Irondequoit Creek Valley Multi-Use Trail
Feasibility Assessment and Design Recommendations

Monroe County, New York

Prepared for:
The Town of Penfield, NY
Genesee Transportation Council, Rochester, NY

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

October 2008

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Irondequoit Creek Valley Multi-Use Trail Study
Feasibility Assessment and Design Recommendations
Town of Penfield, New York

Executive Summary

This report summarizes the analysis and preliminary design studies of the proposed Irondequoit Creek Valley Multi-Use Trail. The Genesee Transportation Council (GTC) contracted with EDR (Environmental Design and Research) to conduct site analysis, assess feasibility, and produce concept-level planning and design for a multi-use trail along Irondequoit Creek in Monroe County. Guidelines for design development, construction and maintenance of the trail system were prepared.

Irondequoit Creek runs along the western border of the Town of Penfield, and is a partial eastern border to the Towns of Brighton and Irondequoit. The Town of Penfield, and Irondequoit Creek, are both in eastern Monroe County. The section of the Irondequoit Creek Valley that was investigated for the potential feasibility of a multi-use trail follows Irondequoit Creek from Panorama Plaza at Penfield Road to the south end of Irondequoit Bay, near Empire Boulevard. The path of the creek twists and turns through northwest Penfield, and eventually empties into Irondequoit Bay, which empties into Lake Ontario.

The Irondequoit Creek Valley Multi-Use Trail is envisioned as a key community connector – both an interesting alternative transportation route and an exciting recreational pathway – for bicycles and pedestrians traveling in the Irondequoit Creek Valley. The 4.8-mile multi-use trail proposed in this study would complete the northern connection from Panorama Plaza to Irondequoit Bay. The proposed trail connects to the existing 1.3-mile segment of multi-use trail that follows the creek from Panorama Plaza to Channing H. Philbrick Park. A future mile-long connection is planned to link Philbrick Park to Spring Lake Park and the Crescent Trail Network in Perinton. When complete, the 7.1-mile trail will follow the path of Irondequoit Creek from the southern end of Irondequoit Bay to the Penfield town line at Spring Lake Park. As described in the Statewide Comprehensive Outdoor Recreation Plan for New York State, the Irondequoit Creek Valley Multi-Use Trail would be a significant element in the establishment of a contiguous trail corridor from the Erie Canal to the Seaway Trail along Lake Ontario.

The Irondequoit Creek Valley and the immediate surrounding area were assessed for the suitability of developing a multi-use trail. A preliminary assessment of the corridor was made, as well as an evaluation of the surrounding land uses, accessibility, vegetation, and other environmental features. The planning process for the feasibility study 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 trail has been mentioned – directly and indirectly – in other local, regional and state-level plans.

The creek meanders through four different Character Zones, which are listed here from south to north. Zone 1 is the Panorama Plaza area, from the confluence of Irondequoit and Allen's Creek to the Dolomite Quarry off of Penfield Road. In Zone 2 the creek flows through the Dolomite Quarry. In Zone 3, the creek meanders through the Ellison Park area. The south end of this zone is the Dolomite Quarry, and the north end is near Browncroft Boulevard. Zone 4 is the Ellison Wetlands area. The south end is near Browncroft Boulevard, and the north end is near Empire Boulevard at the existing parking and trailhead for the Monroe County Wetland Center.

The proposed schematic design adapts to varying conditions while consistently fulfilling the design objectives. The design alternatives address trail alignment, anticipated usage, trail surface materials, and site improvements. The feasibility of each design alternative was evaluated based on ownership, accessibility, environmental suitability, and constructability. One important focus of the schematic design is adaptive reuse of infrastructure that is already available and can accommodate

the trail. This cost-saving approach will lessen the environmental impact of trail development through this sensitive corridor. Conceptual design elements address the frequent flooding along sections of Irondequoit Creek.

The Irondequoit Creek Valley Multi-Use Trail will connect different neighborhoods, existing trails, and community resources. The trail will not disturb the bed or bank of the creek. The trail is likely to cross the creek three times, and different types of bridge structures could be used to make these crossings. Timber frame structures, helical piers, or floating boardwalks are all possible design solutions to create trail crossings that have interesting aesthetic character and minimal impact to the ecosystem. Bridges, while adding character and interest to a trail corridor, are an added expense, and for this reason, their use has been minimized to the greatest extent possible.

Given the scale and complexity of the proposed trail, it is likely that this project will be built in phases over a number of years, as funding becomes available. Each character zone corresponds to a recommended construction phase. Each phase of the trail could be constructed independently and still have significant stand-alone value. Based on June 2008 construction costs, the overall cost for full construction of all four phases is estimated at $3,510,945.

In general, the three proposed phases south of Browncroft Boulevard (Phases 1-3) have relatively few obstacles to implementation and present a highly desirable community trail expansion for a reasonable cost. Road crossings are minimal and easily managed, property ownership issues are few, and there are opportunities for adaptive re-use of existing infrastructure. Construction costs for Phase one, from Panorama Plaza to the Dolomite Quarry, are estimated at $283,703. Construction costs for Phase two, from the Dolomite Quarry to Ellison Park, are estimated at $203,175. Construction costs for Phase three, within Ellison Park, are estimated at $92,610.

Phase 4, which is located in the Ellison Wetlands, is the most sensitive and challenging area in which to accommodate a multi-use trail and still remain appropriate and sustainable. The cost for this phase would be higher (estimated at $2,931,458), but the end result would be a unique trail corridor that would provide an important alternative transportation link and a landmark destination that would support ecotourism in Monroe County.

The Irondequoit Creek Valley Multi-Use Trail has the potential to be a high value alternative transportation corridor. The feasibility of the trail is very favorable, due to the minimal number of road crossings, the involvement of very few property owners, and the opportunity to re-use existing infrastructure. To maximize an exceptional location, the trail corridor will be designed to balance a mix of recreation and alternative transportation uses with the preservation of sensitive ecosystems.

I. Introduction

This report summarizes the analysis and preliminary design studies of the proposed Irondequoit Creek Valley Multi-Use Trail. The Genesee Transportation Council (GTC) contracted with EDR (Environmental Design and Research) to conduct site analysis, assess feasibility, and produce concept-level planning and design for a multi-use trail that would extend from Penfield Road near Panorama Plaza to Empire Boulevard just south of Irondequoit Bay, in the Towns of Penfield, Brighton, and Irondequoit. Guidelines for design development, construction and maintenance of the trail system were prepared.

A. Irondequoit Creek Multi-Use Trail

The Irondequoit Creek Valley Multi-Use Trail is envisioned as a recreational pathway and alternative transportation route for bicyclists and pedestrians traveling in the Irondequoit Creek Valley. The 4.8-mile multi-use trail proposed in this study would complete the northern connection from Panorama Plaza to Irondequoit Bay. The proposed trail connects to the existing 1.3-mile segment of multi-use trail that follows the creek from Panorama Plaza to Channing H. Philbrick Park. A future mile-long connection is planned to link Philbrick Park to Spring Lake Park and the Crescent Trail Network in Perinton. When complete, the 7.1-mile trail will follow the path of Irondequoit Creek from the southern end of Irondequoit Bay to the Penfield town line at Spring Lake Park. As described in the Statewide Comprehensive Outdoor Recreation Plan for New York State, the Irondequoit Creek Valley Multi-Use Trail would be a significant element in the establishment of a contiguous trail corridor from the Erie Canal to the Seaway Trail along Lake Ontario.

The Irondequoit Creek Valley Multi-Use Trail is a mid-term recommendation of Phase One of the GTC Regional Trails Initiative, which was completed in 2002. The development of the Irondequoit Creek Valley Multi-Use Trail will benefit from synergy with two parallel planning initiatives that impact bicycle and pedestrian trails in the Town of Penfield. Monroe County is currently updating the Ellison Park Area Master Plan, which addresses all Monroe County land around Irondequoit Bay, including Ellison Park, Irondequoit Bay Park West, Irondequoit Bay Park East, Tryon Park and the Ellison Wetlands. The Town of Penfield is currently preparing a Bicycle Facilities Master Plan.

B. History of the Irondequoit Creek Valley

Irondequoit Creek runs along the western border of the Town of Penfield, and is a partial eastern border to the Towns of Brighton and Irondequoit. The Town of Penfield, and Irondequoit Creek, are both in eastern Monroe County. Lake Ontario, Irondequoit Bay and Irondequoit Creek played an important role in the settlement of this country and defined much of the early development of Penfield. The present-day creek follows the course of the valley carved by a prehistoric river, whose riverbed now lies under several hundred feet of rock and glacial debris.

Irondequoit Bay has been a landmark on almost every map of the “New World” since it appeared on Champlain’s Map of 1612. It was a gateway to the Seneca Nation, for unlike the Genesee River, there were no barriers, falls, or sheer cliffs along Irondequoit Creek. In 1669, the French explorer Robert Cavalier de LaSalle came to the south end of the Bay in the first recorded visit of white men to the Irondequoit Bay. LaSalle dreamed of finding a passage to the south sea and China. Irondequoit Creek became a natural travel route for the French and English, who pursued a lucrative fur trade with the Iroquois Nation, and competed for control of their territory. The area was a key military location in the 1700’s and had its first settlement in 1800.

Irondequoit Creek drops ninety feet as it flows from the Linden Ave Bridge to the "Hollow", and it was the waterfalls that attracted attention. In 1775, Daniel Penfield began purchasing land and in 1800, began building mills along the falls area to encourage settlement. Population grew rapidly, and in 1810, Townships 13 and 14 were designated by the New York State Legislature as the Town of Penfield. Penfield was the first of the seven east-side towns in the county to be established. By 1814, the census count was 1,874 residents, and it had reached approximately 5,000 people by

1840 when Township 14 was divided apart as the Town of Webster. The resultant population figure of around 3,000 remained fairly constant for almost a century, until World War II.

With the decline of milling in the mid-1800s, the principal industry in the area was agriculture. The Four Corners, where Five Mile Line Road crossed "the road to the mills" (Penfield Road), was the business and residential center of the town, but it did not become an incorporated village. Suburban development escalated sharply during the decades of the 1950s and 1960s, and the population count reached 23,732 in 1970. The present count is estimated at around 34,000.

Sources: The Town of Penfield Comprehensive Plan 2000, LaSalle's Landing Development Plan (1997), and the Town of Penfield Website (2007)

II. Planning Process

The planning process for the Irondequoit Creek Valley Multi-Use Trail 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 planning for the trail is an integral part of a long-range planning process that has been continuous, comprehensive, and participatory.

A. Relationship to Other Plans and Studies

The Irondequoit Creek Valley Multi-Use Trail Feasibility Assessment and Design Recommendations builds on the following previously completed planning initiatives:

Town of Penfield Parks and Recreation Master Plan, 2007
Town of Penfield Open Space Update, 2006
Browncroft Blossom Creek Neighborhood Center Plan, 2003
Irondequoit Bay Harbor Management Plan, 2003
Final Statewide Comprehensive Outdoor Recreation Plan, 2003
Town of Penfield Open Space Plan, 2001
Town of Penfield Comprehensive Plan, 2000
Town of Brighton Comprehensive Plan, 2000
Recreation Demand Study for Penfield, New York, 2000
Irondequoit Bay Hiking Trail Plan, 1999
LaSalle's Landing Development Plan, 1997
Proposal for Ellison Lake, Town of Penfield, 1991
Ellison Park Comprehensive Master Plan, 1985

The proposed Irondequoit Creek Valley Multi-Use Trail follows statewide policies concerning outdoor recreation found in the 2003 Final Statewide Comprehensive Outdoor Recreation Plan (SCORP). These include improving and expanding water-oriented recreation opportunities and supporting compatible recreation and interpretative programs. The proposed trail also meets several goals outlined in the SCORP, which include:

- Advance the development of a statewide system of interconnected trails and greenways and provide access to them.
- Expand trail systems that link communities.
- Improve level of access to parks, historic sites and open space areas to persons with disabilities.

B. Public Input

The Irondequoit Creek Valley Multi-Use Trail 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. Public outreach sessions were advertised in advance on the Town web site and in local newspapers. The sessions were also filmed and broadcast live on Penfield Community Television (PCTV), aired on PCTV multiple times after the meeting, and placed on the Town of Penfield website for streaming video available on demand. Feedback forms were distributed to all attendees, and were posted on the Town web site to solicit input.

Stakeholder Steering Committee Meetings
Committee Meeting, October 30, 2007
Committee Meeting, June 10, 2008

Public Outreach Sessions
Penfield Trails Committee Meeting, October 9, 2007
Public Meeting, November 27, 2007
Public Meeting, July 22, 2008

Other Meetings

As it relates to concurrent planning efforts, the Irondequoit Creek Valley Multi-Use Trail has been a part of an on-going discussion with the Monroe County Parks and Recreation Advisory Board, and the Penfield Bicycle Committee.

III. Existing Conditions Assessment

The proposed location of the Irondequoit Creek Valley Multi-Use Trail and the immediate surrounding area were assessed for the suitability of developing a multi-use trail.

A. Study Area

The section of the Irondequoit Creek Valley that was investigated for the potential feasibility of a multi-use trail follows Irondequoit Creek from Panorama Plaza at Penfield Road to the south end of Irondequoit Bay, near Empire Boulevard. The path of the creek twists and turns through northwest Penfield, and eventually empties into the Irondequoit Bay, which empties into Lake Ontario. The terrain on either side of the creek varies from steep slopes to flat floodplains.

Irondequoit Creek flows north from Panorama Plaza, flowing under Penfield Road. The creek passes through the Dolomite Quarry along the east and north sides of Ellison Lake. At the north end of Ellison Lake, the creek turns back in a southwestern direction, and runs along the edge of Ellison Park, where makes a number of twisting loops, before heading north again. As the creek turns to the north, it passes the historic Daisy Flour Mill at Blossom Road, and then continues to wind through Ellison Park, owned by Monroe County. North of Blossom Road, the meandering Ellison Park section of the creek is popular with canoeists, kayakers, and dog walkers.

As the waterway leaves the park, the creek separates into a main channel and a secondary channel known as the Raceway. The two channels flow north underneath Browncroft Boulevard at two locations. North of Browncroft Boulevard, Irondequoit Creek enters the Ellison wetlands, also owned by Monroe County. This area of the creek is also very popular for water sports, and is known as 'Rochester's Secret Wilderness'. The wetlands area has a number of tributaries and small channels that flow into Irondequoit Creek, making for interesting, but rather wet, terrain. To the west of the creek and the wetlands, Tryon Park occupies some of the steep slopes and is another Monroe County Park. Tryon Park has a network of trails that are primarily used by mountain bikers and hikers. The area known as the 'Old Rifle Range' occupies the eastern hillside, and also has a network of trails that are used primarily by hikers. The creek meanders through this wetland area, and eventually flows under Empire Boulevard and into Irondequoit Bay at LaSalle's Landing Park.

In the 1996 document, *Preservation of Environmentally Sensitive Areas in Monroe County*, the Monroe County Environmental Management Council identified the Irondequoit Creek area of Brighton and Penfield as a sensitive area, and described it in the following way:

> "The Irondequoit Creek Area is a parcel of over one hundred acres of marshland in the Irondequoit Creek Valley. At the section of the creek in Brighton, there are very steep slopes on either side of the creek. These are held in place by a canopy of black walnut, box elder, sugar maple, poplar, American elm, and shagbark hickory. Songbirds, deer, and small mammals are common in this gorge. The wetlands on site are NYSDEC Class I. This site links Ellison Park and the wetland area south of Irondequoit Bay, creating a valuable wildlife corridor."

B. Demographic Analysis

The Irondequoit Creek flows through a natural corridor that is surrounded on most sides by significant development. Approximately 9,000 residents live within one half-mile of the proposed multi-use trail corridor, in the Towns of Penfield, Brighton and Irondequoit. Approximately 64,900 residents live within two miles of the trail corridor (see Figure 13). This density of residents suggests that there will be a number of trail users living in

Figure 1. Community Services Close to Trail

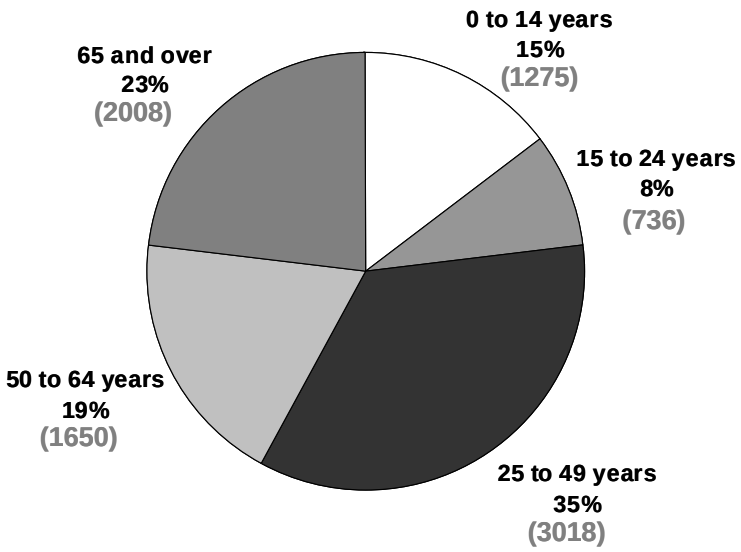
Community Resource	Less than ½ mile	Between ½ mile and 1–½ miles
Restaurants	18	5
Churches	4	10
Schools	1	15

Sources: 2000 U.S. Census, Google Earth Plus

close proximity. In addition, there are a number of community resources within close proximity of the proposed trail corridor, creating numerous destinations. Between the residents living near the trail, and the patrons of these community resources, the numbers suggest that there will be a critical mass of potential trail users.

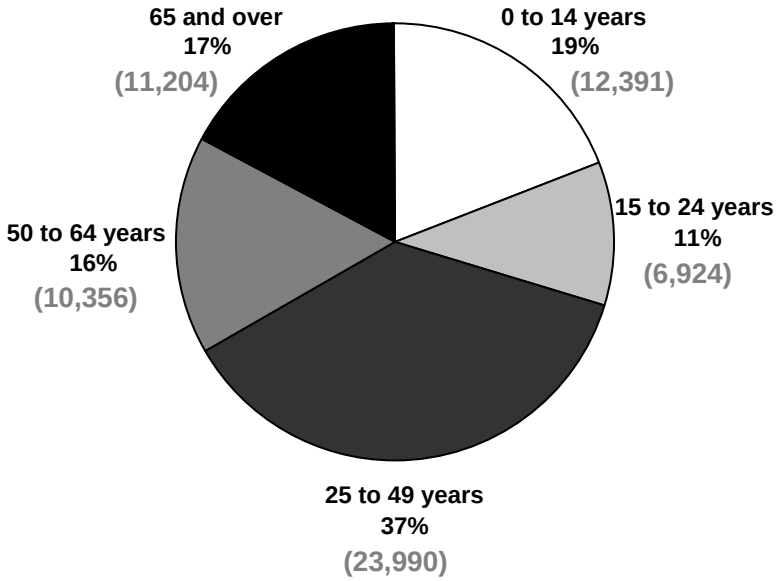
The Irondequoit Creek Trail will be accessible to people of all ages and levels of skill. However, it is still important to understand the makeup of the nearby population. Of the 9,000 residents living within one-half mile of the trail corridor, the greatest segment of the population (35%) is between 25 and 49 years of age. 23% of residents are 65 and over, and 19% are between 50 and 64 years of age. 15% of residents are younger than 14 years old, and 8% are between 15 and 24 years of age. One-half mile is a distance that the average person would travel on foot to reach the trail.

Chart 1. Age of Residents Living Within ½ Mile of Trail



Of the 64,900 residents living within two miles of the trail corridor, the greatest segment of the population (37%) is between 25 and 49 years of age. 19% off residents are younger than 14, 17% of residents are 65 and older, 16% are between 50 and 64 years of age, and 11% of the population is between 15 and 24. Two miles is a distance that the average person would travel on a bicycle to reach the trail. Basic adult and teenage riders, defined as Group B bicyclists by the FHWA (Federal Highway Administration), are likely to use their bicycles for transportation purposes such as going to the store, visiting friends, or going to school.

Chart 2. Age of Residents Living Within 2 Miles of Trail



Sources: 2000 U.S. Census, Google Earth Plus

C. Waterways

The Irondequoit Creek basin encompasses 151 square miles in parts of eight townships and two counties, emptying into Irondequoit Bay on Lake Ontario. 78% of the basin lies within Monroe County, with the remaining 22 percent in Ontario County. Of the Monroe County section, the City of

Rochester occupies 7 percent of the basin. NYSDEC lists Irondequoit Creek (Ont. 108-P 113-3) on its Priority Waterbodies List (#0302-0024) with a state classification of "B (T)." The best usages of Class B waters are as primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival. In addition, Irondequoit Creek is recognized as one of the best rainbow trout (steelhead) streams in New York State, but NYSDEC lists sediment as the primary source of contamination threatening the survival and propagation of fish within the creek.

D. Topography

An analysis of the topography in the project study area revealed that there is significant variation throughout the trail corridor. The project area high point is 402 feet, and the project area low point is 246 feet, which suggests a change of more than 150 feet throughout the site. The creek itself changes 18.5 feet in elevation over the approximately 5.4-mile section of waterway. The slopes range from 0% to 70%.

E. EPODS (Zoning)

The purpose of the Environmental Protection Overlay Districts is to provide special control over land development located in sensitive environmental areas within the Town of Penfield. These districts and their associated regulations are designed to preserve and protect unique environmental features within the Town as much as possible, including but not limited to wetlands, steep slopes, floodplains, watercourses, and woodlands.

The regulations contained in each environmental protection overlay district (EPOD) are not intended to be substituted for other general zoning district provisions, but can be superimposed over such district provisions, and should be considered as additional requirements to be met. The purpose of the overlay district is to provide the Town with an additional level of review and regulation that controls how land development permitted by the Town's primary zoning districts should occur in sensitive or unique environmental areas.

Wetlands - The Town of Penfield regulates development near wetlands in order to preserve, conserve and protect freshwater wetlands. The Town regards wetland areas as invaluable natural resources that provide for flood protection, wildlife habitats, recreational and open space, erosion and pollution control, and protection and recharging of ground water supplies.

Steep Slopes - The development impacts to steep slope areas include soil erosion and sedimentation, destruction of vegetation, increased runoff rates, and slope failure. The Steep Slope Protection District is intended to minimize the impacts of development activities on steep slopes in the Town of Penfield by minimizing the disturbance or removal of existing vegetation, preventing increased erosion and runoff, maintaining established drainage systems, locating development where it is less likely to cause future slope failures, and to retain as much as possible the natural character of these areas. The classification encompasses slopes of 15% or greater.

Woodlands - The Town of Penfield has a Woodland Protection District and Tree Preservation Zone Regulations to preserve and protect woodlands and measurable stands of trees within the Town by regulating or controlling development in those areas. Areas that involve active orchards are not included. Development in woodland areas cannot adversely affect soil stability, surface water runoff, existing drainage systems, natural characteristics of a watercourse, significant wildlife habitats, steep slopes, recreational opportunities, noise levels on adjacent areas, and water quality.

Floodplains - The unmanaged use of property, the alteration of topography, excessive filling, channel encroachment and other acts affect the natural discharge of water through floodplains and constitute a threat to the inhabitants of the Town of Penfield, and to the economic vitality of the community. The Floodplain Protection District regulates development within the areas of the Town that are subject to flooding in order to protect the health, safety and welfare of local residents, to prevent the

loss of property and the potential loss of life in flood prone areas, to preserve water quality, to minimize expenditures for relief, insurance and flood control projects, to limit building and development within the areas of special flood hazard.

Waterways - The Town of Penfield has a Watercourse Protection District to preserve and protect watercourses within the Town by regulating or controlling development in those areas. All areas within seventy-five (75) feet of the centerline of a natural or man-made watercourse are protected stream buffers. Development in these areas cannot adversely affect water quality, watercourse flood carrying capacities, rate of sedimentation, rate or velocity of groundwater runoff, and the natural characteristics of the watercourse.

The proposed trail follows the existing course of the Irondequoit Creek fairly consistently, and the creek traverses many of these sensitive environmental areas. In fact, the creek created or is cause for many of these sensitive areas, and a creek corridor trail would be unable to avoid many of these areas. The proposed path of the trail is almost entirely inside the 75' stream buffer and the 100-year floodplain, and traverses a number of wetland areas as it follows the creek. To a much lesser extent, the proposed trail goes near or through steep slope areas, and through a few wooded areas. Trail construction creates much less impact than many other types of development and construction, and trails can be designed in a way that both responds to and minimizes impact upon the landscape.

F. Open Space Plan

The Town of Penfield has an Open Space Plan (updated as of October 2005) that outlines a preservation strategy for key areas of open space within the community. The plan provides a logical strategy for preserving the Town's natural landscape, environmental features, and residential/rural character. The plan has a structured implementation program that will preserve those areas that define the character of the community, and recommendations to be used in making sound land-use planning decisions at the local level. As of June 2005, the Town of Penfield had preserved eleven properties of active farmland or open space, totaling 1000 acres. Most of the acreage was farmland where the development rights were purchased, while some properties are preserved through open space easements and cluster development.

Preservation of farmland and natural areas were identified as part of Penfield's character, and existing public and private parks and recreational systems were noted as providing facilities in high demand for the residents. The Open Space Plan outlines a number of goals, a number of which relate to trail development and recreational opportunities.

G. Circulation and Transportation

The Irondequoit Creek Valley Multi-Use Trail is proposed as a north-south linkage between a number of different roads, sidewalks, trails, and mass transit routes. The trail would function as a key community connector – as an interesting alternative transportation route and an exciting recreational pathway. Integration of the proposed trail with the Irondequoit Waterway will provide additional layers of transportation and recreation utility. Figure 3 shows the proposed trail overlaid onto a map of existing roadways, bus routes, and trails. This figure identifies where the proposed trail would cross existing roadways, and the accessibility of existing parking facilities. The trail will connect to the existing sidewalk system in numerous places, as well as existing transit routes.

Roadways and Parking

The trail crosses a number of roads that have been identified in the Penfield Bicycle Facilities Master Plan as priority bicycle routes based primarily on their connectivity between useful destinations. The Irondequoit Creek Valley Multi-Use Trail crosses the following priority routes: Empire Boulevard, Browncroft Boulevard, Blossom Road, and Penfield Road. The trail is also in close biking proximity of Creek Street and Panorama Trail. The trail will provide a desirable north-south bicycle route on the west side of Penfield, between the commercial areas of Panorama Plaza and Empire Boulevard.

The trail will need to safely cross vehicular traffic in several locations. At these locations, the trail crossing can occur via an overpass, an underpass, or through an at-grade crossing. The proposed trail route has five road crossings, where the Irondequoit Creek crosses a) Penfield Road, b) Old Penfield Road, c) Blossom Road, d) Browncroft Boulevard, and e) Old Browncroft Boulevard. Each crossing lends itself to a particular type of road crossing, and offers a connection to the existing transportation network. Please see Appendix D for a Road Crossing Analysis.

Trail users may benefit from access to existing parking facilities at Panorama Plaza, in Ellison Park, and off of Empire Boulevard at the trailhead to the Monroe County Wetland Center. Abundant parking capacity for trail users appears to be available at key locations along the trail corridor. Some negotiation with property owners may be required for parking privileges at Panorama Plaza.

Sidewalk Connections

The Town of Penfield is proud of its aggressive position in constructing sidewalks throughout the town. On any given day, you can see residents using these safe and convenient paths. The Town of Penfield has a Sidewalk Policy, which is guided by the Town Board, to dictate the process used by new development for sidewalk installation. The policy also specifies a Sidewalk Master Plan to identify primary roads in need of sidewalks.

The sidewalk priorities are based upon proximity to schools, parks, community facilities, and locations along busy roadways. The primary focus of the town at this time is to install sidewalks within the high-density residential areas, which are typically located west of Fairport, and Nine Mile Point Road. The town currently has over 264,000 linear feet of sidewalks within its borders, or over 50 miles. Each year the town reviews the needs for additional sidewalks and develops a plan for the coming construction season.

The sidewalk system will feed pedestrian traffic onto the multi-use trail in several locations. The proposed trail and existing sidewalk system will combine to create a web of safe and attractive "micro-loops" that will be allow for neighborhood connectivity, positive social interaction, and healthful physical activity.

Transit Connections

The Irondequoit Creek Valley Multi-Use Trail also intersects with multiple Regional Transit Service (RTS) bus routes as published by the Rochester Genesee Regional Transportation Authority (RGRTA). Every bus in the system is equipped with racks to transport bicycles. Three routes directly connect with the path of the proposed trail, while four other bus routes are within ½ mile of the trail. The following connections are currently possible:

Direct connections

- Route 22 *Penfield*, along Penfield Road and at Panorama Plaza
- Route 21/22 *Fairport*, along Penfield Road
- Route 30/40/45, *Webster*, along Browncroft Boulevard and along Empire Boulevard

Within ½ mile

- Route 2 *Parsells*, at Empire Boulevard and North Winton Road
- Route 8 *East Main*, to/from Browncroft Terminal
- Route 18/19 *University*, to/from Browncroft Terminal
- Route 18/19 *Plymouth*, to/from Browncroft Terminal

H. Trail connections

The Town of Penfield and the Penfield Trails Committee support integration of alternative transportation into the evolving regional trails network. The following trails, as described by Penfield Parks and Recreation, are likely to connect to the Irondequoit Creek Valley Multi-Use Trail. The trail connections are described from south to north (please see Figure 4 for a graphic illustration).

Channing H. Philbrick Park Trail (Penfield Town Park)

This is one of Penfield's oldest parks and the trail follows Irondequoit Creek from just north of Linden Avenue. The creek drops 90 ft. in the next mile. Fifteen mills during the last one hundred and fifty years operated in this area, and some old mill foundations are still visible. Conservation measures to control silt from the sand banks have been established along the west bank of the creek.

Location:	Off Route 441 in park along Irondequoit Creek. Trail begins at the trail sign, parking available.
Hiking Time:	1 hour approximately, a turn-around trail
Difficulty:	Simple, narrow footpaths. Steep, slippery, and rocky in some areas.
Length:	Approximately 1-1/2 miles
Features:	Hiking, used by fishermen along creek, several waterfalls, quiet meadow on island, remains of old mills on banks of the creek are visible while hiking

Irondequoit Creek Panorama Plaza Trail

This section of multi-use trail was constructed with Transportation Enhancement Program funding in 2005. The trail goes under Panorama Trail road, past the Home Depot, then under the 441 Expressway and connects to the Linear Trail in Philbrick Park. Good fishing spots along this trail. The existing section of multi-use trail is heavily used.

Location:	Trailhead kiosk behind Tops Market at Panorama Plaza. Parking behind Panorama Plaza.
Hiking Time:	Approximately one hour (turn-around trail).
Difficulty:	Paths are well made with stonedust. Wheelchair accessible.
Length:	One mile.
Features:	Trail begins near confluence of Allen's and Irondequoit Creeks. Follows Irondequoit Creek under Rt. 441 to connect to Philbrick Park. Town of Penfield owns a parcel at the confluence of Allen's and Irondequoit Creeks that may be developed into a trailhead park with water access.

Ellison Park South Entrance Trails (Monroe County Park)

This trail begins on Penfield Road, just west of Gentle's Farm Market. It follows a wash downhill to Irondequoit Creek near the tennis courts. One branch of the trail leads to an overlook of the gravel mining ponds at the east part of Ellison Park. This trail is known as the "Coyote Trail."

Location:	Western edge of town along Irondequoit Creek on south side of Blossom Rd., east of Spruce Shelter, parking available
Hiking Time:	2 hours
Difficulty:	Paths through moderate & steep areas
Length:	Approximately 1 mile
Features:	Hiking, x-country skiing, path along stream, gully south to Penfield Rd., overlooks Manitou Lake, canoeing to Bay. This trailhead on Penfield Road is ½ mile east of the entrance to Corbett's Glen in the Town of Brighton. The Gentle's Farm property was purchased by the Town of Penfield through the Open Space Plan. There is potential for a walking trail through this property that would connect Penfield Road to the Dolomite Quarry and Ellison Park.

Rifle Range Trail/Wetland Center Trail
North extension of Ellison Park (Monroe County Park)
Monroe County purchased the last part of private land in the area to complete this parkland. The trails start just east of Irondequoit Creek on Empire Boulevard. The trails pass the remains of two pits used for target practice for the 108th Infantry of G Company of the National Guard. They were stationed at the East Main Street Armory in Rochester. The New York State Police would also do some shooting there. The main house burned down in the 1960s, but a gazebo still remains. Officers would station themselves there to watch the practicing. The trail follows the east side of Irondequoit Creek, through a climax woodland community of Oak and Sassafras trees, all the way to Browncroft Boulevard and the main part of Ellison Park. This part of the trail is often called the Irondequoit Creek Wetlands East Trail.

Location:	South side of Empire Boulevard, just east of Irondequoit Creek
Hiking Time:	2 hours
Difficulty:	Hills and narrow trail, slippery when wet
Length:	Up to 2 miles
Features:	Remains of rifle target pits and views of Irondequoit Flowlands

Irondequoit Creek Wetlands East Trail/ Monroe County Wetlands Center
This trail follows Irondequoit Creek on the east side all the way to the Rifle Range Trail of the Wetlands Center to the north. There are two loop trails to an overview of the creek near the south end. The Monroe County Wetlands Center is a facility shared by Monroe County, the Town of Penfield, and Heritage Christian Services. Trail begins at the east end of Old Browncroft Boulevard.

Irondequoit Bay Park East Trails (Monroe County Park)
This is an undeveloped Monroe County Park. The trails begin at the end of park road that is off Empire Boulevard. These trails follow the east side of Irondequoit Bay and offer hiking that follows up and down the steep sides. The woods are old, large Oak, Hemlock and Sugar Maple trees.

Location:	West end of Smith Rd, off Empire Boulevard, park in cul-de-sac on Smith Rd., walk down road to Bay
Hiking Time:	1 hour plus
Difficulty:	Steep hills, slippery
Length:	2 miles
Features:	Hiking, nature study, Bay canoeing, mature trees, quiet coves, good spring birding along north meadow, trail connects to the YMCA trail

Corbett's Glen Nature Park
This 52-acre nature park includes: 8' wide multi-use trails, a low-profile wetland boardwalk, a cantilevered creek overlook deck, and a seating area that overlooks Postcard Falls. 2.5 miles of trails provide a range of accessibility and pedestrian links from local neighborhoods. Vertical and horizontal trail alignments respond carefully to a diversity of adjacent property owners, established neighborhood use patterns, and ecological communities.

Access points:
1. Off of Glen Road, near Route 441. Park patrons must park at the top of Glen Road and walk through the tunnel to access the park trail.
2. An eight-car parking lot located off of Penfield Road, across from Forest Hill Road. The proposed Creek trail is less than a mile from Corbett's Glen, via sidewalk connections.

Other Connections
The possibility exists for a future linked trail along Allen's Creek from the Irondequoit Creek Valley Multi-Use Trail to the trail system in Corbett's Glen Nature Park.

New York State Trails
The Irondequoit Creek Valley Multi-Use Trail could function as a north-south connection between the New York State Canalway Trail System and the federally designated Seaway Trail. This connection would link the Canalway Trail to the south to the completed Irondequoit Creek Panorama Plaza Trail, meeting the proposed Irondequoit Creek Valley Multi-Use Trail, which would run north linking to the New York Seaway Trail.

The New York State Canalway Trail System is a network of nearly 300 miles of multi- and single-use trails across upstate New York. It is described in the 2003 Final Statewide Comprehensive Outdoor Recreation Plan (SCORP) as a trail of "statewide significance." The 454-mile New York Seaway Trail is not an actual trail, but as a federally designated Scenic Byway, the route offers scenic on-road bicycling opportunities. Both long distance routes are described in the SCORP as part of New York State's primary trail system.

Providing a north-south connection through the Town of Penfield would provide increased tourism and an increased quality of life in the area, both considered an "enhancement of local and regional environment" according to the New York State Transportation Enhancements Program guidebook. The proposed trail would be anchored at both ends by established commercial zones, and would provide connections to a large number of community resources.

I. Community Connectivity
There are fifteen different opportunities for the trail to connect with destinations and resources in the nearby vicinity. Also made visible by Figure 4, these connections include:

1. Existing multi-use trail between Panorama Plaza and Philbrick Park
2. Town of Penfield land at Allen's Creek confluence, bridge at Nalge Nunc
3. Town of Brighton Corbett's Glen
4. Ellison Park south trailhead
5. Town of Penfield open space at Gentle's Farm
6. Dolomite Quarry, Ellison Lake
7. Potential access from Panorama Trail to Dolomite Quarry
8. Ellison Park
9. Indian Landing School
10. Ellison Wetlands
11. Narrows Bridge – connect to Brighton and Tryon Park
12. Old Rifle Range trails
13. Wetland Center
14. LaSalle's Landing Park
15. Bay Park East

J. Property Ownership
The property ownership situation favors the feasibility of the trail, for there are very few property owners involved. Seventy-five percent of the proposed trail goes through Monroe County land, and the trail is wholly situated within the limits of the Town of Penfield. Other than Monroe County and the Town of Penfield, there are only 3 other property owners along entire trail. These owners include the Dolomite Sand and Gravel Mining Operation, Rochester Gas and Electric (RG&E), and the owners of Panorama Plaza.

Property acquisition is not anticipated with the proposed trail development. The trail will be located primarily on public land, and easements will be needed for access through private property. Federal transportation funds require that public access must be guaranteed for the expected service life of the trail improvements. A permanent easement is recommended to assure the right of the trail to exist on private property and protect the public investment that is made in trail development.

The Dolomite Group has expressed willingness to participate in the trail development. Access through the RG&E parcel appears feasible, but an access easement may need to be negotiated. Access through the Panorama Plaza parcel would need to be finalized during the final design and construction phases. However, depending on the exact location of the trail, the entire system could be located within the existing creek easement. The easement allows the Town of Penfield access to fifty feet on either side of Irondequoit Creek. The preferred option is to keep the trail within the existing easement that the Town already has along Irondequoit Creek.

K. Historic Sites

The Irondequoit Creek Valley is a resource that has played a vital role in much of the region's history. The creek was a transportation corridor, a source of water and sustenance, and a supply of power for mills, among many other functions. A few historic sites still remain along the banks of the creek, and markers commemorate important places where no tangible presence of history remains.

Daisy Flour Mill

The years 1800 - 1840 were a time of rapid settlement and growth in Penfield, which gradually declined as larger milling interests were developed along the Genesee River in nearby Rochester. However, in 1846, along Irondequoit Creek downstream from the "Hollow", Samuel A. Rich built a sawmill that provided the lumber for a grist mill erected in 1848. This mill on Blossom Road, now the Daisy Flour Mill, produced flour and grain products through various ownerships until 1972. It is the only mill structure still standing in Penfield. Today, its machinery and leather drive belts still intact, it is a Penfield Landmark and is listed on the National Register of Historic Places.
(Town of Penfield website)

Ellison Park and The Lost City of Tryon

Officially the first Monroe County Park, Ellison Park came into being in December of 1926. The county accepted approximately 200 acres of land from Mr. and Mrs. Frank T. Ellison in memory of Mr. Ellison's father, Nathaniel. Ellison Park has been the hub of many historical events and locations. Indian Landing, which was located on Irondequoit Creek, was used for many years by the indigenous Iroquois as the beginning of the portage route that stretched along Ellison Park.

The English built Fort Schuyler at Indian Landing in 1721 as a trading post to observe French action in the area. Abandoned after a year, the fort was the first English settlement in western New York. Besides the creek, in the shadow of old Fort Schuyler, is a boulder that marks the site of Indian Landing. Dedicated with considerable ceremony in 1938, few people have visited it since. The inscription on the marker tells the story of Indian Landing:

> "The most important place in the early history of the Genesee Country, all of whose trails led to Irondequoit Bay. A gateway of the Iroquois Confederacy. Here were scenes of adventure and romance for more than 300 years, involving Indian wars, the struggle for empire between the French and English and the Revolutionary and pioneer period. Religion, commerce and war made this territory a famous battleground, bringing here many noted traders, priests and soldiers."

On North Landing Road at the edge of Ellison Park is another blue marker that remembers the once-thriving town, the Lost City of Tryon. Founded by Salmon Tryon in 1797, Tryon was the first white settlement west of Canandaigua, and was abandoned in 1818. Originally founded in hopes of creating a commercial settlement, Tryon used the Irondequoit Creek for trade. A store was built to barter with the Seneca Indians, beginning its trading roots. John Lusk was the first settler in 1789. Salmon Tryon sold the site to John Tryon, who divided it into town lots. Soon the community had a store, a five-story warehouse, a $15,000 flour mill, a customs house, a tavern, a distillery, an eshery, a huddle of houses and even a form of self-government called a "lynch-court."

Irondequoit Creek in those days was wide and swift and devoid of sandbars. At Indian Landing, 30-ton schooners docked to transport the produce of the frontier. Tryon Town was the only settlement along the lake between Oswego and Lewiston. The rest was dismal forest. The nearest center was Canandaigua. Settlers came to trade at Tryon Town, on horseback and by boat. Tryon was a busy place and its promoters dreamed of establishing a great city. By 1826 when the Erie Canal had been cut across the state, Tryon Town was all but deserted. The city fell as swiftly as it had risen.

Rifle Range

The area known as the rifle range, adjacent to Ellison Park, was previously used as a training site by the National Guard and the US Army weapons division. Two pits remain that were used for target practice by the 108th Infantry of G Company of the National Guard, who were stationed at the East Main Street Armory in Rochester. The New York State Police also used the range for shooting. The area was last used for military training during the Korean War. The main house burned down in the 1960s, but a gazebo still remains where officers would station themselves to watch the practicing. Over the years, the Adirondack Mountain Club has cleared out two of the old ranges, one rifle and one pistol, providing visitors a view into the past. Visible remnants of the rifle range still remain.

IV. Schematic Design

The Irondequoit Creek Valley Multi-Use Trail is envisioned as key community connector – both an interesting alternative transportation route and an exciting recreational pathway – for bicycles and pedestrians traveling in the Irondequoit Creek Valley. The multi-use trail will generally follow the stream corridor, and will provide a much-needed North-South regional bicycle connection. The Irondequoit Creek Valley Multi-Use Trail will connect different neighborhoods, existing trails, and community resources. The trail will not disturb the bed or bank of the creek. The design process was guided by six design objectives, which led to several design alternatives, and a preferred conceptual design solution.

A. Design Objectives

The schematic design phase for the Irondequoit Creek Valley Multi-Use Trail was guided by the following overall design objectives:

1. Provide alternative transportation between community resources
2. Provide universal access
3. Maintain user safety
4. Offer a high-quality user experience
5. Protect existing ecological resources
6. Emphasize sustainability and maintainability

B. Design Approach

Using the design objectives, a few alternative design solutions were considered for the Irondequoit Creek Valley Multi-Use Trail. The first overall project option is to do nothing. Despite being the least expensive option, this alternative was quickly discarded from the list of viable possibilities, as it provides no benefit to the community.

The second alternative is to develop a trail following along the banks of the creek. The schematic design adapts to varying conditions while consistently fulfilling the design objectives. The design alternatives address trail alignment, anticipated usage, trail surface materials, and site improvements. The feasibility of each design alternative was evaluated based on ownership, accessibility, environmental suitability, and constructability. One important focus of the schematic design is adaptive reuse of infrastructure that is already available and can accommodate the trail. This cost-saving approach will lessen the environmental impact of trail development through this sensitive corridor. Conceptual design elements consider the frequent flooding along sections of Irondequoit Creek.

The proposed multi-use trail utilizes asphalt, compacted gravel, and stone dust surfaces where appropriate to specific site requirements. The trail surface material is selected based on the following criteria: cost, durability, permeability, accessibility, and aesthetics. AASHTO guidelines indicate that asphalt surfacing is generally the preferred trail material where significant bicycle usage is anticipated. Concrete also provides an excellent surface, but is cost-prohibitive over large areas. However, asphalt costs are rising proportionately with the cost of oil. Stone dust surfaces are less desirable for bicycle routes, but provide a permeable surface that is locally available, relatively low cost, and environmentally friendly.

When properly constructed, stone dust trails are useable by bicyclists and are ADA compliant. Stone dust trails are not sustainable on steep slopes, or where exposed to high velocity water erosion. The trail will be in the flood plain, and subject to periodic flooding. The trail needs to be resistant to flood damage, or easily repaired. The Town of Penfield has found that the stone dust on the existing multi-use trail along Irondequoit Creek to be sustainable and require little maintenance. During the construction design and permitting process, the flow velocities of Irondequoit Creek should be assessed. In areas where the creek's flood velocity is medium or high, the recommended stone dust trail surface may not be the most appropriate choice.

C. Character Zones

The creek meanders through four different Character Zones, which are listed here from south to north. Each character zone corresponds to a recommended construction phase, as described in the Phasing & Implementation section of this report. See Figures 1A-1E for photographs of the various character zones. Zone 1 is the Panorama Plaza area, from the confluence of Irondequoit and Allen's Creek to the Dolomite Quarry off of Penfield Road. In Zone 2 the creek flows through the Dolomite Quarry. In Zone 3, the creek meanders through the Ellison Park area. The south end of this zone is the Dolomite Quarry, and the north end is near Browncroft Boulevard. Zone 4 is the Ellison Wetlands area. The south end is near Browncroft Boulevard, and the north end is near Empire Boulevard at the existing parking and trailhead for the Monroe County Wetland Center.

The trail is likely to cross over the creek three times, and different types of bridge structures could be used to make these crossings. Timber frame structures, helical piers, or floating boardwalks are all possible design solutions to create trail crossings that have interesting aesthetic character and minimal impact to the ecosystem. Bridges, while adding character and interest to a trail corridor, are an added expense, and for this reason, their use has been minimized to the greatest extent possible.

Pathways can be single-use, shared-use, or multi-use trails. A use is typically defined by the user group, such as bicyclists, horseback riders, or people on foot, such as hikers. Single-use trails are the most exclusive, and are generally designed, maintained and used by one user group. Shared-use trails are more broadly used, and while they may be designed for one particular user group, other user groups utilize them. An example might be a trail designed for equestrian use, which allows hikers. A multi-use trail, which is recommended in this study, is the most inclusive type of trail. A multi-use trail allows use by all or most non-motorized forms of transportation.

C. Preferred Conceptual Design Solution

The proposed path of the multi-use trail stays primarily on the eastern side of Irondequoit Creek, except along Ellison Lake. The existing Irondequoit Creek Trail goes under Route 441, past the Home Depot, and under Panorama Trail Road to the rear of the TOPS Supermarket. A trailhead kiosk and parking can be found behind this Panorama Plaza supermarket. The proposed trail picks up from this location and heads north towards Penfield Road.

Throughout the trail corridor, there are opportunities to create secondary and tertiary trails. Some of these secondary and tertiary trails would be connections to established trail networks. Tryon Park and the old rifle range both have networks of trails adjacent to the study area. This can be considered a low road-high road concept. The Irondequoit Creek Valley Multi-Use Trail would be the low road, developed in a way that is accessible to people of all skill levels. The secondary and tertiary trails would loop away from the trail, occupying steeper slopes and wooded areas, and would offer a higher-level challenge. These secondary and tertiary trails would increase physical access to the multi-use trail, and offer opportunities to people wanting to experience other parts of the creek valley, or a different recreational challenge. The trails would be linked in such a way that there could be visual access between the different trail types. The secondary and tertiary trails are not included in the scope of this report, but are an important aspect of trail development in this corridor.

D. Trail signage

Irondequoit Creek offers a number of opportunities for signage. Primary signage will be historic and interpretive signs related to the waterway. Secondary signage will include wayfinding signs, related to the trail and surrounding neighborhoods. Figures 8A-8E show phasing maps, and indicate locations for primary interpretive signage. Secondary signage will typically be placed at rest intervals along the trail. Additional signage may also be required to address safety and regulatory issues that affect trail users and the local environment.

V. Phasing and Implementation

Given the scale and complexity of the proposed trail, it is likely that the project will be built in phases over a number of years, as funding becomes available. An overall approach to phasing the project corresponds with the four Character Zones described earlier (see Figure 8A). Each phase of the trail could be constructed independently and still have significant stand-alone value.

In general, the three proposed phases south of Browncroft Boulevard have relatively few obstacles to implementation and present a highly desirable community trail expansion for a reasonable cost. Road crossings are minimal and easily managed, property ownership issues are few, and there is ample opportunity for adaptive re-use of existing infrastructure.

Phase four, which is primarily located in the Ellison Wetlands area, and starts just south of Browncroft Blvd, is the most sensitive and challenging area in which to accommodate a multi-use trail and still remain appropriate and sustainable. The cost for this phase would be higher, but the end result would be a unique trail corridor that would provide an important alternative transportation link and a landmark destination that would support ecotourism in Monroe County.

A. PHASE 1
South end: Creek Confluence behind Panorama Plaza
North end: Dolomite Quarry access off of Old Penfield Road
Total length: 0.42 miles

Phase 1 Design Concept

The southern terminus for the entire trail project is located behind Panorama Plaza at the confluence of Allen's Creek and Irondequoit Creek (see Figure 8B). The proposed trail will start at the northern end of the existing multi-use trail from Philbrick Park. Within Phase 1, connections are made to existing trail systems, existing automobile routes and parking, and mass transit routes. The Town of Penfield parcel at the confluence offers the potential for a trailhead pocket park with creek access for paddlers. Ample parking exists behind Panorama Plaza, but access agreements with the Plaza owners would need to be formalized.

An 8' wide stone-dust trail is proposed from the confluence north to Penfield Road. The new trail in this area will match the construction of the existing multi-use trail it adjoins. The permeable trail surface in this area is responsive to the sensitive creek ecology. Clearing of mature vegetation will be minimal, and no disturbance to the bed or banks of the creek is proposed. The existing stone-dust creek trail has held up well to periodic flooding.

The trail alignment is located within the existing creek easement to minimize access and ownership issues. Access easements will be needed, but property acquisition is not anticipated. Federal transportation funds require that public access must be guaranteed for the expected life of the trail. Access through the RG&E parcel appears feasible, but an easement may need to be negotiated. Access through the Panorama Plaza parcel would need to be finalized during future design and construction phases. Depending on the exact location of the trail, the entire system could potentially be located within the existing creek easement, which allows the Town of Penfield access to fifty feet on either side of Irondequoit Creek.

An underpass is proposed at the location where the trail crosses Penfield Road. Vertical bridge clearance and bank conditions support the feasibility of this option. A short additional section of trail brings users to Old Penfield Road, where an at-grade crossing is proposed. Please see the Road Crossing Analysis in Appendix D for additional information on both of these road crossings.

The existing bridge on Old Penfield Road allows for a safe crossing to the west side of the creek. The bridge is relatively new construction, with a curbed sidewalk on one side for pedestrians, and

striped shoulders on both sides for bicyclists. From the bridge to the Dolomite Quarry entry, bicyclists can use the existing paved shoulder. Approximately 400 lineal feet of pedestrian trail will need to be accommodated along the steep embankment on pier-supported trail structure. At the top of the steep slope, the pathway returns to a gentle grade that will allow for the construction of an 8' wide stone-dust trail, which will run an additional 309 LF to the access point at the quarry.

Phase 1 Approximate Cost: $284,000

Phase 1 Community Value
This short section of the overall project would extend the existing multi-use trail from Panorama Plaza north to the Dolomite Quarry entrance. The trail would provide off-road access from Ellison Heights to the Plaza, with a potential reduction in short-distance automobile traffic.

B. PHASE 2
South end: Dolomite Quarry access off of Old Penfield Road
North end: Proposed creek crossing into Ellison Park
Total length: 1.25 miles

Phase 2 Design Concept
The Dolomite Group is considering a small parking area and trailhead off of Old Penfield Road. From that point, a 10' wide multi-use trail can be accommodated on the existing access road bed (See Figure 8C). The access road on the east side of the lake was built for heavy trucks and is relatively well graded. Existing slopes will be compliant with ADA Trail Standards (see Appendix C). Some minor repairs and surface improvements will be needed to convert the existing access road to a multi-use trail. The recommended surface is compacted gravel to provide permeability adjacent to the creek. Compacted gravel is an ADA-compliant surface that is firm, stable and slip-resistant. An upgrade to an asphalt surface is a possibility, and could be explored during design development.

In this phase, two portage points are recommended to allow paddlers access from the creek into the quarry lake. An unimproved footpath exists on the east side of the creek. One creek crossing is recommended near the Town of Penfield parcel that connects to Panorama Trail. A second creek crossing is needed at the north end of the lake to make the connection into Ellison Park. The character of these bridges should be consistent with the existing pedestrian bridges in Ellison Park. Interpretive signage and resting intervals with seating are suggested at key locations.

The Dolomite Sand and Gravel Mining Operation is the only property owner involved in this phase. An access easement will be needed, but property acquisition is not anticipated. Federal transportation funds require that public access must be guaranteed for the expected life of the trail. The Dolomite Group has expressed willingness to participate in the trail development.

Phase 2 Approximate cost: $203,000

Phase 2 Community Value
This section of the trail creates connectivity from the Dolomite Quarry into Ellison Park. The Quarry is an emerging open space asset that provides historical, environmental and scenic value. A potential trail link through the Town of Penfield property offers access from Panorama Trail.

C. PHASE 3
South end: Proposed creek crossing into Ellison Park
North end: Parking lot at Pavilion Lodge
Total length: 0.73 miles

Phase 3 Design Concept
Several alternatives were evaluated for bringing the multi-use trail through Ellison Park, including off-road, on-road, and hybrid trail options.

Because the park sees an especially high volume of recreational users, it was desirable to separate pedestrian and bicycle traffic in this zone. The proposed design provides a separate stone dust pathway for pedestrians that follows the existing park road (see Figure 8D). A 6' wide planted buffer separates the pathway from the road. Surfacing, cross-slope and running slope of this pathway will meet accessibility guidelines. Bicyclists will utilize the existing park roads as "signed, shared roadways" according to AASHTO standards (see Figure 10). The park roads meet the criteria regarding lane width, low traffic volumes, and low posted speed limits. In addition, the park roads have open sight lines and all users are accustomed to a mix of automobiles, pedestrians and bicyclists. Appropriate signage will need to be posted to establish the signed/shared roadway.

The existing at-grade road crossing at Blossom Road will be utilized. Sight distance at this crossing is very good, and speed limits on Blossom Road are strictly enforced by local law enforcement. Traffic volumes can be somewhat high during peak periods, but adequate crossing gaps occur at acceptable intervals (see the Road Crossing Analysis in Appendix D for additional information). Signage designed to alert motorists of a trail crossing should be placed on Blossom Road. North of Blossom Road, the same multi-use trail configuration continues to the Pavilion Lodge. Phase 3 ends at the parking lot at Pavilion Lodge.

Phase 3 Approximate cost: $92,610

Phase 3 Community Value
This phase continues the multi-use trail through the developed sections of Ellison Park, providing connections to a number of established recreational facilities. Important connections to the existing road network are made at Blossom Road, which connects to both Landing Road and Creek Street.

D. PHASE 4
South end: Parking lot at Pavilion Lodge
North end: Empire Blvd (existing trailhead and parking for Monroe County Wetland Center)
Total length: 2.40 miles

Phase 4 Design Concept
Beyond Pavilion Lodge, an abandoned service road can be re-surfaced to create a 10' wide multi-use trail section. The proposed trail follows the western bank of the Raceway for about 800 feet until the service road veers away to the west. At this location, a creek crossing is proposed to bring the trail to the eastern side of the Raceway where it will continue to Browncroft Boulevard. As a result of frequent flooding, this section of trail may require an asphalt surface. Please note that the abandoned service road continues up to Landing Road, and with minor improvements could provide additional connectivity between the proposed multi-use trail and the existing transportation network.

Under Browncroft Boulevard, a boardwalk begins and continues into the Ellison Wetlands. Phase 4 is located primarily within the Ellison Wetlands. The wetlands are of high value and comprise an ecologically sensitive area. The upland areas on both sides of the wetlands are steep slopes on sandy soils that are prone to significant erosion. Mature mixed hardwood forests are prevalent in the upland areas. Both Tryon Park on the west side, and the Old Rifle Range on the east side, have existing trail systems. A bridge across Irondequoit Creek is proposed at the Narrows that would connect those two areas. Analysis of GIS mapping and on-site reconnaissance indicated that establishing a multi-use trail on the upland slopes would likely require extensive clearing of mature vegetation. The environmental impacts would be significant, and the accessibility of the trail would meet current standards.

The recommended design, instead, utilizes a boardwalk system along the eastern edge of the wetlands, running along the toe of the wooded slopes (see Figure 8E). Several possible construction systems were considered, and a floating boardwalk system was selected. The floating boardwalks would have the least environmental impact and would be suitable to the local conditions. The proposed boardwalk would maintain an 8' clear width, with bump-outs for resting areas with benches. Where topography allows, connector boardwalks will link to the existing upland trails. The southern end of the boardwalk would start at Browncroft Boulevard, and the northern end would be at the Wetland Center, a facility shared by Monroe County, the Town of Penfield, and Heritage Christian Services. From the Wetland Center, improvements to the existing access road will provide the final stretch of trail to the existing parking and trailhead on the south side of Empire Boulevard.

The preferred solution for Phase 4 is a boardwalk with a curb-like bullrail, designed to meet ADA guidelines. During future design and construction phases, however, there may need to be further investigation to determine the most appropriate solution. Full-height handrails are only recommended around the bumpouts. Handrails along the entire boardwalk would be a significant additional cost, utilizing potentially unnecessary resources and materials. The bullrail is the recommended system for a number of reasons. The boardwalk is a floating system located predominantly in an emergent marsh, which provides an at-grade walkway with no vertical fall concerns. In areas where the boardwalk would intersect the main channel, the water depth is minimal (24" or less). A bullrail is a more appropriate response to public comments related to minimizing visual impact, and providing easy access for paddlers onto the boardwalk.

The Ellison Wetlands include the Irondequoit Creek Waterway, a designated "blue trail" for paddlers. Please see Appendix E for the Town of Penfield Irondequoit Creek Waterway Map. Careful consideration was given to the harmonious integration of the boardwalk trail with the Waterway Trail. The placement of the boardwalk on the east side of the wetlands responds to the official waterway trail, which is on the west side. The alignment of the boardwalk weaves in and out of wetland vegetation, which will provide an interesting experience for trail users, and help reduce the visibility of the boardwalk for paddlers. The Waterway Trail is approximately 2.4 miles in length, and the proposed boardwalk would be in visual proximity for roughly 0.4 miles of that length. Where the two systems come close together, it is anticipated that resting platforms along the boardwalk would be an amenity for paddlers. See Figure 12 for a visual simulation of the boardwalk trail.

The "straightaway", a straight section of the Waterway Trail that runs due east-west in the Ellison Wetlands, has special value to paddlers, particularly due to its scenic qualities in the autumn. When Phase 4 moves forward, further site investigation is recommended to see if possibilities exist to bring the trail overland to protect the scenic value of the straightaway and any other sections of the Waterway Trail that are significant to paddlers.

Phase 4 Approximate cost: $2,931,458

Phase 4 Community Value
Completing the trail segment in Phase 4 would provide an important north-south alternative transportation link to Empire Boulevard. There are important commercial nodes already established along Empire Boulevard, and the south end of Irondequoit Bay is seeing an increasing amount of commercial and residential development. The Monroe County Wetland Center is an evolving facility, and the Town of Penfield is planning an expansion of La Salle's Landing Park. Additional trail connections to Irondequoit Bay Park East and Irondequoit Bay Park West offer future potential.

In addition to the alternative transportation benefits, the Phase 4 boardwalk would provide a new level of accessibility into the Ellison Wetlands. Residents of all mobility levels would be able to enjoy, observe and learn from an extraordinary ecological resource.

VI. 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

In Upstate New York, children obesity trends exceed or match national trends. For example in 2004, twenty-one percent of Upstate New York 3rd graders are obese, which exceeds the national rate of 16% (Upstate NY, 2004). Childhood overweight and obesity is a precursor for adult obesity. The *Strategic Plan for The Prevention of Childhood Overweight and Obesity in Monroe County, NY 2007-2017,* cites "the physical environment and the lack of affordable and safe recreational venues for many children," as a factor in childhood overweight and obesity. The *Greater Rochester Health Foundation* and its Task Force has set the following goal to decrease childhood obesity:

- Reduce the prevalence of overweight and obesity, as measured by Body Mass Index (BMI), from 12,244 (15%) to 4,081 (5%) of Monroe County children ages 2-10 by 2017.

Increased physical activity and creating safe environments are strategies that will be employed to meet the goal.

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 has the benefit of looking and feeling better, but also reducing the 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).

In addition, research studies have found that overweight and obese children have lowered academic achievement in standard test scores (CA Dept of Ed, 2005). Also, findings in other studies show that children who are physical active perform better academically and miss fewer days of school (Dwyer, 1996). 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.

VII. LEED and Sustainability

As a trail project, the Irondequoit Creek Valley Multi-Use Trail does not specifically fall under the jurisdiction of the U.S. Green Building Council (USGBC) and their standards for Leadership in Energy and Environmental Design (LEED). However, LEED has become the accepted standard for incorporating the principles of sustainability into new development and major renovation projects.

Through LEED, the USGBC has provided voluntary rating systems that are based on accepted energy and environmental principles, and strike a balance between established practices and emerging concepts. As of July 2008, there were nine different LEED rating systems. The two rating systems that are applicable to this project are LEED-NC for New Construction, and LEED-ND for Neighborhood Development.

In addition, Monroe County has developed their own Green Building Initiative. Construction projects for County facilities will use green building design practices in accordance with the USGBC LEED standards. Green building design practices will be used to the greatest extent practicable for Monroe County new building construction and building renovation projects of more than 5,000 square feet.

A. LEED for New Construction and Major Renovations (Version 2.2)

As the name implies, this rating system provides guidelines for new building construction and major renovation projects. Credits can be earned in six different categories. The Irondequoit Creek Valley Multi-Use Trail responds to guidelines found in the following categories: Sustainable Sites, and Materials & Resources.

Sustainable Sites

1. Alternative Transportation: Public Transportation Access (Credit 4.1)
2. Alternative Transportation: Bicycle Storage and Changing Rooms (Credit 4.2)
3. Alternative Transportation: Parking Capacity (Credit 4.4)
4. Site Development: Protect or Restore Habitat (Credit 5.1)

Materials & Resources

1. Materials Reuse (Credits 3.1 and 3.2)
2. Recycled Content (Credits 4.1 and 4.2)
3. Regional Materials (Credits 5.1 and 5.2)
4. Certified Wood (Credit 7)

B. LEED for Neighborhood Development (Pilot Version 2007)

This rating system is designed to certify exemplary development projects that perform well in terms of smart growth, new urbanism, and green building. Projects may constitute whole neighborhoods, fractions of neighborhoods, or multiple neighborhoods. Credits can be earned in four categories. The Irondequoit Creek Valley Multi-Use Trail responds to guidelines found in the following categories: Smart Location & Linkage, Neighborhood Pattern & Design, and Green Construction & Technology.

Smart Location & Linkage

1. Reduced Automobile Dependence (Credit 4)
2. Bicycle Network (Credit 5)
3. Steep Slope Protection (Credit 8)
4. Site Design for Habitat or Wetland Conservation (Credit 9)
5. Restoration of Habitat or Wetlands (Credit 10)
6. Conservation Management of Habitat or Wetlands (Credit 11)

Neighborhood Pattern & Design

1. Street Network (Credit 8)
2. Access to Surrounding Vicinity (Credit 11)
3. Access to Public Spaces (Credit 12)
4. Access to Active Spaces (Credit 13)
5. Universal Accessibility (Credit 14)
6. Community Outreach and Involvement (Credit 15)

Green Construction & Technology

1. Reduced Water Use (Credit 3)
2. Minimize Site Disturbance Through Site Design (Credit 6)
3. Minimize Site Disturbance Through Construction (Credit 7)
4. Stormwater Management (Credit 9)
5. Recycled Content in Infrastructure (Credit 17)
6. Construction Waste Management (Credit 18)

VIII. 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. In this case, CPTED specifically applies to the design and construction of trailheads, parking areas, and trail access points.

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.

IX. 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

Under most conditions, a recommended paved width for a two-way shared use path is 10'. In sensitive ecological areas, however, an 8' trail width is allowed where sight distance and trail alignment are good, expected trail use is low, and access by the occasional trail maintenance vehicle will not cause trail surface damage. 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 10', preferably 12' or more. Another important factor in determining the appropriate trail width is that bicyclists will tend to ride side by side on bike paths, necessitating more width for safe use.

A minimum 2' graded area with a maximum 1:6 slope shall be provided adjacent to both sides of the path. 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.

B. Clearance to Obstructions

A minimum 8' horizontal clearance to obstructions shall be provided adjacent to the pavement. A 10' 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 the same as the approaching paved path plus the minimum 2' clear areas. The vertical clearance to obstructions across a bridge or structure shall be 10'.

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 trail is dependent on the expected type of use and on the terrain. The minimum design speed for shared use path should be 20 mph. On unpaved paths, a lower design speed of 15 mph can be used. Similarly, where the grades or prevailing winds dictate, a higher design speed of 25 mph can be used. 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 pathway surface, the coefficient of friction between the bicycle tires and the surface, and the speed of the bicycle. For most bicycle path applications, the maximum superelevation rate will be 3 percent. A straight 2% cross slope is recommended on tangent sections, and ADA guidelines require that cross slopes not exceed 2-3 percent. The minimum superelevation rate of 2% will be adequate for most conditions and will simplify construction. When transitioning a 3 percent superelevation, a minimum 25-foot transition distance should be provided between the end and beginning of consecutive and reversing horizontal curves.

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 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.

X. 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.

XI. 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!

XII. Operations and Maintenance

Guidelines for operations and maintenance of the Irondequoit Creek Valley Multi-Use Trail will help establish this pathway as a multi-use 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 how 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	Volunteers, trail operator
	Sign replacement	
	Map/signage updates	
	Trash removal/litter clean-up	
	Replace/repair trail support amenities (parking lots, benches, restrooms, etc.)	
	Repair flood damage: silt clean-up, culvert clean-up, etc.	
	Patching/minor regrading/stone dust replacement	

Seasonal	Planting/pruning/beautification Culvert clean-out Installation/removal of seasonal signage	Volunteers, trail operator
Yearly	Surface evaluation to determine need for patching or regrading Evaluate support services to determine need for repair or replacement	Trail operator
Frequency	**Maintenance**	*Performed by*
5-year	Repaint or repair trash receptacles, benches, signs, and other trail amenities, if necessary	Volunteers, trail operator
10-year	Resurface / regrade / restripe	Hired contractor, trail operator, volunteers
20-year	Replace / reconstruct trail	Hired contractor, trail operator, volunteers

The proposed Irondequoit Creek Valley Multi-Use Trail will consist of both granular stone dust and boardwalk surfaces. 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. Flooding can be expected in the Irondequoit Creek Valley, and maintenance should be anticipated.

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, 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 stone dust replacement
- Planting, pruning, and general beautification

The yearly cost for routine maintenance depends on the maintenance capabilities already in place with the trail owner and the amount of volunteer labor used. In general, yearly routine maintenance costs can be estimated at $5,000 per mile. This figure does not include snow removal.

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

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 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 bike lanes on existing pavement 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 will be the best source of cost information.

Major Reconstruction
There is one activity considered to be major reconstruction, the complete replacement, regrading, and resurfacing of all trails. 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 are the same as the cost of a new trail plus the cost of demolishing the existing trail. 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.

XIII. SEQR Documentation and Permit Process

Development activities to implement the proposed Irondequoit Creek Valley Multi-Use Trail may involve short term and long term adverse impacts to water quality and significant habitats from construction activities. This plan is a framework to minimize such impacts.

A. SEQR Documentation

This plan is subject to SEQRA because the proposed future actions within the plan may affect the environment. Thus, the following steps are recommended:

1. Complete a Short Environmental Assessment Form (EAF). A Long EAF is optional.
2. Determine the significance of the environmental impact within 20 days.
3. If a Negative Declaration is determined, the lead agency must:
   - Prepare, file, publish and distribute the Negative Declaration. Every Negative Declaration must: identify the relevant areas of concerns; thoroughly analyze the relevant concerns; and document the determination in writing, describing the reasons why the environmental concerns that were identified and analyzed will not be significant.
   - Maintain the file for public access.
4. If a Positive Declaration is determined, the following must be completed:
   - The lead agency must file a notice of the Positive Declaration.
   - A scope of the environmental issues needs to be prepared. Scoping is completed to address the environmental issues, which may be done by the lead agency, by the applicant, or by a consultant. All involved agencies should participate in the scoping process. A draft scope should be given to anyone who has written to express project interest.
   - Per the DEC's suggestion, the draft scope should be available for public review for a minimum of a 20-day period.
   - A draft environmental impact statement (EIS) must be prepared. For this plan, the lead agency or a consultant can prepare the draft EIS.
   - The lead agency must determine acceptance of the draft EIS within 45 days. If adequate, the lead agency prepares, files, distributes and publishes a Notice of Completion.
   - Once the Notice of Completion of the draft EIS is filed, a public comment period begins for a minimum of 30 days.
   - A public hearing can be held. If a public hearing is held, the following must be done: a Notice of Public Hearing must be prepared and filed; a notice must be published in the newspaper in the area of the potential impacts at least 14 days before the hearing, and the public comment period must continue for ten days following the hearing.
   - A final EIS must be prepared within 45 calendar days after the close of any hearings or within 60 days after following the draft EIS, whichever occurs last. The lead agency is responsible for the adequacy and accuracy of the final EIS.
   - Notice of Completion of the Final EIS must be prepared, filed, distributed and published.

Detailed instructions for each step of the SEQR review can be found at the New York Department of Conservation's website under regulations, Chapter VI: 617: State Environmental Quality Review. An additional SEQR review for each construction phase is not necessary.

B. Permit Process

The following permits and other review processes will be required prior to the physical construction of this plan:

1. Joint Application for Nationwide Permit (NWP) from the United States Army Corps of Engineers (Corps) and the New York Department of Environmental Conservation (DEC) including DEC Article 24 for the impacted State wetlands.

2. A possible review may be needed by the New York Department of State: Division of Coastal Resources per the guidelines of the Coastal Erosion Control Permit Program.
3. Review of the SPHINX database and a letter of project intent to the State Historic Preservation Office (SHPO) to confirm the absence or presence of known archeologically sensitive areas, listed sites and eligible sites within the project area.
4. A letter of project intent to the New York State Heritage Program to confirm that endangered and/or threatened wildlife and plant species and/or important ecological communities are or are not identified in the project area boundary.

Prior to any disturbances to Waters of the United States, wetland delineation will need to be conducted on the property and a report prepared for the NWP, and a site visit from the regulatory agencies will be required.

XIV. Potential Funding Sources

A. Federal Sources

Transportation Enhancements Program – This program is federally funded, but administered by the NYS 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 this program 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.

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APPENDICES

APPENDIX A

Schematic Cost Estimates

Irondequoit Creek Valley Multi-Use Trail

EDR Job No. 06080 **(full construction)**

Prepared for: Genesee Transportation Council

NOTE: Conceptual estimate for budgeting purposes only.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$25,500	$25,500
1.2	Clearing and Grubbing	LS	1	$29,000	$29,000
2	**STRUCTURAL**				
2.1	Underpass at Penfield Rd	Each	1	$50,000	$50,000
2.2	At-Grade Crossing at Old Penfield Rd	Each	1	$15,000	$15,000
2.3	Trail Structure above Old Penfield Rd	LF	400	$150	$60,000
2.4	2 Access Points b/w lake & creek	Each	2	$15,000	$30,000
2.5	Pedestrian Bridge over creek	Each	3	$20,000	$60,000
2.6	Road Crossing (Blossom Rd- Striping & Signage)	Each	1	$2,500	$2,500
2.7	8' Wide Floating Boardwalk, bull rails	LF	10,400	$200	$2,080,000
2.8	Resting Boardwalk Bumpouts, with handralls	Each	3	$2,000	$6,000
3	**PAVING**				
3.1	8' W Stone Dust Primary Multi-use Trail	LF	3,175	$20	$63,500
3.2	Medium-duty asphalt pavement, 1 parking lot	SF	1,800	$4	$7,200
3.3	10' W Gravel Trail	LF	5,340	$5	$26,700
3.4	Surface Improvements to Existing Access Rd	LF	900	$7	$6,300
3.5	6' W Stone Dust Primary Multi-use Trail	LF	3450	$16	$55,200
3.6	4' W Stone Dust Connector to Upland Multi-use Trail (3)	LF	300	$12	$3,600
4	**SIGNAGE**				
4.1	Secondary signage/ mile post	Each	8	$850	$6,800
4.2	Primary signage/ informational kiosk	Each	10	$4,000	$40,000
4.3	MUTCD #D11-1 Bike Route	Each	4	$350	$1,400
5	**SITE FURNITURE**				
5.1	Limestone Slabs	Each	18	$700	$12,600
5.2	Benches for boardwalk bumpouts	Each	6	$500	$3,000
6	**PLANTINGS/SITE RESTORATIONS**				
6.1	Specimen Deciduous Trees (2.5-3" cal.)	Each	20	$500	$10,000
6.2	Shrubs	Each	40	$60	$2,400
6.3	Seeding/Mulching	Acre	4	$1,000	$4,000
				SUBTOTAL	**$2,600,700**
7	**DESIGN AND PERMITTING (15%)**				$390,105
8	**CONTINGENCY (20%)**				$520,140

NOTE: ESTIMATE BASED ON JUNE 2008 CONSTRUCTION COSTS **TOTAL** **$3,510,945**

Irondequoit Creek Valley Multi-Use Trail

EDR Job No. 06080 **(Phase 1)**

Prepared for: Genesee Transportation Council

NOTE: Conceptual estimate for budgeting purposes only.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$5,000	$5,000
1.2	Clearing and Grubbing	LS	1	$10,000	$10,000
2	**STRUCTURAL**				
2.1	Underpass at Penfield Rd	Each	1	$50,000	$50,000
2.2	At-Grade Crossing at Old Penfield Rd	Each	1	$15,000	$15,000
2.3	Trail Structure above Old Penfield Rd	LF	400	$150	$60,000
3	**PAVING**				
3.1	8' W Stone Dust Primary Multi-use Trail	LF	2,030	$20	$40,600
3.2	Medium-duty asphalt pavement, 1 parking lot	SF	1,800	$4	$7,200
4	**SIGNAGE**				
4.1	Secondary signage/ mile post	Each	1	$850	$850
4.2	Primary signage/ informational kiosk	Each	2	$4,000	$8,000
5	**SITE FURNITURE**				
5.1	Limestone Slabs	Each	9	$700	$6,300
6	**PLANTINGS/SITE RESTORATIONS**				
6.1	Specimen Deciduous Trees (2.5-3" cal.)	Each	10	$500	$5,000
6.2	Shrubs	Each	20	$60	$1,200
6.3	Seeding/Mulching	Acre	1	$1,000	$1,000
				SUBTOTAL	**$210,150**
7	**DESIGN AND PERMITTING (15%)**				$31,523
8	**CONTINGENCY (20%)**				$42,030
				TOTAL	**$283,703**

Irondequoit Creek Valley Multi-Use Trail

EDR Job No. 06080 **(Phase 2)**

Prepared for: Genesee Transportation Council

NOTE: Conceptual estimate for budgeting purposes only.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$3,000	$3,000
1.2	Clearing and Grubbing (by creek on NW corner of park)	LS	1	$5,000	$5,000
2	**STRUCTURAL**				
2.1	2 Access Points b/w lake & creek	Each	2	$15,000	$30,000
2.2	Pedestrian Bridge over creek	Each	2	$20,000	$40,000
3	**PAVING**				
3.1	8' W Stone Dust Primary Multi-use Trail over knoll	LF	930	$20	$18,600
3.2	10' W Gravel Trail (surface improvements of existing access road)	LF	5,340	$5	$26,700
4	**SIGNAGE**				
4.1	Secondary signage/ mile post	Each	2	$850	$1,700
4.2	Primary signage/ informational kiosk	Each	3	$4,000	$12,000
5	**SITE FURNITURE**				
5.1	Limestone Slabs	Each	9	$700	$6,300
NOTE:	Adaptive reuse of quarry equipment as landscape elements.	Each	TBD	TBD	TBD
6	**PLANTINGS/SITE RESTORATIONS**				
6.1	Specimen Deciduous Trees (2.5-3" cal.)	Each	10	$500	$5,000
6.2	Shrubs	Each	20	$60	$1,200
6.3	Seeding/Mulching	Acre	1	$1,000	$1,000
				SUBTOTAL	**$150,500**
7	**DESIGN AND PERMITTING (15%)**				$22,575
8	**CONTINGENCY (20%)**				$30,100
				TOTAL	**$203,175**

Irondequoit Creek Valley Multi-Use Trail

EDR Job No. 06080 **(Phase 3)**

Prepared for: Genesee Transportation Council

NOTE: Conceptual estimate for budgeting purposes only.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$2,500	$2,500
1.2	Clearing and Grubbing	LS	1	$2,000	$2,000
2	**STRUCTURAL**				
2.1	Road Crossing (Blossom Rd- Striping & Signage)	Each	1	$2,500	$2,500
3	**PAVING**				
3.1	6' W Stone Dust Primary Multi-use Trail	LF	3,450	$16	$55,200
4	**SIGNAGE**				
4.1	Secondary signage/ mile post	Each	0	$850	$0
4.2	Primary signage/ informational kiosk	Each	1	$4,000	$4,000
4.3	MUTCD #D11-1 Bike Route	Each	4	$350	$1,400
5	**SITE FURNITURE**				
5.1	Limestone Slabs	Each	0	$700	$0
6	**PLANTINGS/SITE RESTORATIONS**				
6.1	Specimen Deciduous Trees (2.5-3" cal.)	Each	0	$500	$0
6.2	Shrubs	Each	0	$60	$0
6.3	Seeding/Mulching	Acre	1	$1,000	$1,000
				SUBTOTAL	**$68,600**
7	**DESIGN AND PERMITTING (15%)**				$10,290
8	**CONTINGENCY (20%)**				$13,720
				TOTAL	**$92,610**

Irondequoit Creek Valley Multi-Use Trail

EDR Job No. 06080 **(Phase 4)**

Prepared for: Genesee Transportation Council

NOTE: Conceptual estimate for budgeting purposes only.

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$15,000	$15,000
1.2	Clearing and Grubbing	Acre	1	$12,000	$12,000
2	**STRUCTURAL**				
2.1	8' Wide Floating Boardwalk, bull rails	LF	10,400	$200	$2,080,000
2.2	Resting Boardwalk Bumpouts, with handralls	Each	3	$2,000	$6,000
2.3	Pedestrian Bridge over creek	Each	1	$20,000	$20,000
3	**PAVING**				
3.1	4' W Stone Dust Connector to Upland Trail (3)	LF	300	$12	$3,600
3.2	8' W Stone Dust Primary Multi-use Trail	LF	215	$20	$4,300
3.3	Surface Improvements to Existing Access Rd	LF	900	$7	$6,300
4	**SIGNAGE**				
4.1	Secondary signage/ mile post	Each	5	$850	$4,250
4.2	Primary signage/ informational kiosk	Each	4	$4,000	$16,000
5	**SITE FURNITURE**				
5.1	Limestone Slabs	Each	0	$700	$0
5.2	Benches for boardwalk bumpouts	Each	6	$500	$3,000
6	**PLANTINGS/SITE RESTORATIONS**				
6.1	Specimen Deciduous Trees (2.5-3" cal.)	Each	0	$500	$0
6.2	Shrubs	Each	0	$60	$0
6.3	Seeding/Mulching	Acre	1	$1,000	$1,000
				SUBTOTAL	**$2,171,450**
7	**DESIGN AND PERMITTING (15%)**				$325,718
8	**CONTINGENCY (20%)**				$434,290
				TOTAL	**$2,931,458**

APPENDIX B

Public Input

November 27, 2007

PROJECT NAME:	Irondequoit Creek Valley	Penfield Town Hall
	Multi-Use Trail Meeting	

NAME	ADDRESS	E-MAIL ADDRESS
DICK FREITAS	Penfield	[illegible]@aol.com.
JONATHAN LOGAN	ROCHESTER	LOGANJC@GMAIL.COM
Elliott Eklund	Penfield	eeklund@rochester.rr.com
Bob Torzynski	Rochester	rtorzynski@gtcmpo.org
Tim Murphy	PENFIELD	murphy48@ROCHESTER.RR.com
BRIAN EMELSON	44 SOUTHWOOD LN. Brighton	pbemelson@MSN.COM
Scott Likely	213 Whistlestop	Scott@Towpathbike.com
James Wilke	Rochester	jwilke1@gmail.com
VICTOR GASPAR	MACEDON	VICTOR@TRAILBLAZERSBIKE.COM
Will Hickey	Pittsford	whthird@yahoo.com
Alan Harding	Victor	thepineapple06@yahoo.com
AARON SMITH	Rochester	doushboy@littlebakery.com
JOE HARDING	VICTOR, 20 DUXBURY CIR.	REA20DUX@FRONTIERNET.NET.
Linda Kohl	161 Highlodge Dr	lkohl58@aol.com
MARY LEE	PITTSFORD.	MARYMLEE@ROCHESTER.R.R.COM
MARK ROSENZWEIG	PITTSFORD.	mrosenz1@rochester.rr.com
Rick Williams	PENFIELD	RICKWILL@ROCHESTER.RR.COM
Adam Weil	125 W Hickory st ER 14445	Adamweilzz@gmail.com

November 27, 2007

PROJECT NAME:	Irondequoit Creek Valley Multi-Use Trail Meeting	Penfield Town Hall

NAME	ADDRESS	E-MAIL ADDRESS
DAVID RINALDO	MC PARKS DEPT	
RUSS WAIT		RUSS@WASHGROVE.COM
AARON MOONEY		NIK1AJ@HOTMAIL.COM
tom Wait		tom@washgrove.com
Damian Marinaccio	Rochester	damian.marinaccio@gmail.com
Andy August	Mendon	andy@parkcanbike.com
Ron Wilke Jr	Brighton	RON.WILKEJR@GMAIL.COM
KURT VATER	ROCHESTER	KAVATER@YAHOO.COM
Ava Eichel	22 San Rafael Drive Pittsford	
Sam Eichel		leichel2@rochester.rr.com
Louie Eichel		
Chris Makowski	21 east Main st webster -	C_Makowsk@hotmail.com
Greg Francis	Fairport	gkf@juno.com

06080

November 27, 2007

PROJECT NAME:	Irondequoit Creek Valley Multi-Use Trail Meeting	Penfield Town Hall

NAME	ADDRESS	E-MAIL ADDRESS
Steve Drawe	Penfield, NY	sdrawe@rochester.rr.com
Robert Schuler	Brighton NY	Reas Bmx@Hotmail.com
Scott Peters	Pittsford, NY	SPeters5@rochester.rr.com
Jonah DiPasquale	Brighton NY	j.dipasquale@cannondale.com
Carolyn Ragan	4 Woodside Dr. Penfield	carokaye@yahoo.com.
Eric Metzler	78 Pamela Ca., Rochester	ericlmetzler@gmail.com

Meeting Sign-in Sheet

Project: GTC Priority Trails: Irondequoit Creek Valley Multi-Use Trail

Meeting: Public Meeting #2

Date: July 22, 2008

Name	Organization	Contact Info: Email, Mailing Address
June Summers	Genesee Valley Audubon Soc	summers@frontiernet.net 208 Rhea Crescent Rochester, NY 14615
Clifford Aniedumi	CITIZEN	aamedumi@aol.com 120 Guy Grace LN Webster NY 14580
Elden Tripp	ADK - Penfield Trails Committee	
Dave Harrison	GVL - ADK	dave.harrison@thomson.reuters.com
WF Jones	ADK	14 PARKVIEW DR.
Mary Ellen Collinge	Penfield Trails	
Pat Tobin	Penfield Trails	walkwr48@aol.com 96 Woodside Dr.
Pitts, James	"	103 New Wickham Dr 14526
Frank Steiner	GROC	fsteiner@rochester.rr.com
ADAM REITZ	GROC PATROL	AREITZ@NEUKO.NET
David B Strong	TNC/GLT	davids01@frontiernet.net
Tim Noble	GVC ADK	TNoble@Rochester.RR.COM
Rick Williams	Penfield GROC	rickwill@ROCHESTER.RR.COM

Meeting Sign-in Sheet

Project: GTC Priority Trails: Irondequoit Creek Valley Multi-Use Trail

Meeting: Public Meeting #2

Date: July 22, 2008

Name	Organization	Contact Info: Email, Mailing Address
Bob Torzynski	GTC	—
Tom Perry	Greater Rochester Track Club	tperry01@rochester.rr.com
Joe Manther	—	—
MIKE COSTANZA	PENF. POST	micost5k@yahoo.com
Debbie Drake	TOWN	
Mike Cooper	TOWN OF PENFIELD	Cooper@Penfield.org
Carole Hoffman	resident	choffman002@rochester.rr.com
PAT MERRIDY	TOWN OF IRONDEQUOIT	PMERRIDY@IRONDEQUOIT.ORG 336-6037

RECEIVED
JUL 25 2008
EDR, P.C.

Irondequoit Creek Valley Multi-Use Trail
Public Meeting Comment Form
July 22, 2008

On behalf of the Town of Penfield and the Genesee Transportation Council, EDR is investigating the feasibility of creating a multi-use trail following the edge of Irondequoit Creek between Penfield Road and Empire Boulevard. During this study, we are hoping to understand the different opportunities and concerns of which we may not be aware. Please take a few minutes and let us know if you have any ideas or suggestions regarding the path of the future trail. Please let us know what you think about the ideas presented tonight.

Ideas, Suggestions, Opportunities, Concerns? Good meeting

Are we addressing Handicap accessibility issues on the Multi-use trail?

Please return comments to Tom Robinson at Environmental Design and Research (EDR)
EDR – 274 North Goodman Street – Rochester, NY 14607
Phone: 271-0040 Fax: 271-0042 trobinson@edrpc.com

RECEIVED
JUL 25 2008
EDR, P.C.

Irondequoit Creek Valley Multi-Use Trail
Public Meeting Comment Form
July 22, 2008

On behalf of the Town of Penfield and the Genesee Transportation Council, EDR is investigating the feasibility of creating a multi-use trail following the edge of Irondequoit Creek between Penfield Road and Empire Boulevard. During this study, we are hoping to understand the different opportunities and concerns of which we may not be aware. Please take a few minutes and let us know if you have any ideas or suggestions regarding the path of the future trail. Please let us know what you think about the ideas presented tonight.

Ideas, Suggestions, Opportunities, Concerns?

Consider what will be needed to maintain trails yearly.

Please return comments to Tom Robinson at Environmental Design and Research (EDR)
EDR – 274 North Goodman Street – Rochester, NY 14607
Phone: 271-0040 Fax: 271-0042 trobinson@edrpc.com

David Strang
64 Brentwood Dr
Penfield, NY 14526-1604

RECEIVED
JUL 31 2008
EDR, P.C.

Irondequoit Creek Valley Multi-Use Trail
Public Meeting Comment Form
July 22, 2008

On behalf of the Town of Penfield and the Genesee Transportation Council, EDR is investigating the feasibility of creating a multi-use trail following the edge of Irondequoit Creek between Penfield Road and Empire Boulevard. During this study, we are hoping to understand the different opportunities and concerns of which we may not be aware. Please take a few minutes and let us know if you have any ideas or suggestions regarding the path of the future trail. Please let us know what you think about the ideas presented tonight.

Ideas, Suggestions, Opportunities, Concerns?

I very much like the concept of a trail along Irondequoit Creek and hope someday it will link south to Powder Mill Park, if not at least to the canal.

One concern is for safety at grade crossings - these should be well marked for motorists. You might even consider rumble strips.

Flooding is a concern. I have seen trail deterioration behind Panorama Plaza from Panorama Trail to the junction at Allens Creek. Is there anyway to correct this?

Lastly the boardwalk through Ellison Wetland is the most likely to have significant environmental impacts, such as; introduction of more alien species, human impact on all wildlife living and nesting in the wetland, erosion on slopes and trails through increased usage, boardwalks intruding on the canoeing/kayaking experience, and the presence of more activity possibly deteriorating water quality. I hope these will be addressed.

David Strang - davids91@frontiernet.net

Please return comments to Tom Robinson at Environmental Design and Research (EDR)
EDR – 274 North Goodman Street – Rochester, NY 14607
Phone: 271-0040 Fax: 271-0042 trobinson@edrpc.com

Tom Robinson

From: Tom Perry [tperry01@rochester.rr.com]
Sent: Monday, July 28, 2008 9:37 PM
To: Tom Robinson
Subject: comments on Irondequoit Creek Trail

Tom,

Thank you for the opportunity to comment on the proposed Irondequoit Creek Valley Trail Proposal. I was able to attend last Tuesday's public meeting and found it quite well run and informative.

I am a member of the board and former president of the Greater Rochester Track Club. I attended the meeting as an individual and the following comments are my own, i.e., they do not represent official opinions of the GRTC. My opinions are based on 40 years experience as runner and cyclist.

Comments
1. Phases 1-3 will offer a big benefit for a relatively low cost. Connecting the two parks (Phibrick and Ellison) will be highly attractive to the community and get significant use. Phase 4 will be controversial for ecological impact, high cost and potential adverse impacts on other trails in that zone. Please take care to avoid having Phase 4 controversies sink the entire project. Keep them separate so Phases 1-3 gets done quickly.

2. Phase 4 appears to present real issues for quality of the water trail experience, risks to the environment in its construction and use and cost as noted before. On the other hand, it would be a spectacular experience to walk, run or ride on it.

3. If Penfield really wants to emphasize alternative transportation with the trail, please go with asphalt. Type A cyclists won't ride on stone dust trails... stone dust is too damaging to expensive bike drive trains. Asphalt will also give more days of use, it drains better, won't get muddy, etc.
Note: The paved sections of the Erie Canal Trail get lots of Type A bike use. The unpaved section from Pittsford to Fairport and beyond gets lots of family use but very few serious cyclists. Source: personal observations as a runner and cyclist.

4. Separation of the paths for bikes and pedestrians is the right approach for areas of high cycling usage, e.g., the Ellison Park sections.

5. I'm sure it just wasn't mentioned but for completeness, be sure to include ramps to the roads that are crossed with underpasses, e.g., Browncroft and Penfield Roads.

Feel free to contact me if you have questions about my comments. Thanks,

//Tom

Tom Perry
585-410-0584
Director: CanLake50 Ultras & Fleet Feet Sports Relay: 50 Miles Around the Lake, October 11, 2008 - www.canlake50.org
Coordinator: Western New York Ultra Series, next race: Green Lakes Endurance Runs, August 24, 2008 - www.wny-ultra.org
The Eclectic Runner Redux - http://www.grtconline.org/index.php?option=com_content&task=blogsection&id=8&Itemid=9

APPENDIX C

Trail Design and Accessibility

Trail Design and Accessibility

Summary of federal laws regulating accessibility:

The 1990 law regulating standards of accessible design for built facilities is the Americans with Disabilities Act (ADA). The Architectural Barriers Act (ABA) of 1968 governs accessibility for federally financed facilities. The Americans with Disabilities Act applies to State and Local government facilities, places of public accommodation, and commercial facilities.

Definitions:

Trail: "A route that is designed, designated, or constructed for recreational pedestrian use or provided as a pedestrian alternative to vehicular routes within a transportation system". (ADA Accessibility Guidelines)

Shared-Use Path: "A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Users generally include bicyclists, skaters, and pedestrians. Shared use paths provide non-motorized transportation connections between neighborhoods and communities. They may be along old railroad corridors or rivers, or pass through parks. They generally have relatively few driveways or street crossings." (AASHTO Guide for the Development of Bicycle Facilities)

Single-User Path: "Only trails with features and strict enforcement practices that effectively exclude other users are single-user paths. For this reason, the design needs of all potential user groups should be considered when planning a trail." (FHWA Trail Design for Access)

Summary of Federal Regulatory Guidelines:

Access Board Proposed Guidelines for ADA and Proposed Rule for ABA

The Architectural and Transportation Barriers Compliance Board (Access Board) is responsible for developing accessibility guidelines to ensure that new construction and alterations of facilities subject to the ADA and ABA are readily accessible to and usable by individuals with disabilities. The Access Board developed accessibility guidelines for buildings and facilities subject to the ADA and the ABA and revised them in 2004. The revised guidelines include scoping and technical provisions for several types of recreation facilities.

The Access Board convened a Recreation Access Advisory Committee in 1993. Public comments on its 1994 report revealed a lack of consensus (which is required for rule-making) on major issues regarding outdoor developed areas. The Access Board established a regulatory negotiation committee in 1997 that proposed accessibility guidelines for outdoor developed areas in its 1999 report, available at the Board's Web site (*http://www.access-board.gov/outdoor/outdoor-rec-rpt.htm*). This report contains guidelines for both ADA- and ABA-regulated construction, but the proposed rule applies only to those outdoor areas designed, constructed or altered by Federal Agencies subject to the ABA (such as the Forest Service). The Access Board will issue a second proposed rule that applies to areas subject to the ADA, pending an assessment of the costs and benefits to State and Local Governments arising from their compliance with the proposed rules relating to the ADA.

ADA Accessibility Guidelines

The Access Board Regulatory Negotiation Committee's 1999 report proposed ADA accessibility guidelines for trails, beach access routes, picnic and camping facilities. These will eventually become a rule that will be made part of the ADA Accessibility Guidelines (ADAAG). The proposed guidelines apply to trails subject to the ADA that are designed and constructed for pedestrian use. They do not apply to those primarily designed and constructed for recreational use by equestrians, mountain

bicyclists, or motorized vehicle users, even if pedestrians may occasionally use the same trails. A multi-use trail specifically designed and designated for hiking and (non-mountain) bicycling would be considered a pedestrian trail. The guidelines require all newly constructed and altered portions of existing trails that are connected to accessible trails or designated trailheads to comply. Existing trails and routine trail maintenance are not affected by the requirement. Also exempt are conditional departures from the ADA guidelines permitted for any portion of the trail that would:

1. cause substantial harm to cultural, historic, religious, or significant natural features or characteristics
2. substantially alter the nature of the setting or the purpose
3. require construction methods or materials that are prohibited by Federal, State, or Local regulations or statutes
4. not be feasible due to terrain (excessive slope or cross slope) or the prevailing construction practices.

AASHTO Guidelines for the Construction of Bicycle Facilities

The primary guidelines for bicycle trail accessibility are the 1999 American Association of State Highway and Transportation Officials (AASHTO) guidelines (called the Green Book). These guidelines apply to facilities built with federal transportation funds and require greater accessibility than the ADA guidelines.

Comparison of Trail Design Guidelines:

In trail design guidelines published by various organizations, considerations of the needs of bicyclists, pedestrians, people with disabilities, and other user groups differ greatly, primarily due to the mission and constituency that each agency or organization serves. The following chart summarizes differences between guidelines.

Design Criteria	Access Board Accessibility Guidelines for Outdoor Developed Areas	ADA Guidelines	AASHTO Guide for the development of Bicycle Facilities
Surface	Firm and stable	Firm and Stable	Bikes, wheelchairs: equal firmness. Skaters: paved surface. Most are paved paths, some are crushed aggregate paths.
Width (min.)	36 in. (3 ft./915 mm). Exception: 32 in.	36 in. Exception: 32 in.	10 ft. (3 m); 2-ft. safety buffer each side; 8 ft. (2.4 m) in low-use areas
Openings/Gaps	Max. ½ in. Elongated openings: perpendicular or diagonal to traffic flow. Exception 1: parallel if less than ¼ in. wide. Exc. 2: ¾ in. wide	Max. ½ in. Exception: ¾ in. wide bridge abutments, boardwalks	Minimized to prevent catching bicycle wheels. Grates: flush, openings perpendicular to traffic flow. Clearly mark unavoidable openings.
Protruding Objects	Provide warning if vertical clearance less than 80 in.	Not addressed.	Should not exist within clear tread width. Vertical clearance min. 10 ft. (3 m)

Tread Obstacles (changes in level, roots, rocks, ruts)	Max. 2 in. Exception: up to 3 in.	Max. 2 in. high. Exc.: 3" high where running & cross slopes 5% or less, 1 in. high where slopes greater than 5%.	Should have none.
Passing Space	Min. 60 in. within 1,000-ft. intervals. More frequent intervals for some trail sections.	Not addressed.	Min. clear width of 10 ft (3m). Exception: 8 ft (2.4 m).
Cross Slope	Max. 1:20 (5%) any length. 1: 12 (8.33%) for up to 200 ft. 1:10 (10%) for up to 30 ft. 1:8 (12.5%) for up to 10 ft.	Rec. 0-2% any dist. 3-5% any dist. 10-12% for up to 5 ft. 6-8% for up to 10 ft. No more than 5% where running slope exceeds 5%. Level area 5 ft long at end of each run section.	Limit slope for accessibility. Paved: min. 2% cross slope. Unpaved: attention to drainage to avoid erosion. Curved paths may need superelevation beyond 2%.
Running Slope	Max. 1:20 (5%) any length. 1: 12 (8.33%) up to 200 ft. for up to 30% of entire trail 1:10 (10%) for up to 30 ft. 1:8 (12.5%) for up to 10 ft.	0-5% any dist. 6-8% for up to 50 ft. 9-10% for up to 30 ft. 11-14% for up to 5 ft. No more than 5% where cross slope exceeds 5%. Level landings 5 ft long at end of each run section.	Rec. no greater than 5%. Unpaved: no steeper than 3%. Where terrain dictates, 5% any length, 5-6%: 120 m (400 ft); 8% (1:12.5), for up to 90 m (300 ft); 9% (1:11.1), for up to 60 m (200 ft); 10% (1:10), for up to 30 m (100 ft); 11+% (1:9.1), for up to 15 m (50 ft).
Resting Intervals	Size: 60 in. (1525 mm) length, at least as wide as the widest trail segment adjacent to the rest area. Less than 1:20 (5%) slope in all directions. Required where running slopes exceed 1:20 (5%), at intervals no greater than lengths permitted under running slope.	Level landings 5 ft long at end of each run section of running slope. Level area 5 ft long at end of each run section of cross slope.	No recommendations.
Edge Protection	Where provided, 3 inch (75 mm) minimum height. Handrails are not required.	Not addressed.	Not addressed.
Trail Signs	Designation with symbol of accessibility and info on total length of accessible segment.	Not addressed.	For guidance refer to MUTCD manual.

Trail Design Guidelines for Access published by the Federal Highway Administration:

Average Grade: The average of many contiguous running grades. Running grade is usually measured over the maximum distance afforded by sight lines when grades are continuous. More detailed grade information is obtained from measurement distances of 300 ft. or less. Maximum grade: A limited section of trail that exceeds the typical running grade. This can differ significantly from running grades. Rate of Change of Grade: The change in grade over a given distance. This is determined by measuring the grade and the distance over which it occurs for each segment of the overall distance (2 ft. intervals recommended). Rate of change of grade should not exceed 13 %.

Rest Areas: Level portions of a trail wide enough to provide wheelchair users and others a place to rest and gain relief from prevailing grade and cross-slope demands. Rest areas are most needed for users to pause from exertions on steep or very exposed terrain. They are most effective when placed at intermediate points, scenic lookouts, or near trail amenities such as benches, trash receptacles, bathrooms, and bike rests. Those located off the trail allow stopped users to move out of the way of trail traffic. Rest Area Interval: The distance between rest areas. Most guidelines agree that these should occur at intervals of 400 ft. on easier trails, 900 ft. on moderate trails, and 1200 ft. on difficult trails.

Cross-slope: The slope measured at specific points, perpendicular to the direction of travel. Average cross-slope is the average of those measured at regular intervals along the trail. Running Cross-slope is the average cross-slope of a contiguous section of trail. This is measured by averaging periodic measurements taken over a section of trail. Maximum cross-slope: a limited section of trail that exceeds the typical running cross-slope of the trail. Rate of Change of Cross-Slope: the change in cross-slope over a given distance (2-ft. intervals recommended).

Design Width and Minimum Clearance Width:
Design width is the width specification the trail was designed to meet. It is also called tread width. Minimum clearance width is the narrowest point on a trail, where width is substantially less than the full trail width. This usually results from trees or other obstacles near the trail, or from a reduction in the design width.

Passing Space: A section of path wide enough to allow two wheelchair users to pass one another or travel abreast. Passing spaces are recommended at regular intervals when the trail is narrow for long distances. Passing space interval is the distance between passing spaces. Most guidelines agree with the ADA requirement for accessible routes of at least 60 in. by 60 in. whenever an accessible route provides less than 60 in. of clear space. The ADA guidelines also allow a T-intersection of two paths as an acceptable passing space.

Changes in level: Vertical height transitions between adjacent surfaces or along the surface of a path. Ruts, tree roots, and rocks protruding from the surface are common examples. These can cause difficulty for users with mobility impairments or those using wheeled devices. Unpaved trails almost always have small changes in level.

Vertical Clearance: The minimum unobstructed vertical passage space required along a trail. Specifications for this clearance vary depending on designated trail users, with equestrians requiring the greatest clearance (10 ft) and hikers requiring the least (6.5 ft. or 80 in.). The height of an average blanket of snow should be considered for trails designed for winter use.

Surface: Choice of surface can be affected by variables such as designated trail use types, expected volume of traffic, local conditions, soil conditions, and cost. The surface material on a trail greatly affects which types of user groups will be able to negotiate it. Soft surfaces such as sand and gravel are more difficult for all users to negotiate, and can be hazardous for those using wheeled devices not designed for outdoor terrain. Soft surfaces may be preferred by equestrians, joggers, off-road wheelchair users and mountain bicyclists. Recreational trail surfaces are most commonly composed of naturally occurring soil. Concrete or wood chips may be substituted depending on user types, anticipated volume of traffic, climate, and conditions of the surrounding environment. High-use trails in fragile environments are commonly surfaced with pavement, crushed rock, or stabilized soil mixtures to minimize the impact of human traffic on the trail.

Trail information: Formats include signs, maps, computer programs, posters at trail information stations, audio recordings, and published guides. Typical information includes length, elevation change, usage rules, destination, and descriptive information about points of interest. Providing a

further level of detail helps users assess whether a trail meets their personal level of safety, comfort, and access. This includes objective, detailed information about potential obstacles, surface type, grade, cross-slope, and trail features. Accurate, detailed trail information enables trail users to choose routes appropriate to their skill levels and desired experience. Criteria include personal interest, destination, environment, and desired difficulty. Signage text and symbol size recommendations: The ADA guidelines recommend a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10. Symbols for permanent locations should be raised 0.8 mm (0.03 in.) from the surrounding surface and be in upper case, sans serif or simple serif type. Type should be accompanied by Grade 2 Braille. Background sign color should contrast with lettering color. Locations should not obstruct minimum or vertical clearance width.

Difficulty Ratings: Ratings can be misleading because they can be subjectively determined, relative to trails in the same park or area, rather than relative to objective trail information. The result is that users cannot be sure whether a rating agrees with their own sense of the degree of trail difficulty. Also missing from ratings is the differentiation between sections of trail, which might vary in difficulty along a single trail and affect user access to the entire trail.

Maintenance: Needed to keep trails at or near constructed or intended conditions, and can enhance safety, protect resources, and provide continued public access. Select activities include:

- Checking structural integrity of trail features such as bridges, steps, and railings
- Keeping surface clear of obstacles or hazards
- Clearing and maintaining drainage features to minimize erosion on or near trails
- Cutting vegetation to define the trail clearance width and vertical clearance

Trail Elements: Design of elements should be appropriate to conditions of the trail. For example, a user walking on a paved path would expect an accessible bridge, not a fallen log, when crossing a stream. When an element along an accessible trail is not consistent with the trail's overall design, a user might be forced to turn back without reaching the desired destination.

Built facilities along trails: It is critical that these be accessible to all users, to address the fact that people with disabilities use all types of trails. For example, a person who is mobility-impaired might ride a horse or use a motorized all-terrain vehicle.

Drainage Control Measures and Access: Trails designed with less extreme slopes, or drainage through swales and drainage channels are encouraged. Excessive water on a trail can limit use by accelerating erosion, creating conditions harmful to the trail and hazardous to users. Some cross-slope is needed to allow water to drain off the path. Excessive cross-slopes are difficult to negotiate for people with disabilities. Drainage bars consisting of wood, rock, or rubber structures are often placed across the trail on steep slopes to encourage water to flow off the trail. These pose difficulties for people using wheeled devices. Thin rubber drainage bars that flex are easier to wheel over than other bars. Shared use paths with many wheeled device users should never have drainage bars, because this often results in people traveling off-trail around the bars, rendering the bars ineffective. Swales and drainage channels can provide the same degree of water runoff while affording better access than drainage bars. Building trails with less extreme slopes is the easiest way to avoid the need for drainage bars and prevent erosion. In areas of consistent water flow, culverts, short sections of boardwalk, or bridging can be provided. Swamps and poorly drained areas can be closed at peak times such as spring thaw. Logs or rocks arranged on or in the travel path may improve drainage and mitigate trail erosion.

Minimizing User Conflicts on Trails:
Promoting responsible behavior on trails can minimize conflict. Trail etiquette standards can be publicized on trail signs and in educational materials. Users might be less likely to be offended at the actions of other users when they gain understanding of how each group is supposed to act on the

trail. Users might be less likely to violate established codes of behavior if they believe codes will be enforced by trail personnel. Minimizing contact between conflicting types of trail users can be the best method to avoid conflict. This can be achieved by providing several entrances to a trail or providing trails with varying levels of difficulty. A good understanding of the needs, behavior, motivations, desired experiences, and points of view of different user groups is essential to make wise trail-use decisions.

Sources:

1) Barbara McMillen, et. al. Designing Sidewalks and Trails for Access, Part I of II: Review of Existing Guidelines and Practices. Chapter 5: Trail Design For Access, July 1999.

2) Americans with Disabilities Act (ADA) Accessibility Guidelines and Trails FAQ publication, Tennessee Dept. of Environment and Conservation, Recreation Educational Services Division, Greenways and Trails Program, April 2007.

3) Architectural Barriers Act (ABA) Accessibility Guidelines for Outdoor Developed Areas Proposed Rule. Architectural and Transportation Barriers Compliance Board, 36 CFR Part 1195, published in the Federal Register, June 2007.

4) Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 1999.

APPENDIX D

Road Crossing Analysis

Prepared By:

EDR

274 NORTH GOODMAN STREET
ROCHESTER, NY 14607

Irondequoit Creek Valley Multi-Use Trail Study

Genesee Transportation Council Priority Trails

Road Crossing Analysis - Overall Context Map

Appendix D

FEASIBILITY ANALYSIS CRITERIA

ROAD CROSSING OPTIONS

AT-GRADE
Road width. Traffic volumes. Traffic speed. Sight lines. Pavement conditions. Existing bicycle/pedestrian usage.

UNDERPASS
Existing bridge condition. Vertical clearance. Horizontal clearance. Stream channel geometry. Mean high water elevation. Environmental impact.

OVERPASS
Height requirement. Accessibility. Visual impacts.

(ALL OPTIONS)
Existing context. Construction costs. Maintenance cost/sustainability. Safety. User experience.

EXISTING CONDITIONS

ROAD CROSSING 1 RECOMMENDATION

ROAD CROSSING OPTIONS

AT-GRADE

UNDERPASS

OVERPASS

Feasibility Summary:
Traffic volumes, speed and existing vehicle access points to Panorama plaza make an at-grade crossing problematic at this location. Overpass (bicycle/pedestrian bridge) feasibility is limited by construction costs and accessibility constraints. Underpass appears to be feasible based on existing bridge construction, vertical and horizontal clearances and stream channel geometry.

FEASIBILITY ANALYSIS CRITERIA

ROAD CROSSING OPTIONS

AT-GRADE
Road width. Traffic volumes. Traffic speed. Sight lines. Pavement conditions. Existing bicycle/pedestrian usage.

UNDERPASS
Existing bridge condition. Vertical clearance. Horizontal clearance. Stream channel geometry. Mean high water elevation. Environmental impact.

OVERPASS
Height requirement. Accessibility. Visual impacts.

(ALL OPTIONS)
Existing context. Construction costs. Maintenance cost/sustainability. Safety. User experience.

EXISTING CONDITIONS

ROAD CROSSING 2 RECOMMENDATION

ROAD CROSSING OPTIONS

AT-GRADE

UNDERPASS

OVERPASS

Feasibility Summary:

An underpass at this location may not meet the minimum vertical clearance of 8' recommended by AASHTO. Overpass (bicycle/pedestrian bridge) feasibility is limited by construction costs and accessibility constraints. Old Penfield Road presents a relatively safe at-grade crossing, based on traffic volumes, traffic speeds, and sight lines. The recently constructed bridge provides an opportunity to cross to the west side of the creek, which is the preferred trail alignment. A traffic gap analysis undertaken on June 20, 2008 between 3:50-4:20pm showed an average of 34 cars per hour. To cross Old Penfield Road comfortably, the average pedestrian takes roughly 8 seconds. The analysis also showed there is a average gap time of 1:43 minutes, leaving more than enough time for a pedestrian to cross comfortably.

FEASIBILITY ANALYSIS CRITERIA

ROAD CROSSING OPTIONS

AT-GRADE
Road width. Traffic volumes. Traffic speed. Sight lines. Pavement conditions. Existing bicycle/pedestrian usage.

UNDERPASS
Existing bridge condition. Vertical clearance. Horizontal clearance. Stream channel geometry. Mean high water elevation. Environmental impact.

OVERPASS
Height requirement. Accessibility. Visual impacts.

(ALL OPTIONS)
Existing context. Construction costs. Maintenance cost/sustainability. Safety. User experience.

EXISTING CONDITIONS

ROAD CROSSING 3 RECOMMENDATION

ROAD CROSSING OPTIONS

AT-GRADE

UNDERPASS

OVERPASS

Feasibility Summary:

An underpass at this location will not meet the minimum vertical clearance of 8' recommended by AASHTO. Overpass (bicycle/pedestrian bridge) feasibility is limited by construction costs and accessibility constraints. Blossom Road at this location presents a relatively safe at-grade crossing, based on traffic volumes, traffic speeds, and sight lines. The speed limit of 35 mph is rigorously enforced by the County Sheriff at this location. Pedestrian and bicycle use within Ellison Park is well-established. A traffic gap analysis undertaken on June 20, 2008 between 4:35-5:05pm showed an average of 498 cars per hour on Blossom road. To cross comfortably, the average pedestrian takes roughly 8 seconds. The analysis also showed there is gap of more than 8 seconds an average of once every 32 seconds, creating many opportunities for a safe pedestrian crossing.

FEASIBILITY ANALYSIS CRITERIA

ROAD CROSSING OPTIONS

AT-GRADE
Road width. Traffic volumes. Traffic speed. Sight lines. Pavement conditions. Existing bicycle/pedestrian usage.

UNDERPASS
Existing bridge condition. Vertical clearance. Horizontal clearance. Stream channel geometry. Mean high water elevation. Environmental impact.

OVERPASS
Height requirement. Accessibility. Visual impacts.

(ALL OPTIONS)
Existing context. Construction costs. Maintenance cost/sustainability. Safety. User experience.

EXISTING CONDITIONS

ROAD CROSSING 4 RECOMMENDATION

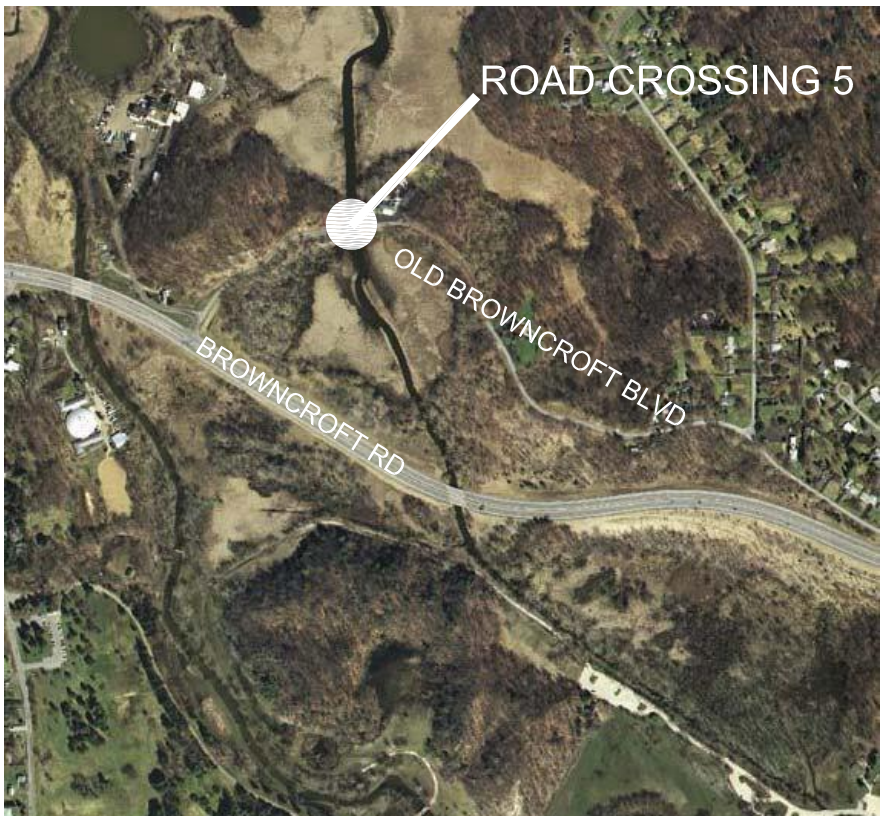
ROAD CROSSING OPTIONS

AT-GRADE

UNDERPASS

OVERPASS

Feasibility Summary:
Posted speed limit along this stretch of road is 55 mph and traffic volumes can be heavy during peak periods. Providing a safe at-grade crossing appears unfeasible. Overpass (bicycle/pedestrian bridge) feasibility is limited by construction costs and accessibility constraints. Underpass appears to be feasible based on existing bridge construction, vertical and horizontal clearances and stream channel geometry.



FEASIBILITY ANALYSIS CRITERIA

ROAD CROSSING OPTIONS

AT-GRADE
Road width. Traffic volumes. Traffic speed. Sight lines. Pavement conditions. Existing bicycle/pedestrian usage.

UNDERPASS
Existing bridge condition. Vertical clearance. Horizontal clearance. Stream channel geometry. Mean high water elevation. Environmental impact.

OVERPASS
Height requirement. Accessibility. Visual impacts.

(ALL OPTIONS)
Existing context. Construction costs. Maintenance cost/sustainability. Safety. User experience.

EXISTING CONDITIONS

ROAD CROSSING 5 RECOMMENDATION

ROAD CROSSING OPTIONS

AT-GRADE

UNDERPASS

OVERPASS

Feasibility Summary:

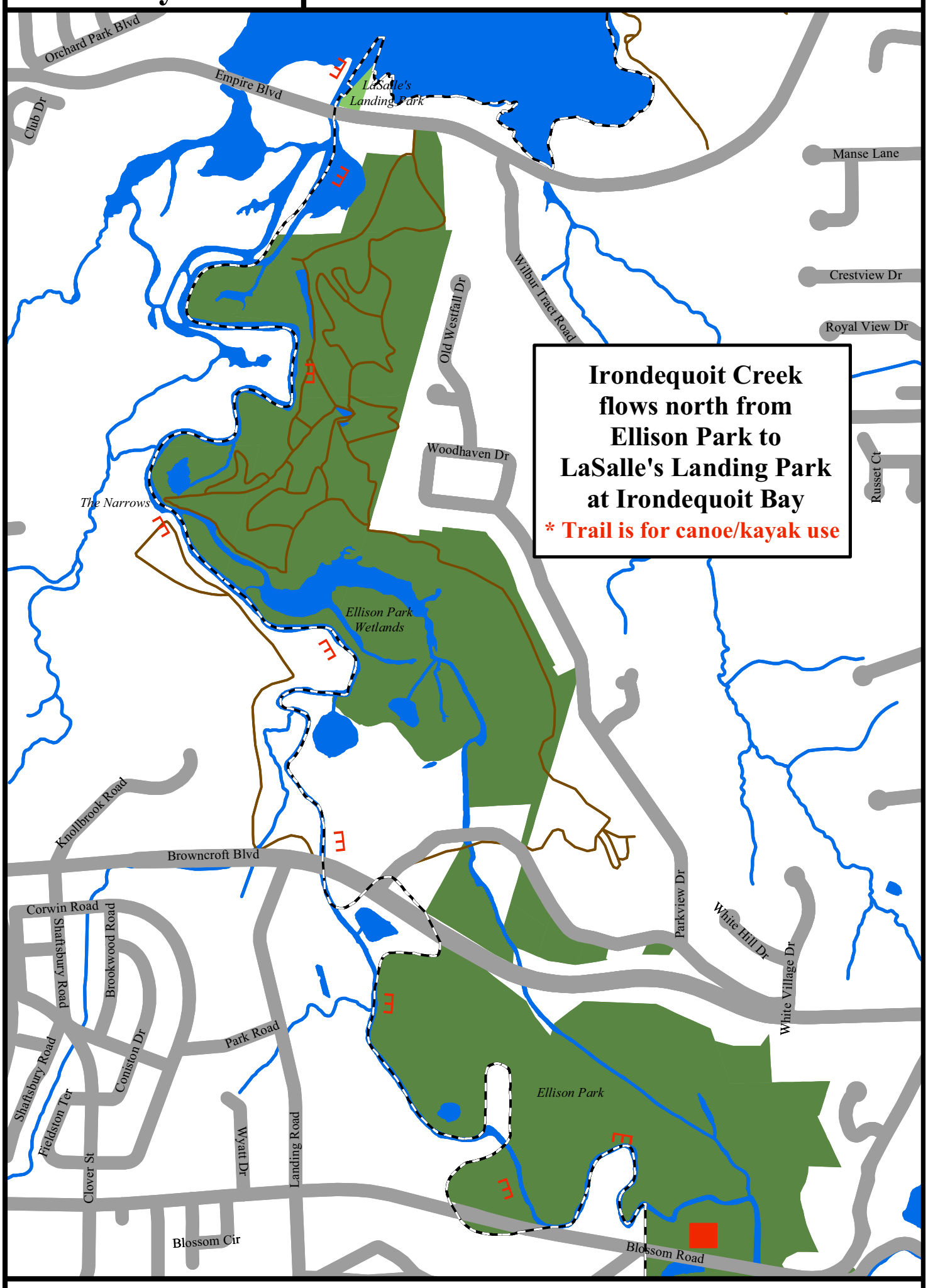
Overpass (bicycle/pedestrian bridge) feasibility in this location is limited by construction costs and accessibility constraints. The road is a dead-end with very limited traffic and an at-grade crossing could meet safety criteria. However, negotiating the embankments on both sides of the bridge could be problematic. The proposed trail moves through the Ellison Wetlands at this point, and may be on a boardwalk structure which could be extended under the existing bridge. An underpass concept is the preferred alternative at this location.

APPENDIX E

Town of Penfield Irondequoit Creek Waterway Map

Town of Penfield Trail System

Irondequoit Creek Waterway*



Irondequoit Creek Waterway*

Ellison Rifle Range Trail

Town Line

Water

Monroe County Parks

Town of Penfield Parks

Other Parks

0 250 500 1,000 Feet

JT/RA 1/03

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