Intermodal Connectivity at Gateway Hubs

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Introduction to Research Topic

Intermodal transit stations are important locations in the regional transit network where two or more transit lines connect, and where high volumes of passenger transfers take place. Metrolinx's Mobility Hub Guidelines (2011) define these places as Gateway Hubs. This study evaluates intermodal connectivity for pedestrians in the winter at two Gateway Hubs in the City of Toronto, Dundas West-Bloor and Kennedy, with four main objectives:

i. Identify barriers to equitable pedestrian accessibility between transportation modes at two Gateway Hubs with a focus on winter conditions;
ii. Position these barriers within the existing and emerging policy framework;
iii. Determine opportunities to reduce these barriers and improve intermodal connectivity at the two Gateway Hubs; and,
iv. Relate these findings to broader recommendations for intermodal mobility hubs across the Greater Toronto and Hamilton Area (GTHA).

This research is innovative because little information is available on intermodal pedestrian connections specifically focusing on winter conditions and the equitable accessibility of different public transportation modes. Additionally, this research is at a smaller scale than previous studies that have been completed at both Gateway Hubs, as its focus is on the transfer area between transit modes, and not the surrounding station area.

Context and Relevance to Metrolinx

Improving intermodal connectivity at Gateway Hubs supports Metrolinx's mission to deliver and build mobility solutions for the region. More specifically, this study relates to Strategy 3 in Metrolinx's 2041 Regional Transportation Plan (RTP): Optimize the Transportation System. A priority action of Strategy 3 is to "set consistent high-quality standards for the traveler experience", which includes transit user safety, convenience of using the transit system, providing universal access to stations, and embedding design excellence in transportation planning, such as accessible station access and wayfinding (2018a). All of these factors affect the pedestrian environment, and how efficient and enjoyable transit transfers can be. Good station design will become increasingly important as ridership on the regional transit system grows, particularly under the GO Expansion program, which will provide frequent, all day, bidirectional service on much of the GO rail network by 2025.

Methods

Three criteria were used to select Gateway Hubs for this study. The stations must have:

1. At least two *existing* intersecting rapid transit modes;
2. At least two unique rapid transit modes (to evaluate connectivity between different transit lines, as well as different transit agencies); and,
3. No construction occurring within the transfer area.

While a few Gateway Hubs meet these criteria, site visits and consultation with Metrolinx informed the selection of Dundas West-Bloor and Kennedy for this study.

The study included four methods:

1. A site visit audit;
2. An intermodal connectivity audit;
3. Sharing circles; and,
4. Interviews with representatives from Metrolinx and the Toronto Transit Commission (TTC).

The site visit audit was completed by the researcher to evaluate quantitiative characteristics of the transfer route under four categories:

- Route Characteristics;
- Station Characteristics;
- Pedestrian Signage; and,
- Intersections.

The site visits also informed the creation of maps and floor plans to show the transfer areas at Dundas West-Bloor and Kennedy stations. Visualizing and

digitizing the built environment are significant complementary tools for public understanding of the pedestrian environment (Scholsberg, & Brown, 2004) and to engage stakeholders and decision makers to see where improvements to the environment should be made (Moura, Cambra, & Conçalves, 2017). The maps and floor plans created for this study were used by the researcher and participants in the intermodal connectivity audits to locate barriers to intermodal connectivity.

The intermodal connectivity audit and sharing circles were completed with participants (n=4 for Dundas West-Bloor station, and n=5 for Kennedy station) to evaluate qualitative characteristics of the transfer route. Participants were recruited through Metrolinx, the TTC, and the University of Toronto Transportation Research Institute (UTTRI), and were given a $50 PRESTO card as compensation for their time.

The intermodal connectivity audit created for this study was adapted from the Pedestrian Environment Data Scan (PEDS) survey (Clifton & Rodríguez, 2004) and a walkability audit previously completed for an honours thesis in two Ottawa neighbourhoods (led by the Healthy Transportation Coalition) (Nelson, 2016). The audit included four categories:

- Transit Area and Information;
- Amenities;
- Pedestrian Route; and,
- Intersections.

To complete the audit, participants walked or wheeled along the transfer route to evaluate the quality of their experience. Sharing circles directly followed the audit and were semi-structured to allow for participants to expand upon their responses recorded in the intermodal connectivity audits.

Interviews were conducted with Metrolinx and TTC staff after all audits and sharing circles were complete. The purpose of the interviews was to understand how existing and emerging policies and initiatives address the barriers to intermodal connectivity as identified by participants in the previous methods, and where there are gaps in the policies, guidelines, and standards.

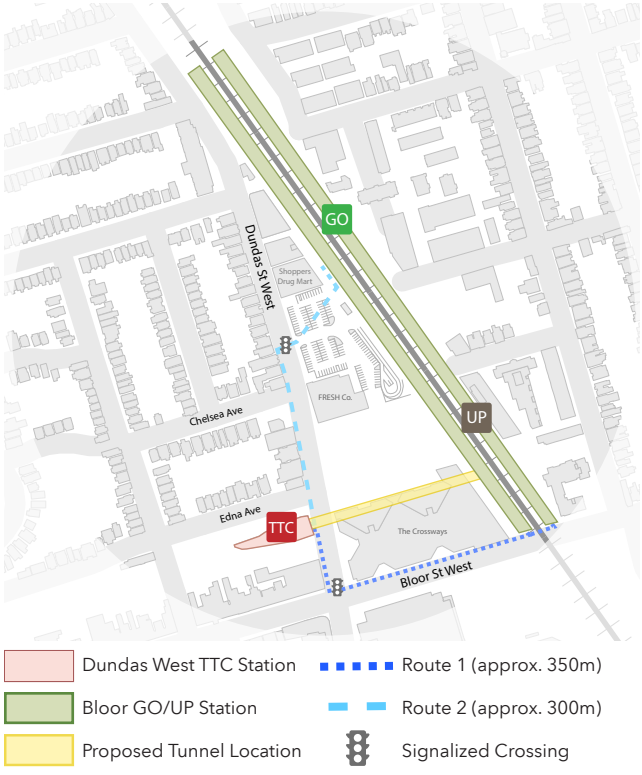

Figure 1: Transfer routes between Bloor GO Transit/UP Express and Dundas West TTC stations

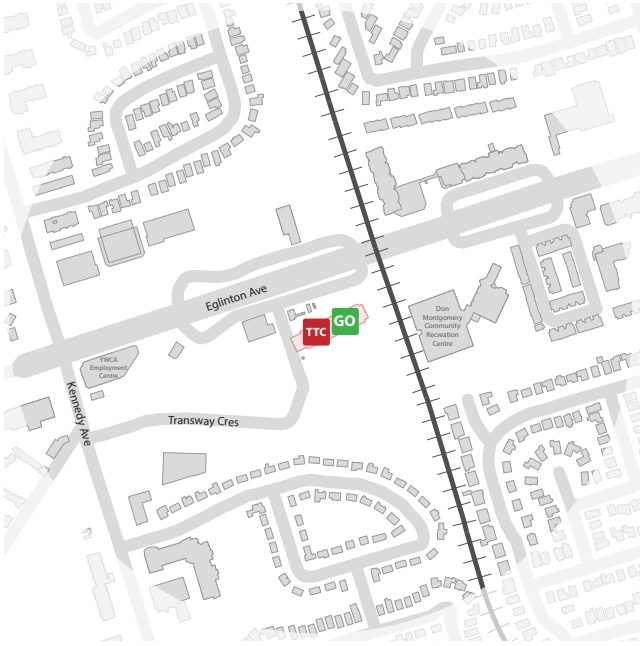

Figure 2: Area Surrounding Kennedy Station

Conclusion and Recommendations

The barriers to intermodal connectivity that were identified by participants have been grouped under four key themes:

i. Wayfinding;
ii. Pedestrian route;
iii. Public realm and amenities; and,
iv. Winter conditions.

Table 1 and 2 below show some examples of these barriers at each study area, with an indication of whether they can be addressed in upcoming station works (i.e. the pedestrian tunnel between Dundas West TTC and Bloor GO stations, and new station entrances for the Eglinton Crosstown LRT at Kennedy station) or through state of good repair (SOGR).

Table 1: Select examples of intermodal connectivity barriers at Dundas West-Bloor Gateway Hub

Examples of Intermodal Connectivity Barriers at Dundas West-Bloor Gateway Hub	Can be Addressed in Upcoming Station Work or SOGR (Y/N)
Wayfinding	
• No maps in Dundas West TTC station showing the transfer route to Bloor GO Transit/UP Express station	Y
• Poor wayfinding signage along transfer route (small signs, only some transit modes indicated)	Y
• Real time information not directly visible from station entrance	Y
• Lack of staff to help riders with transfers	N
Pedestrian Route	
• Unmarked pedestrian pathway through a parking lot along Route 2	Y
• Crossing time along Route 1 too fast	N
• Unclear streetcar track crossings	Y
Public Realm and Amenities	
• Inadequate number of station amenities on station platforms (benches, garbage bins, washrooms), and along transfer routes (benches, garbage bins, trees)	Y
Winter Conditions	
• Too few enclosed shelters under the canopy on the ground floor of Dundas West TTC station	Y
• Lack of intuitive heating features for enclosed shelters on the Bloor GO Transit/ UP Express platform	unknown

Table 2: Select examples of intermodal connectivity barriers at Kennedy Gateway Hub

Examples of Intermodal Connectivity Barriers at Kennedy Gateway Hub	Can be Addressed in Upcoming Station Work or SOGR (Y/N)
Wayfinding	
• Too few wayfinding signage in the transfer area, especially towards the GO Transit platform	Y
• Small text and glare on real time information screens	Y
• Lack of staff to help riders with transfers	N
Pedestrian Route	
• Poor connectivity due to placement of elevators, escalators, and stairs inside the station	N
Public Realm and Amenities	
• Inadequate number of station amenities on platforms (benches, garbage bins)	Y
• Poor public realm (lack of natural lighting, trees and integrated art)	Y
Winter Conditions	
• Poor mitigation of wind tunnels circulating cold winter temperatures within Kennedy station	N

More broadly, a four-phase process is recommended to ensure barriers to intermodal transfers are addressed across the regional transportation network.

Phase 1: Implement improvements identified in the study areas (Dundas West-Bloor and Kennedy)

Barriers to intermodal connectivity at both study areas (as identified in Table 1 and 2) that can be improved in upcoming station works or SORG should be addressed.

Responsibility: The owner of the facility and/or building (i.e. TTC or Metrolinx) for on-site improvements, or the City of Toronto for off-site improvements.

Phase 2: Conduct intermodal connectivity studies at all intermodal stations within mobility hubs

The same principles of this study should be applied to all mobility hubs that classify as intermodal stations. Priority should be given to stations with transfers between different transit agencies, as presented in Table 3.

Table 3: Level of priority for intermodal connectivity audits

High Priority (Unique Transit Agencies)	Low Priority (One Transit Agency)
• Kipling • Main-Danforth • Newmarket GO • Richmond Hill-Langstaff Gateway • Union	• Eglinton-Mt.Dennis • St.George • Yonge-Bloor • Yonge-Sheppard

Responsibility: Metrolinx should conduct intermodal connectivity studies in coordination with local transit providers and municipalities, and in consultation with its Accessibility Advisory Committee (AAC) to ensure the audit tool is inclusive of all transfer experiences.

Phase 3: Implement best practices in retrofits and future station design

Findings from intermodal connectivity studies should be evaluated to determine which changes can be addressed in major station upgrades through the capital program or through SORG.

Responsibility: The owner of the facility and/or building for on-site improvements, or the municipality for off-site improvements.

Phase 4: Continue monitoring and evaluation

Monitoring of intermodal connectivity conditions should be completed at intermodal stations every 10 years, or before changes to a station take place (whichever occurs first). Intermodal connectivity studies should be used to inform the evaluation and updating of existing and emerging policies and initiatives to ensure they address intermodal connectivity barriers.

Responsibility: Metrolinx should oversee the periodic monitoring and evaluation process.

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