Expanding Cyclopath into a Statewide Bicycle Route-Finding Tool

What Was the Need?
MnDOT has put significant effort into providing opportunities for bicycle travel. One of the state’s goals is to increase the percentage of trips made by methods other than personal motor vehicles to help reduce traffic congestion and environmental impact. These efforts have produced results: The League of American Bicyclists rated Minnesota the second most bicycle-friendly state in its 2015 rankings, and MnDOT’s Omnibus Survey revealed that 25 percent of Minnesotans bicycle at least once per month.

MnDOT has provided printed bike maps to help cyclists plan long-distance routes, and local agencies have provided local bike maps. However, the road network changes constantly, so it is impossible for any printed map to be completely up-to-date. Since 2008, MnDOT has also promoted Cyclopath, an online bike route-finding tool for the Twin Cities area operated by the University of Minnesota’s GroupLens Research. While built on MnDOT map data, Cyclopath is a geowiki—an editable map that users can update based on current conditions they observe.

Expansion of the tool beyond the Twin Cities was necessary for bicyclists to find routes in greater Minnesota.

What Was Our Goal?
The goal of this project was to expand Cyclopath into a statewide tool.

What Did We Do?
Integrating statewide route data into the original Cyclopath database involved several technical challenges. Researchers first obtained a geographic database from MnDOT containing statewide road and trail data. This database included information about each road’s bikeability, including shoulder type and width, number of lanes and whether the road has controlled access. However, this database only considered complete roads rather than individual segments. Without additional work, Cyclopath would not be able to direct cyclists to midroute intersections.

Researchers developed custom software to create segments in the database where appropriate. This was less straightforward than simply creating segments at every intersection. Some places where roads cross—such as where a bicycle trail passes over a highway on a bridge—are not connections that bicycles can use to travel between roads. Researchers manually audited the intersections added by the software for accuracy.

MnDOT’s data did not include regional or state bike trails or attributes specific to bicycle facilities. To incorporate this information into Cyclopath, researchers acquired a statewide geodatabase published by the University of Minnesota’s Center for Changing Landscapes. They performed the same segmentization and quality control on this information as on the MnDOT data.

Finally, the developers added functions for planners, including a “Bike Facility” widget.
Researchers attended the Minnesota State Non-Motorized Transportation Advisory Committee meeting in 2012 to collect feedback about the Cyclopath user interface.

What Did We Learn?
Feedback from the advisory committee provided insight into how a typical Cyclopath user would likely use the tool. Changes made based on this information included:

- Simplifying the user interface by removing editing capabilities from the default mode. Most users do not make edits, so having editing functionality on the main page adds clutter without adding significant value. Users can still easily access wiki editing functions.
- Improving navigation by redesigning the tool’s landing page to display the route request form, the site’s most commonly used feature.
- Adjusting the route-finding algorithm to increase the diversity of routes presented when users adjust the preference control slider. The slider allows users to prioritize speed, routes with bike lanes or trails, or the roads rated highest by users. Researchers also improved the algorithm’s efficiency, which significantly improves response time for long routes.

The statewide expansion of Cyclopath was released in the summer of 2014. After the expansion, usage increased from about 100 users creating routes daily to about 250.

What’s Next?
All modifications to Cyclopath have been implemented into the tool. MnDOT will be evaluating opportunities for how to most effectively maintain the tool into the future. MnDOT has worked to promote Cyclopath through press releases and local media coverage, but further outreach and promotion will likely be tied into the maintenance contract.

In the long term, MnDOT hopes to incorporate user-generated information from Cyclopath about existing and desired facilities into its overall planning and prioritization of bicycle facilities.