

## BACKGROUNDER:

# DESIGNING OFF-ROAD PATHS AND TRAILS FOR PEDESTRIANS AND CYCLISTS

## Pedestrian Paths, Bicycle Paths, Multiuse Trails, and Greenways

Off-road pedestrian and bicycle paths, also known as multiuse trails or greenways, are travel routes reserved exclusively for use by pedestrians, cyclists, and users of other forms of active transportation. Physically separated from motorized traffic by an open space or barrier, these paths are most often located in parks or along corridors such as railway lines, hydro corridors, rivers, and industrial areas<sup>1,2</sup>. Off-road paths may be designed for only a single user type, *either* pedestrians *or* cyclists, or they may be multiuse. Multiuse paths are designed to be used by *both* pedestrian and cyclists; and may also be used for in-line skating, skateboarding, non-motorized scooters, and, in some rural areas, horseback riding. Given the City of Toronto's recent commitment to constructing new off-road paths<sup>3</sup>, this backgrounder highlights several elements to be considered when building new paths.

### Toronto's Commitment to Off-Road Paths

- In July, 2011, Toronto City Council motioned to construct a 100 km network of off-road paths at a cost of \$50 million over four years<sup>3,4</sup>.
- The bulk of this network consists of off-road paths recommended previously within the 2001 bike plan; with construction of 30 km of this network in North York and Scarborough scheduled for completion in 2011<sup>3</sup>.
- The 100 km of off-road paths are to be built "along rail, hydro corridors, ravines and valleys to serve as the backbone for bicycle transportation across Toronto"<sup>3</sup>.
- Since these paths are intended to serve both as a transportation corridor and recreational space for pedestrians and cyclists, careful consideration is therefore required to design paths that provide safe and appropriate access for multiple types of users.



Pedestrian Path in High Park, Toronto  
([www.torontolife.com](http://www.torontolife.com))



Seawall multiuse path, Vancouver  
([vancouver.ca](http://vancouver.ca))

### Off-Road Paths: One size does not fit all

Not all off-road paths are one and the same. Off-road paths are designed differently depending on the user they are intended to serve. While not all off-road paths will be paved, most in urban areas are. The following are three main classes of off-road path:

- **Pedestrian Paths:** These paths offer pedestrians a dedicated travel route through parks and public areas. They are the narrowest of off-road paths with a minimum width of 2.5 m\*, and are designed for use by pedestrians and wheelchair users only.<sup>2</sup>
- **Bike Paths:** Off-road bike paths provide a separate corridor dedicated specifically to cyclists. They are similar to pedestrian paths, but have a larger minimum width (3.0 m\*), and are designed for speeds of up to 30 km/h (with posted speeds of up to 20 km/h).<sup>2</sup>
- **Multiuse Paths:** Multiuse paths are trails designed for use by several user groups. As such, the design of multiuse trail must account for the characteristics of each of the users it intends to serve. The recommended minimum width for multiuse trails is 3.0 to 4.0 m\*, depending on the volume of users, and a range of user speeds must be accommodated<sup>2</sup>.

\*These values are for bidirectional paths

<sup>1</sup> American Association of State Highway and Transportation Officials. 2010. *Draft guide for the planning, design, and operation of bicycle facilities*. Accessed November 22, 2011: <http://design.transportation.org/Documents/DraftBikeGuideFeb2010.pdf>

<sup>2</sup> Vélo Québec. 2010. *Planning and Design for Pedestrians and Cyclists*. Montréal: Vélo Québec Association, pg. 39

<sup>3</sup> City of Toronto. 2011. *Decision document: Public Works and Infrastructure Committee – Meeting 5*. Accessed August 30, 2011: <http://app.toronto.ca/tmmis/viewPublishedReport.do?function=getCouncilDecisionDocumentReport&meetingId=4419>

<sup>4</sup> City of Toronto. 2011. *Staff Report: Bikeway Network – 2011 Update*. Accessed November 28, 2011: <http://www.toronto.ca/legdocs/mmis/2011/pw/bgird/backgroundfile-38906.pdf>

## Multiple vs. Single Use Paths: The Case for Separation

While the majority of path users are likely to report positive or satisfactory trail experiences, conflicts between users groups do exist and these conflicts may seriously impact the trail's success<sup>8,9</sup>. These conflicts are often asymmetrical, with pedestrians expressing greater concern than cyclists. In the face of such conflict, users may stop using the trail, either during hours of peak usage or entirely<sup>8,10</sup>.

Safety is of utmost importance to multiuse path use. Differences in user speed are one of the largest sources of conflict, with cyclists typically travelling at higher speeds than pedestrians. Speeding, lack of communication between users, bicycles emerging from behind without warning, and reckless behaviour are commonly cited conflicts by off-road path users<sup>11,12</sup>. For these reasons, cyclists are safer on bicycle-only off-road paths<sup>13</sup>; a fact which is reflected in cyclists' reported preference for these paths<sup>14</sup>.

In response to this, municipalities may wish to consider physically separating pedestrians and cyclists onto two, parallel paths. This is recommended for trails located in denser urban settings<sup>3</sup>. In doing so, the paths may be tailored to each user's preferences with respect to design speed, surfacing, and other trail attributes, thereby avoiding conflict and improving user experiences.

### HIGHLIGHT: Toronto's Martin Goodman Trail

#### Variations in path design within a single trail



East of Strachan Avenue  
(J. Stronghill)

- Zone of high conflict
- Single, shared path
- Narrow (~2.6 m)†
- Two, unidirectional lanes separated by a painted line



Adjacent to Ontario Place  
(www.waterfrontoronto.ca)

- Zone of moderate conflict
- Single, shared path
- Wide (~4.5 m)†
- Two, unidirectional lanes separated by a painted line



East of Humber Bay Bridge  
(www.palaceplace.org)

- Zone of low conflict
- Two, separate paths‡
- Paths differ in width (~2.7 m and 3.5 m)
- Each path is a single, bidirectional lane

†A minimum width of 3.0 m is recommended for bidirectional multiuse paths. Where user volumes are high, this width is recommended to increase to 4.0 m<sup>2</sup>.

‡ However, no signage exists to delineate which path belongs to which user.

<sup>5</sup> Gobster, P.H. 1995. Perception and use of a metropolitan greenway system for recreation. *Landscape and Urban Planning*, 33: 401-413.

<sup>6</sup> Winters M, Teschke K, Grant M, Setton E, Brauer M. 2010. How far out of the way will we travel? Built environment influences on route selection for bicycle and car travel. *Transportation Research Record*, 2190:1-10.

<sup>7</sup> Krizek, K.J., El-Geneidy, A., and Thompson, K. 2007. A detailed analysis of how an urban trail system affects cyclists' travel. *Transportation*, 34: 611-624.

<sup>8</sup> Federal Highway Administration, U.S. Department of Transportation. *Conflicts on multiple use trails: Synthesis of the literature and state of the practice*. Accessed on September 6, 2011: <http://atfiles.org/files/pdf/Conflicts.pdf>

<sup>9</sup> Manning, R.E. and Valliere, W.A. 2001. Coping in Outdoor Recreation: Causes and Consequences of Crowding and Conflict Among Community Residents. *Journal of Leisure Research*, 33(2): 410-426.

<sup>10</sup> Arnberger, A. and Haider, W. 2007. Would you displace? It depends! A Multivariate visual approach to intended displacement from an urban forest trail. *Journal of Leisure Research*, 39(2): 345-365

<sup>11</sup> Reichhart, T. and Arnberger, A. 2010. Exploring the influence of speed, social, managerial and physical factors on shared trail preferences using a 3D computer animated choice experiment. *Landscape and Urban Planning*, 99: 1-11

<sup>12</sup> Lindsey, G. 1999. Use of urban greenways: insights from Indianapolis. *Landscape and Urban Planning*, 45: 145-157.

<sup>13</sup> Reynolds, C.CO., Harris, M.A., Teschke, K., Crompton, P.A., and Winters, M. 2009. The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature. *Environmental Health*, 8:47.

<sup>14</sup> Cycling in Cities. n.d. *Opinion survey brochure*. Accessed December 5, 2011: <http://cyclingincities-spph.sites.olt.ubc.ca/files/2011/10/OpinionSurveyBrochure.pdf>

## Off-Road Paths: Recreational Trail or Transport Corridor?

When incorporating off-road paths into a bikeway network, it is useful to consider what type of cyclist these paths will serve. The majority of off-road paths have been found to serve recreational cyclists<sup>5,12</sup>.

- In a Vancouver-based study, cyclists reported willingness to travel farther to access cycling facilities such as off-road paths, however, on average, cyclists will only detour up to 400 m<sup>6</sup>.
- In a study of off-road paths in Indianapolis, over 90% of cyclists using the paths reportedly did so for health and fitness, 70% for outdoor leisure and recreation, and only 11% for transportation, or non-recreational, use<sup>12</sup>.

One factor that may influence non-recreational use of off-road paths is proximity to residential areas and other travel routes.

- Studies in Minneapolis have shown that to encourage non-recreational use, off-road paths should be located within 5 miles or less of residential and commercial areas, with 1 mile being most optimal<sup>5</sup>.
- Connectivity between off-road trails is important, with off-road facilities ideally located approximately 3-4 km from one another<sup>7</sup>.

Ultimately, the success of an off-road path will depend on its ability to function as a designated bicycle route, and off-road paths that are not within a short distance from common origins and destinations will not be functional transportation corridors.



West Toronto RailPath  
(www.bikepirates.com)