

**DEVELOPING A METHODOLOGY TO EVALUATE
THE SAFETY OF SHARED-USE PATHS
Results from Three Corridors in Connecticut**

May 2004

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Project 02-2

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16. Abstract <p>This project involved the design of a shared-use path safety survey and its use on three facilities in Connecticut in the fall of 2002 and the summer of 2003. The objective was to collect self-reported information on collision and fall events, and travel exposure, so that estimates of crash rates could be developed for these paths. The analysis of the self-reported events and travel patterns provides complementary data that is not available from other sources and need to address safety concerns on these facilities. The strengths of this survey approach include the low cost and the ability to estimate travel exposure thus allowing the estimation of crash rate per mile. Small survey measurement issues were noted.</p> <p>The sample size of 684 was only sufficient to develop aggregate crash rates. These overall rates suggest that skaters have the highest crash rates followed by bicyclists and then pedestrians. The bicycle event rate was three times that of pedestrians while the rate for skaters was over 6 times that of pedestrians. Falls were the more frequently reported events when compared to collisions, and they were more often associated with an injury. The overall incident rate for each of the three individual facilities was highest for the path with the highest volume of users and highest percentage of skaters/cyclists. The following path safety countermeasures are recommended: speed control; clear communication of path operating rules; continuation of the high design standards; education regarding the relative risk of falls; and finally the consideration that different user types be separated when high volumes warrant.</p>			
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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH								
in	inches	25.4	millimetres	mm	millimetres	0.039	inches	in
ft	feet	0.305	metres	m	metres	3.28	feet	ft
yd	yards	0.914	metres	m	metres	1.09	yards	yd
mi	miles	1.61	kilometres	km	kilometres	0.621	miles	mi
AREA								
in ²	square inches	645.2	millimetres squared	mm ²	millimetres squared	0.0016	square inches	in ²
ft ²	square feet	0.093	metres squared	m ²	metres squared	10.764	square feet	ft ²
yd ²	square yards	0.836	metres squared	m ²	hectares	2.47	acres	ac
ac	acres	0.405	hectares	ha	kilometres squared	0.386	square miles	mi ²
mi ²	square miles	2.59	kilometres squared	km ²				
VOLUME								
fl oz	fluid ounces	29.57	millilitres	mL	millilitres	0.034	fluid ounces	fl oz
gal	gallons	3.785	Litres	L	litres	0.264	gallons	gal
ft ³	cubic feet	0.028	metres cubed	m ³	metres cubed	35.315	cubic feet	ft ³
yd ³	cubic yards	0.765	metres cubed	m ³	metres cubed	1.308	cubic yards	yd ³
MASS								
oz	ounces	28.35	grams	g	grams	0.035	ounces	oz
lb	pounds	0.454	kilograms	kg	kilograms	2.205	pounds	lb
T	short tons (2000 lb)	0.907	megagrams	Mg	megagrams	1.102	short tons (2000 lb)	T
TEMPERATURE (exact)								
°F	Fahrenheit temperature	5(F-32)/9	Celcius temperature	°C	Celcius temperature	1.8C+32	Fahrenheit temperature	°F

NOTE: Volumes greater than 1000 L shall be shown in m³

* SI is the symbol for the International System of Measurement

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INTRODUCTION

The original objective of this research was to develop and test a field method to measure the relative safety of different shared-use path¹ conditions, operational characteristics and users. Although the public often assumes these facilities are inherently safe due to the lack of motor vehicles, the transportation safety and design issues on these off-road facilities are not fully understood. Furthermore, previous studies for bicycling have found that off-road shared-use paths have incident and injury rates significantly higher than those for on-road cycling (Aultman-Hall et al. 1998 and 1999, and Moritz 1998). Similar research does not yet exist for pedestrians, rollerbladers and other users on shared-use paths.

This work was originally intended to focus on the design and validation of a survey instrument to collect comprehensive self-reported path crashes and injury events for all path users. This is a particularly challenging experimental design problem due to the need to estimate the travel exposure by path type, disaggregate user groups, and path conditions to correspond to crash and injury tallies. A survey instrument² was designed in the summer of 2002 to collect path crash and fall incidents as well as travel exposure. The survey was piloted in September 2002 on the Farmington River Trail in the Town of Canton, Connecticut. The survey instrument was deemed effective. However, an insufficient sample size was obtained to conduct any safety rate analysis. Given the remaining resources in the project and the availability of interested students, the study was extended beyond its original end date of June 2003 through the summer of 2003. This allowed small modifications to be made to the survey instrument based on its first use as well as the execution of the survey at two additional shared-use paths in an attempt to increase the sample size.

In total, 684 shared-use path users were surveyed on the three shared-use path facilities in Connecticut. These users reported 51 collision or fall events (37 on the specific sections of shared-use paths being studied). The travel patterns of these individuals on these paths and the details of these crash events are analyzed in this study and reported here. This report describes the characteristics of the three shared-use paths where surveys were undertaken. The final

¹ The term shared-use path has become the agreed upon technical term for a facility engineered to handle a mix of non-motorized traffic in a location outside of the road right of way. This is distinct from the facilities termed “paths” in Europe which are often adjacent or within road rights of way. Although the public and official names of the sites studied in this project are often called “trails”, in this report the term does not refer to the less developed hiking or mountain biking style trails.

² While some use the word questionnaire, the term instrument is typically used especially when careful design and pre-testing are used to determine what the instrument is measuring.

survey instrument, as well as its design process and limitations, are described before the tally of results is presented. Finally, a safety rate analysis procedure is presented which allows for the calculation of event (crash) rates per mile traveled. This allows for a preliminary comparison of the relative safety of shared-use paths compared to highways in Connecticut.

DESCRIPTION OF THE SURVEY SITES

It was originally proposed that one representative path be selected for this study. The Farmington River Trail³ in the towns of Canton and Burlington, just north of Farmington (see Figure 1), was selected based on advice from local cyclists, the state pedestrian bicycle coordinator and the trail manager at the Department of Environmental Protection. This path met the requirement of being within a reasonable distance of the University of Connecticut to minimize travel costs and also had a variety of path and user conditions along its length (such as paved versus unpaved and varying path widths). Figure 2 illustrates some of the different cross sections that can be found along this 3.9 mile section of shared-use path which is mapped in Figure 3. Much of the facility is 10 feet wide and paved, meeting the typical design criteria used on rail trails⁴. However, at other sections, the facility has an unpaved narrow cross section (Figure 2d), parallels a sidewalk within a town center (not shown), or travels along a roadway (Figure 2c). It was originally hoped that different crash rates could be calculated for each type of section. However, the sample obtained through distribution at three locations along this path in September 2002 was not large enough for disaggregate analysis. The survey instrument was deemed successful for data collection, but the low user volume was identified as an issue for disaggregate rate calculation.

³ In this report this section of shared-use path is referred to as the Farmington River Trail 1

⁴ A recreational trail for non-motorized transportation use built along an old rail right of way.

Figure 1: Map of Study Sites

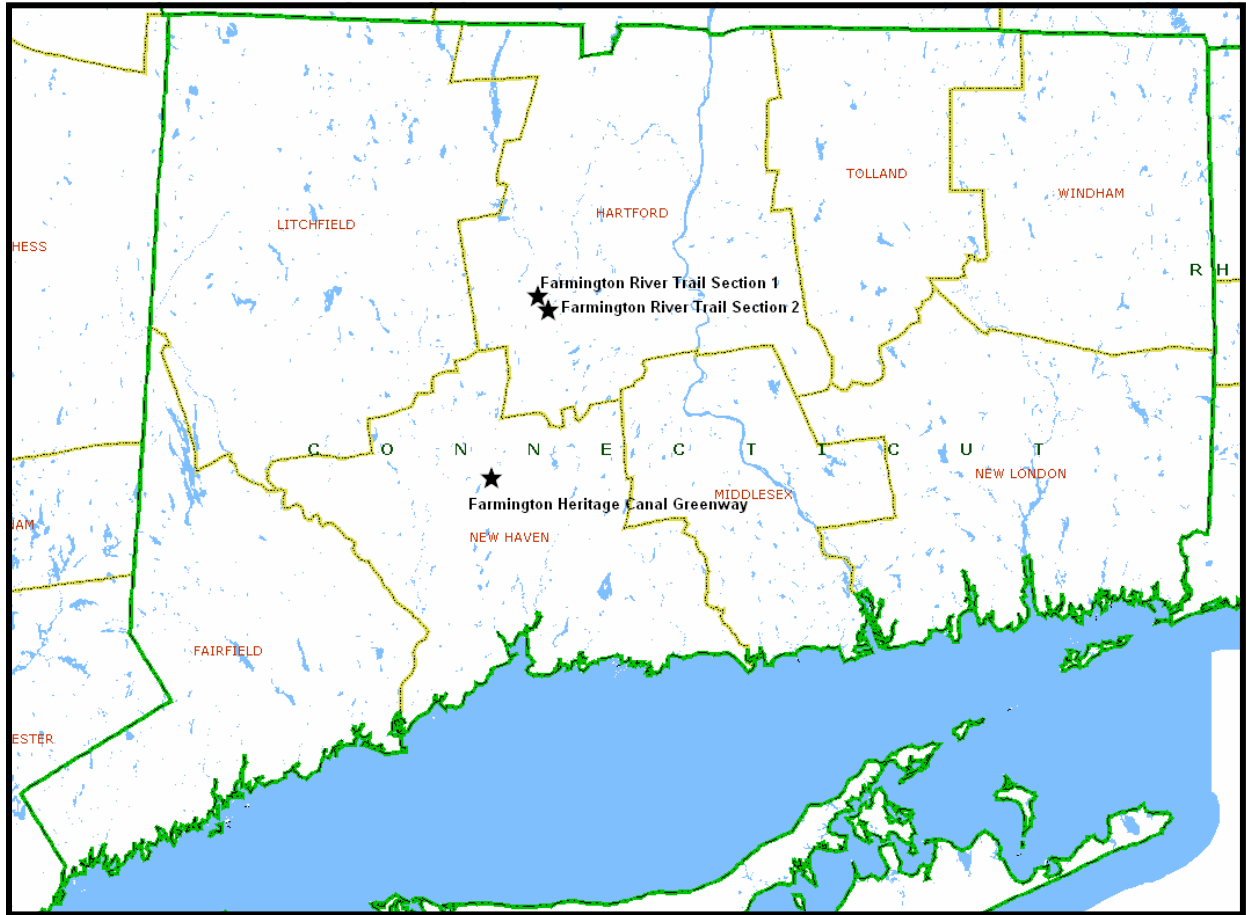


Figure 2: Typical Facility Characteristics - Farmington River Trail 1



a) Bridge south of Collinsville



b) Main trail cross-section

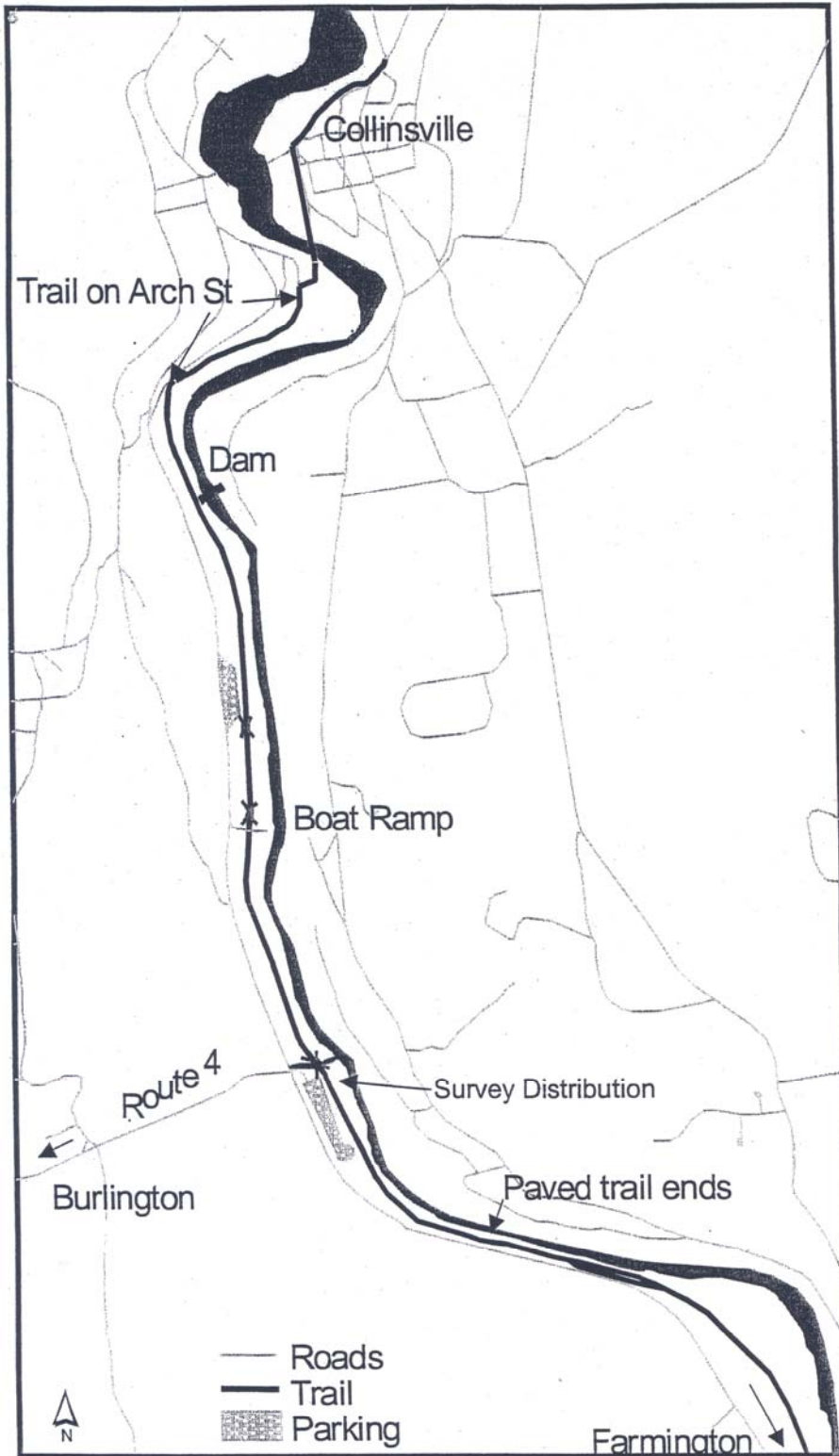


c) Path uses Arch Street south of Collinsville



d) Less-improved section south towards Farmington

Figure 3: Map - Farmington River Trail 1



JHRAC was approached with a request to extend the study duration allowing for data collection on two additional facilities in the summer of 2003. The groups mentioned in the previous paragraph, plus the Farmington River Trail Association and the Connecticut Rails to Trails Association were contacted. This time the research team asked for suggested facilities where user volumes were higher than on the first shared-use path. Another section of the Farmington River Trail⁵ in the town of Farmington and the Farmington Heritage Canal Greenway in Cheshire were recommended and ultimately accepted for the study. Figure 1 illustrates the relative location of these facilities and thus the ease of access from the University of Connecticut for students working on this project. Maps of these 4.5 and 2.9 mile study sites are shown in Figures 4 and 5 respectively. These trails (selected illustrations in Figures 6 and 7) have more uniform cross sections than the first although width varies along the length as well as the size of the clear zone. In some places, a non-paved trail was adjacent to the paved section for joggers and horses. In several sections on both paths, trail fences are immediately adjacent to the trail where a river crossing or other hazard exists. Both paths cross several roadways. As the pictures indicate, both facilities have high design standards and good signage. The decision to use these paths to obtain a larger sample size for crash rate estimation also necessitated the acceptance that it would not be possible within this study to calculate crash rates for different types of path conditions. Instead, the focus would be attempting to collect a sample large enough to defensibly estimate crash rates for different path users (pedestrians versus bicycles for example).

⁵In this report this section of shared-use path is referred to as the Farmington River Trail 2

Figure 4: Map - Farmington River Trail 2



Figure 5: Map - Farmington Heritage Canal Greenway



Figure 6: Typical Facility Characteristics - Farmington River Trail 2



a Intersection with road



b) Typical section



c) Bridge with fencing

Figure 7: Typical Facility Characteristics - Farmington Heritage Canal Greenway



a) Typical section



b) Section with bollards



c) Curved section

Prior to survey execution, the permission of the Connecticut Department of Environmental Protection and the individual towns was sought. Arrangements were made with volunteers from trail groups to assist with distribution. Surveys were only distributed at locations where users could see the survey station in advance and no safety hazard was created. These locations were typically at parking lots or other path widenings.

SURVEY INSTRUMENT / QUESTIONNAIRE DESIGN

Several brainstorming sessions were conducted in the summer of 2002 concerning, not only site selection, but also questionnaire design. The groups consulted included members of the Connecticut Department of Transportation, the Connecticut Bicycle Coalition and the University of Connecticut. Two members of the Transportation Research Board Committee on Bicycle Transportation replied with comments on draft versions of the survey. Two versions of the survey were pre-tested with graduate students in the Department of Civil and Environmental Engineering. The survey design challenge was to develop an instrument that collected the frequency and patterns of path use, crash event experience, as well as demographic information from all users. The final survey instruments are shown in Appendices A through C. The original documents were in an attractive booklet format on 11 by 17 inch colored paper. The pages have been photo-reduced to fit in this report.

The questions on the first page collect the following information on the frequency and conditions under which each user travels on the path: the type of activities undertaken; the frequency of use; the number and type of members in the user's group; the weather conditions; and the time of day when the trail was used. The second page collects information concerning the person's "accidents"⁶ on the trail. An accident was defined boldly in a box at the top of the page as "an event where you FALL or you COLLIDE with another user or object regardless of fault. (You may or may not have been injured.)". In all cases, accidents for the previous 12 months were recorded. Due to the limited number of accidents reported on the first trail, the second and third surveys were changed to collect information for all accidents on all trails in the previous 12 months (not just the trail where the survey was distributed to the user). The data table was then augmented to include a place to indicate whether or not each accident had

⁶ While the traffic safety community has turned to use of the words crash, collision or incident, people in our pre-tests confirmed that the public still relates to the word "accident".

occurred on the particular trail section under study. This was necessary to ensure the accident count matched the travel exposure merits being collected, in order to allow for accident rate calculation for each of the specific paths. In order to fit this information in a one page table, the number of accidents for which information could be collected was reduced from three to two for the second two surveys. No respondent on the first trail indicated having experienced three accidents in the previous 12 months so this reduction was deemed acceptable.

The last two pages of the survey each used a map to collect information. On the third page, participants indicated the location of accidents as well as any sections that they perceived to be unsafe along the path. Respondents were asked to describe any safety issues they perceived. The fourth and final page included a map for tracing one's most common route along the path, as well as additional questions on trip frequency as a double check on the information provided on the first page. The route was used to estimate the number of miles of travel on the path as an exposure metric for the crash rate estimation. The participants were also asked on the last page to indicate age and sex and to provide any additional general comments. The exact wording and order of questions was altered slightly after the first use in September 2002.

The use of maps to collect route information and crash/fall location was intended when the research was proposed. For the Farmington River Trail 1, street center line Geographic Information System (GIS) files for the highway network were obtained from the MAGIC GIS Data Center at the University of Connecticut. The shared-use paths GIS layer was created by biking the trail with GPS receivers to determine its location. GIS data for this trail was not available in digital format. This map was created in the GIS software ArcView. Labeling, particularly the addition of landmarks relevant to path users, was undertaken manually. For the Farmington Heritage Canal Greenway and the Farmington River Trail 2, the transportation planning and GIS software, Transcad, was used for map production. In this case, the old railway lines were available in addition to the road layers and many landmarks were already available in the software database. This eliminated the need to collect the trail location with GPS, however, certain additional landmarks were still recorded with GPS on bicycles.

The University of Connecticut Committee on the Ethics of Research on Human Subjects reviewed the final survey questionnaire and approved it for use for adults. The study qualified for an exemption from full committee review as participation was voluntary.

SURVEY EXECUTION

Table 1 indicates the days in September 2002, July 2003 and August 2003 when surveys were distributed at each of the three shared-use path sites. On the Farmington River Trail 1, surveys were distributed at both main parking lots off of State Route 179, as well as in downtown Collinsville. For the later two study sites, surveys were distributed at one main parking lot, as indicated on Figures 4 and 5. The location of survey distribution is a potential biasing factor that affects which users are identified and included in the sample. In each case, the distribution site was selected with safety concerns in mind (especially allowing space for cyclists and other higher speed users to stop safely), but also to ensure a full range of users passed by.

Table 1: Dates of Survey and Response Rate

	Farmington River 1	Heritage Canal Greenway	Farmington River 2
Dates Surveyed (average one-way users per hour)	Wed 09/04/02 (57) Tues 09/17/02 (40) Fri 09/20/02 Sat 09/21/02 Sun 09/22/02 (36) Sat 09/28/02 (39) Sun 09/29/02 Mon 09/30/02 Wed 10/02/02	Wed 07/01/03 (29) Sat 07/12/03 (79) Sun 07/13/03 (85) Tues 07/15/03 (45)	Sat 08/09/03 (35) Wed 08/13/03 (17)
Surveys			
Distributed	420	333	77
Returned	295 (70%)	323 (97%)	66 (86%)

All users 18 years of age or older were welcome to complete a survey. Snack and drink stations were set up off the trail and advance warning signs were placed along the trail in either direction from the survey station. Student workers or volunteers explained the purpose of the study as questions were asked. If people preferred, they were provided with a postage paid envelope to return the survey at a later time. Table 1 indicates the number of surveys distributed and returned at each site. The response rate, percentage of distributed surveys returned, varied between 70% and 97%. This large range was caused by a deliberate change in strategy between the 2002 and 2003 execution. A lower than desired number of surveys were returned by mail from the Farmington River Trail 1 and therefore in the summer of 2003, people were encouraged to complete the survey on site rather than return it later by mail. It was originally thought that

the survey would be less burdensome to the users if they could return it later. However, this proved false.

Not all users stopped at the survey stations to talk to the survey team or to complete the survey. Therefore, the above response rates are an over-estimate of the number of trail users that were actually captured. Furthermore, user counts were undertaken of all one-way traffic on the trail to compare the proportion of actual users to the proportions of different users responding to the survey. For the second two trails the start and end times for these counts were recorded such that one-way volumes can be calculated for these days. The average hourly traffic volumes are shown in parenthesis in Table 1, columns 2 and 3. These one-way rates are relatively high but note that observation times at these sites was often 5 to 8 hours long and that peak volumes exceeded even these averages. Table 2 indicates the distribution of users during counting times on these trails. Most users are either pedestrians (walking or running) or cyclists. The higher proportion of cyclists in the later two cases could have been due to the summer surveying time or the close proximity to neighborhoods that was not the case on the first trail. Most individuals would need to transport their bikes via car to use the trail at the first study site. This might represent a significant disincentive. Note, also that in all three cases the number of baby strollers is appreciable. The number of skaters (rollerbladers) was similar on the Farmington River trails but much higher on the Heritage Canal Greenway. No horses were observed and the number of dogs (counted only on the last two trails) was lower than expected.

Table 2: One-way Observations of Path Users by Type

Type	Farmington River 1	Heritage Canal Greenway	Farmington River 2
Walkers	44.9%	25.0%	22.7%
Walkers with Strollers	3.2%	1.8%	3.1%
Runners	6.7%	3.2%	4.9%
Wheelchairs	0%	0%	0.6%
Skaters	6.0%	23.7%	9.8%
Scoters	1.3%	0.1%	0%
Skateboarders	0.4%	0%	0%
Cyclists	37.6%	45.5%	55.2%
Horse riding	0%	0%	0%
Dogs	N/A	0.6%	3.7%

DATABASE DEVELOPMENT

Two types of data entry were required. First, the answers to the multiple choice or check-based questions were placed into a database and error checked. Second, geo-coded route information for travel exposure calculations had to be processed from the maps. Both these tasks were programmed into a MS Access database. User-ready forms such as those shown in Figures 8 and 9 were designed. The answers to the questions were coded by the data entry person selecting the appropriate response from pull down menus. In the case of the map information, the complete study sections were divided between access points, as shown in Figure 9. The length of each section was coded into the database. Data entry was accomplished by selecting the sections of the trail used by each participant and indicating if the trip was undertaken in one or two directions (one way versus out and back). The total length of the person's most common route was then automatically calculated and used for the exposure calculation.

Figure 8: MS Access Survey Data Template (one of eight sheets for each user)

The screenshot shows a Microsoft Access form titled "Survey Form : Form" for the "TRAIL SAFETY SURVEY STUDY 2003". The form is divided into several sections:

- Survey Number:** A text box containing the number "1".
- This Survey was taken at:** A list of survey locations with checkboxes and date ranges:
 - Farmington Heritage Canal Greenway ... 7/1/03 - 7/16/03
 - Farmington River Trail Section 1 ... 9/17/02 - 9/22/02
 - Farmington River Trail Section 2 ... 7/25/03 - 8/6/03
- Please enter any comments about this record in general:** A large empty text area.
- Form Choices:** Two buttons: "Close" and "Add New Survey".
- Usage/Activities/Details/Tabbed Interface:** A series of tabs at the top of the right-hand section: Usage, Activities, Details, Accident Records, Risky Areas, Common Route, Summary, Misc.
- With whom do they use this trail:** A grid of dropdown menus:

Alone:	Often	With kids:	Never
With one other:	Sometimes	With stroller:	Never
With two or more:	Often	With wheelchair:	Never
With dog:	Never	With special access:	Never
- When do they use this trail:** A grid of dropdown menus:

On a weekday:	Always	In the evening:	Often
On a weekend:	Sometimes	In the dark:	Never
In the morning:	Often	In the rain:	Sometimes
In the afternoon:	Often	In the snow:	Sometimes
- Do they wear a helmet when they ...** A grid of dropdown menus:

ride a bike:	Sometimes
in-line skate:	Always
ride a scooter:	Not Applicable

At the bottom of the form, there is a record navigation bar showing "Record: 1 of 684".

COMMENTS FROM SHARED-USE PATH USERS

In two places on the questionnaire, the respondents were invited to write their own comments. The comments in Appendix D are those for the general comment section on page 4 of the surveys. Appendix E contains the comments for the question and map on page 3 where users were asked to identify sections of the path they believed to be risky for falls or collisions, as well as explaining why they believed given sections were risky. Comments are presented separately for each path in both Appendices. Minor typos have been changed and information circled on the maps has been added in words (this was necessary for only a limited number of responses). It is first interesting to note that users were complimenting the trail and saying how much they liked it on page 3 in the safety concerns section even before they reached page 4. Granted, the sample is self selected and only people who like the trail might be expected to be using it and therefore included in the survey. However, the overall response is positive and people in both sets of comments clearly indicate they want more paths and trails.

Figure 9: MS Access Template for Route Entry from Survey Map

Survey Form : Form

TRAIL SAFETY SURVEY STUDY 2003

Survey Number:

This Survey was taken at:

- Farmington Heritage Canal Greenway ... 7/1/03 - 7/16/03
- Farmington River Trail Section 1 ... 9/17/02 - 9/22/02
- Farmington River Trail Section 2 ... 7/25/03 - 8/6/03

Please enter any comments about this record in general:

Form Choices:

Usage | Activities | Details | Accident Records | Risky Areas | Common Route | Summary | Misc.

Please refer to the trail diagram for the common sections traveled. Toggle the buttons next to the section numbers that this person travels continuously on an average day to insert the distance traveled. Toggle again to change the distance to zero.

Out		Back	
<input type="checkbox"/> 1	<input type="text" value="0.936"/> mi.	<input type="checkbox"/> 1	<input type="text" value="0.936"/> mi.
<input type="checkbox"/> 2	<input type="text" value="0"/> mi.	<input type="checkbox"/> 2	<input type="text" value="0"/> mi.
<input type="checkbox"/> 3	<input type="text" value="0"/> mi.	<input type="checkbox"/> 3	<input type="text" value="0"/> mi.
<input type="checkbox"/> 4	<input type="text" value="0"/> mi.	<input type="checkbox"/> 4	<input type="text" value="0"/> mi.
<input type="checkbox"/> 5	<input type="text" value="0"/> mi.	<input type="checkbox"/> 5	<input type="text" value="0"/> mi.
<input type="checkbox"/> 6	<input type="text" value="0"/> mi.	<input type="checkbox"/> 6	<input type="text" value="0"/> mi.
<input type="checkbox"/> 7	<input type="text" value="0.508"/> mi.	<input type="checkbox"/> 7	<input type="text" value="0.503"/> mi.

Total Distance Traveled
Total appears on the Summary Tab...

Record: of 684

In terms of safety concerns, several responses were repeated by users. First, intersections with roads are perceived as dangerous. Observation of intersections on all three trails reveal that a full range of safety control devices for path trail intersection are in use. The section of trail along Arch Street on the Farmington River Trail 1 consists of sharing the residential road with traffic. This section was perceived as unsafe based on user comments, but it is unclear if safety problems are actually present. On the same trail, the bridge over the Farmington River was noted in the comments (and also circled on the maps). The southern approach is steep and has a sharp turn at the end of a steep grade. In general, the steep sections of trails and bridges were deemed hazardous by the trail users. In future studies, a more explicit effort to collect detailed information on trail hazards might be warranted. Many users asked for a clearer indication of the operating rules, including warning before overtaking, keeping to the right and clearly defining the right of way between different groups of users. Many users commented that speed was a problem for some bicycles and skaters. Numerous individuals asked for emergency call boxes and even more asked for portable restrooms. Several noted crowding, young children, unleashed dogs, horses and trail debris as problematic. Overall, safety concerns mostly related to traffic, either that on the trail or crossing it at streets. These comments in this report will be submitted to the trail managers and volunteer associations with an interest in these trails. Several issues of a specific nature will be of use to those who work on specific trails.

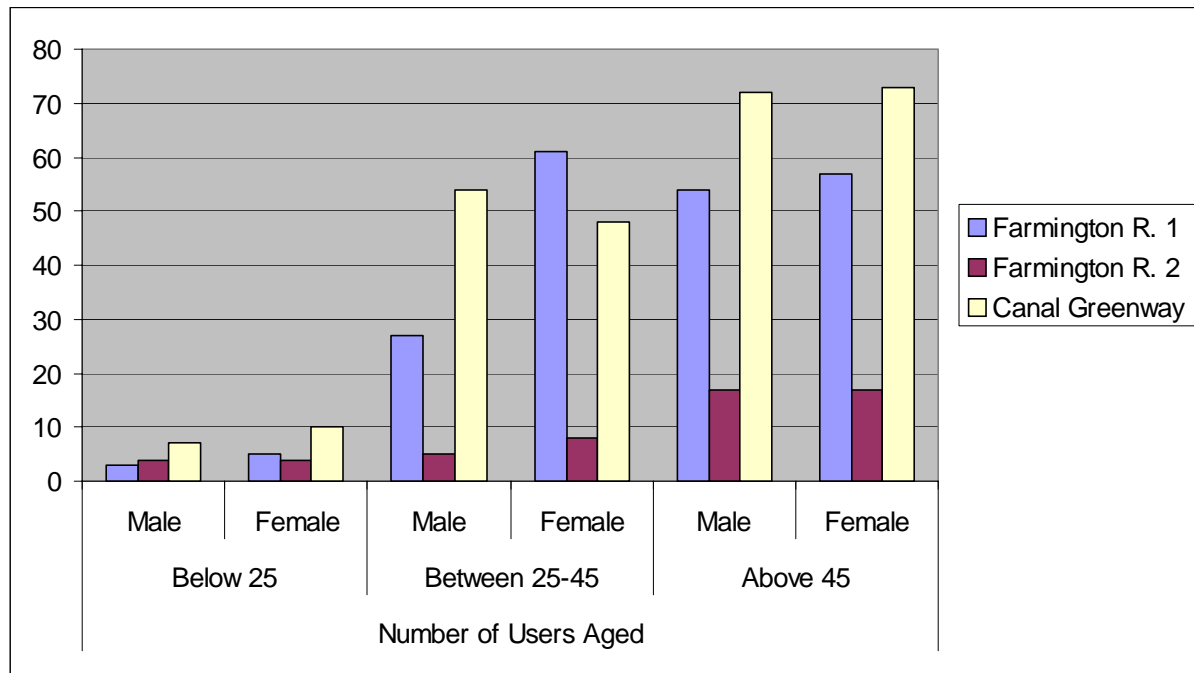
Several non-traffic safety related requests might be useful to trail designers and managers. There were numerous requests for porta potties, trash cans, mileage markers, phones and drinking water.

PATTERNS OF PATH USE

The only demographic variables captured for respondents were age and sex. Figure 10 illustrates a balance of male and female respondents was obtained on each of the three facilities (Note that 27 observations of sex and 149 observation of age are missing). The age distribution is skewed towards more middle aged and older individuals. First, the number of respondents below the age of 25 years is lower than was actually observed on the path due to the deliberate exclusion of those under 18 years old. This exclusion allowed the study to qualify for an exception to human subjects review at the University (some parents completed a survey for their children). However, the larger number of adults over the age of 45 years shown on Figure 10 is

consistent with subjective observation during the studies. The average age of female respondents was 45 years while male respondents averaged 48 years old. The age and sex profile of users was very similar on all three facilities.

Figure 10: Number of Respondents by Age and Sex



Tables 3 and 4 summarize the average trail use of the 684 users in the sample disaggregated by the trail where they were surveyed. It is interesting to note the extent of use throughout the year. Winter use is claimed to be only slightly less than half of summer use. Furthermore, comparison of Tables 3 and 4 to each other indicates that the majority of trail use by these individuals is on the trail where they were surveyed. This suggests that people use the trail nearest their home and do not generally travel to many trails. Caution should always be used when using self-reported data of this nature. There is a concern that people can overestimate their “good” activities (such as exercising on a trail) and underestimate their “bad” activities (such as eating fattening food). The information presented in Tables 3 and 4 was derived from the questions on page 1 of the survey questionnaire. In order to have an informal (and admittedly imperfect) check on this information, an additional question was asked on page 4 of the survey. Users were asked on page 4 to specifically indicate how many times they had used the given trail in the last one week. These results are summarized in Table 5 and indicate that the overestimate of travel on the page 1 question varies between 13 and 35%. This over-

estimate could be corrected for in the exposure calculations for the crash rate analysis, but was not in this case because this effectively increases the crash rates and might be considered inappropriate by some reviewers. However, this measurement issue must be considered when the crash rate estimates are used.

Table 3: Mean Number of Times Per Week THIS Trail is Used (self-reported)

	Spring	Summer	Fall	Winter
Farmington R. 1	1.9	2.0	2.0	0.7
Farmington R. 2	2.0	2.8	2.1	0.8
Canal Greenway	2.2	2.7	2.1	0.7

Table 4: Mean Number of Times Per Week ANY Trail is Used (self-reported)

	Spring	Summer	Fall	Winter
Farmington R. 1	information not collected			
Farmington R. 2	2.7	3.6	2.8	1.5
Canal Greenway	2.6	3.3	2.6	0.9

Table 5: Comparison of Estimate by Season with Activity in Last Week

	# of Days (from Q1)	# of Days (from Q13)	Ratio Actual:Reported
Farmington R. 1 (Fall)	2.0	1.7	0.87
Farmington R. 2 (Summer)	2.8	1.8	0.65
Canal Greenway (Summer)	2.7	2.1	0.79

Tables 6 and 7 provide an indication of the types of activities people undertake on the three paths. Table 6 illustrates that about half of the people surveyed on each trail participate in more than one activity at some point. Just over a third of users surveyed on Farmington River Trail 1 were always pedestrians, and between a fifth and a quarter of those surveyed on the second trails were always cyclists. However, for the most part only approximately half of the trail users use only one mode on these facilities. Table 7 indicates that a large majority of people are pedestrians at some point, but that a sizeable portion are also bikers or skaters as well. Table 8 indicates the self reported helmet use for these “wheeled” activities. The number of scooter riders and skaters using a helmet is lower than for cyclists. Note that this table presents aggregated results from all three paths and the percentage is based on only those respondents who answered the question.

Table 6: Type of Use for Those with Only One Activity

	Percentages of users whose sole activity is:				
	Pedestrian	Biking	Rollerblading	Other	Mixed
Farmington R. 1	35.5	14.5	2.7	1.0	46.3
Farmington R. 2	16.7	19.7	6.1	0.0	57.6
Canal Greenway	13.9	23.8	14.9	0.3	47.1

Table 7: Type of Use for Those with More than One Activity

	Percentages of users who at some point are: *			
	Pedestrians	Bikers	Rollerbladers	Other
Farmington R. 1	95.3	46.6	14.2	8.5
Farmington R. 2	86.4	63.6	25.8	9.1
Canal Greenway	62.8	57.6	33.1	5.0

*Note that some users indicated that they use the trail for multiple activities, and are therefore included in more than one column

Here the mixed uses are factored in to show which activities are most important

Table 8: Self-reported Helmet Usage

	Always	Sometimes	Never	N/A
When riding a bike	167 (55%)	53 (17%)	86 (28%)	105
When in-line skating	66 (35%)	20 (10%)	103 (55%)	224
When on a scooter	33 (40%)	5 (6%)	45 (54%)	329

The composition of trail user groups is of interest not only for personal safety but also for managing operating conditions on the trails. Larger groups, those with special access needs, children and animals are known to require special accommodations or rules. These factors were identified in the users' comments as well. Table 9 indicates the composition of the groups and people using the three facilities. This table indicates that many responses were left blank and it can be assumed that these correspond to individuals never using the trail in the particular group category. Few differences are seen between the three trails. People use the Farmington River Trail 1 less frequently alone, which might be related to the fact that this trail is the most remote of the three. Most people use all three facilities alone or in groups of two people and sometimes three. However, groups of two are the most common user group on the trails. Dogs, children, and strollers make up small, but appreciable, portions of the user groups. Wheelchairs and people with other access needs are the least common of the user groups.

Table 9: Composition of Trail User Groups (percentage of respondents)

Farmington R. 1	Always	Often	Sometimes	Never	Blank
Alone (no other person)	6.8	20.3	20.6	21.3	31.1
With one other person	28.4	27.0	19.3	4.1	21.3
With two or more people	9.5	16.2	23.0	16.9	34.5
With a dog	8.8	9.8	7.8	34.1	39.5
With children	9.8	11.5	14.9	24.7	39.2
With a stroller	4.4	4.1	5.1	41.2	45.3
With a wheelchair	0.0	0.3	0.7	51.0	48.0
With special access accommodations	0.7	0.3	2.4	49.0	47.6

Farmington R. 2	Always	Often	Sometimes	Never	Blank
Alone (no other person)	6.1	39.4	22.7	13.6	18.2
With one other person	16.7	27.3	40.9	3.0	12.1
With two or more people	1.5	13.6	31.8	16.7	36.4
With a dog	4.5	3.0	10.6	40.9	40.9
With children	4.5	7.6	9.1	43.9	34.8
With a stroller	1.5	3.0	3.0	48.5	43.9
With a wheelchair	0.0	0.0	4.5	48.5	47.0
With special access accommodations	0.0	3.0	3.0	47.0	47.0

Canal Greenway	Always	Often	Sometimes	Never	Blank
Alone (no other person)	8.1	36.2	17.3	9.3	29.1
With one other person	22.9	25.1	26.1	5.3	20.7
With two or more people	6.5	9.9	27.9	17.6	38.1
With a dog	1.5	3.4	10.8	36.2	48.0
With children	5.3	8.1	17.0	26.9	42.7
With a stroller	0.9	2.5	5.6	40.6	50.5
With a wheelchair	0.0	0.3	1.2	46.4	51.4
With special access accommodations	0.3	0.3	1.2	46.4	51.7

Also of interest were the times and conditions when people use the shared-use path facilities. Table 10 summarizes these results and indicates few significant differences between the three individual facilities. Once again blank responses were interpreted as “never”. The results indicate that a minority of people are only weekday or only weekend users. Most people use the trail on a variety of days of the week. Furthermore, there is a good distribution of people who use the paths in the morning, afternoon or evening as one would hope. Surprisingly between 5 and 15% of the users indicated that they use the trail in the dark. Roughly one quarter indicate using the trail in the snow or ice, while between a quarter and half (depending on the

trail) use the facility in the rain. Note that one or two people indicated always using the trail in the snow or rain, an unlikely situation. Overall however these estimates of trail use during less than ideal weather are non-trivial and may have safety impacts as the trail is presumably less safe for travel during these less than ideal conditions. The overall results presented in Table 10 are potentially biased by the times of day and week when the trails were surveyed. An effort was made to visit the trails on different days and at different times. These results confirm that the sample included a full range of users with respect to time and condition of use. Due to the non-randomness of the sampling procedure, it is impossible to say if the sample is representative of the universe of trail users. Table 11 indicates the users we sampled have, on average, been using the facilities for a relatively long time. The standard deviations indicate a large range, suggesting we surveyed both new and old users as hoped. The differences between facilities are no doubt related to their age (The Canal trail has been opened the longest).

Table 12 contains the average distance and standard deviation of the most common route used by the respondents on each of the three trails. This information is based on the sections of the path on the maps circled by the users. The statistics for the routes used by individuals who only participated as a pedestrian (walking, running or jogging) or only as a cyclist are also shown. All three sets of average lengths seem long and indicate that when users go to the facility they take the time to use a significant portion of it. Cyclists travel further than pedestrians as expected, but not by much. The Farmington River Trails are more remotely located and might be deemed to attract more serious users (those who use cars for access) have longer average trip lengths. Regardless, the route lengths are longer than one might expect, particularly for pedestrians. If users over-estimated the length of their routes, this would have the effect of increasing the crash rates calculated later in this report. Table 12 indicates that a significant number of respondents did not trace a route on a map, especially for the September 2002 survey of the Farmington River Trail 1. The improved response in 2003 could be due to the emphasis of encouraging people to complete the survey while on the trail as opposed to mailing it back. It could also relate to subtle changes in the questionnaire, including better maps in 2003. Certainly, this aspect of the data collection should be pursued carefully if the research design is used on other trails.

Table 10: Time and Conditions of Trail Use (percentage of respondents)

Farmington R. 1	Always	Often	Sometimes	Never	Blank
On a weekday	information not collected				
On a weekend	information not collected				
In the morning	6.1	33.8	24.3	9.8	26.0
In the afternoon	17.2	40.5	30.1	3.0	9.1
In the evening	4.4	18.6	26.4	20.6	30.1
In the dark	0.3	2.0	5.4	48.3	43.9
In the rain	1.0	1.7	25.7	32.1	39.5
With snow or ice	1.0	3.4	25.0	32.4	38.2

Farmington R. 2	Always	Often	Sometimes	Never	Blank
On a weekday	9.1	47.0	33.3	1.5	9.1
On a weekend	10.6	50.0	31.8	3.0	4.5
In the morning	4.5	42.4	25.8	9.1	18.2
In the afternoon	6.1	27.3	42.4	7.6	16.7
In the evening	1.5	22.7	34.8	12.1	28.8
In the dark	0.0	0.0	15.2	45.5	39.4
In the rain	0.0	4.5	48.5	21.2	25.8
With snow or ice	0.0	3.0	24.2	37.9	34.8

Canal Greenway	Always	Often	Sometimes	Never	Blank
On a weekday	16.4	39.0	22.0	4.0	18.6
On a weekend	27.2	42.4	18.6	1.9	9.9
In the morning	13.3	35.0	23.2	7.4	21.1
In the afternoon	8.4	33.1	29.4	3.7	25.4
In the evening	2.8	17.6	28.2	18.6	32.8
In the dark	0.3	0.6	6.2	48.0	44.9
In the rain	1.9	2.5	30.3	28.8	36.5
With snow or ice	1.9	3.4	21.1	38.4	35.3

Table 11: Length of Time Users Have been Using the Path (months)

	Mean # of Months	Standard Deviation
Farmington R. 1	34.7	17.8
Farmington R. 2	29.8	29.4
Canal Greenway	66.6	90.1

Table 12: Average and Standard Deviation of Most Common Route

	All Users		Pedestrians Only		Bicyclists Only		Missing Data
	Mean	SD	Mean	SD	Mean	SD	
Farmington R. 1	5.6	1.7	5.0	1.5	6.3	1.6	68%
Farmington R. 2	6.1	2.7	4.7	2.4	6.4	2.4	13%
Canal Greenway	4.8	1.4	3.6	1.4	5.5	0.8	21%

The total aggregate amount of travel in the previous one year, by each of the different modes on the trails, was calculated using Equation 1.

$$T_j = \sum_i t_{ij} = \sum_i (P_{ij} L_i Y_i) \quad [1]$$

Where T_j = total travel for mode j (miles)

t_{ij} = travel per year for person i on mode j (miles)

P_{ij} = percentage of time the trail is used by person i for mode j

L_i = average trip length for person i

Y_i = average number of trips per year for person i (estimated from the times trail is used per season)

These measures give a different impression of the data and is an attempt not to describe the composition of the sample itself, but rather the overall travel on the path in the last year as extrapolated from the sample. This total travel by mode accounts for the frequency of trips by users as well as the proportion of time they undertake each activity as shown in Table 13. It moves towards estimating a total travel exposure for the safety rate analysis but also allows for more detailed evaluation of user behavior. For example, Table 14 shows that depending on the trail, the total amount of pedestrian activity and bicycling activity is different for men versus women.

Table 13: Total Travel by Mode

	Total Travel (1000s of miles per year)				
	All	Pedestrian	Bicycling	Skating	Other
Farmington R. 1	37.3	22	13.2	1.2	0
Farmington R. 2	33.5	13.4	15.4	4.4	0.2
Canal Greenway	120	42.4	51.5	23.6	1.5

Table 14: Total Travel by Mode by Sex

Males	Total Travel (1000s of miles per year)				
	All	Pedestrian	Bicycling	Skating	Other
Farmington R. 1	12.9	6.7	5.5	0.7	0
Farmington R. 2	21.2	7.1	11.9	2.1	0.2
Canal Greenway	55.7	16.4	27.9	9.5	1

Females	Total Travel (1000s of miles per year)				
	All	Pedestrian	Bicycling	Skating	Other
Farmington R. 1	24.4	15.3	7.7	0.4	0
Farmington R. 2	12.3	6.3	3.6	2.3	0
Canal Greenway	64.4	26	23.7	14	0.4

The total travel by mode indicated in Table 13 should also be compared to the user counts conducted by the research team along the trail as the surveys were being conducted (Table 2). This comparison is tabulated for pedestrians, cyclists and skaters in Table 15. Recall that this comparison is of interest in order to ensure that users responded to the survey in the same proportion that they used the trail. For example, the survey total travel might have contained a significantly smaller proportion of cycling than the proportion of cyclists counted on the trail because cyclists were less likely to stop and complete the survey. If cyclists have a different crash rate than other users, this would impact the overall path crash rate predicted from the sample. In these cases, it might be necessary to weight the exposure and crash tallies by user type in overall crash rate estimation. The skaters are overestimated in the sample on the Canal Greenway and underestimated on the Farmington River Trail 2. Pedestrians are overestimated in the sample on the Farmington River Trail 2. Cyclists are underestimated in the sample on the Canal Greenway. Overall, the percentages in Table 15 are in reasonable agreement and this weighting was not conducted in this preliminary study.

Table 15: Comparison of Trail User Volumes and Total Travel by Mode

	Mode	Percent of Volume (from User Counts)	Percent of Total Travel from Survey
Farmington River Trail 1	Pedestrian	54.8	59.0
	Bicycle	37.6	35.4
	Skater	6.0	3.2
Farmington River Trail 2	Pedestrian	30.0	40.0
	Bicycle	45.5	46.0
	Skater	23.7	13.1
Canal Greenway	Pedestrian	30.7	35.3
	Bicycle	55.2	42.9
	Skater	9.8	19.7

COLLISIONS AND FALL RESULTS

Traditional crash and injury databases are not complete with respect to incidents that occur on paths. There are two key limitations that hinder non-motorized safety analysis particularly for shared-use paths: lack of complete incident databases; and lack of travel exposure information. This section of the report addresses the first limitation while the next section addresses the later. Table 16 indicates the number of individuals reporting an accident in this study. Note that not all of these accidents occurred on the paths being studied (37 did). Bicycle and pedestrian crash incident datasets are incomplete in several ways. First, police reports often contain only events that involve a motor vehicle. This not only limits data on road crashes but also completely eliminates data on shared-use path crashes. Table 17 provides evidence that the majority of accidents for which information was collected in this survey went unrecorded in police datasets (only 3 of the 37 were reported to police). Furthermore, most did not occur at intersections with public roads where the chances of being reported are higher. A traditional alternative to the use of police databases in safety analysis is the use of emergency room records. These datasets include only the more serious events where medical attention is required. Only two of the 35 injuries reported in this study were labeled major and thus required medical attention. Therefore, neither police nor emergency room data provide a full picture of all the safety-related events being experienced by non-motorized transportation users on paths. This illustrates that in order to more clearly understand the safety of shared-use paths, we must survey the actual users and determine their experiences with crashes and falls to complement other datasets.

Table 16: Self-Reported Incidents

	# of Surveys	# of Accidents	# of People w/ Accid.
Farmington R. 1	296	10	9
Farmington R. 2	66	7	6
Canal Greenway	323	34	30
Total	685	51	45

Table 17: Incident Reporting

	Reported		At Intersection	
	Yes	No	Yes	No
Farmington R. 1	0	10	1	9
Farmington R. 2	0	7	0	7
Canal Greenway	3	31	8	26

In addition to limited data on path crashes not reported to police or in emergency rooms, most shared use path crash datasets are also limited in that they do not include falls. Falls have been shown to be a more common event for bicyclists, with similar injury rates to crashes (Doherty et al. 2000). The results on the trails Connecticut indicate that falls are the more common path incident for cyclist, skaters and pedestrians. A total of 63% of the accidents reported were falls. More injuries resulted from falls than collisions (20 versus 15). This illustrates the need to focus on the path circumstances that lead to falls as well as those that lead to collisions. Table 18 provides a summary of the types of users involved in all of the events reported. The most common event involved only one skater or one bicyclist.

Table 18: User Involvement in Incidents

Type of Event	Number Reported
Pedestrians Only	6
One Bicycle	18
Bicyclist-Pedestrian	5
Two Bicycles	2
Skater Only	12
Skater and Another User	3
Other	2

SAFETY RATE ANALYSIS

The need for route-specific travel exposure data to determine the amount of travel undertaken on different types of facilities and to develop disaggregate crash rates from crash histories is clear. For motorized vehicle incident rates, the total vehicle miles traveled is the most common

measure of exposure. A Federal Highway Administration report (Clarke and Tracy 1995) supports the assertion within this proposal that “current bicycle data sources, while useful, seldom provide sufficient detail from which to create programs and countermeasure strategies.” The authors further identify the need to measure travel exposure in order to completely answer key bicycle safety questions. In order to evaluate the relative safety of paths with different design or operational conditions for different classes of users, incident counts must be corrected by the amount of travel that occurs in the different locations and is undertaken by different users. Crash count or frequency analysis is not sufficient to fully understand shared-use path safety.

The travel exposure for each group of users on each trail has been estimated from the survey responses using equation 1. The average trip length for users who did not complete the map section of the survey was taken as the average for individuals on the given facility. The travel exposure for the last year was obtained by using the number of times per week each season the user reported using the trail. The sum of these travel exposures by activity is shown in Table 19. The collision and fall totals for accidents which occurred only on the three study trails are shown aggregated in the same categories in Table 20. These events have been categorized based on the activity that the respondent was undertaking when the event occurred. For example, if a pedestrian reported a collision between himself and a bicycle, this would be coded as a pedestrian event in this part of the analysis. Estimates of crash rates can be obtained by dividing the number in Table 19 by the exposure in Table 20 as indicated in equation 2.

$$R_j = C_j / T_j \quad [2]$$

Where R_j = average crash rate per mile for mode j

C_j = total crashes reported while participating in mode j

T_j = total travel for mode j from equation 1

Table 19: User Travel Exposure by Mode (1000s miles)

	Farmington R. 1	Farmington R. 2	Canal Greenway	Total
Pedestrian	66	21	74	162
Bicycle	48	8	68	124
Skating	16	5	22	43
Total	137	34	167	

Table 20: Incidents by Mode and Facility

	Farmington R. 1	Farmington R. 2	Canal Greenway	Total
Pedestrian	3	0	3	6
Bicycle	2	2	15	19
Skating	3	1	7	11
Total	9 (includes 1 scooter accident)	3	25	37

The resulting crash rates are shown in Table 21. Given the relatively small sample size these rates should be considered estimates and the individual rates for each type of user should be used with particular caution. However, more confidence can be given to the overall rates shown as row and column totals and these provide interesting preliminary results. Event rates for skaters are highest, followed by bicyclists and pedestrians. The overall rates are highest on the Heritage Canal Greenway (the trail with the greatest traffic volumes and largest number of intersections) and lowest on the Farmington River Trail 1 (trail with fewest intersections and the lowest percentage of skaters and bicyclists 43.6% versus 69.2% and 65%).

Table 21: Incident Rates per 1000 miles of Travel

	Farmington R. 1	Farmington R. 2	Canal Greenway	Total
Pedestrian	0.05	0.00	0.04	0.04
Bicycle	0.04	0.25	0.22	0.15
Skating	0.19	0.20	0.32	0.26
Total	0.07	0.09	0.15	0.11

While these relative results provide evidence that supports intuitive planning experience, the absolute values should be used with caution as estimates of the actual crash rates on shared-use paths. The number of crashes was not sufficient to predict the disaggregate crash rates with certainty. Recall that the most serious events that injured or scared a user so they did not return to the path are not included in the dataset. The user would not have been on the trail to receive a survey. Also recall that injuries were numerous, but not serious in most cases. Furthermore, the trip lengths and frequency may be over reported by the users, making these estimates of rates too low.

It is natural to want to compare these accident rates to those on roadways for all vehicles including motorized vehicles. This comparison is difficult as not all minor crashes and events are reported in the police accident database for the state. However, for Connecticut, the Federal Highway Administration (FHWA 2002) reports that in 2001 15,920 million vehicle miles were traveled on all road types in urban and rural areas. The Connecticut Department of

Transportation, Office of Planning Inventory and Data indicates that 83,256 crashes in 2001 were reported to police. Therefore, the average crash rate was 5.2 for every million vehicle miles traveled. This rate is only 1/20th the overall rate reported here for shared-use paths.

CONCLUSIONS AND RECOMMENDATIONS

The primary objective of this research was to develop and test a field method to measure the relative safety of different shared-use path conditions, operational characteristics and users. The survey instrument developed in this project was successful and can be used for these purposes. The analysis of results indicates that complementary data, that are not available from other sources, regarding the safety and travel patterns on shared-use paths, was collected in this study. While incident rates could not be disaggregated by trail conditions or demographic characteristics, the evaluation of the average overall incident rates for different user modes and between trails is valuable. First, the overall rates suggest that skaters have the highest event rates, followed by bicyclists and then pedestrians. The bicycle event rate was three times that of pedestrians, while the rate for skaters was over six times that of pedestrians. Falls were the more frequently reported events when compared to collisions and they were more often associated with an injury. These results are unique from previous research in that more than bicycle path safety rates were measured. They confirm the previously untested assumption, and comments by users, that wheeled users have worse safety records compared to pedestrians. This is consistent with the long held assumption, for all modes of transportation on roads, that speed is dangerous.

The overall incident rates are highest on the trail with the largest traffic volume and largest number of intersections and lowest on the trail with the fewest intersections and the lowest percentage of skaters and bicyclists. Finding that the highest incident rate is on the highest volume path is particularly concerning as the demand for shared-use paths and their popularity increases. Given that this study indicates that frequent collisions and falls occur on shared-use paths and that they often result in some injury, there is a need for safety countermeasures. These study results combined with comments from the survey respondents suggest that countermeasures should include several actions: speed control; clear communication of path operating rules; and finally the consideration that different user types be separated when high volumes warrant. These first countermeasures are difficult to implement due to cost and

limited rights of way, but never the less warrant attention whenever possible particularly for trail management. The continuation of high design standards (geometric and traffic control related) is clearly a safety countermeasure, and the nature of these results suggest that older facilities with lower standards may require upgrading in the future. Finally, due to the high incidence of falls, education, perhaps in the form of signage, could be undertaken so that users are aware of this risk.

The strengths of this survey approach to measure shared-use path safety include the low cost and the estimation of disaggregate travel exposure allowing estimation of incident rates per mile traveled by user. Although the survey instrument and methodology were successful, the sample size of 684 was not sufficient to develop fully-defensible disaggregate rates (men versus women cyclists for example). The reason for this is that insufficient events were reported by these users for disaggregation by accident type or path conditions. Because all path users, as opposed to just bicycles, have not been the subject of any prior study, the sample size necessary for path rate calculations was not known in advance. The results here support the recommendations of previous research (Aultman-Hall and Kaltenecker 1999) that a sample size of at least 3000 is needed for a full disaggregate crash rate analysis. It is recommended that a study with a larger sample size be undertaken using this methodology if more disaggregate incident rates are needed.

Two minor survey measurement issues were found. First, the users may have overestimated their weekly path use by season, however, a method to correct for this was also proposed. Second, the average length of routes traced on the maps seemed longer than expected and further investigation into this survey question and its wording is recommended before the instrument is used again. Given the successful use of the survey on multiple paths in this study, it is conceivable that this instrument could be used over a large regional area, or even nationally, to evaluate differences in the frequency and conditions for path incidents for different path users.

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Appendices

Appendix A: Farmington River Trail 1 Survey – Fall 2002

Trail Safety Study

We would appreciate your help in a study of trail user safety. **No matter how often you use this trail, please complete this questionnaire and return it to this desk or in the envelope provided.** This study has been approved by the University of Connecticut Committee on the Ethics of Research on Human Subjects. If you have any questions call me collect at (860) 486-2717 or email aultman@enr.uconn.edu. Thank you for your assistance.

Lisa Aultman-Hall, Associate Professor
 Department of Civil and Environmental Engineering
 University of Connecticut

1. Please estimate how often you use **The Farmington River Trail**.

Spring: ___ times per week **Summer:** ___ times per week
Fall: ___ times per week **Winter :** ___ times per week

2. Of the time you spend on **THIS trail**, estimate the percentage of time you are undertaking each of the following activities.

_____ Walking	_____ In-line skating
_____ Running	_____ Skateboarding
_____ Jogging	_____ Scooter
_____ Biking	_____ Skiing
_____ Horse back riding	_____ Other: _____

3. Who do you use this path with?

	ALWAYS	OFTEN	SOMETIMES	NEVER
Alone (no other person)				
With one other person (including a child)				
With two or more other people				
With a dog				
With children				
With a child in a stroller				
With a wheelchair or in a wheelchair				
With a person, not in a wheelchair, but needing special access accommodations (you or someone else)				

4. When do you use this path?

	ALWAYS	OFTEN	SOMETIMES	NEVER
In the morning				
In the afternoon				
In the evening				
In the dark				
In the rain				
With snow or ice on the path				

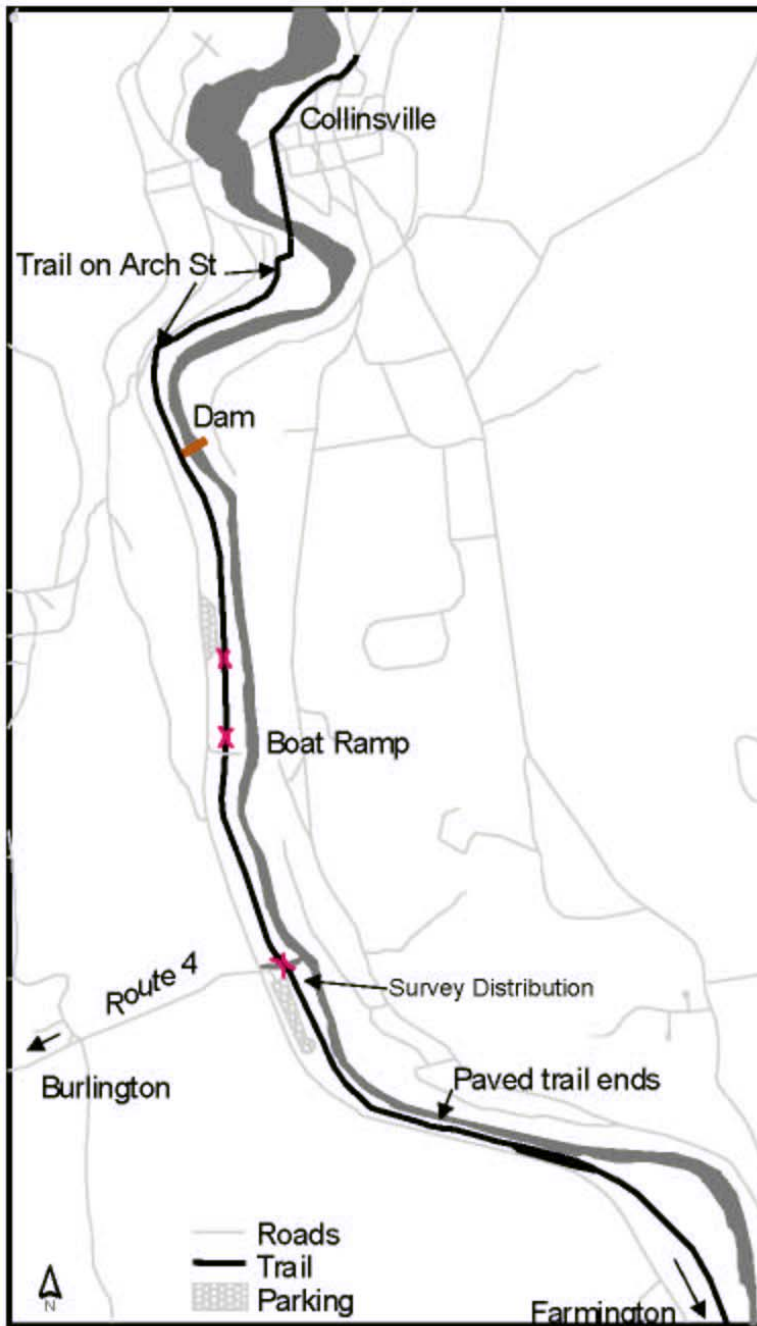
DEFINITION: An ACCIDENT is an event where you FALL or you COLLIDE with another user or object regardless of fault. (You may or may not have been injured.)

5. In **the last 12 months** did you have an accident on **this trail**.

- YES** – please fill in table for each accident.
- NO** – go to question 7 on the opposite page.

	Accident A	Accident B	Accident C
Type of Event	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user
Approximate Time	___ : ___ am pm	___ : ___ am pm	___ : ___ am pm
Month			
When this event occurred what were you doing?	<input type="checkbox"/> walking <input type="checkbox"/> jogging <input type="checkbox"/> running <input type="checkbox"/> biking <input type="checkbox"/> in-line skating <input type="checkbox"/> riding scooter <input type="checkbox"/> on skateboard <input type="checkbox"/> skiing <input type="checkbox"/> riding horse <input type="checkbox"/> other	<input type="checkbox"/> walking <input type="checkbox"/> jogging <input type="checkbox"/> running <input type="checkbox"/> biking <input type="checkbox"/> in-line skating <input type="checkbox"/> riding scooter <input type="checkbox"/> on skateboard <input type="checkbox"/> skiing <input type="checkbox"/> riding horse <input type="checkbox"/> other	<input type="checkbox"/> walking <input type="checkbox"/> jogging <input type="checkbox"/> running <input type="checkbox"/> biking <input type="checkbox"/> in-line skating <input type="checkbox"/> riding scooter <input type="checkbox"/> on skateboard <input type="checkbox"/> skiing <input type="checkbox"/> riding horse <input type="checkbox"/> other
If collision ... what did you collide with?			
INJURIES to you:	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)
INJURIES to someone else:	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)
Did this occur at an intersection with a road?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was this event reported to police or other official?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
PATH SURFACE (check as many as appropriate):	<input type="checkbox"/> Snow/Ice <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes	<input type="checkbox"/> Snow/Ice <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes	<input type="checkbox"/> Snow/Ice <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes

6. On the map below, mark the approximate locations of the accidents you reported on the last page – mark them A, B, or C if appropriate.



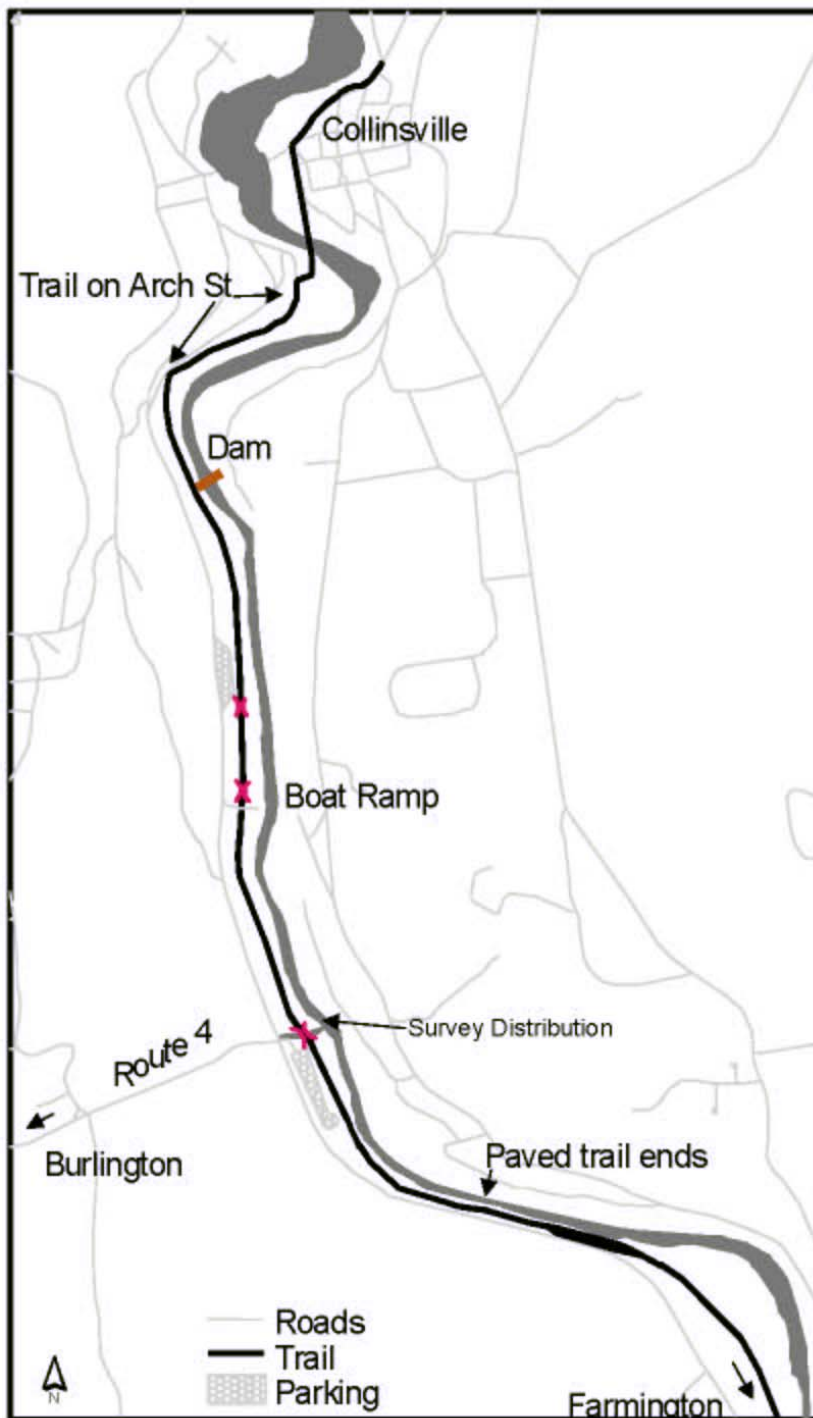
7. If there are sections of the path that you believe are particularly risky for falls or collisions, circle these sections on the map to the left. Briefly describe why you feel your circled section is unsafe.

8. If you bicycle on the path, do you wear a helmet (circle one)?
 ALWAYS
 SOMETIMES
 NEVER

9. When in-line skating here, do you wear a helmet (circle one)?
 ALWAYS
 SOMETIMES
 NEVER

10. If you ride a scooter or skateboard here, do you wear a helmet (circle one)?
 ALWAYS
 SOMETIMES
 NEVER

11. On the map below, please trace your most common route. Use arrows to show direction if appropriate.



12. Approximately when did you first use this path?
Month ____ Year ____

13. In the last week which days were you on the path?
(Check all that apply)

- Mon ____
- Tues ____
- Wed ____
- Thurs ____
- Fri ____
- Sat ____
- Sun ____

14 Optional Data:

Year of Birth: _____
Sex: M F

Please indicate in the space below any other comments you wish to make.

THANK YOU for your assistance.

Appendix B: Farmington River Trail 2 Survey – Summer 2003

Trail Safety Study 2003

We would appreciate your help in a study of trail user safety. **No matter how often you use this trail, please complete this questionnaire and return it to this desk or in the envelope provided.** This study has been approved by the University of Connecticut Committee on the Ethics of Research on Human Subjects. If you have any questions call me collect at (860) 486-2717 or email aultman@enr.uconn.edu. Thank you for your assistance.

Lisa Aultman-Hall, Associate Professor
 Department of Civil and Environmental Engineering
 University of Connecticut

1. Please estimate how often you use the **Farmington River Trail**.

Spring: ___ times per week **Summer:** ___ times per week
Fall: ___ times per week **Winter:** ___ times per week

2. Please estimate how often you use **ANY trail, including this one**.

Spring: ___ times per week **Summer:** ___ times per week
Fall: ___ times per week **Winter:** ___ times per week

3. Of the time you spend on **THIS trail**, estimate the percentage of time you are undertaking each of the following activities.

_____ % Walking _____ % Biking _____ % Skateboarding _____ % Other:
 _____ % Running _____ % Horse back riding _____ % Scooter
 _____ % Jogging _____ % In-line skating _____ % Skiing

4. With whom do you use **THIS trail**?

-- Please check ONE for EACH line --

	ALWAYS	OFTEN	SOMETIMES	NEVER
Alone (no other person)				
With one other person (including a child)				
With two or more other people				
With a dog				
With children				
With a child in a stroller				
With a wheelchair or in a wheelchair				
With a person, not in a wheelchair, but needing special access accommodations (you or someone else)				

5. When do you use **THIS trail**?

-- Please check ONE for EACH line --

	ALWAYS	OFTEN	SOMETIMES	NEVER
On a Weekday (Monday- Friday)				
On a Weekend (Saturday- Sunday)				
In the morning				
In the afternoon				
In the evening				
In the dark				
In the rain				
With snow or ice on the path				

6.

DEFINITION: An ACCIDENT is an event where you FALL or you COLLIDE with another user or object regardless of fault. (You may or may not have been injured.)

In the last 12 months did you have an accident on ANY trail, including this one?

- YES – please fill in the table for each accident.
- NO – go to question 7 on the next page.

	Accident A	Accident B
Type of Event	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user
Approximate Time	_____ : _____ am pm	_____ : _____ am pm
Month		
When this event occurred what were you doing?	<input type="checkbox"/> walking <input type="checkbox"/> riding scooter <input type="checkbox"/> jogging <input type="checkbox"/> on skateboard <input type="checkbox"/> running <input type="checkbox"/> skiing <input type="checkbox"/> biking <input type="checkbox"/> riding horse <input type="checkbox"/> in-line skating <input type="checkbox"/> other: _____	<input type="checkbox"/> walking <input type="checkbox"/> riding scooter <input type="checkbox"/> jogging <input type="checkbox"/> on skateboard <input type="checkbox"/> running <input type="checkbox"/> skiing <input type="checkbox"/> biking <input type="checkbox"/> riding horse <input type="checkbox"/> in-line skating <input type="checkbox"/> other: _____
If collision ... what did you collide with?		
INJURIES to you:	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)
INJURIES to someone else:	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)
Did this occur at an intersection with a road?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was this event reported to police or other official?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
PATH SURFACE (check as many as appropriate):	<input type="checkbox"/> Snow/ Ice <input type="checkbox"/> Sand/ Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes	<input type="checkbox"/> Snow/ Ice <input type="checkbox"/> Sand/ Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes
PATH ENVIRONMENT (check as many as appropriate):	<input type="checkbox"/> Well-trimmed Surrounding Plant Life <input type="checkbox"/> Overgrown/ Obtrusive Plant Life <input type="checkbox"/> Litter/ Trash <input type="checkbox"/> Clear Pathway <input type="checkbox"/> Crowded <input type="checkbox"/> Hardly Any Other Users	<input type="checkbox"/> Well-trimmed Surrounding Plant Life <input type="checkbox"/> Overgrown/ Obtrusive Plant Life <input type="checkbox"/> Litter/ Trash <input type="checkbox"/> Clear Pathway <input type="checkbox"/> Crowded <input type="checkbox"/> Hardly Any Other Users
Did this accident occur on THIS trail?	<input type="checkbox"/> Yes <input type="checkbox"/> No Please mark location on map to the right ⇨	<input type="checkbox"/> Yes <input type="checkbox"/> No Please mark location on map to the right ⇨

2
CONTINUED...



7. Circle any sections of the path you believe are risky for falls or collisions. Briefly describe why you feel your circled sections are unsafe.

8. If you bicycle on ANY trail, do you wear a helmet?
(circle one)

- ALWAYS
- SOMETIMES
- NEVER
- NOT APPLICABLE

9. When in-line skating on ANY trail, do you wear a helmet?
(circle one)

- ALWAYS
- SOMETIMES
- NEVER
- NOT APPLICABLE

10. If you ride a scooter or skateboard on ANY trail, do you wear a helmet?
(circle one)

- ALWAYS
- SOMETIMES
- NEVER
- NOT APPLICABLE



11. On the map below, please **trace the most common route** you take on **THIS trail**. Use arrows to show direction if appropriate.

12. Approximately when did you first use the **Farmington River Trail**?
 Month: _____
 Year: _____

13. In the last week which days were you on the **Farmington River Trail**?
 (Please check all that apply)

Mon	<input type="checkbox"/>
Tues	<input type="checkbox"/>
Wed	<input type="checkbox"/>
Thurs	<input type="checkbox"/>
Fri	<input type="checkbox"/>
Sat	<input type="checkbox"/>
Sun	<input type="checkbox"/>

14. Optional Data:
 Year of Birth: 19 _____
 Sex: M F

Please indicate in the space below any other comments you wish to make.

THANK YOU for your assistance.

Appendix C: Farmington Heritage Canal Greenway Survey – Summer 2003

Trail Safety Study 2003

We would appreciate your help in a study of trail user safety. **No matter how often you use this trail, please complete this questionnaire and return it to this desk or in the envelope provided.** This study has been approved by the University of Connecticut Committee on the Ethics of Research on Human Subjects. If you have any questions call me collect at (860) 486-2717 or email aultman@engr.uconn.edu. Thank you for your assistance.

Lisa Aultman-Hall, Associate Professor
 Department of Civil and Environmental Engineering
 University of Connecticut

1. Please estimate how often you use the **Farmington Canal Greenway**.

Spring: ___ times per week **Summer:** ___ times per week
Fall: ___ times per week **Winter :** ___ times per week

2. Please estimate how often you use **ANY trail, including this one**.

Spring: ___ times per week **Summer:** ___ times per week
Fall: ___ times per week **Winter :** ___ times per week

3. Of the time you spend on **THIS trail**, estimate the percentage of time you are undertaking each of the following activities.

_____ % Walking	_____ % In-line skating
_____ % Running	_____ % Skateboarding
_____ % Jogging	_____ % Scooter
_____ % Biking	_____ % Skiing
_____ % Horse back riding	_____ % Other: _____

4. With whom do you use **THIS trail**? (Please check one for each line)

	ALWAYS	OFTEN	SOMETIMES	NEVER
Alone (no other person)				
With one other person (including a child)				
With two or more other people				
With a dog				
With children				
With a child in a stroller				
With a wheelchair or in a wheelchair				
With a person, not in a wheelchair, but needing special access accommodations (you or someone else)				

5. When do you use **THIS trail**? (Please check one for each line)

	ALWAYS	OFTEN	SOMETIMES	NEVER
On a Weekday (Monday- Friday)				
On a Weekend (Saturday- Sunday)				
In the morning				
In the afternoon				
In the evening				
In the dark				
In the rain				
With snow or ice on the path				

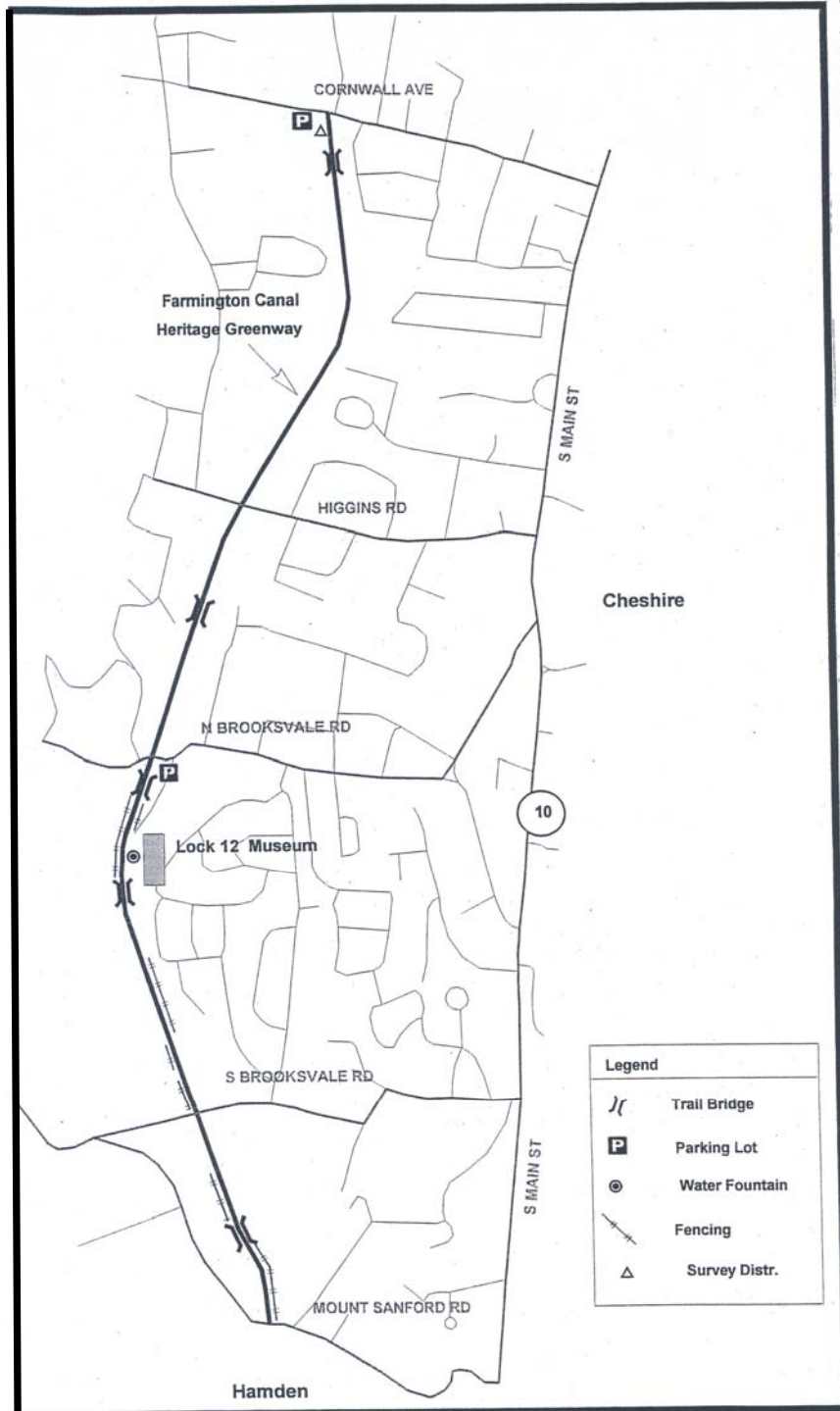
6.

DEFINITION: An ACCIDENT is an event where you FALL or you COLLIDE with another user or object regardless of fault. (You may or may not have been injured.)

In **the last 12 months** did you have an accident on ANY trail, including this one?

- YES – *please fill in the table for each accident.*
- NO – *go to question 8 on the opposite page.*

	Accident A	Accident B
Type of Event	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user	<input type="checkbox"/> fall <input type="checkbox"/> collision with an object <input type="checkbox"/> collision with another user
Approximate Time	_____ : _____ am pm	_____ : _____ am pm
Month		
Did this accident occur on THIS trail?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
When this event occurred what were you doing?	<input type="checkbox"/> walking <input type="checkbox"/> riding scooter <input type="checkbox"/> jogging <input type="checkbox"/> on skateboard <input type="checkbox"/> running <input type="checkbox"/> skiing <input type="checkbox"/> biking <input type="checkbox"/> riding horse <input type="checkbox"/> in-line skating <input type="checkbox"/> other: _____	<input type="checkbox"/> walking <input type="checkbox"/> riding scooter <input type="checkbox"/> jogging <input type="checkbox"/> on skateboard <input type="checkbox"/> running <input type="checkbox"/> skiing <input type="checkbox"/> biking <input type="checkbox"/> riding horse <input type="checkbox"/> in-line skating <input type="checkbox"/> other: _____
If collision ... what did you collide with?		
INJURIES to you:	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)
INJURIES to someone else:	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)	<input type="checkbox"/> None <input type="checkbox"/> Minor <input type="checkbox"/> Major (medical attention required)
Did this occur at an intersection with a road?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was this event reported to police or other official?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
PATH SURFACE (check as many as appropriate):	<input type="checkbox"/> Snow/ Ice <input type="checkbox"/> Sand/ Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes	<input type="checkbox"/> Snow/ Ice <input type="checkbox"/> Sand/ Gravel <input type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Pavement with Cracks or Potholes
PATH ENVIRONMENT (check as many as appropriate):	<input type="checkbox"/> Well-trimmed Surrounding Plant Life <input type="checkbox"/> Overgrown/ Obtrusive Plant Life <input type="checkbox"/> Litter/ Trash <input type="checkbox"/> Clear Pathway <input type="checkbox"/> Crowded <input type="checkbox"/> Hardly Any Other Users	<input type="checkbox"/> Well-trimmed Surrounding Plant Life <input type="checkbox"/> Overgrown/ Obtrusive Plant Life <input type="checkbox"/> Litter/ Trash <input type="checkbox"/> Clear Pathway <input type="checkbox"/> Crowded <input type="checkbox"/> Hardly Any Other Users



7. If you recorded an accident on **THIS TRAIL** on the previous page, please mark the approximate locations of the accidents on this map. Mark them with an A or B as appropriate.

8. If there are sections of the path that you believe are particularly risky for falls or collisions, circle these sections on the map to the left. Briefly describe why you feel your circled sections are unsafe.

9. If you bicycle on ANY trail, do you wear a helmet? (circle one)

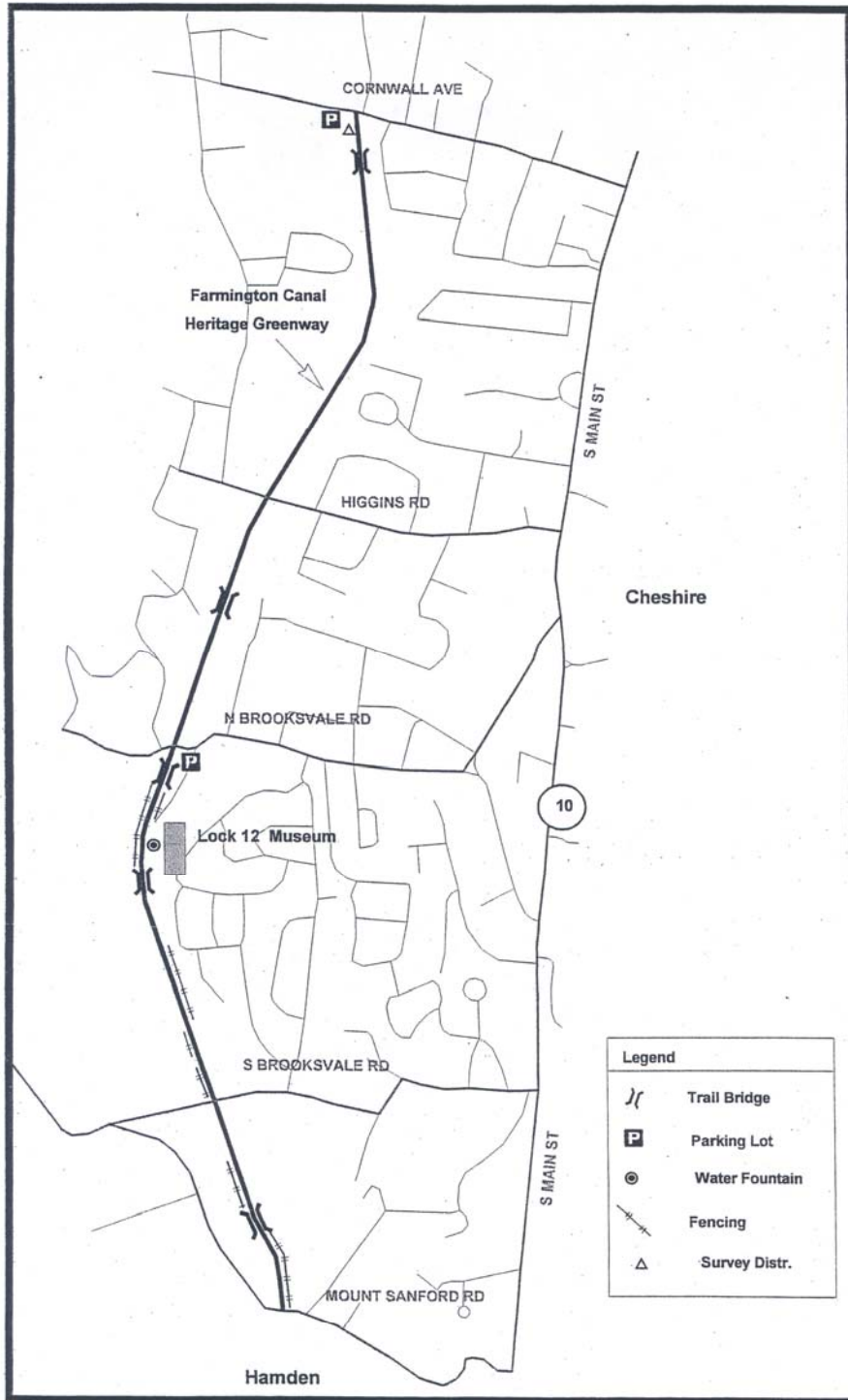
- ALWAYS
- SOMETIMES
- NEVER

10. When in-line skating on ANY trail, do you wear a helmet? (circle one)

- ALWAYS
- SOMETIMES
- NEVER

11. If you ride a scooter or skateboard on ANY trail, do you wear a helmet? (circle one)

- ALWAYS
- SOMETIMES
- NEVER



12. On the map below, please trace the most common route you take on **THIS** trail. Use arrows to show direction if appropriate.

13. Approximately when did you first use the **Farmington Canal Greenway**?
 Month: _____
 Year: _____

14. In the last week which days were you on the **Farmington Canal Greenway**?
 (Please check all that apply)

Mon	<input type="checkbox"/>
Tues	<input type="checkbox"/>
Wed	<input type="checkbox"/>
Thurs	<input type="checkbox"/>
Fri	<input type="checkbox"/>
Sat	<input type="checkbox"/>
Sun	<input type="checkbox"/>

15. Optional Data:
 Year of Birth: 19 _____
 Sex: M F

Please indicate in the space below any other comments you wish to make.

Legend	
	Trail Bridge
	Parking Lot
	Water Fountain
	Fencing
	Survey Distr.

THANK YOU for your assistance.

Appendix D: General Comments from Survey

Farmington River Trail Section 1

Bikers not expressing they are coming up behind you and with children this poses a risk of injury. They should let you know they are passing

Everything is great

First time on this trail. Filled with other trail instead

First time user- from out of state- It is lovely, I wish we had this where I live!

First used when it opened

First used when opened

Generally use Cheshire trail- no one in Farmington river trail seems to use courtesy comments (i.e. On your left passing)

Great place- love multiple user families, bikers, people with dogs

Great trail

I like the vegetation buffer left between the trail and the river

I love this place and feel safe to come alone with my dog

I love this trail and wish it was longer. I generally start from my home in Plainville

In regards to bikes: When walking one can't hear them- I have been "surprised" quite often. Bikers or others moving fast should call out and say they are passing- on the right or on the left. The overtaken have the right of way!!!

I've never had any accidents but if there was one, there should be call boxes to report them

Love this trail- It's beautiful

Most scenic part of bike trail - my favorite place to walk and bike with my grandchildren

Narrow on a busy Sunday with bikes, other walkers, and dogs

Need porta-pots

Nice place

Path is in good shape once in a while it needs more cleaning/sweeping

Perhaps a Portable Rest room @ the parking area

Porta Potty

Take high speed bikers off the path - BAN THEM

Tell the bikes to use a bell when passing

Thank you for continuing to improve the trail

This is a very nice place. Thank you for maintaining it as well as you do!

Trail markings for distance... "you are here" maps to indicate how much farther to certain areas

Traveled on when wasn't yet paved... people on bicycles go too fast and don't say they're passing... there will be someone hurt because of this

We love It here!

We need bathrooms

We really enjoy the trail and we think it is a great resource for Burlington

We would like porta potties kept clean

We would love to see the trail continue to the south with a paved surface

When it first opened (before it was paved) was when I first used... nice path, I've never seen any problems

Wonderful for walking and so scenic

Farmington River Trail Section 2

1. Littering on/off trail- need garbage cans; 2. Maintenance of the trail edge needs fill-in or preventive repairs on various spots.

Bikers need to let you know they are coming from behind- 2/3rds don't... I love the trail!

Great reason to live here!

Great Trail!

Great Trail!

Great trail! Please complete from North Hampton, MA to New Haven, CT!

Great trail. I wish it were cleared of snow and ice so I could use it instead of just West Hartford Reservoir.

Horse riding needs to be addressed. Horses chew up the soft runner trail. Also, owners tend NOT to clean "litter" left by the horses.

Horses on trail are destroying blue stone and leaving manure on trail

I wish the trail was longer.

Inadequate parental supervision of small children.

Involve users in planning, hazards, visibility, etc.

Keep building smooth paved paths and keep connecting them.

Keep up the good work!

Less publicity- it's too crowded already.

Make more trails!

Many people need to be aware of staying right!

Provide more access to trails. Pave access from N. Britain Ave, near Roma. Pave access from Roma Dr. to trail behind Roma that runs to Unionville. Complete section of trail from Unionville to Canton.

Thank you for keeping the trails safe.

Think it's great.

This is the best trail in the area!

This trail is beautiful!!

Trail is a great asset to the area.

Trail is great! Finish it!

We are very glad to have such a nice trail nearby!

What about call boxes at intervals that dial direct 911?

Will be back!

Wonderful- I hope they continue to N. Hampton.

Wonderful.

Young children with tricycles are a menace. Mothers don't tell their children to stay on the right side so they waver from side to side. Why not a sign (many signs) along trail asking parents to keep kids on right side of the trail??!!

Farmington Heritage Canal Greenway

A dotted line down the center on entire trail might convince people to stay on the right side.

A great spot for a trail would be between New Milford and Kent CT along the river.

A portolet or bathroom facility would be great.

Also use the trail as a connector to Brooksvale park.

Always enjoy coming here.

Centerline on trail is needed throughout.

Crossing streets should have signs for cars to stop at crosswalk

Dog waste receptacles needed. People with dogs should be required to have something to clean waste with.

Dogs need to be picked up after. It is a major problem- along the gravel trail especially.

Extend in Cheshire ASAP.

Extend it to the shoreline.

Extend trail to Meriden soon.

Finish the trail to Southington town line!

First time on trail.

First time user.

Great place to bike for all ages and abilities.

Great to take children to bike ride or walk.

Great trail and feel safe on it.

Great trail- well maintained!

Great trail.

Great! This person rarely uses this trail b/c they are from out of town.

Great trail!! thank you!

Hope the trail will be extended. I like to travel to mass at St. Thomas Beckett on the trail.

I can't wait til the trail is extended into Southington.

I love the trail- a porta potty would make it even better.

I love the trail- I'd rather ride by bicycle on this trail than elsewhere.

I love the trail!

I love this trail!

I love this trail. I think this a great way for people to have safe fun.

I love this trail. I feel very safe here. Thanks.

I think it's a mistake to bring the trail into urban New Haven as I believe it invites "trouble".

I think the trail is excellent!

I wish there were separate trails for walkers- it would be safer.

In line skaters and people on bicycles go too fast and don't warn of approach.

It is a wonderful place.

It is great. It's very therapeutic.

It's great.

It's wonderful.

Keep expanding it.

Leave it the way it is. Don't screw it up with rules and regulations like the local state and national governments are famous for.

Let's get the trail finished up to the Southington border ASAP. Also, repaint the cracks that are starting to appear.

Little kids on bikes are a hazard.

Live 1 mile from trail- Love it!

Live out of town.

Love it.

Love the trail- glad it got extended.

Love the trail!

Love this trail. Wish there was one closer to my house- the East Haven shoreline.

Mainly use Hamden section only.

Make it longer!

Modify signs to include rollerblade safety tips while bikes yield to peds, bladers seem to follow their own way.

My husband and I enjoy hiking on this trail. It's shady and convenient.

Need a Port o Let in between streets.

Need a soft path on BOTH sides of the trail for joggers.

Need better police surveillance to ensure cars stop at crosswalks. Have had several close calls!!

Need more trails- great trail

Need more water fountains along the trail.

Needs to be longer on the Southington Side

Needs trash cans along path- emergency phones too

New boards that are even on the bridge near Mt Sanford.

Nice trail, good for kids, need more port-a-lets (bathrooms).

Nice trail. Needs extension to New Haven, if possible, needs dedicated parts to mountain bikes (probably not possible) never had a bad experience with unsafe bikers, in liners, moms w/ strollers, etc.

Note: on vacation before Saturday so couldn't use trail....Love the trail!

One time I witnessed an accident and the ambulance couldn't get to the trail because they had not key to unlock the posts where the trail intersects the road.

People just don't seem to grasp the concept of single file in congested areas!

People need to clean up after their animals.

Perfect- I love it.

Please look into the Litchfield Area for new bike trails.

Problem w/ unleashed dogs.

Problems: Little children with training wheels who don't know left from right. This is not a place to learn how to ride a bike.

Recommendations: more awareness placed on 1) dog owners picking up "mess" 2) courtesy for others, especially walkers, by skaters and people with children

Rollerbladers should be more courteous in maneuvering when approaching other trail users.

See comment on intersections

Should be stop signs at street crossings.

Should have signs posted for directions to go and stay on own side; also speed.

Skated 1200 mi on the trail last year.

Thank you for keeping the path smooth and well paved

Thanks.

The accident referred to was really a "hit and run" to me and another walker who reported to the police on a cell phone.

The Canal is well maintained.

The greenway is supposed to go from N.H. to MA WHEN!? Cheshire keeps dragging its feet to finish.

The largest problem I have is people walking/biking etc. down the center of the trail rather than on the side.

The trail is dangerous because of the excessive speed of some bikers and roller bladers.

The trail is fine the way it is minus the paint on the path.

The trail is great! We need more.

The trail should be extended. 24 miles round trip isn't enough.

There should be a walkway from the new parking lot to the trail- going into the road with rollerblades is risky at best.

There should be more patrolling by park supervisors or police officers- enjoyable trail when people obey the rules.

There should be no bikes on the gravel walking path; dogs "mess" and need to be picked up after; white line needs to be repainted.

This person rarely uses this trail b/c they are from out of town.

Too many dogs.

Top advantages of this trail are mix of shade/sun, quietness, and relative flatness (good for kids)

Trail is great...dangerous sections need to be rebuilt and snow/ice removed in winter.

Travels along Rt 10 not this trail...

Use this trail with 3 children and 2 adults.

Use generally 6am weekdays, 8-9 am weekends.

Very nice trail.

We (me and my children) love this trail!

We absolutely love this trail, and we hope you continue the trail soon (like in Europe).

Well maintained.

Wish it was longer!

Wish people with kids would take more time to teach them the rules of the trails!! Maybe sometime in the future lighting could be added for more nighttime use.

Wish that the Southington Trail was completed. Enjoyed the trail! Will return on both bike and foot. Thank you for the beautiful and safe trail!

Wish there were more distance indicators on the trail. Many users don't know to stay right at all times- perhaps some signs in parking areas?

Wonderful

Appendix E: Comments from Users on where Trail Risks are Located**Farmington River Trail Section 1**

Bridge over Farmington River going into Collinsville

Steep sharp drop off between boat ramp and parking lot

Unpaved section of the trail

Where paved trail ends, there is an open concrete drain for street with no cover. A large rock overhangs the drain but a dog or child could fall or climb in the drain (has running wall at bottom)

...wish path was longer... wish it continued to Farmington

... would have used it sooner if protective fencing available

...been jogging for 20 years...this is the safest & most inter.

...post rules for bike etiquette like letting people know...

...suggest signage about dogs with leashes, clean up, etc.

...take care of path in winter - no ice / bikers go too fast

area with steep trail to the river that begins very close to the trail (between the boat ramp and the parking lot)

Intersection of Arch St - cars moving quickly; 2. At private homes on Arch St, on street parking- some cars move in/out very fast

A call box for safety would be nice

A lot of twigs in the trail and lots of leaves as well where skaters might trip – especially between parking lots

A phone in parking lot connected to 911 only would help

Any place where the trail drops off steeply to the right by the water especially for small children

As a walker, speeding bicyclists worry me, that shouldn't be

Beautiful Path! / First time here, will use all four seasons

Unpaved section of trail - because its not paved and bumpy

The steel vertical barriers are dangerous. Sometimes they come undone and they are not bright enough - poor design

Been using since before it was paved

Been using this place long before it opened

Better system for marking the continuation of trail

Bicyclists go too fast / annoying dog lives in unpaved area

Bikers and skaters go too fast with little kids around
Bikers sometimes go too fast and pose danger for walkers
Bikers, skaters don't announce selves when passing, should raise awareness
Brickyard trail in Farmington needs fencing ... of raised trail
Bicyclists need to warn walkers that they are coming through
Children are not monitored properly / people should move out of the way to talk
The dam... no guard rails to block from falls
Connect trail w/ Unionville trail
Continue trail to Farmington!
Dam - should it be fenced off??
Dogs going to bathroom is awful! There is no need for it!!!
During summer increase in visitors increases trash, need more volunteers during that time
Feel comfortable & safe / noticed several unsafe split trees
First time on this trail.
Great idea for making a trail in a scenic area that all can use
Great Place!!!
Great spot for walking dog
Great trail, wish it was longer
Have had 4-5 near misses riding bicycle involving badly trained children
I love it, it's such a beautiful path
I love the path - enjoyable - love to see families enjoying it!
I love this path - wish it were longer! Needs bathrooms
I love this trail
I think path is generally very safe and good
I think this section of trail is the most attractive section in CT
I worry about my safety as far as being attacked
In-line skaters and bicyclists shouldn't go too fast and should give warning to pedestrians when passing
It is a really fun party with nice scenery
It would be nice if there were some portalets or other facilities available

Leaves make it slippery

Love it! Go as often as time allows

Love it, thanks

Love the flatness of trail / heard of man on trail behaving inappropriately

Love the path!

Love the path, beautiful and fun!

Love the trail

Love the trail - plan to use as often as possible

Love the trail / river!

Main paved trail is too narrow, should have designated bike lane

Mileage markers

Mileage signs desired / if biking, some drops off are steep.

Need education in Bike Safety

Need portable restrooms / make trail accessible during winter

Needs security like police or private security so users feel safe

Outdoor bathroom should be provided

Path flooded at times / would like mileage signs up

Pave more!

Please connect this to other trails, they're great!

Potties please & water

Prefer trails in the woods to paved trails so I don't use this one often

Pretty well maintained... hard when there are a lot of kids on the trail because they stop in the middle of the road

Put in signs for dog walkers to pick up mess

Sharp turn to bridge on Arch St. trail

Should extend trail to Unionville Iron Bridge / Good work!

Should modify drainage close to river to evade standing water in damp

Signs for people to stay on the right - big emphasis!!!

Signs telling people to stay right or single file would be good

Snow clearing in winter would be nice

Some type of poison ivy / open up to Farmington

Sports bikers go too fast in family times

Strange people hang around, would like to see police patrollers

The leaves on the path are dangerous

The trail is great! Mile markers would be helpful

The areas that are very steep areas where children could fall

Think trail is enormous asset to area! Its safe, pretty place for people.

This is a great addition to our community

This is a great trail! It's the best part of the entire greenway

This is a lovely section

This trail has been a blessing

This trail seems safe. Could be a bit wider w/ line down middle

Trail is well kept

Tree roots under paving are cracking the pavement, recommend their removal

Tremendous asset to area

Unpaved and broken asphalt where paved trail ends

Unsure on how to negotiate space

Use Farmington or Unionville more often because its less busy

Very beautiful trail

Very safe path, good for kids. Adds to my quality of life in CT

We enjoy the path

We have enjoyed the trail, well monitored w. friendly supvsn.

We love the trail. Please create more trails. Good use of our tax money

We try to be considerate - Cyclists need to anticipate others users...

Where the rough pavement is

Wish for a bathroom

Wish for a center line through entire length and signs saying keep right.

Wish people who bring their dogs would scoop up the poop

Wish people would pick up litter and don't bring glass - they throw them near river.

Wish trail was completed into Unionville

Wonderful Path, can't wait for extension to be completed

Would like to see the path extended into Unionville

Would like to see the trail cleaned weekly with mech sweeping

Would use more in winter if cleared of snow

Farmington River Trail Section 2

Trail narrows on bridges and people stop to look at river.

Red Oak Hill Rd intersection

Red Oak Hill Rd intersection

Abruptly stop and turn right along well traveled highway...plus a four stop intersection. The intersection with Red Oak Hill Road

Because there are lots of people, you have to be careful - the new bridge over the Farmington River

Bikers and rollerbladers don't warn of approach- they're dangerous.

Bridge roadway expanders make inline skaters stick to surface and significantly change speed of rollerblader. New bridge over Farmington river

Fencing rotten...need centerline...need to make walking shoulder more user friendly (get rid of overgrowth)

Generally I find young children entering the trail from their yard without looking.

I believe the whole trail is very safe.

I don't think any one area is more risky than other areas...Comment: some bikes and rollerbladers tend to go fast- sometimes risky for walkers and runners

I feel very safe.

None unless people not using the trail properly

Safe trail.

The boulders in the middle of the trail! Bridge over Farmington Ave

tight radius while enter/exiting. Intersection with Red Oak Hill Rd

Users are not aware of riders approaching from behind- people tend to spread out and take up the whole trail.

Visibility looking left and right (coming from both directions on trail) is VERY limited. This is true for traffic as well. It is not uncommon for a car going above speed limit to "appear" while in the intersection. I suggest speed bumps. (CC Rd)

Wet leaves, branches, deer crossing and chipmunks

Farmington Heritage Canal Greenway

All intersections

All intersections - stop areas often have cars that ignore or go fast

Area between Higgins and bridge, south of that road

Area between N. Brooksvale and S. Brooksvale

Intersection with N. Brooksvale Rd

Intersection with N. Brooksvale Rd

Intersections at Higgins and N. Brooksvale - cars do NOT stop at designated crosswalks at intersections.

Lock 12 Museum Area

Lock 12 Museum Area

Midway between Cornwall and Higgins - not able to see oncoming bikes when they drive too fast around the curve.

N. Brooksvale Rd) - limited sight distance

southern two bridges

Between Cornwall and Higgins - ridges/ rises: an unskilled rider or rollerblader could lose control; all sections w/ rollerbladers w/ headphones or people learning to rollerblade during peak hours.

1) planked bridges are getting rough, 2) dips at road and brick interfaces, 3) general gravel and sticks

All intersections

All intersections with roadways

At crossways to road traffic

At most intersections/crosswalks drivers do not slow down... I was almost hit by a bus- scraped elbows and knees when fell in the crosswalk.

Between Higgins Road and bridge south of road- roots are dangerous, bridge south of N. Brooksvale is rough

Bridges are tough on novice rollerbladers

Bridges are warped [circled one nearest N. Brooksvale and one nearest Mount Sanford]

Bridges- especially the one nearest Mount Sanford Rd- it is very bumpy for in line skaters

Bridges- especially the one nearest Mount Sanford Rd- the bridges are bumpy for in-line skaters

Bumps broken pavement - below Higgins Road and above bridge

The bridge between S. Brooksvale and Mount Sanford

Congestion at the rest area at Lock 12 Museum

Congestion- lots of rollerbladers (Cheshire side)

Cracked pavement especially just north of the Higgins intersection

End of trail near Cornwall Ave- too many people, children

Fenced areas are narrow

For in-line skating, the section where the walking path gravel gets on the pavement

Hamden Sherman Ave 1/3 of a mile from Sherman, sharp turn- not safe

Heading south past Sherman, there's one very sharp turn which is usually sandy and totally blind in both directions.

In Hamden across by Quinnipiac trail intersects with traffic going downhill

Intersection with N. Brooksvale, after crossing the road it's a very close right turn

Intersections are a bit risky

Lock 12 Museum is just a very busy area

Mostly at stop signs

Mostly safe - some spots where trail getting bumpy but usually marked/painted (where problems are)

Mt. Carnel Section, unavailable on the map provided

Near Talbots going north from Rt 10 makes left turns into riders

None- only leaves and debris

None- safety is great

None...My one safety concern is people travel side by side - maybe signs would help

Only when people walk ride or skate 2-3 people wide- not in a single line

Over the wooden bridges some of them are very bumpy for roller blades

Poles at all intersections, confusion about whether traffic will stop

Roller bladers

Section in Hamden- trail is dangerous with steep downhill going at Rte 10- trail should have followed the old rail line...another dangerous section in Hamden is just before Shift St- same problem- trail didn't follow old rail line- leading to steep downhill

Noted 2 points on the map for collisions but no reasons why

Sherman Ave curve in Hamden

Speed skaters need to slow down- a lot of kids are on the trail

Steep hill where plank (?) is located that leads to main rd (in Hamden)

The path is safe

The only parts of the trail that are risky are the sections where you have to cross a road or street. Some bonehead drivers do not seem to recall what is required of them when pedestrians are in a crosswalk.

There are 3 big hills which are particularly dangerous and awaiting a big accident... Especially one hill stopping at a traffic light... saw many children on bikes and in line skates almost ride into traffic

There is a bridge that has very uneven boards and is very difficult to skate over into Hamden (bridge north of Mt. Sanford)

This bridge near Higgins Rd is a nightmare for rollerbladers- it should be sanded or paved. The other wooden bridges are OK but still unpleasant

Traveling south as you leave lock 12 - 1 piece of board on the bridge sticks up more than the others.

Wood slot bridges are difficult for novice skaters

Would be nice if Hamden plowed in wintertime