester.*

Cornell University Department of City and Regional Planning, May 2001. *South Genesee River Corridor Study, Rochester, NY.*

FEMA Map Service Center, *Definitions of FEMA Flood Zone Designations*. FEMA website, accessed on October 31, 2007. http://www.fema.gov/

Genesee Transportation Council, February 2005. *Regional Rights-of-Way Preservation Action Plan: Abandoned Railroads.*

Lane, Frenchman and Associates. December 1990. *Vision 2000: A Plan for Downtown.*

Lane, Frenchman and Associates. September 1986. *Genesee River South Corridor Land Use and Development Plan.* Prepared for the City of Rochester, Monroe County and the University of Rochester.

Lane, Frenchman and Associates. September 1986. *Genesee River South Corridor Plan: Draft Generic Environmental Impact Statement.* Prepared for the City of Rochester.

Lowe, Charles. Bridge Inspector, NYS Department of Transportation, Region 4. November 28, 2007. Email correspondence with Ellen Micoli Soffa.

Miner, Connie. November 2007. Funding Opportunities from Connie D. Miner & Co. Grant Consultants, 4818 Kraus Road, Clarence, New York, 14031, (716) 759-3336.

National Flood Insurance Program, November 1, 1978. *Flood Insurance Rate Map* (FIRM), City of Rochester, NY, Monroe County, Community Panel Number 360431-0020-B, Page 20 of 25. FIRMette retrieved from FEMA website August 31, 2007.

National Resources Conservation Service, October 31, 2007. Web Soil Survey, National Cooperative Soil Survey. Soil Map, Monroe County, New York. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

NYS Office of Parks, Recreation and Historic Preservation (NYSOPRHP). April 2008. Information Request 07PR06850. Letter received by EDR from Historic Sites Restoration Coordinator, Marie Sarchiapone, with Resource Evaluation by Robert Englert.

Saskatchewan Environmental Society (SES) website, October 2007. *Alternative Transportation.* http://www.environmentalsociety.ca/issues/alt-trans/index.html

Stone Consulting and Design, Inc. April 2002. *Rail Based Transit Proposal for Rochester, New York*. Prepared for the Rochester Rail Transit Committee.

U.S. Department of Agriculture, March 1973. Soil Conservation Service, Soil Survey: Monroe County, New York.

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, July 2005. Fact Sheet: *Preventing Chronic Diseases: Investing Wisely in Health – Preventing Obesity and Chronic Diseases Through Good Nutrition and Physical Activity.* Retrieved from website in October 2007.

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (Publish date unknown). Fact Sheet: *Promoting Active Lifestyles Among Older Adults.* Retrieved from website in October 2007.

U.S. Fish and Wildlife Service. November 2007. Wetlands Geodatabase http://wetlandsfws.er.usgs.gov/NWI/index.html

West, Larry. October 2007. *Public Transportation: Fast Track to Fewer Emissions and Energy Independence*. http://environment.about.com/od/greenlivingdesign/a/public_transit.htm. Published by About.com, part of the New York Times Company.

Wilbur, Smith and Associates, April 1998. *Rochester Light Rail Transit Economic Development Feasibility Study: Final Report.* Prepared for the City of Rochester.

APPENDICES

APPENDIX A

Cost Estimate

GTC Priority Trails Preliminary Cost Estimate

EDR Job No. 06080

Prepared for: Genesee Transportation Council and the City of Rochester, NY

NOTE: Conceptual estimate for budgeting purposes only.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$10,000	$10,000
1.2	Demolition of timber bridge decking	LS	1	$30,000	$30,000
1.3	Clearing and grubbing	ACRE	0.25	$6,000	$1,500
1.4	Asphalt pavement removal 4-6" thick	SY	700	$5.50	$3,850
2	**STRUCTURAL**				
2.1	ADA compliant ramp to bridge (structure only)	LS.	1	$200,000	$200,000
2.2	Re-encase concrete piers	S.F.	700	$50	$35,000
2.3	Retaining walls 8' ht w/ 33 degree slope	L.F.	100	$250	$25,000
2.4	Gateway structures	LS.	1	$40,000	$40,000
3	**FINISHES**				
3.1	Preparing existing steel bridge for painting	LS.	1	$25,000	$25,000
3.2	Painting existing steel bridge	LS.	1	$25,000	$25,000
4	**PAVING**				
4.1	10' wide asphalt multi-use trail	LF	560	$28	$15,680
4.2	19' wide concrete walk over bridge structure	LF	810	$200	$162,000
4.3	14' wide concrete walk on new ramp	LF	183	$170	$31,110
4.4	Brick paving for U of R ramp approach	SF	3,000	$8	$24,000
5	**SIGNAGE**				
5.1	Directional/Informational signage	Each	5	$1,500	$7,500
6	**SITE FURNITURE**				
6.1	Benches	Each	16	$700	$11,200
6.2	Handrailings (bridge, ADA ramp, and overlook)	LF	2330	$75	$174,750
6.3	Bike Racks	Each	4	$700	$2,800
7	**SITE ELECTRICAL**				
7.1	14' Pole Lights	Each	16	$2,000	$32,000
7.2	Site electrical	LS	1	$10,000	$10,000
7.3	Security cameras	Each	2	$7,500	$15,000
8	**PLANTINGS**				
8.1	Specimen Deciduous Trees (2.5-3" cal.)	Each	17	$500	$8,500
8.2	Shrubs	Each	30	$60	$1,800
8.3	Seeding/Mulching	Acre	0.25	$1,000	$250
				SUBTOTAL	**$891,940**
9	**BRIDGE ENGINEERING STUDY**	LS	1	$50,000	$50,000
10	**DESIGN AND PERMITTING FEES (15%)**				$133,791
11	**CONTINGENCY (20%)**				$178,388
				TOTAL	**$1,254,119**

APPENDIX B

Existing Conditions Images

Railroad Bridge over Genesee River, looking south

Restricted access at east side near University of Rochester

Underside of bridge as it passes through University of Rochester campus

Eastern terminus of bridge in overgrown vegetation

Access to bridge from western side - overgrown with vegetation

View across bridge from western bank

APPENDIX C

Public Input

Erie-Lackawanna Railroad Bridge Conversion

City of Rochester, NY

	Public Comments
1	Try to keep option open for both multi-use and light rail, or trolley viaduct, side by side on former ELRR viaduct as per "Future Alternative Transportation Possibilities" item 1 and light rail expert Jim Graeber's talk at RRCDCs "Reshaping Rochester" lecture last year.
2	Resolve item above and procede with pedestrian/bicycle access as soon as possible
3	Have lights on bridge
4	Illuminate bridge structure, i.e. abutments
5	No Rail
6	Pro Rail with trail
7	Like pedestrian aspect
8	We need to preserve a wide enough ROW to accommodate both the bike/ped path and rail transit on both approaches to the bridge. This includes space for separation between the uses.
9	The bike/ped bridge should be built as an add-on structure on the north side of the existing bridge (either cantilevered or using the existing pier/footings that protrude out on the north side of the bridge)
10	If bike/ped path is to be built on the existing bridge structure, it should be designed in such a way that minimizes the cost to use the bridge for rail transit in the future. (no overhead arches with a clearance less than 15 feet, no substantial structures that would have to be moved.
11	This is a very creative project. My concern - not to throw cold water on the concept - is public safety. At present there are incidents on the pedestrian bridge to the south, or that bridge is used by suspects as an escape route. What anti-crime designs are you encorporating into the project? Since the bridge straddles the river, does the east side or west side RPD respond? Lighting? Cameras? Security Bike Patrols? Thank you for creatively reusing this asset.
12	Let's design - the provisions for Rail with Trail - preserve wood-decked bridge - "multi-use" trail, crushed stone on direct alignment to bridge, asphalt trail in parallel alignment - assess and evaluate economic impacts, opportunities and benefits - light entire length of trail for evening use.
13	Concerned with crime and the perception of it
14	Follow through with Flower City Bridge Concept
15	Overall, like the concept
16	Poll U of R students about what they want to see for the corridor and connections between U of R River Campus and Downtown.
17	Accommodate and anticipate U of R students desire to reach downtown entertainment, recreation, retail, etc.
18	Would like to see lighting along the length of the bridge
19	Put trail in front of ramp (visible from road; eliminate blind spots. Just reposition the ramp)
20	Preservation of Transportation Corridor
21	Your research and compilation has done an excellent job of detailing many of the reasons connecting the bridge to a pedestrian & cyclist crossing makes sense. I think the designs look great too. My specific area of comment is on the positive impact to the PLEX neighborhood, where I reside and work. PLEX would benefit from the connection through the increased access for U of R students, faculty and employees; greater accessibility for the neighborhood would almost certainly increase the attractiveness of the area to renters & buyers. Those who already live there would have greater access to the river, trails network, University, Mt. Hope Cemetery, etc. This bridge conversion has been a dream of a number of PLEX residents dating back to the South River Corridor study of the 1980's when resident-participants pushed to keep it from being demolished. I'm hopeful that we'll be walking over the bridge soon!
22	The placement of the ADA accessible ramp blocks view of the trail from the road and parking lot creating a security hazard. Multiple vectors of escape after a mugging would require more security and police patrols for an equivalent response time. In addition, hidden spots just feel less secure. Instead, an easy fix, just have the ramp behind the trail and realign the trail adjacent to the parking lot.

Erie-Lackawanna Railroad Bridge Conversion

City of Rochester, NY

Public Comments - continued	
23	Use brick instead of concrete
24	The arch does not provide vertical clearance for light rail.
25	Rails with trails
26	FTA "New Starts" as a funding source for rail trolley/streetcar project development.
27	Community connectivity is facilitated by a rail trolley between U of R and Corn Hill & Downtown
28	Recommend wood planks or a "historic" surface like brick, not concrete or stamped concrete
29	"smiley face" and "star" drawn next to Key Issues #1 - Still a transportation corridor.
30	Passenger rail IS viable :) $4.15 gasoline.
31	Perfect entry and access to UR for rail trail trolley - UR to downtown.
32	Would like to see the same concept sketch with an integrated rail trolley - Rails with Trails.
33	It appears that the piers/footings would support an add-on structure for a bike path while keeping the main bridge for light rail (bike trail alongside rail trail)
34	I am excited about the possibility of lighting this side of the city on the river. Any improvements or projects to enhance walking trails open to the public would be great.

APPENDIX D

NYSOPRHP Comments

New York State Office of Parks,
Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

David A. Paterson
Governor

Carol Ash
Commissioner

April 10, 2008

Tom Robinson
EDR
274 North Goodman St
Rochester, New York 14607

Re: INFO REQ
Erie RR Bridge
Rails-to-Trails Conversion
over Genesee River
ROCHESTER, Monroe County
07PR06850

Dear Mr. Robinson:

Thank you for requesting the comments of the Office of Parks, Recreation and Historic Preservation (OPRHP). OPRHP has reviewed the information you provided in accordance with the New York State Parks, Recreation and Historic Preservation Law, Section 14.09.

OPRHP noted that the Erie RR Bridge is considered a cultural resource eligible for inclusion in the State and National Registers of Historic Places. Please see the enclosed Resource Evaluation. Questions regarding this evaluation may be addressed to Robert Englert at 518-237-8643 ext 3268.

The materials submitted included concept sketches by Environmental Design and Research dated October 2007.

The proposed work consists of, but is not limited to, installing railings, piers, benches, lighting etc to convert the railroad bridge to a pedestrian bridge.

Based upon this review, it is the OPRHP's opinion that this project will have No Adverse Impact upon cultural resources in or eligible for inclusion in the State and National Registers of Historic Places with the conditions that:

1. The new construction is easily identified as new and the historic fabric of the bridge is recognizable as the original bridge. This may be accomplished by dating the different elements of the bridge. 2010 or later for new construction and 1890 or 1917 as appropriate for the girder plates.

2. If state or federal funds are obtained, designs are resubmitted to this office for review.

3. The color black be reconsidered. The metal railings and girder plates will absorb the heat of the sun and become very hot. Lighter colors such as those in the enclosed pictures may be more practical.

OPRHP appreciates the opportunity to comment on this project. Should you have any questions about this review, please contact me at 518-237-8643 ext 3284 or at marie.sarchiapone@oprhp.state.ny.us. Thank you.

Sincerely,

Marie Sarchiapone
Historic Sites Restoration Coordinator

CC: MAS Chron

Enclosure

RESOURCE EVALUATION

Date:	12/28/2007	Staff:	Robert T. Englert
Property:	Erie RR Bridge over Genesee River between	MCD:	ROCHESTER
Address:	Third Ward and U of R campus. Erie RR Bridge.	County:	Monroe
Project Ref. No.:	**07PR06850**	USN:	05540.008406

I. ☐ Property is individually listed on SR/NR :

Name of listing :

☐ Property is a contributing component of a SR/NR district:

Name of District:

II. ☐ Property meets eligibility criteria

☐ Property contributes to a district which appears to meet eligibility criteria.

Pre SRB: ☐ Post SRB: ☐ SRB Date

Criteria for inclusion in the National Register.

A ☐ **Associated** with events that have made a significant contribution to the broad patterns of our history;

B ☐ **Associated** with the lives of persons significant in our past;

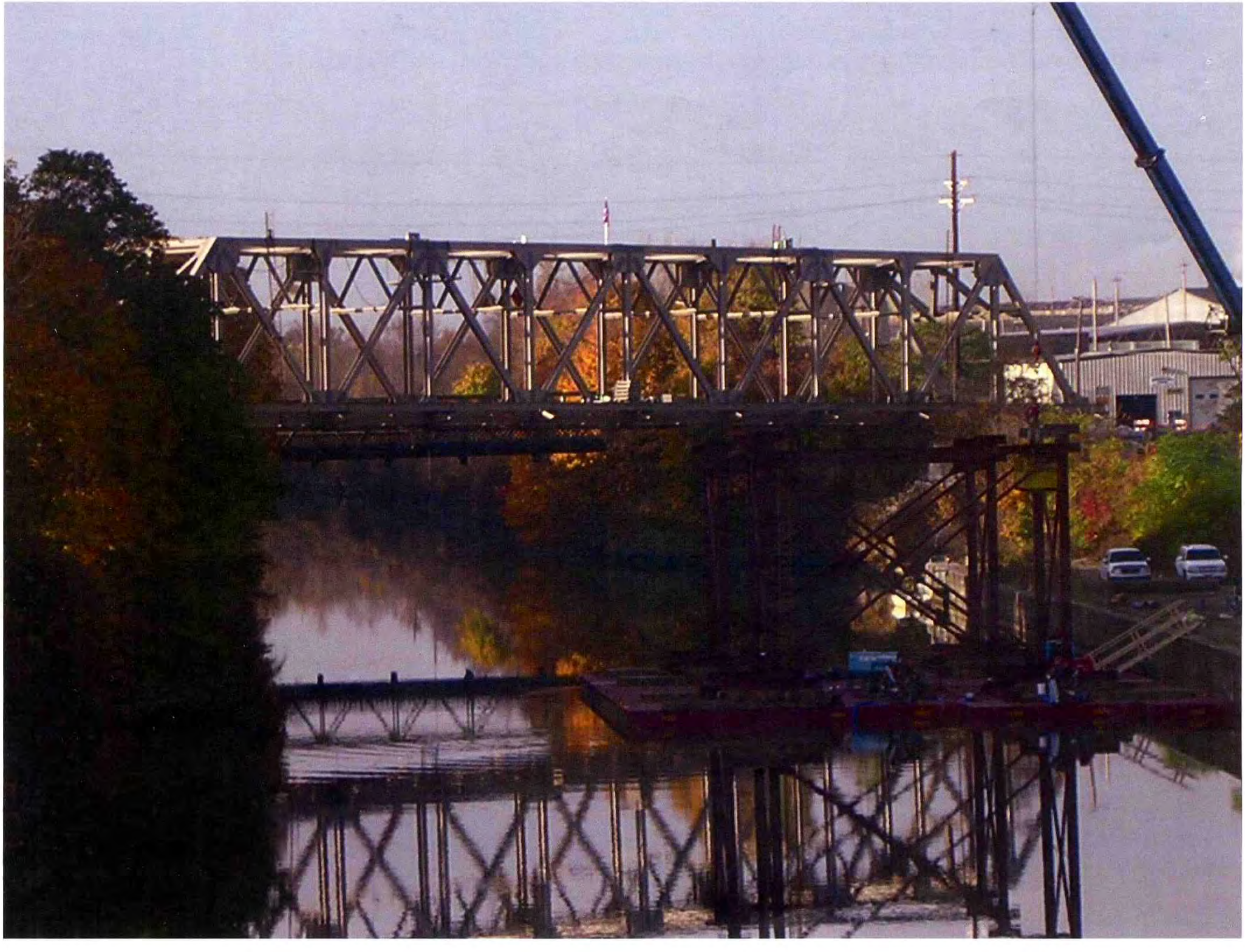
C ☑ Embodies the distinctive characteristics of a type, period or method of construction; or represents the work of a master; or possess high artistic values; or represents a significant and distinguishable entity whose component may lack individual distinction;

D ☐ **Have** yielded, or may be likely to yield information important in prehistory or history.

STATEMENT OF SIGNIFICANCE:

The Erie Railroad Bridge across the Genesee River is a notable example of a large, multi-span, plate girder deck bridge of the early twentieth century. Originally constructed in to carry the Rochester branch of the Erie Railroad, the heavy plate girder structure is carried on a series of cut stone piers. Enlarged ca. 1917-20 when the Genesee River was canalized as part of the Erie Barge Canal, the bridge reflects standard engineering design and construction of the period applied to the challenge of spanning the Genesee River as canal. The bridge retains substantial integrity of design and materials, and is a well preserved example of its type, period and method of construction in Monroe County.

If you have any questions concerning this Determination of Eligibility, please call Robert T. Englert at 518-237-8643. ext 3268



APPENDIX E

Trail Construction Standards

Trail Construction Standards
(Derived from AASHTO "Development of Bicycle Facilities")

Class I bikeways (bike paths) are facilities with exclusive right of way, with cross flows by motorists minimized. Class I bikeways are typically described as serving "the exclusive use of bicycles and pedestrians." However, experience has shown that if significant pedestrian use is anticipated, separate facilities for pedestrians are necessary to minimize conflicts. Dual use by pedestrians and bicycles is undesirable, and the two should be separated wherever possible.

Motorized bicycles are prohibited on bike paths unless authorized by ordinance or approval of the agency having jurisdiction over the path. Likewise, all motor vehicles are prohibited from bike paths. Signing can strengthen these prohibitions.

A. Widths
The minimum paved width for a two-way bike path shall be 7'10". The minimum paved width for a one-way bike path shall be 4'11". A minimum 2' graded area shall be provided adjacent to the pavement. A 3' graded area is recommended to provide clearance from poles, trees, walls, fences, guardrails, or other lateral obstructions. Where the paved width is wider than the minimum required, the graded area may be reduced accordingly. However, the graded area is a desirable feature regardless of the pavement width.

Where heavy bicycle volumes are anticipated and/or significant pedestrian traffic is expected, the pavement width of a two-way path should be greater than 7'10", preferably 11'10" or more. Another important factor to consider in determining the appropriate width is that bicyclists will tend to ride side by side on bike paths, necessitating more width for safe use.

B. Clearance to Obstructions
A minimum 2' horizontal clearance to obstructions shall be provided adjacent to the pavement. A 3' clearance is recommended. Where the pavement width is wider that the minimum required, the clearance may be reduced accordingly; however, an adequate clearance is desirable regardless of the paved width. If a wide path has pavement that is contiguous with a continuous fixed object (i.e. a block wall), a 4" white edge stripe, 12" from the fixed object, is recommended to minimize the likelihood of a bicyclist hitting it. On structures, the clear width between railings shall be not less than 7'10". It is desirable that the clear width of structures be equal to the minimum clear width of the path. The vertical clearance to obstructions across the clear width of the path shall be a minimum of 8'3". Where practical, a vertical clearance of 9'10" is desirable.

C. Striping and Signing
A yellow stripe may be used to separate opposing directions of travel. A centerline stripe is particularly beneficial in the following circumstances: a) where there is heavy use, b) on curves with restricted sight distance, and c) where the path is not lit and nighttime use is expected.

D. Intersections with Highways
Intersections are a prime consideration in bike path design. If alternate locations for a bike path are available, the one with the most favorable intersection conditions should be selected. Where motor vehicle cross traffic and bicycle traffic is heavy, grade separations are desirable to eliminate intersection conflicts. Where grade separations are not feasible, assignment of right of way by traffic signals should be considered. Where traffic is not heavy, stop or yield signs for bicyclists may suffice. Bicycle path intersections and approaches should be on relatively flat grades. Stopping sight distances at intersections should be checked and adequate warning should be given to permit bicyclists to stop before reaching the intersection, especially on downgrades.

When crossing an arterial street, the crossing should either occur at the pedestrian crossing, where motorists can be expected to stop, or at a location completely out of the influence of any intersection to permit adequate opportunity for bicyclists to see turning vehicles. When crossing at midblock locations, right of way should be assigned by devices such as yield signs, stop signs, or traffic signals that can be activated by bicyclists. Even when crossing within or adjacent to the pedestrian crossing, stop or yield signs for bicyclists should be placed to minimize potential for conflict resulting from turning autos. Where bike path stop or yield signs are visible to approaching motor vehicle traffic, they should be shielded to avoid confusion. In some cases, "Bike X-ing" signs may be placed in advance of the crossing to alert motorists. Ramps should be installed in the curbs, to preserve the utility of the bike path. Ramps should be the same width as the bicycle paths. Curb cuts and ramps should provide a smooth transition between the bicycle path and the roadway.

E. Design Speed

The proper design speed for a bike path is dependent on the expected type of use and on the terrain. The minimum design speed for bike paths shall be 16 mph. Installation of "speed bumps" or other similar surface obstructions, intended to cause bicyclists to slow down in advance of intersections or other geometric constraints, shall not be used. These devices cannot compensate for improper design.

F. Horizontal Alignment and Superelevation

The minimum radius of curvature negotiable by a bicycle is a function of the superelevation rate of the bicycle path surface, the coefficient of friction between the bicycle tires and the bicycle path surface, and the speed of the bicycle.

For most bicycle path applications, the superelevation rate will vary from a minimum of 2 percent (the minimum necessary to encourage adequate drainage) to a maximum of approximately 5 percent (beyond which maneuvering difficulties by slow bicyclists and adult tricyclists might be expected). A straight 2% cross slope is recommended on tangent sections. The minimum superelevation rate of 2% will be adequate for most conditions and will simplify construction. Superelevation rates steeper than 5% should be avoided on bike paths expected to have adult tricycle traffic.

G. Stopping Sight Distance

To provide bicyclists with an opportunity to see and react to the unexpected, a bicycle path should be designed with adequate stopping sight distances. The distance required to bring a bicycle to a full controlled stop is a function of the bicyclist's perception and brake reaction time, the initial speed of the bicycle, the coefficient of friction between the tires and the pavement, and the braking ability of the bicycle.

H. Lateral Clearance on Horizontal Curves

Bicyclists frequently ride abreast of each other on bicycle paths, and on narrow bicycle paths, bicyclists have a tendency to ride near the middle of the path. For these reasons, and because of the serious consequences of a head-on bicycle accident, lateral clearances on horizontal curves should be calculated based on the sum of the stopping sight distances for bicyclists traveling in opposite directions around a curve. Where this is not possible or feasible, consideration should be given to widening the path through the curve, installing a yellow center stripe, installing a curve ahead warning sign, or some combination of these alternatives.

I. Grades

Bike paths generally attract less skilled bicyclists, so it is important to avoid steep grades in their design. Bicyclists not physically conditioned will be unable to negotiate long, steep uphill grades. Since novice bicyclists often ride poorly maintained bicycles, long downgrades can cause problems. For these reasons, bike paths with long, steep grades will generally receive very little use. The

maximum grade rate recommended for bike paths is 5%. It is desirable that sustained grades be limited to 2% if a wide range of riders is to be accommodated. Steeper grades can be tolerated for short segments (i.e. up to about 500 feet). Where steeper grades are necessitated, the design speed should be increased and additional width should be provided for maneuverability.

J. Structural Section

The structural section of a bike path should be designed in the same manner as a highway, with consideration given to the quality of the base soil and the anticipated loads the bikeway will experience. It is important to construct and maintain a smooth riding surface with skid resistant qualities. Principal loads will normally be from maintenance and emergency vehicles. Expansive soil should be given special consideration and will probably require a special structural section. A minimum pavement thickness of 2 inches of asphalt concrete is recommended. Type "A" or "B" asphalt concrete (as described in Department of Transportation Standard Specifications), with ½ inch maximum aggregate and medium grading is recommended. Consideration should be given to increasing the asphalt content to provide increased pavement life. Consideration should also be given to sterilization of base soil to preclude possible weed growth through the pavement.

At unpaved highway or driveway crossings of bicycle paths, the highway or driveway should be paved a minimum of 10 feet on each side of the crossing to reduce the amount of gravel being scattered along the path by motor vehicles. The pavement structure at the crossing should be adequate to sustain the expected loading at that location.

K. Drainage

For proper drainage, the surface of a bike path should have a cross slope of 2%. Sloping in one direction usually simplifies longitudinal drainage design and surface construction, and accordingly is the preferred practice. Ordinarily, surface drainage from the path will be adequately dissipated as it flows down the gently sloping shoulder. However, when a bike path is constructed on the side of a hill, a drainage ditch of suitable dimensions may be necessary on the uphill side to intercept the hillside drainage. Where necessary, catch basins with drains should be provided to carry intercepted water across the path. Such ditches should be designed in such a way that no undue obstacle is presented to bicyclists. Culverts or bridges are necessary where a bike path crosses a drainage channel.

L. Barrier Posts

Barrier posts may be necessary at entrances to bike paths in order to prevent motor vehicles from entering the trail. When locating such installations, care should be taken to assure that barriers are well marked and visible to bicyclists, day or night (i.e. install reflectors or reflectorized tape). Barrier configurations that preclude entry by motorcycles generally present safety and convenience problems for bicyclists. Such devices should be used only where extreme problems are encountered.

Striping an envelope around the barriers is recommended. If sight distance is limited, special advance warning signs or painted pavement warnings should be provided. Where more than one post is necessary, 5-foot spacing should be used to permit passage of bicycle-towed trailers, adult tricycles, and to assure adequate room for safe bicycle passage without dismounting. Barrier post installations should be designed to be removable, permitting entrance by emergency and service vehicles.

M. Lighting

Fixed source lighting reduces conflicts along paths and at intersections. In addition, lighting allows the bicyclist to see the bicycle path direction, surface conditions, and obstacles. Lighting for bicycle paths is important and should be considered where riding at night is expected, such as bicycle paths

serving college students or commuters, and at highway intersections. Lighting should also be considered through underpasses or tunnels, and where nighttime security could be a problem.

Depending on the location, horizontal illumination levels of 5 lux to 22 lux should be maintained. Light poles should meet the recommended horizontal and vertical clearances. Luminaires and poles should be at a scale appropriate for a pedestrian or bicycle path.

APPENDIX F

Managing Multi-Use Trails

Managing Multi-Use Trails

Multi-use trails, when they are well designed, carefully maintained, and effectively managed, are a significant community resource. However, trails can have a number of conflicts and challenges, which can be addressed by physical design and management responses.

A. Managing Conflict on Multi-Use Trails

The challenges faced by multiple use trail managers can be broadly summarized as maintaining user safety, protecting natural resources, and providing high quality user experiences. These challenges are interrelated and cannot be effectively addressed in isolation. To address these challenges, managers can employ a wide array of physical and management options such as trail design, information and education, user involvement, and regulations and enforcement.

The existing literature and practice were synthesized into the following 12 principles for minimizing conflict on multi-use trails. Adherence to these principles should help improve sharing and cooperation on multi-use trails.

1. *Recognize Conflict as Goal Interference* – Trail conflict is typically related to human behavior rather than inherent incompatibility among different trail uses.

2. *Provide Adequate Trail Opportunities* - Offer adequate trail mileage and provide opportunities for a variety of trail experiences. This will help reduce congestion and allow users to choose the conditions that are best suited to the experiences they desire.

3. *Minimize Number of Contacts in Problem Areas* - Each contact among trail users (as well as contact with the evidence of others) has the potential to result in conflict. So, as a general rule, reduce the number of user contacts whenever possible. This is especially true in congested areas and at trailheads. Disperse use and provide separate trails where necessary after careful consideration of the additional environmental impact and lost opportunities for positive interactions this may cause.

4. *Involve Users as Early as Possible* - Identify the present and likely future users of each trail and involve them in the process of avoiding and resolving conflicts as early as possible, preferably before conflicts occur. For proposed trails, possible conflicts and their solutions should be addressed during the planning and design stage with the involvement of prospective users. Likewise, existing and developing conflicts on present trails need to be faced quickly and addressed with the participation of those affected.

5. *Understand User Needs* - Determine the motivations, desired experiences, norms, setting preferences, and other needs of the present and likely future users of each trail. This “customer” information is critical for anticipating and managing conflicts.

6. *Identify the Actual Sources of Conflict* - Help users to identify the specific tangible causes of any conflicts they are experiencing. In other words, get beyond emotions and stereotypes as quickly as possible, and get to the roots of any problems that exist.

7. *Work with Affected Users* - Work with all parties involved to reach mutually agreeable solutions to these specific issues. Users who are not involved as part of the solution are more likely to be part of the problem now and in the future.

8. *Promote Trail Etiquette* - Minimize the possibility that any particular trail contact will result in conflict by actively and aggressively promoting responsible trail behavior. Use existing educational materials or modify them to better meet local needs. Target these educational

efforts, get the information into users' hands as early as possible, and present it in interesting and understandable ways (Roggenbuck and Ham 1986).

9. *Encourage Positive Interaction Among Different Users* - Trail users are usually not as different from one another as they believe. Providing positive interactions both on and off the trail will help break down barriers and stereotypes, and build understanding, good will, and cooperation. This can be accomplished through a variety of strategies such as sponsoring "user swaps," joint trail-building or maintenance projects, filming trail-sharing videos, and forming Trail Advisory Councils.

10. *Favor "Light-Handed Management"* - Use the most light-handed approaches that will achieve area objectives. This is essential in order to provide the freedom of choice and natural environments that are so important to trail-based recreation. Intrusive design and coercive management are not compatible with high-quality trail experiences.

11. *Plan and Act Locally* - Whenever possible, address issues regarding multi-use trails at the local level. This allows greater sensitivity to local needs and provides better flexibility for addressing difficult issues on a case-by-case basis. Local action also facilitates involvement of the people who will be most affected by the decisions and most able to assist in their successful implementation.

12. *Monitor Progress* – Monitor the ongoing effectiveness of the decisions made and programs implemented. Conscious, deliberate monitoring is the only way to determine if conflicts are indeed being reduced and what changes in programs might be needed. This is only possible within the context of clearly understood and agreed upon objectives for each trail area.

Trail managers recognize trail conflicts as a potentially serious threat. Many are optimistic, however, and feel that when trail conflict situations are tackled head on and openly they can become an opportunity to build and strengthen trail constituencies and enhance outdoor recreation opportunities for all users.

B. Challenges Faced by Multiple-Use Trail Managers

The manager of any trail faces many challenges, usually within the context of too few staff and too little money. The underlying challenges faced by trail managers, however, remain the same regardless of the type of trail and whether it serves a single group or many different ones. Trail managers attempt to: 1) maintain user safety, 2) protect natural resources, and 3) provide high-quality user experiences. These issues can become more complex and more difficult to manage as the number and diversity of trail uses increase, but the challenges and the tools available to address them remain basically the same.

Maintaining User Safety

Unsafe situations or conditions caused by other trail users can keep visitors from achieving their desired trail experience. This goal interference due to safety concerns is a common source of conflicts on trails. There are a number of threats to user safety that can occur on trails. Some of these include:

- Collisions and near misses among users and/or their vehicles
- Reckless and irresponsible behavior
- Poor user preparation or judgment
- Unsafe conditions related to trail use (i.e. deep ruts, tracks on snow trail)
- Unsafe conditions not related to trail use (i.e. obstacles, terrain, weather, river crossings)
- Poor trail design, construction, maintenance or management
- Other hazards (i.e. bears, lightning, cliffs, crime)

To help maintain user safety on trails, planners and managers can attempt to control or influence many factors, including the following:

- User speed (often has more to do with speed differential than speed itself)
- Mass of user and vehicle (if any)
- Sight distances
- Trail width
- Trail surface
- Congestion (i.e. number of users per mile)
- Users overtaking one another silently or without warning
- Trail difficulty (i.e. obstacles, terrain, condition)
- User skill level and experience
- User expectations and preparedness (i.e. walkers who understand they may see bicycles on a particular trail can better prepare themselves for possible encounters)
- Emergency procedures
- On-site management presence

Protecting Natural Resources

Resource impacts such as soil erosion, damaged vegetation, polluted water supplies, litter, vandalism, and many other indications of the presence of others can lead to feelings of crowding and conflict. These feelings can occur even when there is no actual contact among different trail users. A hiker's enjoyment might be reduced by seeing All-Terrain Vehicle (ATV) tracks near a wilderness boundary, for example, or an equestrian user might be upset to see many cars with bike racks at the trailhead before beginning a ride.

Minimizing environmental impacts is a high priority for resource and recreation managers. Natural resources include soils, wildlife, vegetation, water, and air quality. Historic, cultural, and archaeological resources are also vulnerable to impacts caused by trail use. A considerable amount of trail manager time and resources is spent attempting to minimize impacts affecting each of these resources. All trail use, regardless of travel mode, impacts natural resources. Research indicates that the following factors influence the amount of resource damage caused by trail use:

- Soil characteristics: type, texture, organic content, consistence, depth, moisture (i.e. muddy versus dry), temperature levels (i.e. frozen terrain versus thawed)
- Topography and slope of trail surface
- Position in land form (i.e. northern versus southern exposure)
- Elevation
- Type of ecosystem
- Type of vegetation and terrain beside trail (influencing widening)
- Quality of trail design and construction (especially regarding drainage)
- Level of maintenance (i.e. effectiveness of drainage)
- Use: type, frequency, season, concentration/dispersal
- Type of vehicle
- Difficulty of terrain
- Up or down hill traffic direction
- Style of use or technique (i.e. skidding tires versus controlled riding)

Providing High-Quality User Experiences

Researchers believe that people who participate in outdoor recreation activities do so because they hope to gain certain rewards or outcomes. These outcomes consist of a wide variety of experiences such as solitude, challenge, being with friends and family, testing skills, experiencing nature, and others. The trail experience that is desired varies a great deal across activities, among people

participating in the same activity, and even within the same individual on different outings. In fact, recreational enthusiasts are often seeking to satisfy multiple desires in a single outing. Recreational behavior is understood to be goal-directed and undertaken to satisfy desires for particular experiences. The quality of these experiences is often measured in terms of user satisfaction.

In a perfect world, land managers could provide nearby, high-quality opportunities for every type of experience trail users might possibly seek. This is rarely possible, of course. Limited budgets, limited amounts of land, and the sheer number of users with different preferences make it impossible to perfectly satisfy all people all the time. Flexibility, compromise, and common courtesy on the part of all users are necessary to maximize the opportunities for high-quality experiences for everyone.

C. Physical Responses

Proper trail design, layout, and maintenance (or redesign and reconstruction when necessary) are essential for user safety and resource protection, and are important contributors to user satisfaction as well. Proper design addresses more than aesthetics and minimized resource impacts. Design can be used to encourage trail users to behave in appropriate ways. Influencing proper behavior through the subtleties of design is preferable and often more effective than attempting to do so, after the fact, through educational programs or regulations. For example, it is easier and more effective to prevent shortcutting of switchbacks by designing climbing turns in rugged, well-screened areas than by posting educational signs at poorly designed switchbacks.

Different users often have different needs and desires regarding physical trail attributes such as surface, slope, length, sight distances, and amenities. Various standards and recommendations are available for different user groups. These needs and preferences are far from universal even within one user group, however. Walkers, joggers, runners, hikers, people walking dogs, and people pushing strollers are all pedestrians, for example, but they do not have the same needs and desires in terms of physical trail attributes or trail settings. The best physical responses will always be dictated by specific local conditions. Managers and planners should identify the present and likely future trail users and determine the needs and desires of those users. Users of different ages, motivations, activity preferences, etc., will have different physical trail needs and preferences. Ryan (1993), for example, suggests hosting a community design workshop for proposed rail-trails to identify these needs and preferences.

Providing separate trails for different users groups has many drawbacks. They point out that it can be expensive, cause resentment, be difficult to enforce, and limit opportunities for communication and cooperation among users. When separate trails are necessary, they suggest encouraging rather than requiring single use and explaining the reasons for this strategy at trailheads. This approach combines physical design with information and education efforts. Advocates of multi-use trails see providing separate trails as a last resort. They feel positive interaction among users on the trail is best way to foster communication, understanding, and a strong, cooperative trail community.

Physical design solutions include:

- Paint the centerline on heavily used multi-purpose trails and greenways. This can help communicate that users should expect traffic in both directions and encourage users to travel on the right and pass on the left.
- Screen trails for sight, sound, and smells (i.e. exhaust fumes from motorized vehicles). Include physical and visual buffers in the design by using natural features such as topography, vegetation, or the sound of water to insulate users from one another when possible. Add buffers as needed on existing trails.
- Provide separate trailheads for different users.
- Separate uses at trailheads and for the first (most crowded) stretches of the trail. These separate segregated trails could then converge, perhaps a mile from the trailhead, after

users are more spread out. On the other hand, Attila Bality of the National Park Service advocates forcing all trail users to share the same trail for some distance (i.e. one mile) before having single use or restricted-use trails diverge from the main trail if necessary. He believes that users will only learn to understand one another and share trails if encouraged to do so. Some may not share unless forced to do so.

- Consider adequate sight distances in the design process.
- Build trails wide enough to accommodate the expected use. Many sources and recommended standards are available for various user groups.
- Build trails wide enough for safe passing, and/or provide pullout areas.
- Design and construct trails to minimize erosion.

APPENDIX G

User Guidelines for Multi-Use Trails

User Guidelines for Multi-Use Trails

Non-motorized trails have become very popular, which has resulted in congestion and potentially hazardous situations. Regardless of whether you are bicycling, walking, jogging or skating, if you follow the same set of rules as everyone else, your trip will be safer and more enjoyable. Help make the multi-use trails safe for everyone by using the following guidelines:

A. Be Courteous

All trail users, including bicyclists, joggers, walkers, wheelchairs, skateboarders, rollerbladers, and skaters, should be respectful of other users regardless of their mode, speed, or level of skill.

B. Be Predictable

Travel in a consistent and predictable manner. Always look behind you before changing positions on the trail.

C. Don't Block the Trail

When traveling in a group with other trail users or your pets, use no more than half the trail so as not to block the flow of other users.

D. Keep Right

Stay as near to the right side of the trail as is safe, except when passing another user.

E. Pass On The Left

Pass others, going your direction, on their left. Yield to slower and on-coming traffic. Use hand signals to alert those behind you of your moves. Look ahead and back to make sure the lane is clear before you pull out and pass. Pass with ample separation and do not move back to the right until safely past. Remember: children and pets can be unpredictable.

F. Stopping

When stopping, move off of the trail. Beware of others approaching you from behind and make sure they know you are pulling over.

G. Give Audible Warning Before Passing

Give a clear signal by using voice, bell or horn before passing. Give the person you are passing time to respond. Watch for their reaction. So that you can hear signals, don't wear headphones on the trail.

H. Obey All Traffic Signs And Signals

Use extra caution where trails cross streets. Stop at all signs and intersections and be cautious when crossing driveways. When entering or crossing a trail, yield to traffic on the trail.

I. Use Lights At Night

Be equipped with lights when using a trail at any time from dusk to dawn. Bicyclists should have a white light visible from five hundred feet to the front and a red or amber light visible from five hundred feet to the rear. Other trail users should have white lights visible from two hundred fifty feet to the front, and a red or amber light visible from two hundred fifty feet to the rear.

J. Don't Use A Trail Under The Influence Of Alcohol or Drugs

Don't overestimate the safety of any trail. You may need all of your reflexes quickly, so it is important that they are not impaired.

K. Be Respectful Of Private Property

Trails are open to the public, but often the land on the side of the trail is private property. Please respect all property rights.

L. Clean Up Litter

Do not leave glass, paper, cans, plastic, or any other debris on or near a trail. If you drop something, please remove it immediately.

M. Recognize When You Have Outgrown Trails

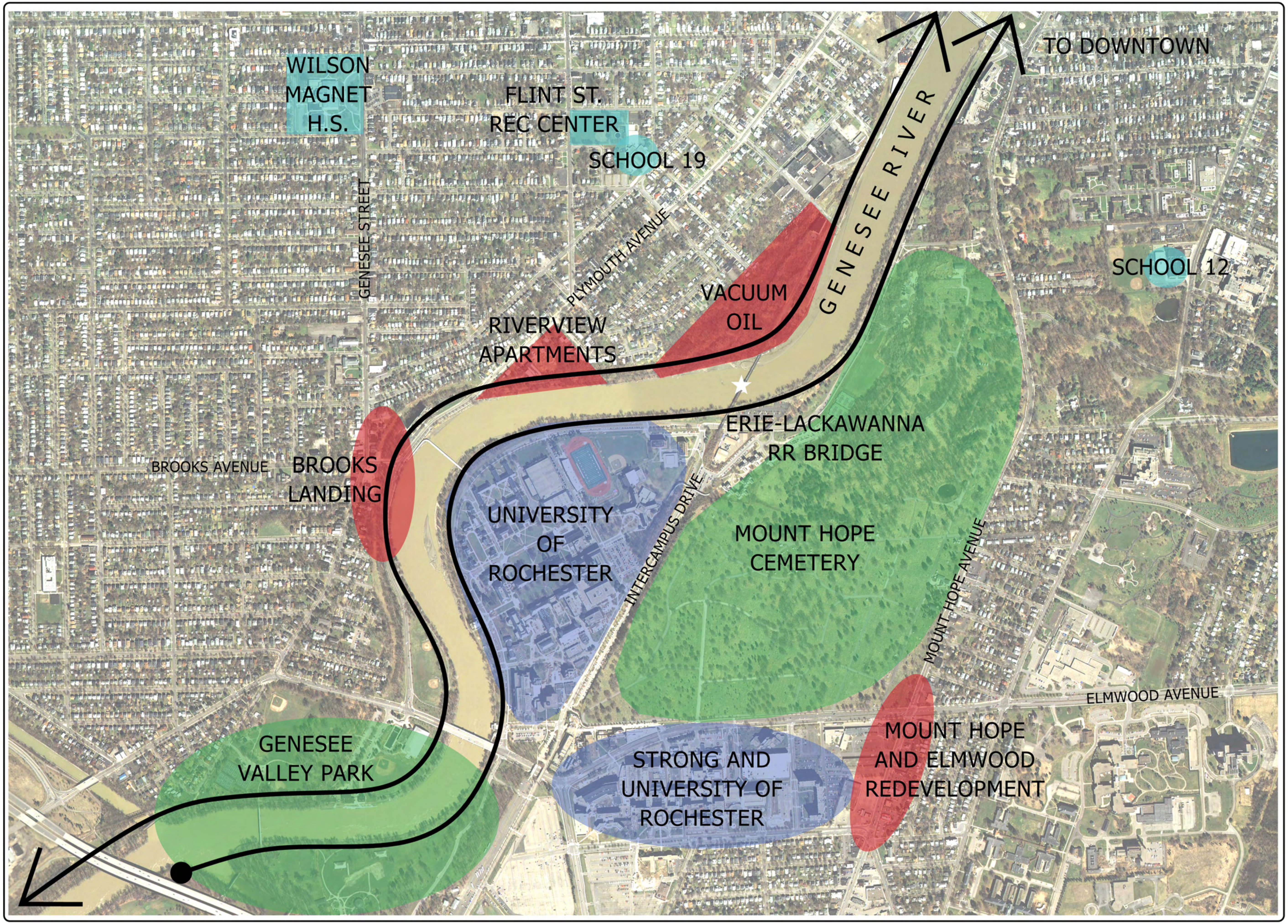
Trails have engineering and design limits. If your speed or style endangers other users, check for alternative routes better suited to your needs. Selecting the right location is safer and more enjoyable for all concerned.

Remember, Always Exercise Due Care And Caution!

FIGURES

Erie Lackawanna Railroad Bridge
Rochester, NY

Figure 1



NORTH

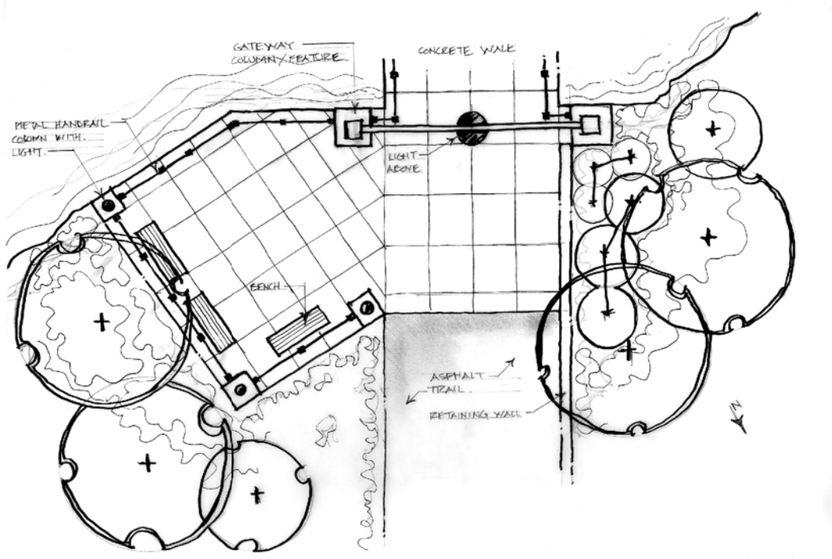
DRAWING REVISIONS:

No.	Date	Revision	BY

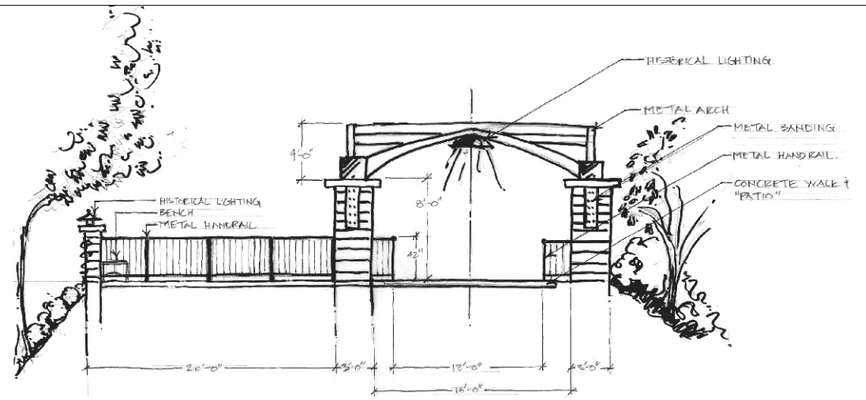
EDR
Environmental Design & Research, Landscape Architecture, Planning, Environmental Services, Engineering and Surveying, P.C.
274 North Goodman Street
Rochester, NY 14607
(585) 271-0040
FAX (585) 271-0042
Syracuse Rochester Buffalo

PROJECT TITLE: ERIE-LACKAWANNA RAILROAD BRIDGE
PROJECT LOCATION: CITY OF ROCHESTER, COUNTY OF MONROE, STATE OF NEW YORK
CLIENT: GENESEE TRANSPORTATION COUNCIL AND THE CITY OF ROCHESTER
DRAWING TITLE: NEIGHBORHOOD SURROUNDING USES

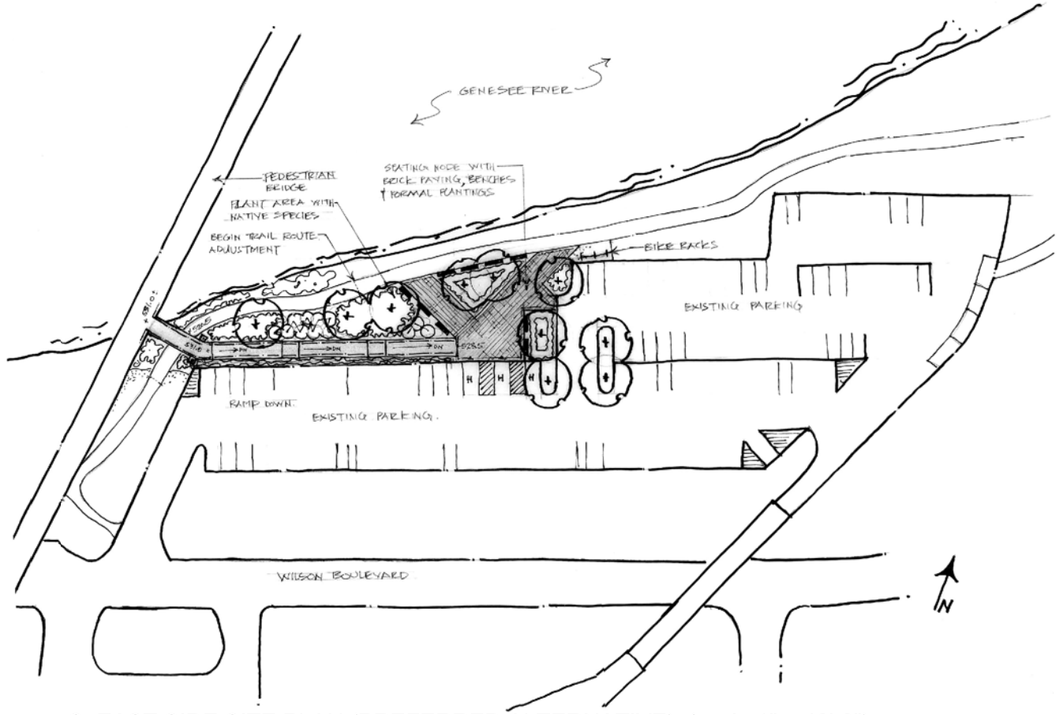
DATE: November 2, 2007
SCALE: 1" = 800'
EDR JOB #: 06080
FILE NAME: Basemap.dwg
DRAFTER: EMS
DRAWING NUMBER: Figure 2



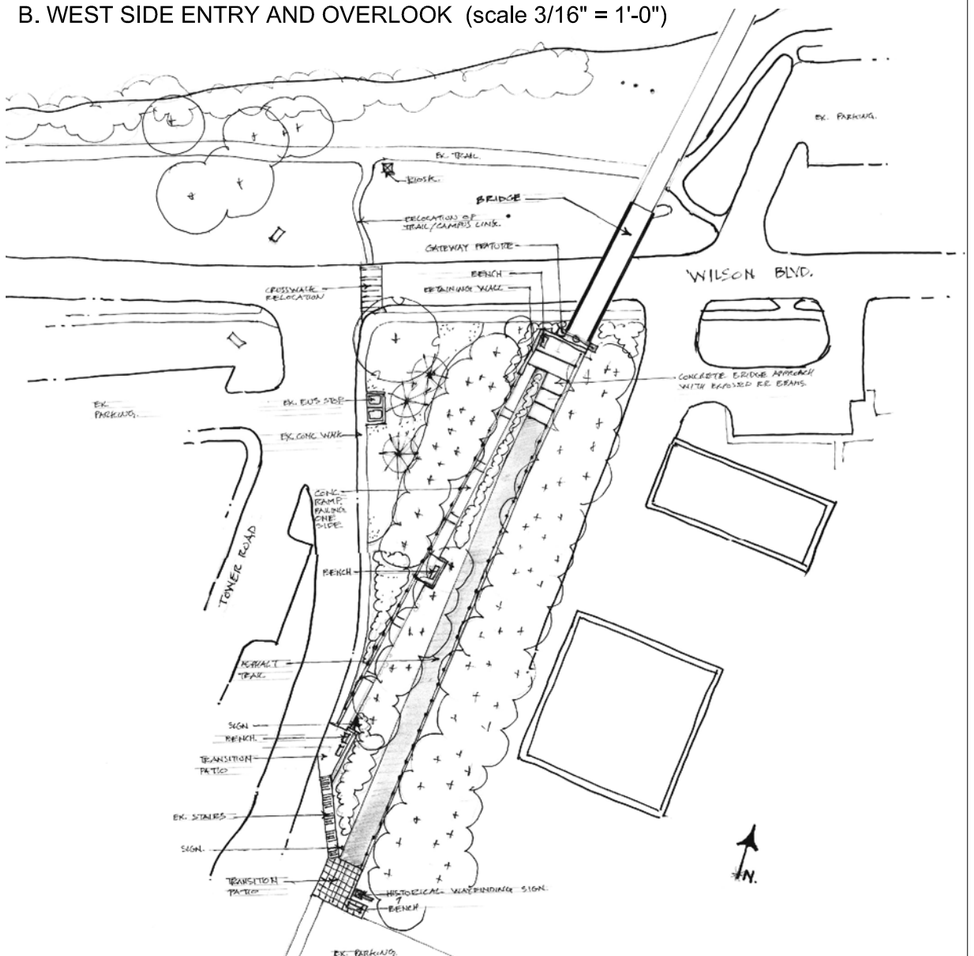
A. WEST SIDE SITE PLAN (scale 3/16" = 1'-0")



B. WEST SIDE ENTRY AND OVERLOOK (scale 3/16" = 1'-0")



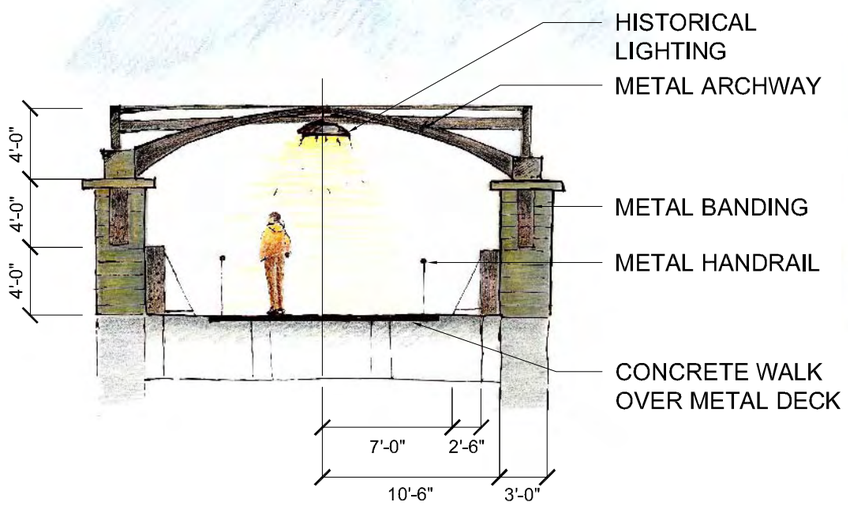
C. EAST SIDE SITE PLAN (PREFERRED ALTERNATIVE) (scale 1" = 40'-0")



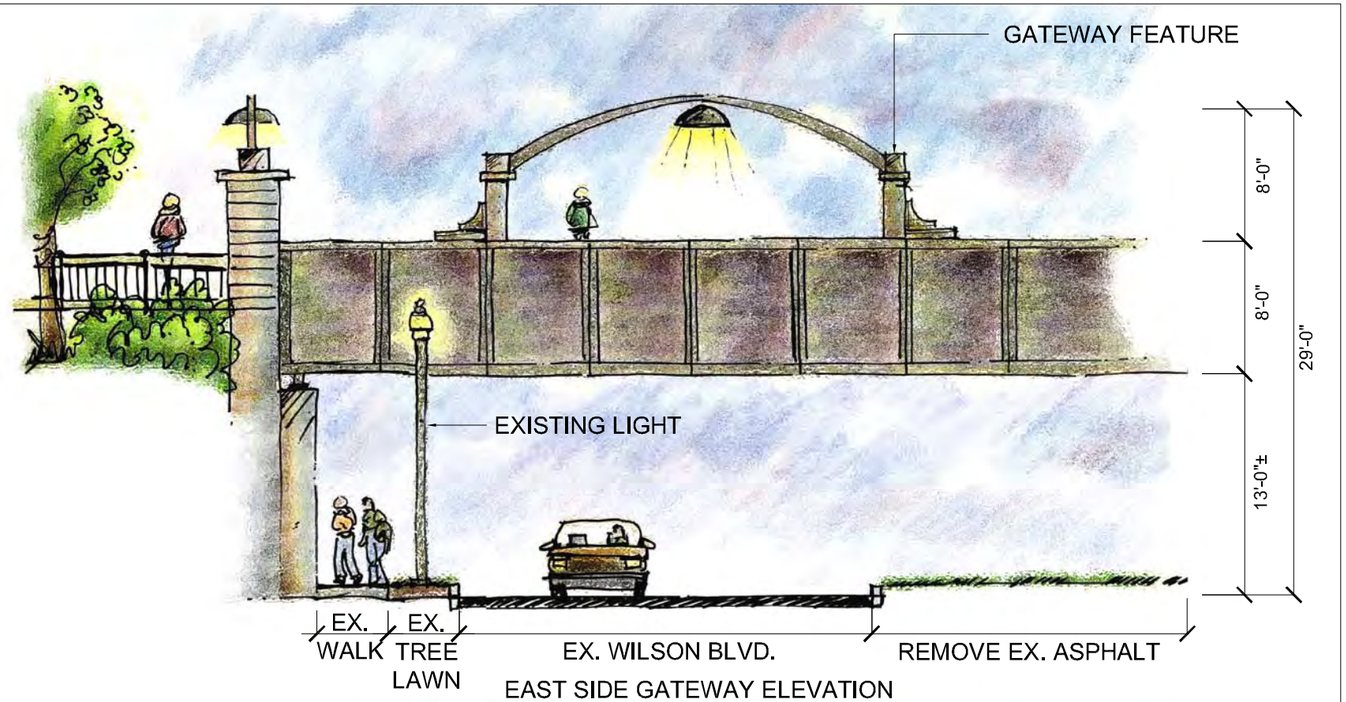
D. EAST SIDE SITE PLAN (EARLY ALTERNATIVE) (scale 1" = 40'-0")

Erie-Lackawanna Railroad Bridge
Rails-to-Trails Conversion

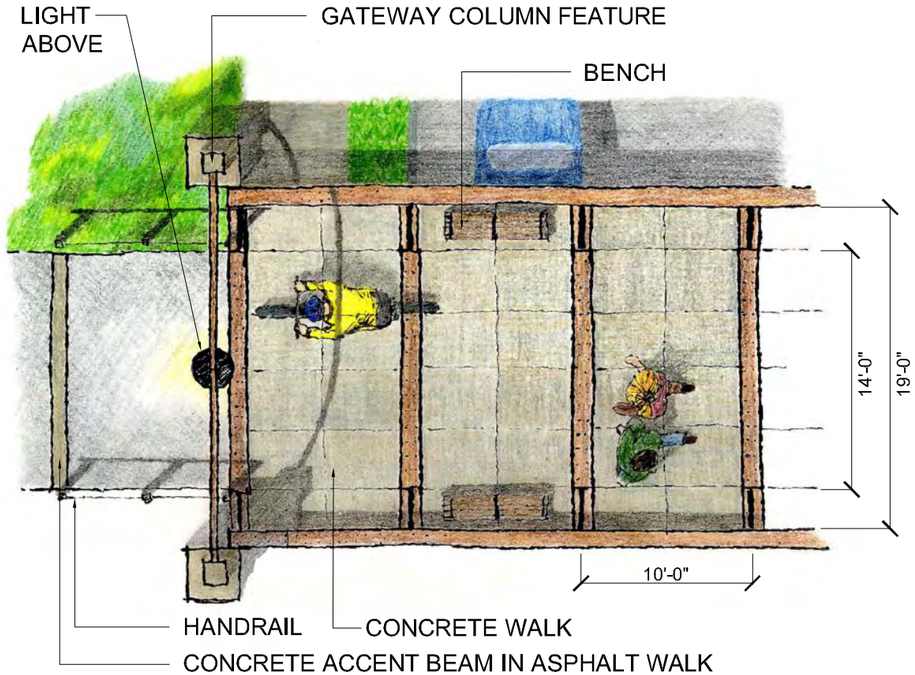
Concept Sketches October, 2007 Scale: As Noted EDR Figure 3



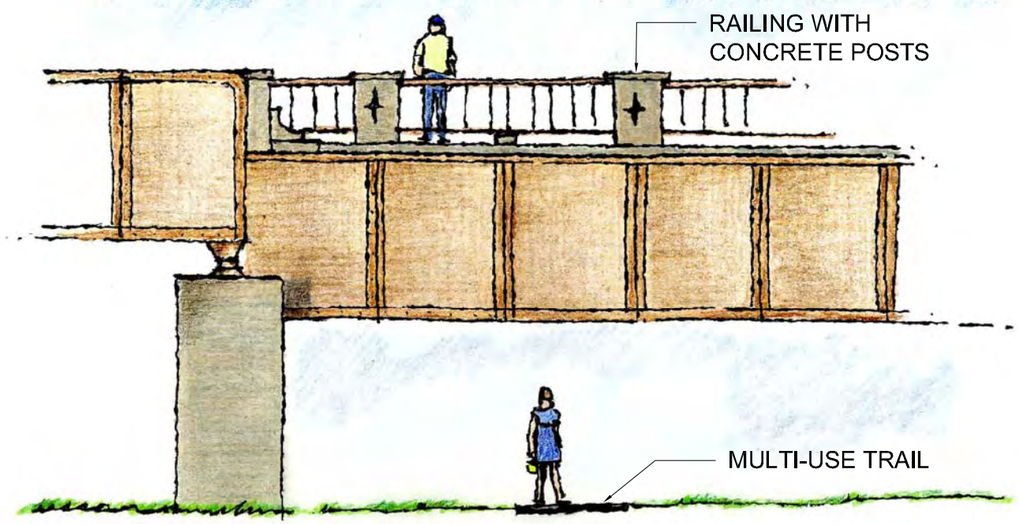
EAST SIDE ENTRY GATEWAY



EAST SIDE GATEWAY ELEVATION



PLAN VIEW OVER WILSON BLVD.



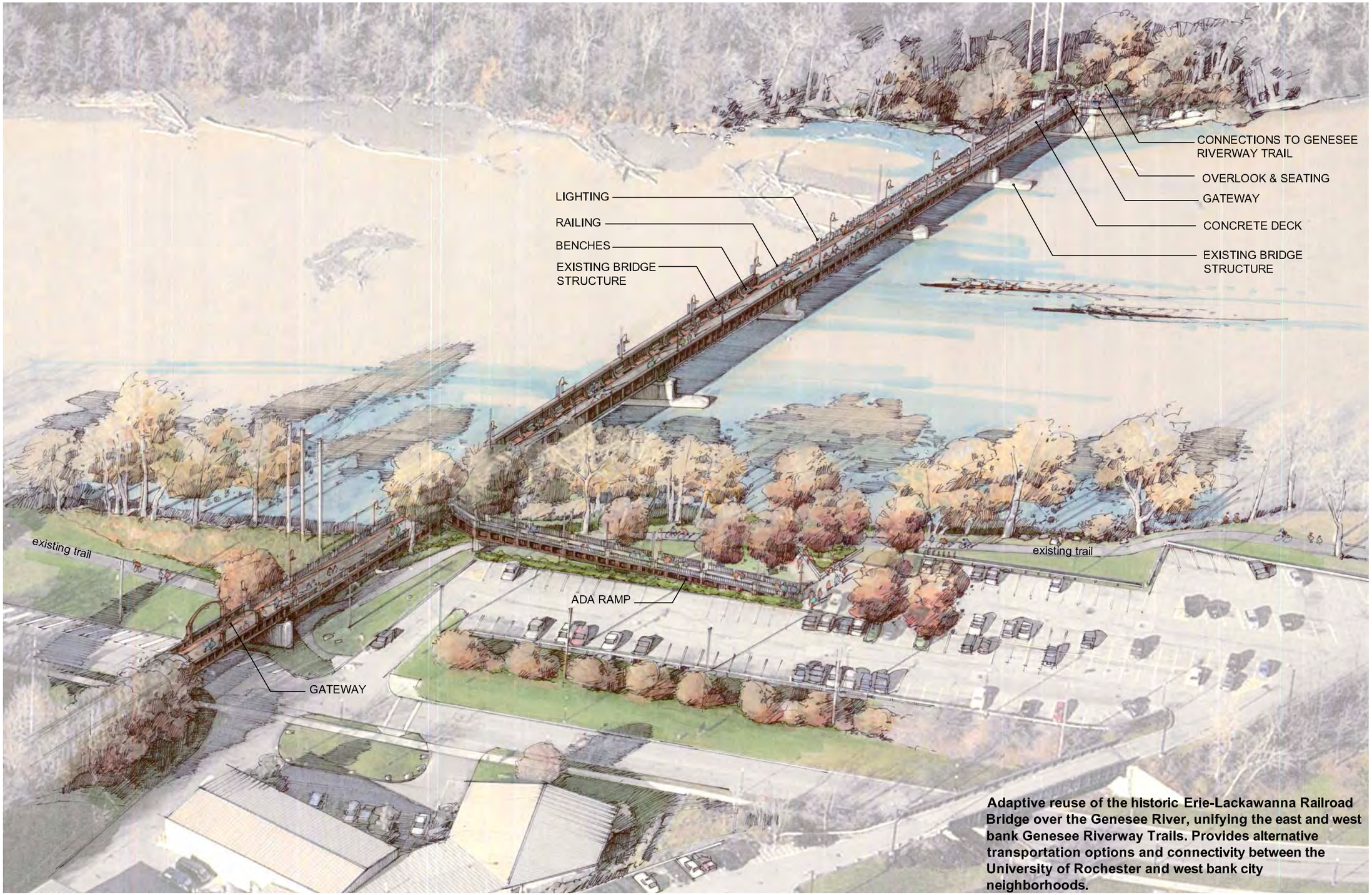
TRANSITION TO RAILING

Erie-Lackawanna Railroad Bridge
Rails-to-Trails Conversion

Concept Sketches October, 2007 Scale: N.T.S.

EDR

Figure 4



Adaptive reuse of the historic Erie-Lackawanna Railroad Bridge over the Genesee River, unifying the east and west bank Genesee Riverway Trails. Provides alternative transportation options and connectivity between the University of Rochester and west bank city neighborhoods.

Erie-Lackawanna Railroad Bridge
Rails-to-Trails Conversion

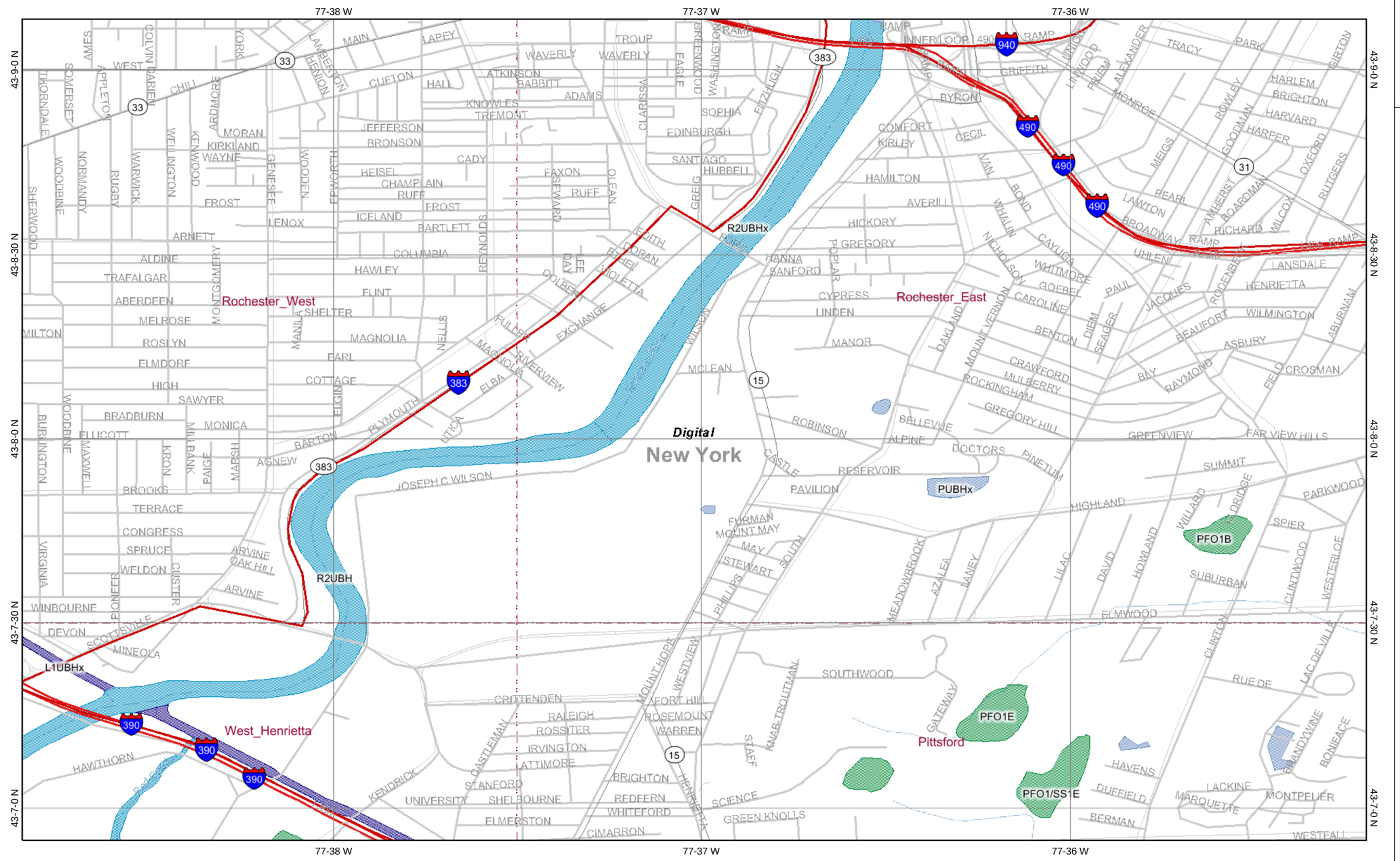
Concept Sketch

October, 2007 not to scale

EDR

Figure 5

Internet Mapping Framework



Legend

CONUS_wet_scan

- 0
- 1
- Out of range

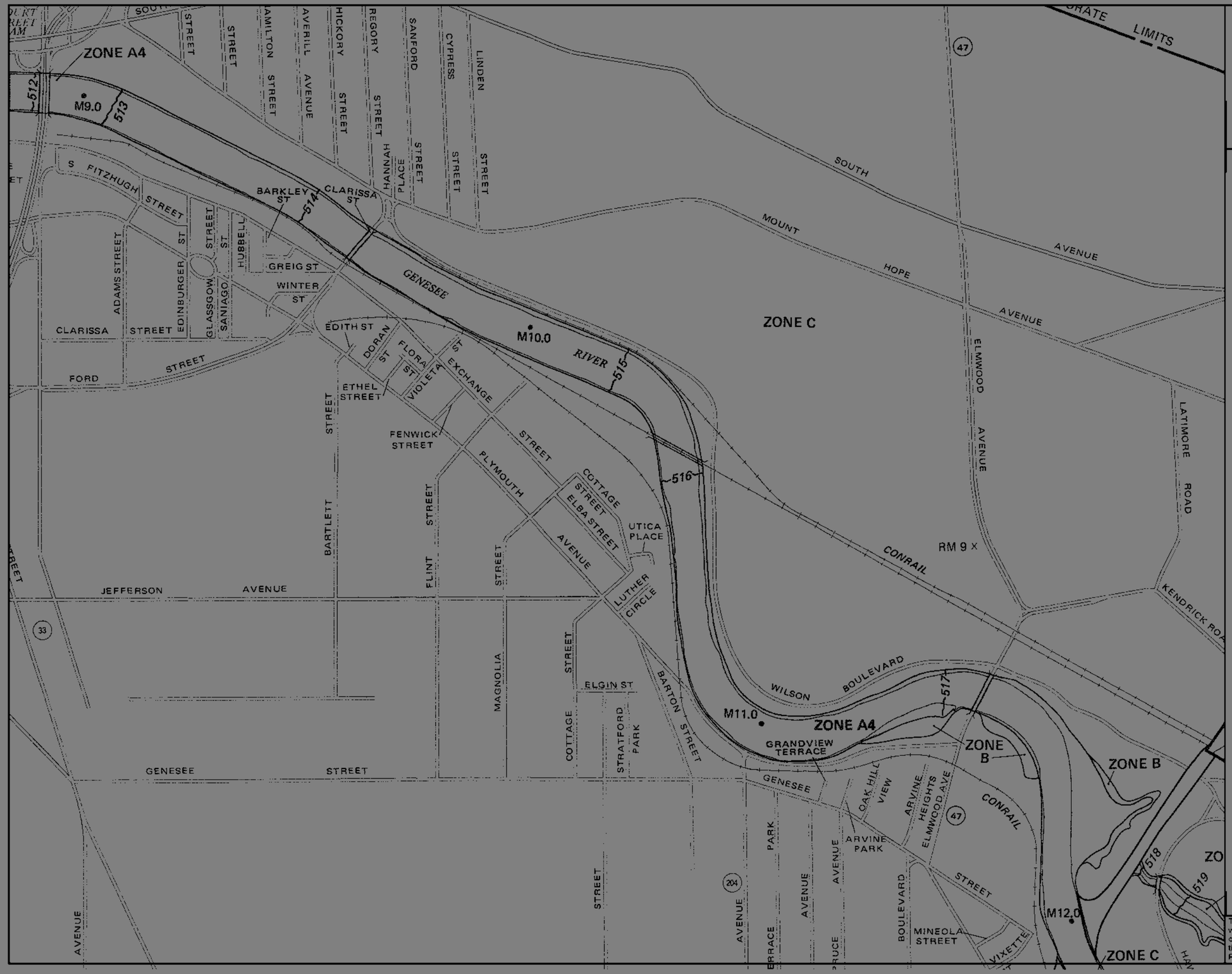
Interstate
Major Roads

Scale: 1:20,000

Map center: 43° 8' 1" N, 77° 37' 1" W

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

NWI Wetlands Figure 6



APPROXIMATE SCALE
1000 0 1000 FEE

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

CITY OF
ROCHESTER,
NEW YORK
MONROE COUNTY

COMMUNITY-PANEL NUMBER
360431 0020 B

PAGE 20 OF 25
(SEE MAP INDEX FOR PAGES NOT PRINTED)

EFFECTIVE
NOVEMBER 1, 1978

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Figure 7