






## Transitway Impacts Research Program (TIRP) Research Brief

# Can better connections increase transitway ridership?

### Why was the study needed?

A transitway trip is more than just the time spent on a train or bus. It also includes the modes riders use to reach transitway stations, such as local buses, walking, and biking. Planners need to understand how these connections affect ridership.










This study explored the multimodal connections between transitway stations and riders' origins and destinations. It asked:

-  How do Twin Cities transit users choose to reach transitway stations?
-  How do they choose their paths through the transit system itself?
-  Does the quality of connections at stations affect transit use?

*“This research provides important perspectives on the customer value of transitway connections by mode, informing effective transit planning to transitways.”*

— Adam Harrington, Director of Service Development,  
Metro Transit

### Key Findings

-  Transitway riders consistently choose their access mode to a station based on distance and time.
-  The overwhelming majority of transitway users walk to a station.
-  Women are more likely to view biking negatively than men do. This possibly indicates barriers to bike usage compared to other modes.
-  Women view driving more positively than men do.
-  Riders plan their paths through the transit system based on four factors: in-vehicle time, waiting time at stations, walking time, and transfers.
-  In the Twin Cities there is significant overlap among the four factors. Users primarily choose the path that minimizes their total travel time, which, in most cases, is the same as the fewest transfers. This implies few back-up options if one path is unavailable.
-  Higher-quality bus connections at transitway stations produce higher ridership at those stations.
-  There is value in measuring the quality of bus connections rather than simply counting routes or trips per day. Factors such as safety also matter.
-  There was a lack of nationally consistent data about bike and pedestrian facilities. As a result, the study could not determine if better bike or pedestrian connections would create more transit trips.

**Boardings at a transitway station increase 20%** for each additional square mile reachable by local bus service from that station on an average weekday.

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## New Method for Measuring Quality of Connections

Existing measurement tools include a simple count of connecting bus routes or numbers of trips per day. To address shortcomings of these tools, the researchers developed an innovative, improved method for measuring the quality of bus, bicycle, and pedestrian connections to transitway stations. Using geospatial analysis techniques, the method calculates the area reachable in 15 minutes of travel on a street or transit network. Transit travel times include walking and waiting time; bicycle and pedestrian travel times only consider local streets. Planners can use the tool to calculate the mobility provided by current connections and estimate the impacts of service changes.

### Project Design

Researchers used mode choice modeling to investigate how Twin Cities transit riders plan their mode to access transit stations. Mode choices considered were walking, regular bus, driving, drop-off, biking, and taxi or transportation network company (e.g., Uber or Lyft).

Then, they combined several algorithms to analyze how riders choose the path they take during their transit trip—the shortest path, a perceived shortest path, or neither.

In addition to these Twin Cities-based analyses, the research team carried out a ridership analysis using data from 341 transitway stations at 16 designated peer regions across the United States. The ridership analysis focused on estimating how the quality of bus, bicycle, and pedestrian connections to transitways affect station-level ridership.

### Recommendations

Current plans for the Twin Cities transitway system include extending existing light rail lines and adding new bus rapid transit lines (both arterial and dedicated guideway). Some new lines will lead to new right-of-way acquisition and the potential for development around station areas. Land use around station areas could shape the types of modes used to access the system.

In light of these plans, the research team recommends:

- Locate new transitway stations so that they intersect corridors with high transit demand and high levels of connecting bus service.
- Plan local bus service to provide convenient, direct service to transitway stations.
- Improve walkability to transitway stations. This should be a priority.
- Improve bike access and infrastructure (e.g., bike lanes and storage space) and plan for the impacts of dockless bikeshare.
- Develop detailed, accurate, standardized data on pedestrian and bicycle systems.

### Learn More

Final report: *Multimodal Connections to Transitways*, CTS Report 19-04 , March 2019

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*“Distances do not tell the whole story. Just because it may be possible to get to a transitway station does not mean the trip will be an attractive, pleasant, or even safe one.”*

— Yingling Fan, principal investigator

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