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.). Exception: 32 in.	36 in. Exception: 32 in.	10 ft.; 2-ft. safety buffer each side; 8 ft. 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.

Design Criteria	Access Board Accessibility Guidelines for Outdoor Developed Areas	ADA Guidelines	AASHTO Guide for the Development of Bicycle Facilities
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.
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. Exception: 8 ft.
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%: 400 ft; 8% (1:12.5), for up to 300 ft; 9% (1:11.1), for up to 200 ft; 10% (1:10), for up to 100 ft; 11+% (1:9.1), for up to 50 ft.
Resting Intervals	Size: 60 in. 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 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.

COMPLETE STREETS

Complete Streets

In addition to understanding the opportunities and constraints specific to the study area, we can look to the complete streets[1] concept for solutions. According to the National Complete Streets Coalition (NCSC), complete streets are roadways designed and operated to enable safe, attractive, and comfortable access and travel for all users[2]. Pedestrians, bicyclists, motorists and public transport users of all ages and abilities are able to safely and comfortably move along and across a complete street[3]. Complete streets also create a sense of place, improve social interaction, and generally increase land values of adjacent property.

Complete streets look different in different places. They must fit with their context and to the transportation modes expected[4]. Although no singular formula exists for a complete street, an effective one includes at least some of the following features[5]:

- sidewalks
- bike lanes
- wide shoulders
- plenty of crosswalks
- refuge medians
- bus pullouts
- special bus lanes
- raised crosswalks
- audible pedestrian signals
- sidewalk bump-outs (bulb-outs)

These features make a street safer and more pleasant for pedestrians and vehicles. A Federal Highway Administration safety review found that designing a street for pedestrian travel by installing raised medians and redesigning intersections and sidewalks reduced pedestrian risk by 28%[6]. The practice of complete streets is not only about allocation of street space, but also about selecting a design speed that is appropriate to the street typology and location, and that allows for safe movements by all road users[7].

Complete streets have a number of different benefits, primarily related to[8]:

- gas prices
- climate change
- economic revitalization
- safety
- children
- people with disabilities
- older people
- health
- transit
- transportation costs

Gas Prices

Walking, biking and using public transit saves money and reduces the United States' dependence on oil. Walking and bicycling require no gasoline usage and transit's fuel usage is more efficient than automobiles. Almost fifty percent of all trips in metropolitan areas are three miles or less and 28 percent are one mile or less, which are distances that many people can cover by foot or bicycle if streets are safe.[9] If each American substituted driving with

[1] http://www.completestreets.org
[2] National Complete Streets Coalition website, http://www.completestreets.org, December 2008.
[3] Ibid.
[4] John Laplante and Barbara McCann. "Complete streets: We can get there from here," ITE Journal, May 2008.
[5] National Complete Streets Coalition brochure. March 2009.
[6] Ibid.
[7] John Laplante and Barbara McCann. "Complete streets: We can get there from here," ITE Journal, May 2008.
[8] National Complete Streets Coalition website, http://www.completestreets.org, December 2008.
[9] 2001 National Personal Transportation Survey.

walking or bicycling for the distance recommended for daily exercise, oil consumption in the U.S. could be reduced by 35 to 38 percent.[10]

Climate Change

Currently, the transportation sector is the fastest growing carbon dioxide source in the U.S. with emission rates rising 2 percent every year. By 2030, carbon emissions from transportation are projected to be 41 percent above today's level if driving is not curbed.[11] Complete streets encourage Americans to drive less and use streets for walking, bicycling, and using public transit. In part due to streets that are unsafe for walking, bicycling or taking transit, automobiles currently account for 65 percent of trips less than one mile. Developing complete streets would help convert these short automobile trips to multi-modal travel. Other studies have found that using non-motorized transport could eliminate five to ten percent of urban automobile trips.[12]

Economic Revitalization

Business owners and residents can benefit economically from infrastructure for non-motorized transportation and lowering automobile speeds by changing road conditions. Creating complete streets in retail and commercial areas accommodates customers and employees that lack transportation or do not feel safe walking, bicycling or using public transit in an automobile-centric environment. When San Francisco's Mission District reduced traffic lanes to slow down cars and accommodate other users, merchants reported a 40 percent increase in sales, a 60 percent increase in local resident shoppers, and a significant increase in pedestrian and bicycling activity.[13] In addition, complete streets contribute to an increase in property values, including residential properties, due to a willingness to pay more to live and work in walkable communities.

Safety

Streets lacking safe places to walk, cross, catch a bus, or operate a bicycle are a safety hazard. Almost 5,000 pedestrians and bicyclists die and more than 70,000 are injured each year on U.S. roads.[14] Pedestrian crashes are more than twice as likely to occur in places without sidewalks.[15] Designing streets for pedestrians with sidewalks, raised medians, better bus stop placement, traffic calming measures, and accommodations for disabled travelers contribute to improved pedestrian safety.[16] Some design features, such as medians, improve safety for all users. Medians enable pedestrians to cross busy roads in two stages and reduce bicyclist injuries from left-turning motorists. Speed reductions created through enlarging sidewalks, installing medians, and adding bicycle lanes, help to lower fatality rates. Eighty percent of pedestrians struck by an automobile going 40 mph will die, however the fatality rates decrease with speed. Forty percent will die when hit by a vehicle traveling 30 mph and only 5 percent will die when hit at 20 mph[17]. Also, bicyclists are safer riding with traffic in bicycle lanes than on sidewalks due to unexpected conflicts at driveways and intersections.

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[10] Higgins, Pat. Exercise Based Transportation Reduces Oil Dependence, Carbon Emissions and Obesity Environmental Conservation 2005

[11] Ewing, Reid. Growing Cooler: The Evidence on Urban Development and Climate Change. Urban Land Institute/Smart Growth America, 2007.

[12] Litman, Todd. TDM Encyclopedia (ADONIS, 1999; Mackett, 2000; Socialdata Australia, 2000; Cairns et al, 2004).

[13] Drennen, Emily. *Economic Effects of Traffic Calming on Urban Small Businesses*. 2003. http://www.emilydrennen.org/TrafficCalming_full.pdf.

[14] Michelle Ernst, *Mean Streets 2004: How Far Have We Come?*, Surface Transportation Policy Project (2004).

[15] B.J. Campbell and others, *A Review of Pedestrian Safety Research in the United States and Abroad*, Federal Highway Administration Publication # FHWA-RD-03-042 (January 2004).

[16] Ibid.

[17] W.A. Leaf and D.F. Preusser, "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups," US Department of Transportation, National Highway Traffic Safety Administration (1999).

Children

A lack of complete streets inhibits children from walking or bicycling to school and playing in their neighborhoods. Pedestrian injury is a leading cause of unintentional, injury-related death among children, ages 5 to 14.[18] Currently, only 17 percent of children walk or ride their bicycles to school compared to 71 percent of their parents when they were children.[19] Sidewalks, footpaths, safe street crossings, and reduced vehicle speeds in school zones contribute to an increase in children walking and bicycling to school.[20] In addition, complete street policies can augment Safe Routes to School (SRTS) programs, to help communities implement complete street design elements into their roadway improvements.

People with Disabilities

Incomplete streets often create unsafe conditions, inhibit use or are a source of frustration for people with disabilities. For example, unpaved surfaces and disconnected, narrow, or deteriorated sidewalks provide unstable or poor conditions for wheelchair travel. High-speed traffic through wide intersections limits mobility for older persons. WALK signals that are solely visual provide no cues to visually impaired pedestrians. Bus stops without adequately paved surfaces and seating are often inaccessible and uncomfortable. Complete street programs provide communities with transportation investments that accommodate all users. For example, complete street designs incorporate inclusive details, such as curb ramps and retimed signals to account for slower movement at intersections, smooth sidewalks free of obstacles, with usable benches along pedestrian routes and ample space to approach, wait, and board safely at transit stops.

Older People

By 2025, the U.S. Census Bureau projects that the portion of Americans over 65 will increase from 12 percent to nearly 20 percent, totaling 62 million Americans. Many older adults prefer not to drive for safety reasons; however, many roads do not provide safe alternatives to driving. In 2005, older Americans made up 20 percent of all pedestrian fatalities. A national poll found that 47 percent of Americans over 50 could not safely cross main roads near their homes, 40 percent did not have adequate neighborhood sidewalks, and 48 percent had no comfortable place to wait for the bus.[21] Also, incomplete streets contribute to older Americans' isolation at home due to a lack of transportation options. Over 50 percent of older adults who reported unsafe walking, bicycling, and transit facilities near their home said they would walk, bicycle, or take transit more often if their streets were improved. Examples of complete street designs include retiming signals to account for slower walking speed, constructing median refuges or sidewalk bulb-outs to shorten crossing distances, and installing curb ramps, sidewalk seating and bus shelters with seating. Also, improved lighting, signage, and pavement markings are among the measures that can benefit drivers of any age, but particularly older drivers.

Health

Obesity is a major American health issue. A recent study found that 32 percent of American adults are obese[22], and the number of overweight or obese American children almost tripled from 1980 to 2004.[23] According to health

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[18] *Surface Transportation Policy Project* (2004) *Mean Streets*.
[19] Appleyard, B. (2005), *Livable Streets for Schoolchildren.* NCBW Forum.
[20] Ewing, R. Will Schroeer, William Greene. *School location and student travel: Analysis of factors affecting TRB,* National Research Council, Washington, D.C., 2004, pp. 55-63.
[21] AARP, *Fighting Gas Prices, Nearly A Third of American sage 50+ Hang Up Their Keys To Walk But Find Streets Inhospitable, Public Transportation Inaccessible*. http://www.aarp.org/research/press-center/presscurrentnews/aarp_poll_fighting_gas_prices_nearly_a_third_of_am.html
[22] U.S. CDC. (2006) *Physical Activity and Good Nutrition: Essential Elements to Prevent Chronic Disease and Obesity.*
[23] U.S. CDC. (2004) *Physical Activity and the Health of Young People.*

experts, inactivity is a major contributor to obesity and other diseases, such as diabetes, heart disease, and stroke. Fifty-five percent of American adults fall short of recommended activity guidelines, and approximately 25 percent report being completely inactive.[24] Complete streets encourage active travel by providing a network of safe sidewalks and bikeways. A study found that 43 percent of people with safe places to walk within 10 minutes of home met recommended activity levels and among those without safe places to walk just 27 percent met the recommendation.[25]

Transit

Incomplete streets are barriers to transit riders. Poor street design hinders many pedestrians, seniors, and people with disabilities from getting to transit stops in a safe and convenient manner. Communities providing complete streets understand that buses and trains carry more people at a lower cost than automobiles, and help reduce congestion and air pollution. Complete streets accommodate buses moving through traffic and provide accessible bus stops and sidewalks. For example, since 2000 Los Angeles uses a priority signal system that allows buses to shorten red lights and extend green lights. As a result, ridership has increased over 30 percent and travel time has decreased by 25 percent.[26] Also, improving access to transit aids in reducing usage of more costly transportation alternatives, such as paratransit or private transportation services. The Maryland Transit Administration calculated that a daily paratransit commuter costs about $38,500 a year for one person while basic improvements to a transit stop cost approximately $7,000, and extensive improvements (lighted shelter, bench, new sidewalk) cost around $58,000.

Transportation Costs

Transportation costs are the second largest expense for American households. On average, automobile purchases, operation, and maintenance account for 98 percent of the money spent for transportation by American households. Families living in auto-reliant communities without sidewalks, bicycle lanes, and convenient public transit cannot choose less expensive transportation options. Households in auto-reliant communities spend 20 percent more on transportation than in complete street communities.[27] Complete streets encourage families to choose bicycling, walking, or taking public transit over driving. Households residing near public transit drive an average of 16 fewer miles per day compared to households without public transportation options. When residents can reduce their transportation costs, they often invest more in the local economy, which in turn creates new jobs and more tax revenue.[28] In addition, property values increase in pedestrian-friendly communities and communities with convenient transit stops. For example, in Chicago, houses within a half-mile of a suburban rail station sell on average for $36,000 more than homes located farther away.[29]

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[24] U.S. Department of Health and Human Services (2000) *Healthy people 2010*. 2nd edition. Washington, DC: U.S. Government Printing Office.

[25] Powell, K.E., Martin, L., & Chowdhury, P.P. (2003). Places to walk: convenience and regular physical activity. *American Journal of Public Health, 93*, 1519-1521.

[26] Los Angeles County Metropolitan Transportation Authority. *Metro Rapid Demonstration Program, Final Report*. March 2002.

[27] McCann, Barbara. *Driven to Spend: Sprawl and Household Transportation Expenses.* STPP, March 2000. <http://www.transact.org/report.asp?id=36>

[28] Bekka, Khalid. *Economic Benefits of Public Transit*. Wisconsin Department of Transportation, November 2003. <http://on.dot.wi.gov/wisdotresearch/database/briefs/03-07transitbenefits-b.pdf>

[29] *What Happens to a Capital Investment in Public Transportation?* American Public Transportation Association. <http://publictransportation.org/reports/asp/pub_business.asp>

APPENDIX H
Route 104 Corridor Trail Feasibility Study

SCHEMATIC COST ESTIMATES

Prepared for GTC and the Towns of Ontario, Sodus, Webster, and Williamson, NY

Route 104 Corridor Trail Preliminary Cost Estimate | **Alternative 1**
edr Job No. 10034 | **Railroad Trail**
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	$10,000	$10,000
1.2	Clearing, grubbing, and earthwork	LS	1	$25,000	$25,000
1.3	Erosion and sediment controls	LS	1	$25,000	$25,000
2	**STRUCTURAL**				
2.1	10' wide boardwalk, with curb rails and helical pier foundation system	SF	84,760	$27.50	$2,330,900
2.2	Creek crossings	Each	14	$21,500	$301,000
3	**PAVING**				
3.1	10' wide stone dust multi-use trail	SF	644,280	$3	$1,932,840
3.2	Trail drainage improvements	LS	1	$50,000	$50,000
3.3	Crosswalk striping	LF	19,245	$15	$288,675
3.4	Crosswalk striping	Each	18	$50	$900
3.5	Concrete sidewalk expansion (Webster)	SF	4,200	$7	$29,400
4	**SIGNAGE**				
4.1	Mile post signage	Each	34	$1,000	$34,000
4.2	Trailhead kiosks & signage	Each	6	$10,500	$63,000
4.3	Traffic Signal - Pedestrian Improvements	LS	1	$3,500	$3,500
5	**SITE FURNITURE**				
5.1	Limestone slab seats	Each	51	$500	$25,500
5.2	Bicycle racks	Each	6	$1,000	$6,000
5.3	Trail gates, 2 per road crossing	Each	36	$1,000	$36,000
5.4	Fencing	LF	1000	$40	$40,000
6	**PLANTINGS**				
6.1	Native trees (3" cal.)	Each	100	$600	$60,000
6.2	Native shrubs	Each	500	$80	$40,000
6.3	Seeding, mulching, and site restoration	Acre	20	$1,500	$30,000
				SUBTOTAL	**$5,331,715**
7	**CONTINGENCY (20%)**				$1,066,343
				SUBTOTAL	**$6,398,058**
8	**DESIGN AND PERMITTING (15%)**				$959,709
				TOTAL	**$7,357,767**
9	**ADD ALTERNATE - PAVING**				
	10' wide asphalt multi-use trail ($3.30/SF)	SF	644,280	$0.30	$193,284
10	**ADD ALTERNATE - TRAIL GATEWAYS**	Each	36	$5,000	$180,000
				CONTINGENCY 20%	$38,657
				DESIGN AND PERMITTING 15%	$34,791
				TOTAL	**$7,804,499**

Route 104 Corridor Trail Preliminary Cost Estimate
edr Job No. 10034
Prepared for: Genesee Transportation Council
NOTE: Conceptual estimate for budgeting purposes only

Alternative 1
Railroad Trail
Webster, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$1,000	$1,000
1.2	Clearing, grubbing, and earthwork	LS	1	$2,500	$2,500
1.3	Erosion and sediment controls	LS	1	$2,500	$2,500
2	**STRUCTURAL**				
2.1	10' wide boardwalk, with curb rails and helical pier foundation system	SF	2,680	$27.50	$73,700
2.2	Creek crossings	Each	1	$21,500	$21,500
3	**PAVING**				
3.1	10' wide stone dust multi-use trail	SF	62,710	$3	$188,130
3.2	Trail drainage improvements	LS	1	$5,000	$5,000
3.3	Crosswalk striping	Each	3	$50	$150
3.4	Crosswalk striping	SF	4,200	$7	$29,400
4	**SIGNAGE**				
4.1	Mile post signage	Each	2	$1,000	$2,000
4.2	Trailhead kiosks & signage	Each	1	$10,500	$10,500
4.3	Traffic Signal - Pedestrian Improvements	LS	1	$3,500	$3,500
5	**SITE FURNITURE**				
5.1	Limestone slab seats	Each	6	$500	$3,000
5.2	Bicycle racks	Each	1	$1,000	$1,000
5.4	Trail gates, 2 per road crossing	Each	5	$1,000	$5,000
5.3	Fencing	LF	100	$40	$4,000
6	**PLANTINGS**				
6.1	Native trees (3" cal.)	Each	10	$600	$6,000
6.2	Native shrubs	Each	50	$80	$4,000
6.3	Seeding, mulching, and site restoration	Acre	2	$1,500	$3,000
				SUBTOTAL	**$365,880**
7	**CONTINGENCY (20%)**				$73,176
				SUBTOTAL	**$439,056**
8	**DESIGN AND PERMITTING (15%)**				$65,858
				TOTAL	**$504,914**
9	**ADD ALTERNATE - PAVING**				
	10' wide asphalt multi-use trail ($3.30/SF)	SF	62,710	$0.30	$18,813
10	**ADD ALTERNATE - TRAIL GATEWAYS**	Each	5	$5,000	$25,000
				CONTINGENCY 20%	$3,763
				DESIGN AND PERMITTING 15%	$3,386
				TOTAL	**$555,876**

Route 104 Corridor Trail Preliminary Cost Estimate
edr Job No. 10034
Prepared for: Genesee Transportation Council
NOTE: Conceptual estimate for budgeting purposes only

Alternative 1
Railroad Trail
Ontario, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$4,000	$4,000
1.2	Clearing, grubbing, and earthwork	LS	1	$10,000	$10,000
1.3	Erosion and sediment controls	LS	1	$10,000	$10,000
2	**STRUCTURAL**				
2.1	10' wide boardwalk, with curb rails and helical pier foundation system	SF	26,730	$27.50	$735,075
2.2	Creek crossings	Each	6	$21,500	$129,000
3	**PAVING**				
3.1	10' wide stone dust multi-use trail	SF	159,410	$3	$478,230
3.2	Trail drainage improvements	LS	1	$20,000	$20,000
3.3	Crosswalk striping	LF	19,245	$15	$288,675
3.4	Crosswalk striping	Each	7	$50	$350
4	**SIGNAGE**				
4.1	Mile post signage	Each	16	$1,000	$16,000
4.2	Trailhead kiosks & signage	Each	2	$10,500	$21,000
5	**SITE FURNITURE**				
5.1	Limestone slab seats	Each	21	$500	$10,500
5.2	Bicycle racks	Each	2	$1,000	$2,000
5.4	Trail gates, 2 per road crossing	Each	14	$1,000	$14,000
5.3	Fencing	LF	400	$40	$16,000
6	**PLANTINGS**				
6.1	Native trees (3" cal.)	Each	40	$600	$24,000
6.2	Native shrubs	Each	200	$80	$16,000
6.3	Seeding, mulching, and site restoration	Acre	8	$1,500	$12,000
				SUBTOTAL	**$1,806,830**
7	**CONTINGENCY (20%)**				$361,366
				SUBTOTAL	**$2,168,196**
8	**DESIGN AND PERMITTING (15%)**				$325,229
				TOTAL	**$2,493,425**
9	**ADD ALTERNATE - PAVING**				
	10' wide asphalt multi-use trail ($3.30/SF)	SF	159,410	$0.30	$47,823
10	**ADD ALTERNATE - TRAIL GATEWAYS**	Each	14	$5,000	$70,000
				CONTINGENCY 20%	$9,565
				DESIGN AND PERMITTING 15%	$8,608
				TOTAL	**$2,629,421**

Route 104 Corridor Trail Preliminary Cost Estimate
edr Job No. 10034
Prepared for: Genesee Transportation Council
NOTE: Conceptual estimate for budgeting purposes only

Alternative 1
Railroad Trail
Williamson, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$3,500	$3,500
1.2	Clearing, grubbing, and earthwork	LS	1	$8,750	$8,750
1.3	Erosion and sediment controls	LS	1	$8,750	$8,750
2	**STRUCTURAL**				
2.1	10' wide boardwalk, with curb rails and helical pier foundation system	SF	32,520	$27.50	$894,300
2.2	Creek crossings	Each	4	$21,500	$86,000
3	**PAVING**				
3.1	10' wide stone dust multi-use trail	SF	240,560	$3.00	$721,680
3.2	Trail drainage improvements	LS	1	$17,500	$17,500
3.3	Crosswalk striping	Each	5	$50	$250
4	**SIGNAGE**				
4.1	Mile post signage	Each	12	$1,000	$12,000
4.2	Trailhead kiosks & signage	Each	2	$10,500	$21,000
5	**SITE FURNITURE**				
5.1	Limestone slab seats	Each	21	$500	$10,500
5.2	Bicycle racks	Each	2	$1,000	$2,000
5.4	Trail gates, 2 per road crossing	Each	10	$1,000	$10,000
5.3	Fencing	LF	350	$40	$14,000
6	**PLANTINGS**				
6.1	Native trees (3" cal.)	Each	35	$600	$21,000
6.2	Native shrubs	Each	175	$80	$14,000
6.3	Seeding, mulching, and site restoration	Acre	7	$1,500	$10,500
				SUBTOTAL	**$1,855,730**
7	**CONTINGENCY (20%)**				$371,146
				SUBTOTAL	**$2,226,876**
8	**DESIGN AND PERMITTING (15%)**				$334,031
				TOTAL	**$2,560,907**
9	**ADD ALTERNATE - PAVING**				
	10' wide asphalt multi-use trail ($3.30/SF)	SF	240,560	$0.30	$72,168
10	**ADD ALTERNATE - TRAIL GATEWAYS**	Each	10	$5,000	$50,000
				CONTINGENCY 20%	$14,434
				DESIGN AND PERMITTING 15%	$12,990
				TOTAL	**$2,710,499**

Route 104 Corridor Trail Preliminary Cost Estimate
edr Job No. 10034
Prepared for: Genesee Transportation Council
NOTE: Conceptual estimate for budgeting purposes only

Alternative 1
Railroad Trail
Sodus, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$1,500	$1,500
1.2	Clearing, grubbing, and earthwork	LS	1	$3,750	$3,750
1.3	Erosion and sediment controls	LS	1	$3,750	$3,750
2	**STRUCTURAL**				
2.1	10' wide boardwalk, with curb rails and helical pier foundation system	SF	22,830	$27.50	$627,825
3	**PAVING**				
3.1	10' wide stone dust multi-use trail	SF	181,600	$3	$544,800
3.2	Trail drainage improvements	LS	1	$7,500	$7,500
3.3	Crosswalk striping	Each	3	$50	$150
4	**SIGNAGE**				
4.1	Mile post signage	Each	6	$1,000	$6,000
4.2	Trailhead kiosks & signage	Each	1	$10,500	$10,500
5	**SITE FURNITURE**				
5.1	Limestone slab seats	Each	9	$500	$4,500
5.2	Bicycle racks	Each	1	$1,000	$1,000
5.4	Trail gates, 2 per road crossing	Each	7	$1,000	$7,000
5.3	Fencing	LF	150	$40	$6,000
6	**PLANTINGS**				
6.1	Native trees (3" cal.)	Each	15	$600	$9,000
6.2	Native shrubs	Each	75	$80	$6,000
6.3	Seeding, mulching, and site restoration	Acre	3	$1,500	$4,500
				SUBTOTAL	**$1,243,775**
7	**CONTINGENCY (20%)**				$248,755
				SUBTOTAL	**$1,492,530**
8	**DESIGN AND PERMITTING (15%)**				$223,880
				TOTAL	**$1,716,410**
9	**ADD ALTERNATE - PAVING**				
	10' wide asphalt multi-use trail ($3.30/SF)	SF	181,600	$0.30	$54,480
10	**ADD ALTERNATE - TRAIL GATEWAYS**	Each	7	$5,000	$35,000
				CONTINGENCY 20%	$10,896
				DESIGN AND PERMITTING 15%	$9,806
				TOTAL	**$1,826,592**

Route 104 Corridor Trail Preliminary Cost Estimate
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NOTE: Conceptual estimate for budgeting purposes only

Alternative 2
Active Transportation Package

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$10,000	$10,000
1.2	Erosion and sediment controls	LS	1	$10,000	$10,000
2	**PAVING**				
2.1	Pavement striping and markings on Ridge Road shared roadway bicycle route	LF	185,120	$1.40	$259,168
2.2	Pavement striping on Lake Ave & Furnace Rd connections btw Ridge Road and Route 104	LF	10,800	$2.40	$25,920
2.3	Concrete walk pavement - new sidewalks on Furnace Road btw Ridge Rd and Route 104	SF	22,200	$7.00	$155,400
2.4	Concrete walk pavement - expanded sidewalks on Lake Avenue btw Ridge Road and Route 104	SF	14,750	$7.00	$103,250
2.5	Concrete walk pavement on select Route 104 pedestrian areas	SF	37,500	$8.00	$300,000
2.6	Pedestrian crosswalk improvements at intersections	Each	16	$2,500.00	$40,000
3	**SIGNAGE**				
3.1	Informational and directional signage	LS	1	$15,000	$15,000
3.2	Bicycle warning and Share the Road signage - one signage assembly every 1/4 mile	Each	136	$250	$34,000
4	**SITE FURNITURE**				
4.1	Benches	Each	20	$1,000	$20,000
4.2	Bicycle racks	Each	20	$1,000	$20,000
4.3	Bicycle shelters	Each	6	$50,000	$300,000
5	**PLANTINGS**				
5.1	Native street trees (3" cal.)	Each	175	$600	$105,000
5.2	Seeding, mulching, and site restoration	Acre	0.6	$1,500	$900
				SUBTOTAL	**$1,398,638**
7	**CONTINGENCY (20%)**				$279,728
				SUBTOTAL	**$1,678,366**
8	**DESIGN AND PERMITTING (15%)**				$251,755
				TOTAL	**$1,930,120**

Route 104 Corridor Trail Preliminary Cost Estimate
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Alternative 2
Active Transportation Package
Webster, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$1,000	$1,000
1.2	Erosion and sediment controls	LS	1	$1,000	$1,000
2	**PAVING**				
2.1	Pavement striping and markings on Ridge Road shared roadway bicycle route	LF	13,520	$1.40	$18,928
2.2	Concrete walk pavement on select Route 104 pedestrian areas	SF	3,750	$8.00	$30,000
2.3	Pedestrian crosswalk improvements at intersections	Each	4	$2,500.00	$10,000
3	**SIGNAGE**				
3.1	Informational and directional signage	LS	1	$1,500	$1,500
3.2	Bicycle warning and Share the Road signage - one signage assembly every 1/4 mile	Each	14	$250	$3,500
4	**SITE FURNITURE**				
4.1	Benches	Each	2	$1,000	$2,000
4.2	Bicycle racks	Each	2	$1,000	$2,000
4.3	Bicycle shelters	Each	1	$50,000	$50,000
5	**PLANTINGS**				
5.1	Native street trees (3" cal.)	Each	18	$600	$10,800
5.2	Seeding, mulching, and site restoration	Acre	0.1	$1,500	$150
				SUBTOTAL	**$130,878**
7	**CONTINGENCY (20%)**				$26,176
				SUBTOTAL	**$157,054**
8	**DESIGN AND PERMITTING (15%)**				$23,558
				TOTAL	**$180,612**

Route 104 Corridor Trail Preliminary Cost Estimate
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Alternative 2
Active Transportation Package
Ontario, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$3,500	$3,500
1.2	Erosion and sediment controls	LS	1	$3,500	$3,500
2	**PAVING**				
2.1	Pavement striping and markings on Ridge Road shared roadway bicycle route	LF	67,452	$1.40	$94,433
2.2	Pavement striping on Furnace Rd connection between Ridge Road and Route 104	LF	4,520	$2.40	$10,848
2.3	Concrete walk pavement - new sidewalks on Furnace Road btw Ridge Rd and Route 104	SF	22,200	$7.00	$155,400
2.4	Concrete walk pavement on select Route 104 pedestrian areas	SF	13,125	$8.00	$105,000
2.5	Pedestrian crosswalk improvements at intersections	Each	7	$2,500.00	$17,500
3	**SIGNAGE**				
3.1	Informational and directional signage	LS	1	$5,250	$5,250
3.2	Bicycle warning and Share the Road signage - one signage assembly every 1/4 mile	Each	47	$250	$11,750
4	**SITE FURNITURE**				
4.1	Benches	Each	7	$1,000	$7,000
4.2	Bicycle racks	Each	7	$1,000	$7,000
4.3	Bicycle shelters	Each	2	$50,000	$100,000
5	**PLANTINGS**				
5.1	Native street trees (3" cal.)	Each	62	$600	$37,200
5.2	Seeding, mulching, and site restoration	Acre	0.2	$1,500	$300
				SUBTOTAL	**$558,681**
7	**CONTINGENCY (20%)**				$111,736
				SUBTOTAL	**$670,417**
8	**DESIGN AND PERMITTING (15%)**				$100,563
				TOTAL	**$770,980**

Route 104 Corridor Trail Preliminary Cost Estimate
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Alternative 2
Active Transportation Package
Williamson, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$3,500	$3,500
1.2	Erosion and sediment controls	LS	1	$3,500	$3,500
2	**PAVING**				
2.1	Pavement striping and markings on Ridge Road shared roadway bicycle route	LF	63,234	$1.40	$88,528
2.2	Pavement striping on Lake Ave connection between Ridge Road and Route 104	LF	6,280	$2.40	$15,072
2.3	Concrete walk pavement - expanded sidewalks on Lake Avenue btw Ridge Road and Route 104	SF	14,750	$7.00	$103,250
2.4	Concrete walk pavement on select Route 104 pedestrian areas	SF	13,125	$8.00	$105,000
2.5	Pedestrian crosswalk improvements at intersections	Each	4	$2,500.00	$10,000
3	**SIGNAGE**				
3.1	Informational and directional signage	LS	1	$5,250	$5,250
3.2	Bicycle warning and Share the Road signage - one signage assembly every 1/4 mile	Each	43	$250	$10,750
4	**SITE FURNITURE**				
4.1	Benches	Each	7	$1,000	$7,000
4.2	Bicycle racks	Each	7	$1,000	$7,000
4.3	Bicycle shelters	Each	2	$50,000	$100,000
5	**PLANTINGS**				
5.1	Native street trees (3" cal.)	Each	62	$600	$37,200
5.2	Seeding, mulching, and site restoration	Acre	0.2	$1,500	$300
				SUBTOTAL	**$496,350**
7	**CONTINGENCY (20%)**				$99,270
				SUBTOTAL	**$595,620**
8	**DESIGN AND PERMITTING (15%)**				$89,343
				TOTAL	**$684,962**

Route 104 Corridor Trail Preliminary Cost Estimate
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Alternative 2
Active Transportation Package
Sodus, NY

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL AMOUNT
1	**SITE PREPARATION**				
1.1	Mobilization/Demobilization	LS	1	$2,000	$2,000
1.2	Erosion and sediment controls	LS	1	$2,000	$2,000
2	**PAVING**				
2.1	Pavement striping and markings on Ridge Road shared roadway bicycle route	LF	41,454	$1.40	$58,036
2.2	Concrete walk pavement on select Route 104 pedestrian areas	SF	7,500	$8.00	$60,000
2.3	Pedestrian crosswalk improvements at intersections	Each	4	$2,500.00	$10,000
3	**SIGNAGE**				
3.1	Informational and directional signage	LS	1	$3,000	$3,000
3.2	Bicycle warning and Share the Road signage - one signage assembly every 1/4 mile	Each	22	$250	$5,500
4	**SITE FURNITURE**				
4.1	Benches	Each	4	$1,000	$4,000
4.2	Bicycle racks	Each	4	$1,000	$4,000
4.3	Bicycle shelters	Each	1	$50,000	$50,000
5	**PLANTINGS**				
5.1	Native street trees (3" cal.)	Each	33	$600	$19,800
5.2	Seeding, mulching, and site restoration	Acre	0.1	$1,500	$150
				SUBTOTAL	**$218,486**
7	**CONTINGENCY (20%)**				$43,697
				SUBTOTAL	**$262,183**
8	**DESIGN AND PERMITTING (15%)**				$39,327
				TOTAL	**$301,510**

RELATIONSHIP TO OTHER PLANS AND STUDIES

APPENDIX I
Route 104 Corridor Trail Feasibility Study

The Route 104 Corridor Trail Feasibility Study builds on the following previously completed planning initiatives in Monroe and Wayne Counties:

- Comprehensive Plan for the Town of Williamson, NY, 2010
- Town of Webster, NY Comprehensive Plan Update, 2008
- Town of Williamson, NY: Routes 21 and 104 Gateway Study, 2008
- Design Guidelines for the Historic Business Center in the Hamlet of Williamson, NY, 2007
- Town of Ontario, NY Comprehensive Plan, 2006
- A Community Based Vision Plan for the Hamlet of Williamson, NY, 2005
- Regional Trails Final Report and Action Plan: Phase Two – Non-TMA Region, 2004
- Wayne County Comprehensive Plan Public Opinion Survey, 2004
- Wayne County Recreationways Master Plan, 2001
- Town of Williamson Parks and Recreation Master Plan, 1999

Each of these plans and studies is summarized in the following paragraphs, and any relevance to the proposed Route 104 Corridor Trail study is described.

Comprehensive Plan for the Town of Williamson, NY, 2010
Prepared by Bergmann Associates, the Williamson Comprehensive Plan Update presents a vision for the Town that reflects the priorities and objectives of the community. The Plan outlines a series of recommended actions for preserving, protecting, and enhancing the qualities and characteristics of Williamson that have been determined to be most important to Town residents and stakeholders. The plan focuses on revitalizing Main Street, protecting significant agricultural lands, identifying appropriate locations for future growth and development, retaining the rural character and natural resources in the Town, and enhancing other community resources, including social institutions, historic structures and sites, and parks and recreation facilities. The Plan provides the Town with a framework for decision-making, investment, and prioritizing activities in Williamson over the course of the next decade.

The following plan objectives support developing a multi-use trail along Route 104:

- Objective 2.C. Promote walkability throughout the Town by incorporating linkages and connections into new development projects.
- Objective 4: Provide adequate recreation facilities, including parks, trails, linkages, and access to natural resources, for the use and enjoyment of residents and visitors to the Town of Williamson.
- Objective 4.B. Continue to work with Trail Works, Inc. to identify and implement additional multi-use trail systems both within the Town and connections to adjacent towns.

Town of Webster, NY Comprehensive Plan Update, 2008
The Town of Webster Comprehensive Plan Update was prepared by a committee consisting of citizens and Town officials. The plan includes an inventory of existing conditions, a future land use plan, and policy recommendations for the Route 104/404 Corridor; Waterfront/Sandbar; Environmental Resources, Open Space, and Recreation; and Pedestrian Access and Safety. An Implementation Strategy summarizes the recommendations, identifies the entity or entities responsible for carrying out the recommended actions, the proposed time frame for completing the actions, potential costs and sources of funds.

The following goals and objectives of the plan support developing a multi-use trail along Route 104:

- (CORR) Goal G: Maximize the utility of the Rt. 104/Expressway corridor as a transportation and aesthetic resource for the community.
- (ENV) Goal Q: Improve Existing Parks, including Facility Improvements and Trail Connections
- (ENV) Objective Q.1. Review proposed vacant lands and trails on Open Space Inventory map to determine opportunities for park expansions, improved access and existing or new trail linkages
- (ENV) Goal R: Prepare a Trail and Alternative Transportation System Plan (TATS Plan)

Town of Williamson, NY: Routes 21 and 104 Gateway Study, 2008
Prepared by a consultant team that included Clark Patterson Lee, Fisher Associates and the Steinmetz Planning Group, the Route 21 & 104 Gateway Study was completed in 2008. The purpose of the plan was to identify improvements for the area surrounding the intersection of Routes 21 and 104 in Williamson, NY. The Plan identifies five key goals, including creating a visually attractive hamlet / town center gateway on Route 104; attracting motorists on 104 to the Hamlet of Williamson; enhancing the business climate within the Hamlet; reducing traffic speeds and enhancing safety; and improving pedestrian connections. The final corridor recommendations included planting a row of trees along Route 104 in conformance with required clear zones; introducing a flush, colored median on Route 104; street lighting; and a signage program including two large gateway signs. The plan identifies improvements separated into four stages to help break out costs and impacts on people using the roadway. The plan also identifies funding opportunities the Town could pursue to help pay for improvements and includes design guidelines for future development along the Route 104 commercial corridor.

Most of the goals of the study do not conflict with a Route 104 Corridor trail, but the execution of the study's site-specific recommendations (e.g. planting trees) will need to be considered when the trail alignment is laid out in this area. The goals of the study include:

- Create a visually attractive hamlet/town center gateway on Route 104;
- Attract Route 104 motorists to the hamlet's commercial area (on Ridge Road);
- Enhance the business climate in the hamlet center;
- Reduce traffic speed and improve safety at the Route 21/104 intersection; and
- Improve pedestrian linkages at the Route 21/104 intersection and between Route 104 and the hamlet center.

Design Guidelines for the Historic Business Center in the Hamlet of Williamson, NY, 2007
Prepared by the Rochester Regional Community Design Center, the Design Guidelines were developed as part of the Implementation Phase associated with the Community Design Charrette. The guidelines were based on input and ideas generated through the design charrette process. The design guidelines were developed to apply to buildings, streets, sidewalks, and public spaces within the Hamlet of Williamson Historic Business Center. The design guidelines were broken into four sections to assist users. The sections included: General Guidelines for Existing Buildings; General Guidelines for New Buildings; General Guidelines for Specific Building Components; and Guidelines for Specific Main Street Type Buildings. Sub-categories covered within the sections include building detailing, building configuration, appropriate design techniques, details and material, colors, awnings and canopies, and signage. Building specific recommendations were developed for 24 buildings on Main Street and include an illustrated design scheme to visually portray recommended façade improvements. The Design Guidelines do not specifically relate to the Route 104 Corridor Trail.

Town of Ontario, NY Comprehensive Plan, 2006
Prepared by Stuart I. Brown Associates and MRB Group, the Town of Ontario Comprehensive Plan was completed in 2006. The purpose of the plan is to guide local officials and community members in making decisions that will affect the future of the Town. The plan includes a land use overview, a future land use map and conservation overlay, and topical sections that address the major issues identified by the community: natural resources and open space; farmland and agriculture; housing and residential neighborhoods; economic development; parks and recreation; transportation and infrastructure; and community services and facilities. In each section, the Plan presents: goals; background information; issues and opportunities; tools and techniques; and recommended actions. An implementation strategy summarizes the recommended actions by topic, with a proposed time frame, responsible agency, cost estimate, and potential funding sources. A summary of the recommended actions by time frame provides a year-by-year guide to implementing the Plan.

The plan has the following recommended actions that support developing a multi-use trail along Route 104:

- PR-2 (TI-10): Work with local bicycling clubs and other organizations to create dedicated bicycle routes along Lake Road and in other suitable locations.
- PR-3 (TI-11): Develop trails for bicycling, hiking and other uses including equestrian use that connect with neighboring systems.

A Community Based Vision Plan for the Hamlet of Williamson, NY, 2005
In 2005 a two-day charrette was held at Williamson's United Methodist Church. The event, known as the Williamson Community Design Charrette, was intended to create a plan for the hamlet of Williamson that would maintain or increase its vitality and to take a proactive approach to addressing sprawl within the Town. Approximately 100 residents and design professionals took part in the charrette event, which concentrated on five focus areas, including Main Street; Route 21; Route 104; Architectural and Agricultural Preservation; and the hamlet of Williamson in its entirety. A variety of design ideas were generated during the charrette, including the addition of street trees and façade improvements on Main Street; the creation of a village green at the Town Complex; a gateway feature at the intersection of Route 104 and Lake Avenue; landscape buffers; and the re-routing of truck traffic. A variety of other recommendations and implementation actions are also identified in the final Vision Plan.

The Vision Plan suggests locations for commercial development that will fit within existing buildings and create a shopping area that is walkable, pedestrian friendly and inviting. Suggested development takes into account building scale, location, and interstitial spaces, which can be developed as appropriate parking, landscaped green space, and pedestrian walkways. These recommendations do not specifically conflict with a Route 104 Corridor Trail, as the need for a pedestrian-friendly environment has been highlighted. The site-specific recommendations, however conceptual they might be, will need to be considered when the trail alignment is laid out in this area.

Regional Trails Final Report and Action Plan: Phase Two – Non-TMA Region, 2004
The GTC, with assistance from various consultants, drafted the Regional Trails Initiative Final Report & Action Plan – Phase 2 in March of 2004. The plan outlined the various existing recreational and multi-use trails located throughout the GTC's nine county area, as well as planned and suggested trails. Currently, the Route 104 Corridor State snowmobile trail (SS Trail #4), which runs from the Ontario- Williamson town line to the Wayne-Cayuga county line, is the only major trail system that is listed within the corridor study area.

The report identifies the proposed Route 104 Corridor Trail (Ontario-Sodus) as Trail #114, a "planned near term" trail. In addition, there are two planned/suggested trails identified by the GTC report that would connect to the proposed Route 104 Corridor Trail. Trail #116 (Route 104 Corridor Trail – Sodus to Wolcott) and Trail #155 (Pultneyville to Marion Trail). Trail #116 was classified as "planned near-term" project which indicates the proposal has been identified in other local planning documents and is recommended for near-term implementation, while Trail #155 was suggested as a long-term project and has not been identified in any other plans or documents. The Route 104 Corridor Trail would be a multi-use trail parallel to the existing snowmobile trail (SS Trail #4 described above) and the Pultneyville to Marion trail would run from the hamlet of Pultneyville (in the Town of Williamson) to the northern terminus of the planned Newark to Marion trail. At the time of this report, the Pultneyville to Marion trail was also being studied through GTC's 2010-2011 Priority Trails Advancement Program.

Wayne County Comprehensive Plan Public Opinion Survey, 2004
The survey was conducted in May-June 2004 by planning consultant George Homsy of Canandaigua under contract with Wayne County. The project was done in collaboration with and was supervised by the County Planning Department. A total of 614 people returned the survey, which had been mailed to a random sample of 1,500 Wayne County households with at least one registered voter listed at the address. In addition, a subgroup of the sample households received follow-up post cards to encourage participation. These efforts pushed the response rate to 40.9 percent, making it a statistically reliable survey sample. The results of the survey reveal the public's strong support in five general areas:

- Preservation of the county's rural characteristics
- A desire for walkable communities
- Economic development as a priority
- Protection of the natural environment
- Consolidation of some local governments

The results of this survey generally support the development of a multi-use trail in the Route 104 Corridor, as indicated by the interest in walkable communities.

Wayne County Recreationways Master Plan, 2001
Wayne County hired Trowbridge & Wolf Landscape Architects to prepare the Recreationways Master Plan in 1999. The draft plan was completed and submitted to the County in 2000. A revised final draft was prepared by the Wayne County Planning Department in 2001, with mapping created more recently in 2008. The plan was designed to document existing and proposed recreationways in Wayne County; link proposed recreationway corridors to significant tourist, cultural, recreational, and commercial destinations; link proposed trails to statewide and regional trails; develop policy recommendations and design standards that integrate the needs of diverse users; and facilitate workshops to gather input of trail user groups.

The Route 104 Corridor was listed as one of the three natural east-west corridors for recreationway development, and notes that these corridors are linked to larger regional and statewide recreationway systems. This plan identifies the two parallel east-west corridors that comprise the Route 104 corridor: the NYSDOT Route 104 roadway right-of-way, and the Rochester Gas & Electric (RG&E) owned utility corridor which consists of an active railroad, operated by Ontario Midland Railroad and electrical transmission lines. The plan notes, "Both RG&E and NYSDOT are amenable to trail development and are willing to work with Wayne County and local trail organizations toward the development of trails and trail license agreements".

The Recreationways Master Plan remarks that "motorized recreational vehicles do currently ride the entire length of this corridor within Wayne County" and that between Ontario and Sodus, the "NYSDOT and RG&E corridors are used heavily by ATVs, dirt bikes and snowmobiles (which) ride along the south side of Route 104". The plan notes that if this corridor were "developed, it would become the main east-west spine for off-road motorized vehicles and could be incorporated into the State Snowmobile Route". However, in the Implementation section, the plan goes on to state, "Wayne County should negotiate with RG&E and Ontario Midland Railroad for the development of a non-motorized trail within the RG&E corridor. Without the liability of motorized vehicles, Ontario Midland might prove more agreeable to trail development". The plan discusses using this corridor for motorized off-road vehicles, then recommends a non-motorized trail, and ultimately suggests developing two separate treadways, one for motorized trail users and one for non-motorized trail users to provide the optimal multi-use trail situation. Not all motorized off-road vehicles are currently envisioned in the proposed Route 104 Corridor Trail.

Town of Williamson Parks and Recreation Master Plan, 1999
In 1999, the Town of Williamson developed a Parks and Recreation Master Plan. The impetus of the Plan was the Town's 1998 purchase of a large parcel of land in the center of the Town for the development of a town park. The purpose of the Master Plan was to define the most appropriate direction for the Town to take in providing additional recreation opportunities to its residents. The Plan inventories existing park and recreation facilities and assesses the needs of the Town with respect to recreation facilities and programming. Long-term goals and objectives, as well as strategies for achieving the goals, are identified in the Plan. The plan identifies specific recreation, park, and open space amenities recommended for the new town park based on findings. There was a significant amount of community involvement throughout the planning process.

A survey was administered during the planning process, and the results showed good support for walking/hiking and bicycling, and surprisingly little support for winter sports such as cross country skiing and snowmobiling. The townwide public opinion survey indicated a substantial interest in the creation of a hiking and biking trail network in the town. The plan noted that the potential exists for the long-term establishment of a town-wide and intertown trails network. The plan supports the development of trails in the Town of Williamson, but does not specifically identify the Route 104 Corridor as a potential location.

ECOLOGICAL CHARACTER

On November 2, 2010, an **edr** ecologist visited the study area to specifically identify the dominant ecological communities, wildlife habitat and streams present within the study area.

The study area is set amongst a significant regional transportation corridor. General community cover types include deciduous forest, riparian forest, successional forest, scrub shrub, old-field, agricultural land and developed/disturbed land. Each of the different ecological community types identified during the site visit is described below.

Inventory of Existing Cover Types

Northern Deciduous Forest. The deciduous forest community observed within the study area is located primarily on smaller lots that have been spared development and are frequently adjacent to successional forests and old-field. A well-structured forest canopy exists with some of the typical canopy species such as sugar maple, red oak, black cherry and hickory present. The understory is comprised of maple and oak saplings, ironwood, honeysuckle and buckthorn. Due to the timing of the site visit during the fall season, an herbaceous layer was not observed. Grape, Virginia creeper, and poison ivy define the vine layer. In addition to mature forest, there are large areas of early successional forest. These areas seem to be most likely either former farm land that has been left to regenerate or abandoned commercial properties. In most instances, pioneer species such as red maple and cottonwood were present along with shrub species such as gray dogwood, honeysuckle and buckthorn dominating. Herbaceous species found in these areas include typical old-field grasses such as orchard grass, timothy, and perennial rye and broad-leaved herbaceous species such as red and white clover, milkweed, thistles, burdock, asters, Canada goldenrod, and Queen Anne's lace

Riparian/Forested Wetland. Riparian forest and forested wetlands within the study area are the dominant forest and wetland type. These forested wetlands were observed in association with many of the perennial streams that flow south to north across the study area. The forested wetlands are located on large parcels located in the broad lowlands along the study area and in most cases are designated as New York State Department of Environmental Conservation (NYSDEC) State protected wetlands. Green ash, red maple, sycamore, American elm, black willow and cottonwood dominate the overstory. Species dominating the shrub layer are silky dogwood, speckled alder, spicebush, honeysuckle and buckthorn. Cattail, common reed, jewelweed, joe pye weed, interrupted fern, sensitive fern, asters, goldenrods, soft rush, may apple, skunk cabbage and swallowwort were noted in the herbaceous layer in various locations.

Mixed Conifer and Northern Hardwood Forest. In several areas of the study area, a mixed coniferous and deciduous forest community was noted. One significant area where mixed stands are located is north and east of the Spencer Speedway. A mix of hemlock, white pine, red pine, Norway spruce, red maple, green ash, basswood, American beech, black cherry, red oak and hickory dominate the overstory. The understory is comprised of black cherry saplings, musclewood, honeysuckle and privet. The herbaceous layer is limited due to the dense mixed canopy.

Successional Old-Field. Successional old-field is defined by Reschke (1990) as "a meadow dominated by forbs and grasses that occurs on sites that have been cleared and plowed (for farming or development), and then abandoned." This ecological community is scattered throughout the study area, primarily in the form of abandoned agricultural fields. Species found in these areas include typical old-field grasses such as orchard grass, timothy, and perennial rye. Broad-leaved herbaceous species found in old fields include red and white clover, milkweed, thistles, burdock, asters, Canada goldenrod, and Queen Anne's lace. Shrubs (including honeysuckle, raspberry, gray dogwood, and brambles) and saplings from adjacent forestland, are also typically components of this community, but represent less than 50% of total vegetative cover.

Emergent Wetland. Emergent wetlands within the study area are not as prevalent as forested wetlands; however, one notable area was observed on the south side of Route 104, west of Fisher Road. This area is possibly a wetland mitigation site associated with compensatory wetland mitigation requirements. Cattail, common reed, jewelweed, sensitive fern, asters, goldenrods, sedges and soft rush dominate these emergent wetland areas. However, in many areas, cattail and common reed are overcrowding other species and prohibiting diversity. Silky dogwood and alder species are also found in and around some of the transition areas between other adjacent wetland communities.

Successional Shrubland. Successional shrubland is frequently associated with old fields and young forest on the periphery of agricultural areas. Shrubland areas are commonly found in poorly drained areas or fallow fields that have gone out of agricultural production. Areas of young trees and shrubs are also intermixed with some forested areas. Herbaceous species similar to those found in successional old fields occur in this community. However, shrub species such as gray dogwood, hawthorn, honeysuckle, raspberry, multiflora rose, and wild grape dominate this community.

Scrub shrub wetlands were also noted within the study area. The main concentration of scrub shrub wetlands is associated with other adjacent forested and emergent wetland community types. The largest concentration of scrub shrub wetland is associated with the previously mentioned emergent wetland complex south of Route 104 west of Fisher Road. Gray dogwood, silky dogwood, speckled alder, spice bush, honeysuckle and buckthorn dominate the shrub layer. Cattail, common reed, jewelweed, joe pye weed, sensitive fern, asters, goldenrods, sedges and soft rush dominate the herbaceous layer.

Agricultural Land. Agricultural land constitutes one of the largest community types within the study area. Corn seems to be the primary row crop, while other crops include soybeans, alfalfa, oats and wheat. Although pastureland is not as prevalent in the study area, it is used for the grazing of livestock and is typically characterized by mixed grasses and broad-leafed herbaceous species, including clovers, plantains, and dandelion. Hayfields are typically rotated into (and out of) row crop production (typically corn and soybeans), and less often into pastureland. Consequently, the percentage of each agricultural type is continuously changing. Vegetable farms and fruit tree orchards are an additional agricultural land use that is common in the region. One significant orchard and organic farm were noted on the south side of Route 104 and just east of Spencer Speedway.

Disturbed/Developed Land. The Project site also includes Disturbed/Developed land. This community is a combination of several "cultural communities" defined by Reschke (1990), and is characterized by the presence of buildings, paved areas, and lawns. It includes residential yards, farmyards, storage yards, and roads, along with the native and introduced plant species that inhabit such areas (e.g., bluegrass, goldenrod, chicory, ragweed, and Queen Anne's lace). Areas of developed land are associated with a range of various structures such as industrial facilities, commercial businesses and plazas to single family residences. Due to the proximity of Route 104 and the associated development, this is the largest community in the study area.

Rare Threatened and Endangered Species. A letter dated February 9, 2011 was sent by **edr** to the New York Natural Heritage Program. A response dated February 23, 2011, identified one State-protected fish species (historical record), in the study area. The Natural Heritage Report on Rare Species and Ecological Communities identified the Blackchin Shiner *(Notropis heterodon),* as having been seen in Salmon Creek in the Town of Williamson. This species has been ranked by the New York Natural Heritage Program as S1, meaning typically 5 or fewer occurrences. In addition, the New York Natural Heritage Program identifies this species as "critically impaired".

The Federally Listed Endangered and Threatened Species and Candidates Species list identifies the following plant and wildlife species on a countywide level for Wayne County: bald eagle (*Haliaeetus leucocephalus*), bog turtle (*Clemmys muhlenbergii*), Eastern prairie fringed orchid (historic) (*Platanthera leucophea*), and Indiana bat (*Myotis sodalis*). No federally listed plant or wildlife species are identified for the part of the study area located in Monroe County. Although more rigorous study is required to definitively conclude the presence or absence of these rare, threatened and endangered species, there were no observations of these species made during the site visit.

Invasive species. Invasive plant species are problematic in certain areas of the study area. Several invasive species such as common reed, honeysuckle, buckthorn, multiflora rose and privet are beginning to concentrate heavily in several upland and wetland areas in the study area. Common reed was the most prevalent invasive species observed in roadside ditches and in several of the wetlands and streams.

Habitat Assessment. As previously described, the study area is dominated by a variety of ecological community types. Wildlife observations throughout the study area during the site visit included Canada goose, mallard, great blue heron, whitetail deer including numerous tracks and trails, mink, American crow, red tailed hawk, various songbirds, and green frogs. The value of these communities to various wildlife species is summarized below.

Mature Forest Habitat. Observations made during the field survey indicate that forest within the study area provides habitat for wildlife species that require forest interior conditions, such as wood thrush, warblers, eastern-wood pewee, red tail hawk, common crow, red-eyed vireo, black-capped chickadee, tufted titmouse, white breasted nuthatch, and several woodpecker species such as the hairy, red breasted, flicker, and pileated woodpecker. Common mammals that utilize forested habitat include the gray squirrel, red squirrel, eastern chipmunk and whitetail deer (observed numerous individuals and tracks). Mature forest is an important resource that provides excellent habitat and cover for many species of migrating songbirds.

Successional Forest Habitat. Successional communities provide nesting and cover for a variety of wildlife species. Various songbirds, such as blue jay, robin, dark eyed junco, gray catbird, American goldfinch, house finch, cedar waxwing, indigo bunting, northern cardinal, sparrows, and yellow warblers require low brushy vegetation for nesting and escape cover. Common mammals typically found in these types of brushy successional habitat include whitetail deer, grey squirrel, eastern cottontail, red fox and woodchuck. Eastern coyote is most likely an occasional visitor within the study area. In addition, some of the shrub species found in these areas produce berries, which provide a good wildlife food source.

Wetland Habitat. In combination with the emergent wetlands and the larger riparian forests, a significant wetland/aquatic habitat exists within the study area. These areas provide a source of food, water, and/or cover for various waterfowl and many of the upland species mentioned previously. These water bodies also support small fishes, amphibians, and a diversity of insects and aquatic invertebrates. They are preferred foraging areas for aerial insectivores, including songbirds and bats. In addition, these areas provide habitat for various wetland/aquatic wildlife species, including Canada goose, great blue heron, belted kingfisher, mallard, wood duck, and reptiles such as painted turtle, green frog, spring peepers, bullfrog, and American toad. During the site visit, a blue heron was observed flying from one wetland area to another across Route 104. Several whitetail deer were observed in and around the edge of these wetlands, along with tracks and trails, which are evidence that well-used migratory corridors link the different ecological communities within the study area. Although not sited during this site visit, beaver are common throughout the region in wetlands similar to those present in the study area and should be expected to reside within the study area.

Successional Old-Field Habitat. A meadow community provides good nesting and foraging habitat for songbirds such as the field sparrow, black-capped chickadee, and eastern bluebird. The larger meadow/grassland parcels can potentially be visited by bird species such as bobolink, red-winged blackbird, horned lark, eastern meadowlark, northern harrier, and savannah sparrow. Animals that don't necessarily live there year-round often visit meadow communities either at certain times of the day, or in certain seasons when food in other habitats is scarce. Meadow communities experience prolonged sun exposure during much of the day, resulting in the loss of snow cover before other communities. Grasses may begin to initiate growth here long before other fresh food sources become available in other communities. Therefore, browsing species, such as the white-tailed deer are frequent visitors in such areas, as are other mammals such as red fox and Eastern coyote out hunting for a meal of field mice or moles.

POTENTIAL AREAS OF CONFLICT BETWEEN USERS

POTENTIAL AREAS OF CONFLICT BETWEEN USERS
(Derived from "Conflicts on Multiple Use Trails" by FHWA and the National Recreational Trails Advisory Committee)

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. Potential conflicts along the Route 104 Corridor Trail include conflicts between different types of trail users, conflicts between motorists and trail users at road crossings, and conflicts between trail users and property owners. The following sections discuss ways to manage conflict.

1. 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.

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

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.

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.

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.

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.

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.

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, both now and in the future.

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.

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.

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.

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.

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.

2. 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. As described previously, trail managers attempt to: maintain user safety, protect natural resources, and 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, consistency, 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.

3. 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.