ETSAB: Wayfinding

Improving the User Experience for Edmonton's Transit System

Recommendation

That Administration provide a report to Committee on options to implement the wayfinding recommendations as outlined in the February 12, 2019, Edmonton Transit System Advisory Board report CR_6856.

Executive Summary

This report summarizes and presents the results of a high level analysis by the ETS Advisory Board (ETSAB) of the City of Edmonton's wayfinding system as it relates to the City's transit system (ETS). Based on the analysis, this report also presents a list of solutions and recommendations to be considered for upgrading the Edmonton Transit Service wayfinding system, resulting in an improved customer experience. This report is not intended to be considered a fully comprehensive study on wayfinding for ETS, but highlights some examples of opportunities for improvement, including some potential solutions for the short term and the longer term.

This report provides recommendations for ways to rectify some of the wayfinding issues identified during the site visits. A high-level review of potential technology opportunities for wayfinding purposes is presented, an option that can be both a short term and long term solution. The benefits and need to apply Universal Design to the existing and future wayfinding strategies for the City of Edmonton, inter-municipal plans and ETS are also discussed in some detail.

Recommendations

1. **To Adopt Uniform, Consistent, and Predictable Wayfinding Practices**
   To adopt a wayfinding practice, documentation, standards or by-laws that set up best practices for the planning, design and maintenance of the ETS and LRT wayfinding system. Ideally, this practice should be part of a comprehensive wayfinding strategy for the City of Edmonton, including the pathway system, park systems, etc. Key issues to consider are the use of strategies that are uniform, consistent, and predictable so they are user friendly.

2. **To Adopt Universal Design Policy and By-Law**
   To adopt a universal design policy and by-law so the elements of the wayfinding system are universally accessible to all users. In general, if something is designed for the most vulnerable users, it will most likely serve everyone adequately. Universal Design practices relate to both the physical devices used in the wayfinding system and also to how the information is presented to people, and how people can access and use the transit system in conjunction with the municipal and inter-municipal transportation systems.

Attachments

1. Report: Wayfinding - Improving the User Experience for Edmonton's Transit System

ETSAB: Wayfinding - Improving the User Experience for Edmonton's Transit System

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1. Introduction

This report summarizes and presents the results of a high level analysis by the ETS Advisory Board (ETSAB) of the City of Edmonton's wayfinding system as it relates to the City's transit system (ETS). Based on the analysis, this report also presents a list of solutions and recommendations to be considered for upgrading the Edmonton Transit Service wayfinding system, resulting in an improved customer experience. This report is not intended to be considered a fully comprehensive study on wayfinding for ETS, but highlights some examples of opportunities for improvement, including some potential solutions for the short and long term.

This report provides recommendations for ways to rectify some of the wayfinding issues identified during the site visits. A high-level review of potential technology opportunities for wayfinding purposes is presented, an option that can be both a short term and long term solution. The benefits and need to apply Universal Design to the existing and future wayfinding system for the City of Edmonton, inter-municipal plans and ETS are also discussed.

2. Literature Review

A high level literature review was conducted to identify the City of Edmonton's existing wayfinding practices and procedures. The following documents are available at the City of Edmonton webpage on the Wayfinding Project. Walk Edmonton's Program Coordinator presented the status of the project to the Board at the September 24th general meeting.

2.1. Wayfinding Sign Designs

The City is designing wayfinding signage for the downtown core and the river valley with the goal of making them consistent, so they are easier for citizens to identify and use. The City's Pedestrian Wayfinding Design Standard mentions ETS in terms of this design but focuses on sidewalks and river valley pathways.

Figure 2.1-1 ETS Planner Maps and Beacon Sign

Figure 2.1-1 shows examples of planner maps (Display A and B) and a beacon sign (Display C). Planner maps display an area within about five minutes of walking distance. These maps show a “heads-up” orientation (i.e. the map represents the items from the point of view of the direction as the user is looking at it). The maps illustrate points of interest, significant buildings and LRT stations.

Another type of map referred to as “finder map” (not illustrated) will show a much wider area (i.e. a district or an ETS route map and they have a “north-up” design – north is at the top of the illustration).

The type of map installed will depend on available space. The Display A (on the left in Figure 2.1-1) can be placed on a sidewalk, and Display B (in the center of figure 2.1-1) can be placed where there is more available space (i.e. outside an LRT station or around Churchill Square). The maps are planned to be illuminated so that they are visible under all conditions. The plan is to place them at key decision points (i.e. street corners, mall exits, LRT exits, etc.). The City hopes to have these signs in electronic form sometime over the next few years. This will allow them to provide updated information in a more timely manner, and may even include updated transit information. The ETS beacon sign (Display C in figure 2.1-1) is designed to be placed outside of transit stations, particularly in the downtown core. As well as having a lighted beacon they will have maps similar to Displays A and B.

3. Site Visits

ETSAB members participated in several site visits to LRT Stations, Transit Centres, bus stops, and onboard ETS vehicles to identify issues related to the wayfinding system as well as improvement opportunities. The Board used an integrated approach to conduct the site visits, similar to the City of Edmonton's Gender-Based Analysis plus Training (GBA+). ETSAB formed a team that included both female and male members, with and without mobility aids and vision impairments. Some members commuted with temporarily mobility constraints that are commonly used, such as strollers for parents with small children, and bicycles. Therefore, the team was representative of a broad segment of users of the transit system with mobility challenges, which made it possible to conduct a comprehensive and inclusive analysis of the current wayfinding system, within time and resource constraints.

The main goals of the site visits were to identify wayfinding issues in and around the existing transit facilities and vehicles, and to identify potential challenges. More specifically, the focus was on:

- Wayfinding practices for regular transit operations;
- Wayfinding practices related to the connectivity between the pedway system, streets and the transit system;
- Wayfinding practices for special events; and
- Wayfinding practices on transit vehicles (both buses and LRT vehicles).

The following subsections highlight the visits to Churchill LRT Station and Meadows Transit Centre.

3.1. Churchill LRT Station

A site visit to Churchill LRT Station was conducted on September 5, 2018 from 5:15 p.m. to 7:30 p.m. Members gathered at the entrance to City Centre Mall at the northwest quadrant of the intersection of 100 Street & 102nd Avenue.

For this exercise, the team looked for a "universal access".[1] The team found that there is no universal access at the immediate LRT entrance/exits in Churchill Square:

- At the northeast quadrant of the intersection of 100 Street & 102nd Avenue, there are no indications of the whereabouts of a nearby universal access.
- At the entrance across from the AGA gallery there are misleading, outdated, and incorrect instructions about the location of the closest universally accessible entrance. The instructions directed the team to an access that is private and not available at all times (including the time of the site visit). One security member of the private building by coincidence approached us and pointed out to the team the universally accessible entrance at the northeast quadrant of the intersection of 102nd Avenue & 99 Street.
- At the intersection of 102nd Avenue & 99 Street, along 102 Avenue (not facing Churchill Square, on one side of the Winspear Centre, which is not the main entrance) there is a universal access to the LRT station.

The team accessed Churchill LRT Station at the universal access near the Winspear Centre about one hour after the site visit started. Detailed notes taken during the site visit are provided in the following section. **Figure 3.1-1** shows an aerial view of Churchill Square and the location of the LRT accesses described.

Figure 3.1-1 Sir Winston Churchill Square and LRT Accesses (Taken from Google Earth, 2018)

[1]In this report, a *universal access* should be understood as an accessible access/exit to the transit station that can be used by all transit users, including vulnerable users such as children, parents with toddlers, and people with mobility, auditory or visual impairments, among others.

The findings of the site visit have a significant impact given that Churchill Station is one of the main transit stations (a key service point for the Edmonton transit system), with potential connections between regular buses, rapid buses, LRT, and other modes of transportation, and that it connects a very diverse range of trips which include commuter, shopping, recreational, and special events trips among others. The lack of landmarks and the lack of use of recognizable branding for the station entrance/exits is remarkable. They seem to blend in with the surrounding architecture.

Furthermore, the lack of universal design principles negatively impact accessibility for many vulnerable people, which not only includes people using wheelchairs and other mobility aids, but also adults with small children who are pushing one or more baby strollers, etc. This is a key area of the City, where people are attending events taking place at Churchill Square and surrounding area - museums, shopping centers, restaurants or other downtown attractions that are expected to be family-friendly, as well as transferring between transit stations and services. Also, the fact that the existing public wayfinding information is misleading, outdated, or otherwise erroneous at such important locations, is in itself a measure of effectiveness and usefulness of the current wayfinding transit system.

3.2. Meadows Transit Centre

One of the newest transit centres, shown in **Figure 3.2-1,** is currently used by eight routes, with stops along the island, the east sidewalk, and outside the transit centre along 17th Street. At the time of the site visit, three stop bays within the transit centre were unused. Accessibility is good, with curb cuts (ramps) and marked crosswalks allowing access from all directions. Pathways are all useable by both ambulatory and disabled transit users.

Aside from the large mural on the outside wall of the transit centre, wayfinding elements are missing. The color scheme is limited, with grey concrete benches, and glass walls and doors. Unique features and colorful elements that are needed to effectively form a cognitive map with contrasts needed by persons with visual impairments in wayfinding are missing.

Figure 3.2-1 Meadows Transit Centre (Taken from Google Earth, 2018)

4. Wayfinding Issues

With the understanding that the City of Edmonton is undertaking a review of their wayfinding strategies, the issues presented in this report might assist ETS to improve communications with users and potential users of the transit system. During the site visits the following issues were identified:

1. **No use of a recognizable/visible transit brand landmark**
   Visual strategies that improve conspicuity of LRT stations, bus stops and transit centres, especially when looking at them from far away, can help unfamiliar users to identify where the transit station entrance/exits are located and if it is a universal access. There is zero indication, when you are at the City Centre Mall entrance, at the plaza on Sir Winston Churchill Square, or anywhere near the intersection of 100 Street & 102 Ave that there is an LRT station access nearby. Similarly, in the vicinity of the Winspear Centre there are not visible or recognizable landmarks that indicate the existence of an access to the LRT station or any sign that indicates this is a universal access. Moreover, there is one “Churchill Station” sign that doesn’t use any recognizable transit symbol to indicate to unfamiliar users that this is an LRT access.

   Figures 4-1 to 4-2 shows the LRT access at 100 Street & 102 Avenue which is not visible or recognizable. **Figure 4-6** shows the LRT universal access at the Winspear Centre, which is also not visible or recognizable.

2. **LRT stations entrances/exits are not universal accesses**
   The lack of universal design impacts vulnerable users and inhibits modal shift. This includes, but is not limited to how access is provided to vulnerable users (i.e. parents with strollers, wheelchair users, cyclists) as well as how key information is presented (i.e. wayfinding tools that are readable for vulnerable users such as people with limited vision, or wayfinding tools that are situated at a reachable height.).

   Figures 4-1 to 4-3 show an LRT access that is inaccessible for vulnerable users and where wayfinding tools are used ineffectively and are inaccessible for vulnerable users. This is also the case as shown in **Figure 4-5** at the other location.

3. **Lack of information**
   All universally inaccessible transit station entrances should provide information about where universal accesses are located (extended to as many universal accesses are in the area, and updated in case an entrance is out-of-order, difficult to reach, or only available at certain times). **Figures 4-3 and 4-5** shows LRT accesses that are inaccessible for vulnerable users and do not provide information about where universal accesses might be.

Figure 4-1 LRT Access at 100 Street and 102 Avenue

Figure 4-2 LRT Access at 100 Street and 102 Avenue

Figure 4-3 LRT Access at 100 Street and 102 Avenue

4. Inaccurate and outdated information

There is another entrance to Churchill LRT station at the northwest quadrant of the intersection of 102A Avenue and 99 Street. This entrance is also not universally accessible. Two issues were identified in relation to inaccurate and outdated information:

(a) Above the entrance there are two signs, one indicating access to the Pedway system and one showing a wheelchair, a woman, and a man. This last sign has small letters clarifying that there are accessible washrooms within the station. However, there is no universal access to reach those. Furthermore, that sign from the distance can be understood as the provision of universal access at that entrance, which is not the case.

(b) The entrance is also served by a wayfinding map which illustrates destinations of interest (such as the Art Gallery of Alberta) and the location of the LRT entrances (both accessibility-friendly and unfriendly). However, the information provided on the map is outdated, indicating a wrong location for an accessible LRT entrance at Chancery Hall. At best, assuming there is one universal access to the LRT at Chancery Hall, this is located within a private building, and unreachable after business hours. (It was closed by 5 p.m.).

At the doors of Chancery Hall there is also misleading and/or outdated information, which “confirms” the existence of a universal access within the building and instructs users to ring the bell outside of business hours. However, there was no response to the bell. After several minutes of waiting, a Chancery Hall security person who did not know about the LRT access arrived incidentally and indicated there was no access to the building outside of business hours, regardless of the information provided in the door. At this location, there is no further information about where a universal access to the LRT might be located.

In this case, the wayfinding information at both the 102A Avenue & 99 Street entrance and Chancery Hall entrance is inaccurate and confusing, and misinforms LRT users, including those most vulnerable. **Figures 4-4 and 4-5** illustrates these issues at the 102A Avenue & 99 Street entrance and Chancery Hall doors, respectively.

Figure 4-4 LRT Access at 102A Avenue and 99 Street

Figure 4-5 Chancery Hall Entrance

5. **Lack of Accessible Signage**
   There is a universal access to Churchill LRT station along 102 Avenue at the Winspear Centre. However, this station lacks recognizable signage that indicates it is universally accessible, as shown in **Figure 4-6**.

6. **Lack of Security Strategies at Transit Stations**
   The Winspear Centre LRT accessibility entrance doesn't look user friendly and it feels insecure for many of the team members. **Figure 4-7** shows details of the interior of this entrance.

7. **Lack of Wayfinding Tools**
   The interior of the Winspear Centre LRT entrance lacks any type of wayfinding tools (signage, writing information, symbols, etc.) and navigation seems to be more a case of trial and error. Examples of useful information are a station map, indication of where the elevator is going, where you will be arriving next (the name "Winspear Centre" may not be helpful for unfamiliar users), and where the emergency buttons are. **Figures 4-7 and 4-8** illustrate the lack of wayfinding tools at the interior of this entrance.

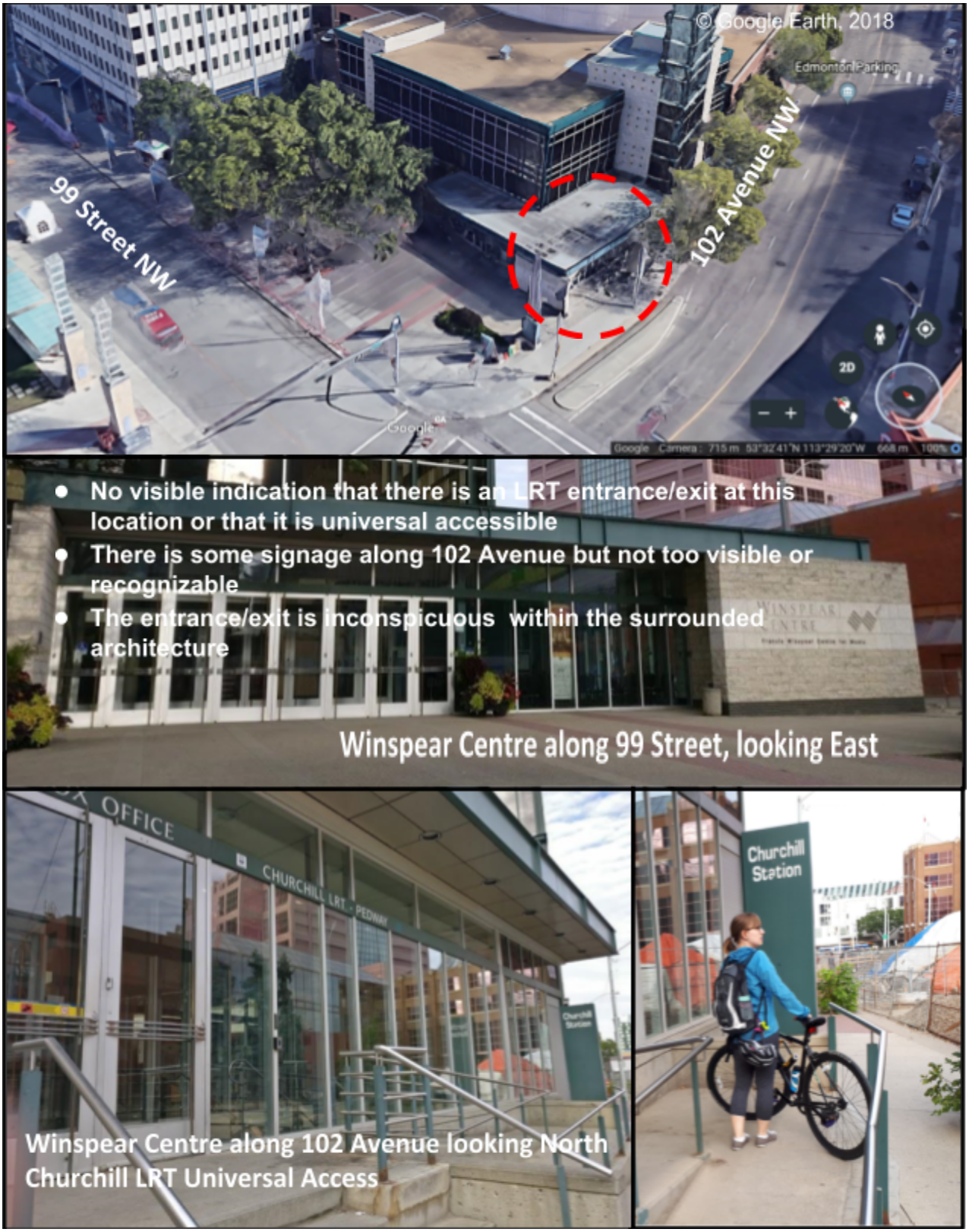

Figure 4-6 Winspear Centre – LRT Churchill Station Entrance

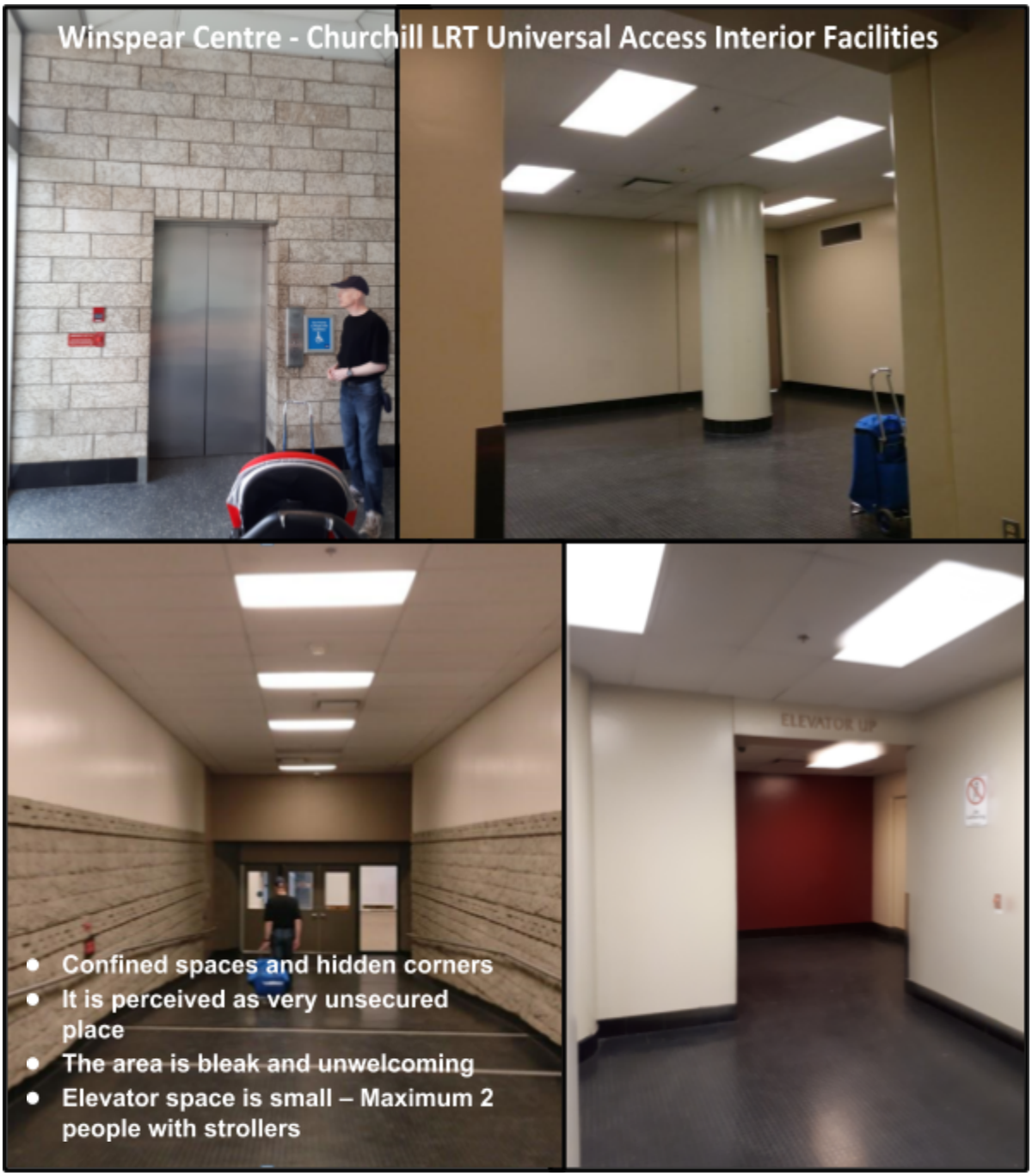

Figure 4-7 Winspear Centre – LRT Churchill Station Indoors

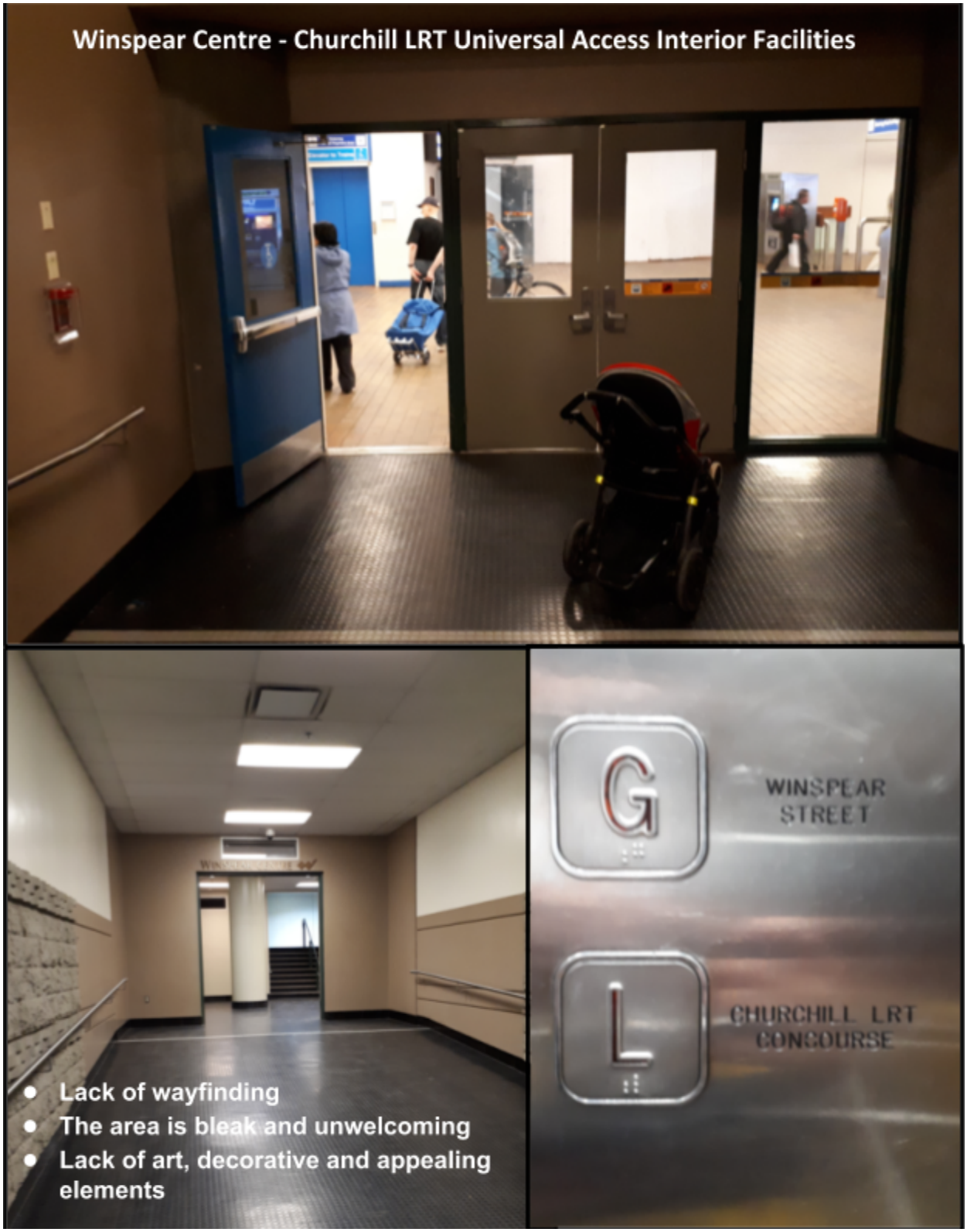

Figure 4-8 Winspear Centre – LRT Churchill Station Indoors

8. **Information map location is not ideal**
   At the Churchill LRT station there is a map showing exits and pedways, but unfortunately it was in a bad location, easy to miss, and partially obstructed by an ATM (**Figure 4-9**). Additional upgrades that might improve wayfinding include illumination and use of colors that differentiate advertisement signs from information and wayfinding signs.

9. **Font size seems inadequate for users with visual impairments**
   Given the available areas for wayfinding displays, a larger font size and bigger maps could improve the transit experience and the effective use of wayfinding tools (**Figure 4-9**).

Figure 4-9 Map Location and Font Size

10. Map completeness

The available maps seem to miss useful information for transit users, such as maps of the transit station itself showing station layout, important features (such as stairs, ramps, elevators, bathrooms, etc.), where (or to what street) hallways lead (depiction rather than text), connections to nearby bus stop locations and transit routes, Pedway system integration, and connectivity throughout the station hallways.

11. Lack of transit routing and schedule information

Related to the map completeness and wayfinding information, it seems an unacceptable omission to lack information regarding LRT and transit schedules, routes information, and potential connections. If not in real time, this is key information for transit users that should be provided in one form or another and kept updated. **Figure 4-10** shows detail of a wayfinding map. The detail shows the exits at LRT Central Station. However, it would be beneficial to show bus connections at each exit (i.e. the Central Station exit at 100A Street and Jasper Avenue can connect users to route buses 5, 7, 120, 135 and the St. Albert bus; while, the Jasper Avenue and 100 Street exit connects to southbound bus routes such as 15, 8, and 81, among others. Exiting on the wrong or the farthermost exit can lead to delays and missing transfer connections. The same should be provided at bus stops to indicate where the nearby bus stops and LRT stations are.

Figure 4-9 Transit Routes and Schedule Information

12. Information effectiveness

The overhead signs do not provide useful information about where the hallways lead to, especially for unfamiliar users and in the absence of a station map. (**Figure 4-11**).

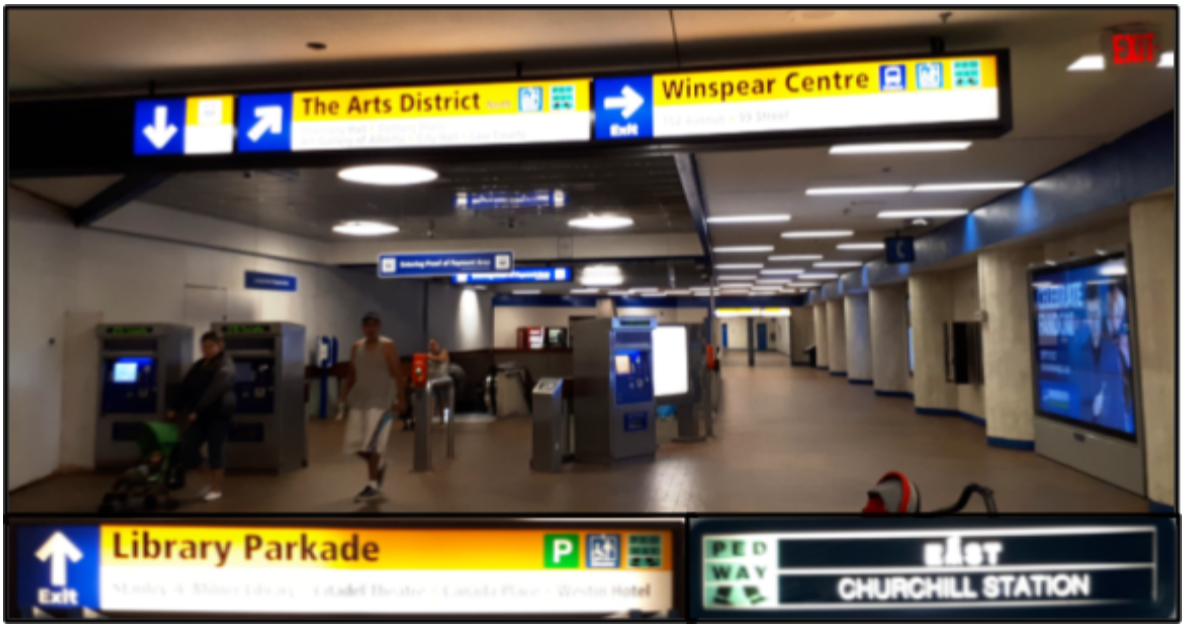

Figure 4-11 Information Effectiveness at Maps and Overheads

13. Missing accessible information

There is no indication of where the elevator is from the pathway. Station maps or overhead signs, showing where the elevators are located, should be placed at key points, on the pathways and hallways, so the information is available at different locations for users with mobility constraints or unfamiliar with the station.

Figure 4-12 Missing Accessible Information in Maps or Overheads

14. Telephone location

Similar to the missing accessible information on the maps, the location of telephones within the station should be provided on the wayfinding maps. Despite the generalized use of cellphones, telephones are a nice feature that add value to the transit system and can assist users in wayfinding and security matters.

Figure 4-13 Telephone Location in Maps and Overheads

15. Centralized Backlit Map Use

Some LRT stations have a centralized and backlit map, typically showing most transit system routes and LRT lines. The bus stop and route map is very nearly unusable. It doesn't show route directions, schedule and frequency. Most likely it is not updated every season or when changes are done to the system (temporary or permanent changes). The font size is very small, and the two line colors indicating service levels (blue and pink) overlap and block each other. This device could be upgraded to an interactive display providing transit information and allowing for trip planning (LRT and bus).

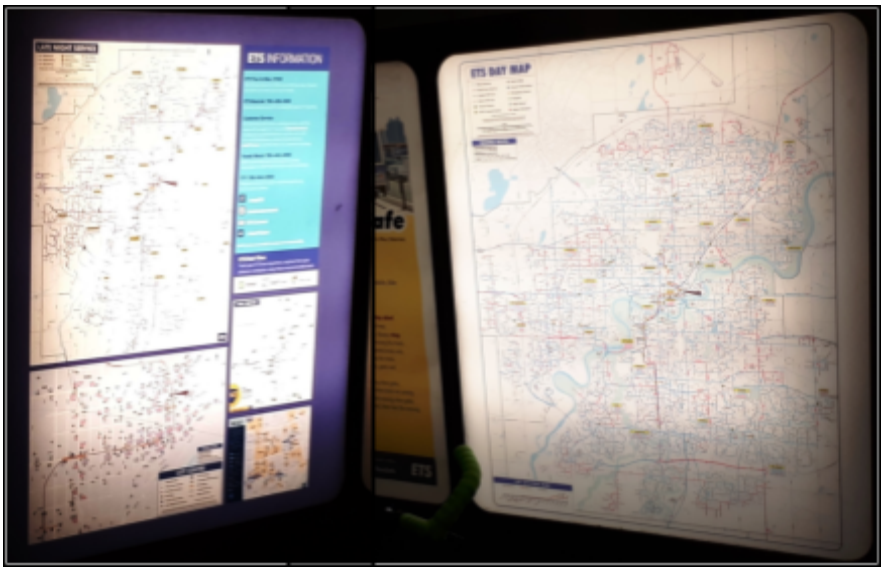

Figure 4-14 Centralized Lighted Map

16. Use of auditory tools

At some points throughout Churchill LRT station there are auditory tools. This is a welcome wayfinding strategy for universal design. However, some of them seem not to be functioning. In addition, some are just a direct call to 311. It might be useful to include their location on the maps, as they could potentially be used by minors and unfamiliar transit users, among others.

Figure 4-15 Auditory Tools

17. Consistent and Uniform Wayfinding System

Wayfinding strategies and tools should be consistent and uniform. This refers not only to the design and placement of wayfinding tools but also to how the information is presented. Signs, symbols and colors should be uniform and consistent. The placement of wayfinding tools should be intuitive and conforming to user's expectations. For example, at Churchill station it was observed that: (a) the location of maps is unpredictable; (b) the amount of information on the maps is not consistent; and (c) different symbols and signs are used to indicate the same feature (i.e. an elevator, or an accessible feature), just to mention a few. **Figure 4-16** shows some examples of inconsistent wayfinding practices.

Figure 4-16 Inconsistent and Non-Uniform Wayfinding System

18. Wayfinding system useful information

The wayfinding system needs to be designed and maintained in such a way that the information provided to the users is accurate, up-to-date and useful, taking into account unfamiliar transit users. **Figure 4-17** shows an example of an elevator entrance that provides directions about what to do if the elevator is out of order. However, these instructions are difficult to understand and therefore to follow. A wayfinding map might be more useful in this case.

The first sign reads: "NOTICE, Elevator #1 is out of service; for access to Chancery Hall travel to Winspear Elevator #4". Unless you have the elevators numbers in a wayfinding map this information is useless.

The second sign reads: "If elevator is not working and you required assistance, please use the emergency phone located by the escalator leading to the trains". Again, only if you know your way through the station this information is useful.

In addition, this handicap access elevator is accessible weekdays only between 6:00 a.m. to 5:55 p.m. For access to street level it is advice to use the elevators at City Hall, Winspear Centre, or Citadel Theatre. Given that it is expected that the elevator will not be accessible all the time, it would be beneficial to provide useful information for wayfinding such as a map showing where the other elevators are located and how to reach them.

Figure 4-17 Wayfinding System Useful and Useless Information

19. Provide 'you are here' indicator on all wayfinding maps

This indicator is really helpful. It should be made consistent on all wayfinding maps, so that the transit users can always have a point of reference. Not all observed wayfinding maps at Churchill LRT station have this indicator. In addition, even when a map is recycled, the indicator needs to point in the right direction or it will be confusing for transit users. **Figure 4-18** shows a map that was originally intended for 102A Avenue & 100 Street, and it is now placed along 100 St & 102 Avenue. Therefore, the 'you are here' indicator places the user in a different location and might be confusing. While reusing the existing material is a good practice, a simple patch to the map with the updated information will avoid providing inaccurate information on a wayfinding map.

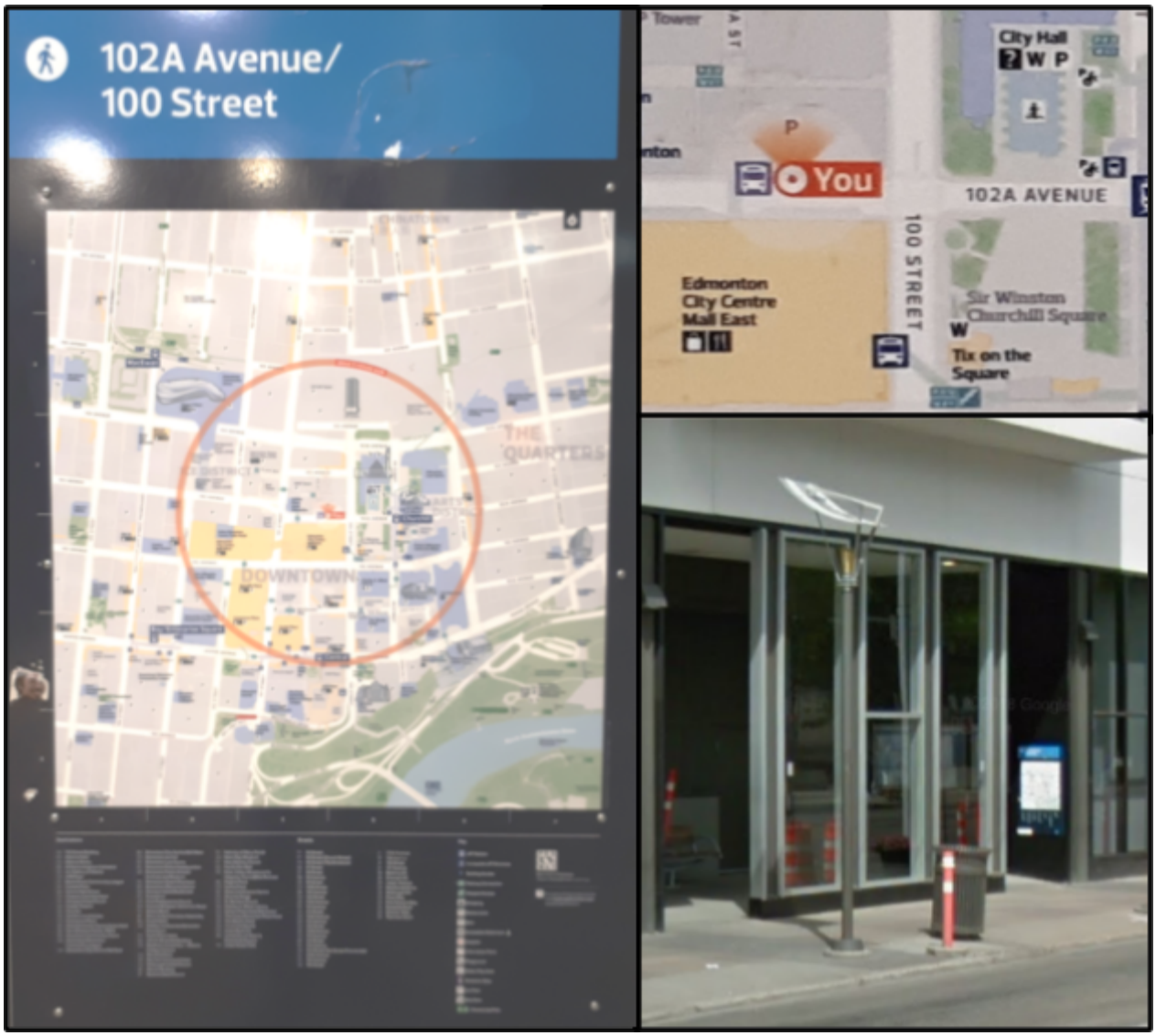

Figure 4-18 "You Are Here" Indicator and Incorrect Use

The “You Are Here” Indicator, or some form of it (i.e. a start dot), should also be used on the LRT System Map. This could help unfamiliar transit users when using the LRT system **(Figure 4-19)**.

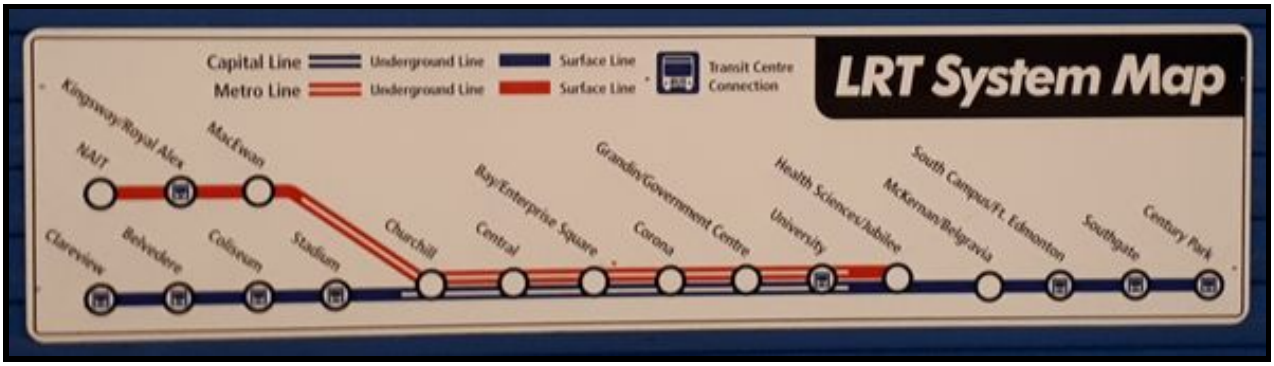

Figure 4-19 “You Are Here” Indicator and LRT System Map

20. Wayfinding at Bus Stop Locations

Although many of the examples in this report relate to wayfinding at LRT or Main stations, the same practice can and should be applied at bus locations. Transit information should be provided at all bus stops, including but not limited to transit routes, schedules, frequencies, connections, updates, and location of nearby bus stops or LRT stations (very useful for trip planning and transfers).

Figure 4-20 Wayfinding at Bus Stop Locations

Figure 4-20 above shows two bus stops located at the intersection of 156 Street and 77A Avenue, across from each other. They both serve Bus Route #4, but for different directions (westbound to West Edmonton Mall/ Lewis Farms and the eastbound to Capilano/ University/ South Campus). However, the bus stop signs do not indicate which Route #4's direction is served. Transit users at this location have taken Route #4 in the wrong direction or have missed the bus by waiting at the wrong bus stop. Wayfinding tools could be employed at bus stops to indicate what bus route each direction is servicing.

21. Wayfinding at ETS vehicles and Bus Stops

The wayfinding system also includes transit vehicles - both trains and buses. **Figure 4-19** shows the typical map onboard the LRT vehicles. This map lacks information about potential connections, schedules and frequencies. On some buses, there are maps available for some transit routes (but typically only two or three routes). At some transit stations, schedule, frequency and route maps are provided but only for transit routes serviced at that location. At bus stops, no wayfinding tools are provided at all. It would be beneficial to provide a comprehensive map of the transit routes, updated to the season, for the purposes of trip planning, rescheduling or transfer identification. With acknowledgement of the space limitations, it would be also beneficial to provide route, schedule and frequency information. Technology could be a key element of the wayfinding strategies to address the potential of wayfinding tools on transit vehicles and at bus stops.

5. The Challenge of Information And Visual Presentation

One challenge of wayfinding is the reference system used to provide map information. The map can be presented using a north arrow (looking up, down, left or right) or organized in the same direction the user is facing, regardless of what is true north. Different people feel more comfortable using one way or another, and that possess a challenge for how wayfinding information should be presented. **Figures 5-1 and 5-2** show an example of how two different oriented systems (street map and a cellphone application) of the same area might look completely different and confuse the user. Technology can allow for flexibility in how a map is read, and even provide interactive three-dimensional maps.

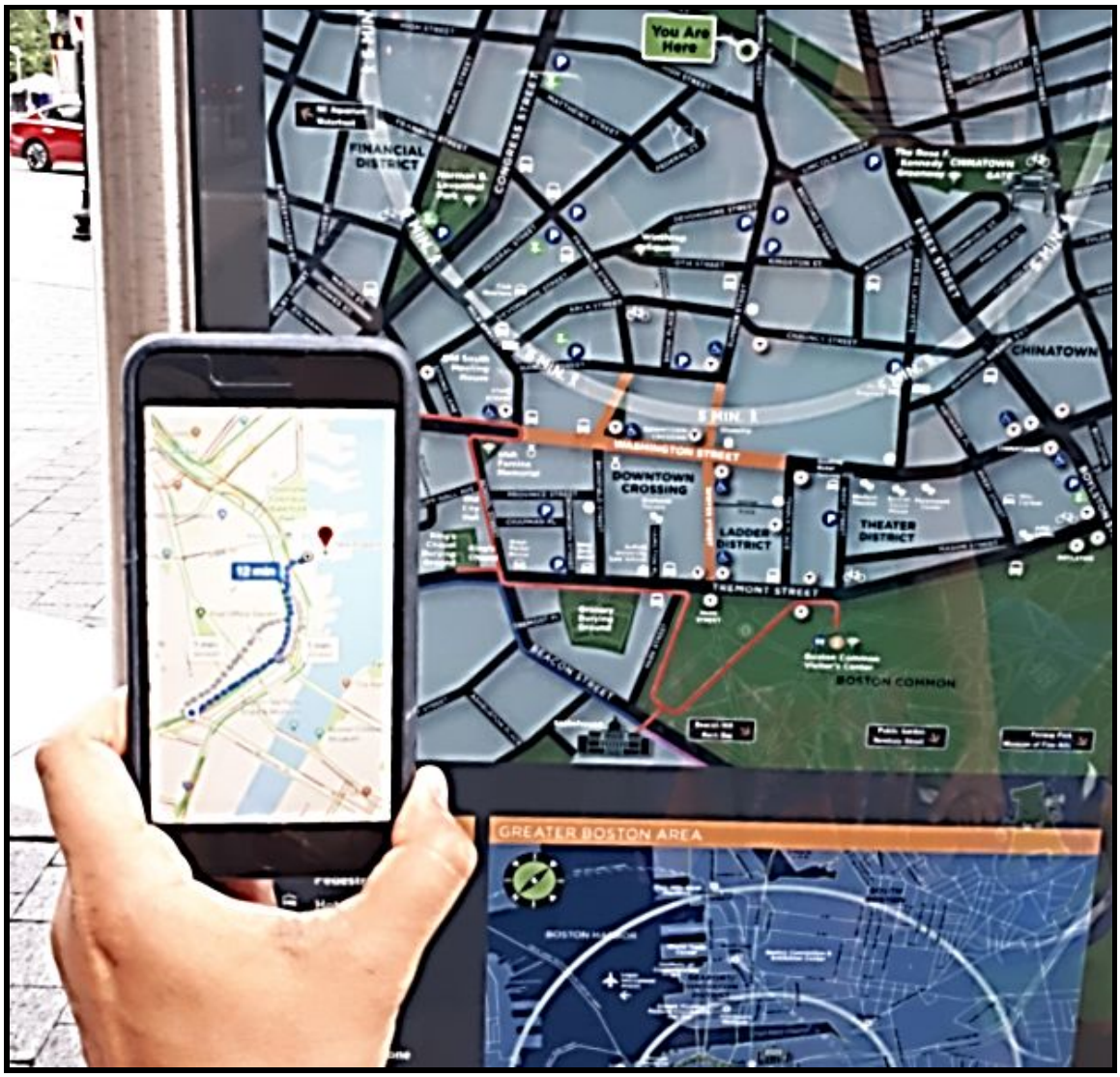

Figure 5-1 Wayfinding Map – Different Orientation

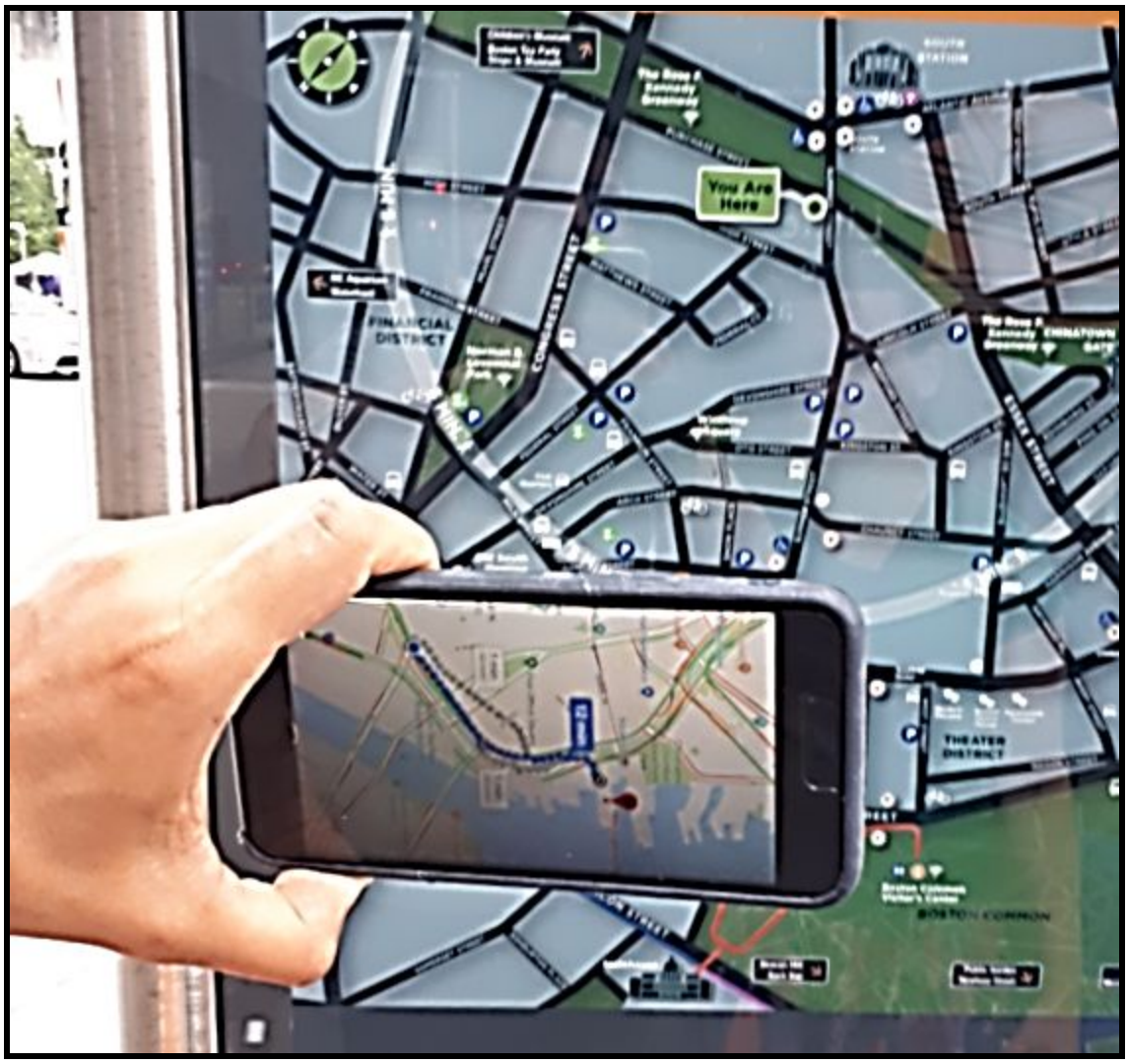

Figure 5-2 Wayfinding Map – Same Orientation

6. The Role of Universal Design

6.1. Universal Design Definitions and Guidelines

Universal Design, as related to transportation, is defined as "the design and composition of an environment so that it may be accessed, understood and used:

- To the greatest possible extent,
- In the most independent and natural manner possible,
- In the widest possible range of situations, and
- Without the need for adaptation, modification, assistive devices or specialised solutions, by any person of any age or size or having any particular physical, sensory, mental health or intellectual ability or disability."[1]

Universal Design emerged from the earlier barrier-free concepts, accessibility, and adaptive and assistive technologies, and also integrates aesthetics into its core considerations. Universal Design has been getting more attention in recent years, given the aging population growth, higher life expectancy, and modern medicine that increases the survival rate of those with significant injuries, illnesses and birth defects.[2]

Considering that the aging population is a reality in Canadian cities and regions, the City of Winnipeg took a proactive approach, and in 2001 became the first Canadian municipality to adopt a Universal Design policy.[3] The City of Winnipeg Accessibility Design Standard provides the accessibility requirements for the implementation of the Universal Design Policy, and it is meant to be applied to both public and employee spaces within City funded, owned, leased or occupied spaces. The standard provides rationality and requirements for: general access and circulation, general information and communication systems (including acoustics and signage), general amenities (including waiting and queuing areas, and seating), general context specific requirements, exterior design standards (exterior access and circulation, exterior amenities, and exterior context specific requirements such transit facilities and passenger loading zones), and interior design standards.[4]

To the knowledge of the Board, the City of Edmonton does not have any specific policies for Universal Design, although the Pedestrian Wayfinding Design Standard does accommodate some accessible design. In addition, the City of Edmonton Accessibility Advisory Committee

[1] What is Universal Design, Centre for Excellence in Universal Design, National Disability, Authority; Website: http://universaldesign.ie/What-is-Universal-Design/Definition-and-Overview/; Accessed on April 2018.
[2] Wikipedia, Universal Design; https://en.wikipedia.org/wiki/Universal_design.
[3] Aaron Leckie; Judy Redmond; Age-Friendly Cities, Inter-departmental collaboration: Designing for Accessibility in Winnipeg; Case-in-Point 2013.
[4] City of Winnipeg, 2015 City of Winnipeg Accessibility Design Standard, 2015.

(AAC) developed a checklist to promote the concept of Universal Design; this document provides some recommendations of best practices not related specifically to wayfinding, and only code requirements are mandatory[5].

Furthermore, there are seven principles of Universal Design according to the U.S. National Disability Authority (NDA)[6]. In the following paragraphs, the seven principles and their guidelines are presented according to NDA.

Principle 1: Equitable Use

The design is useful and marketable to people with diverse abilities.

Guidelines: provide the same means of use to all users or equivalent (i.e. Wayfinding maps are accessible for all users and provide alternative means for those with visual impairments); avoid segregating or stigmatizing any users; provisions for privacy, security, and safety should be equally available to all users; and make the design appealing to all users.

Principle 2: Flexible in Use

The design accommodates a wide range of individual preferences and abilities. *Guidelines:* provide choice in methods of use (i.e. alternative methods of access wayfinding information); accommodate right- or left-handed access and use; facilitate the user's accuracy and precision; and provide adaptability to the user's pace (i.e. use of technologies can accommodate user preferences to access the wayfinding information).

Principle 3: Simple and Intuitive Use

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Guidelines: eliminate unnecessary complexity (i.e. user friendly); be consistent with user expectations and intuition (i.e. while aesthetics elements add value to individual stations, consistent approach to wayfinding elements of the design may help unfamiliar users to access the system); accommodate a wide range of literacy and language skills (i.e. wayfinding strategies should use audible, tactile and visual aids as it fits); arrange information consistent with its importance (i.e. prioritize transit information); provide effective prompting and feedback during and after task completion.

Principle 4: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

[5] Checklist for accessibility & Universal Design; City of Edmonton Accessibility Advisory Committee; Unknown publication year.

[6] The 7 principles, Centre for Excellence in Universal Design, National Disability, Authority; Website: http://universaldesign.ie/What-is-Universal-Design/The-7-Principles/ ; Accessed on April 2018.

Guidelines: use different modes (pictorial, verbal, tactile) for redundant presentation of essential information (i.e. in wayfinding, schedule information, and real-time information); provide adequate contrast between essential information and its surroundings (i.e. in wayfinding, schedule, real-time information, and emergency features); maximize "legibility" of essential information (i.e. take into account users with visual impairments; on bays with several bus stops provide signs that can be "read" from far away - like the bus numbers and other key information); differentiate elements in ways that can be described (i.e. provide simple and easy instructions or directions for all users); and provide compatibility with a variety of techniques or devices used by people with sensory limitations (i.e. some aesthetics features can negatively impact some users with visual impairments; take into consideration what is required for the proper operation of existing and potential technologies that can be used by users with mobility or other impairments).

Principle 5: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Guidelines: arrange elements to minimize hazards and errors: most used elements, most accessible; and hazardous elements eliminated, isolated or shielded (i.e. accommodate boxes and other objects in a way that don't block access to wayfinding tools); provide warnings of hazards and errors; provide fail safe features; and discourage unconscious action in tasks that require vigilance.

Principle 6: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

Guidelines: allow user to maintain a neutral body position; use reasonable operating forces; minimize repetitive actions; and minimize sustained physical effort.

Principle 7: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Guidelines: provide a clear line of sight to important elements for any seated or standing user (i.e. ensure visual information is equally accessible for both low and high eye-level lines; make reach to all components comfortable for any seated or standing user (i.e. accessible devices to wayfinding purposes); accommodate variations in hand and grip size; provide adequate space for the use of assistive devices or personal assistance (i.e. wayfinding tools such as interactive screens should be reachable for all users including those with mobility constraints).

6.2. Universal Design and Wayfinding

Universal design refers to broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible to older people, people without impairments, and people with impairments.

Wayfinding is the organization and communication of people's dynamic relationship to space and the environment.

Successful design to promote wayfinding allows people to:

- Determine their location within a setting
- Determine their destination
- Develop a plan that will take them from their location to their destination

The design of wayfinding systems should include:

- Identifying and marking spaces
- Grouping spaces
- Linking and organizing spaces through both architectural and graphic means

Wayfinding is about assisting everyone in traveling from a starting point 'A' to a destination 'B'. Wayfinding allows people to do this with ease and helps them to form a cognitive map that can be used on successive trips. Wayfinding has three features:

- It is accessible: everyone, despite their physical capabilities, should be able to follow the same path to reach the destination.
- It is understandable: a mixture of text, symbols, maps and unique features such as art and colour impart the message to the widest range of people.
- It is memorable: everyone creates for themselves a subconscious map as they travel that in future helps them get to their destination. As we travel we note places along the way and unique features to create our map. An example might be: "I go past the office and take the next left. I turn right at the bronze statue and my destination is the blue door on the right.

7. Existing and Potential Technologies

Wayfinding can strongly benefit from the use of existing technologies. This report focuses on the wayfinding strategies and tools at physical locations within the City and at ETS facilities, and excludes wayfinding strategies on digital devices.

Currently there are technologies that allow interactive access to wayfinding information. Therefore, wayfinding information and tools are not limited to what is possible and reasonable on paper displays. Electronic media provides a large number of possibilities and plenty of room for improvements. Those issues are also outside the scope of this report.

In this section, the ETSAB team focussed on existing technology in the form of interactive maps. These maps can be provided within and outside ETS facilities, government buildings, shopping malls, and other places of interest. The interactive maps allows for several tasks, including but not limited to access to information to help users to navigate stations, reach destinations within and outside the stations, identify closest and accessible pathways to destinations, entrances or exits, perform trip planning, review real time transit information, review schedules, frequency and available transit routes and services, and identify multi-modal trips, among other functions.

Interactive maps can be used instead of the outdated central wayfinding signage at LRT stations. They could also be placed at main Transit Centres, pedways throughout the LRT stations, key decision points, and other locations within the ETS system.

The following set of figures illustrates an interactive map located at a downtown office and a shopping mall. The information provided by this device is quite versatile and comprehensive.

Figure 7-1 shows an interactive screen at a mall in downtown Toronto. The screen is permanently displaying advertisements; however, it could be also used for transit and other wayfinding purposes.

Figure 7-2 shows the main menu on the left. On the top there are twelve square buttons and on the bottom there are two blue buttons. At the very bottom of the screen, there is a menu button and an “accessible” button. If the accessible button is pressed, the screen flips down as shown on the right side of the picture, so all options on the screen are accessible. On the blue panels, three options are available: Retail directory, Office directory, and Enterprise Rent-A-Car; as shown in **Figure 7-3**. In addition, the following options are available on the 12 square buttons: Building map, Food, ATMs, Washroom, Leasing, Security, Green, Local Sports Schedule, Neighbourhood map, Parking, PATH (Pedway system), and Transit; as shown in **Figure 7-4.**

Figure 7-1 Wayfinding Interactive Screen (1 of 4)

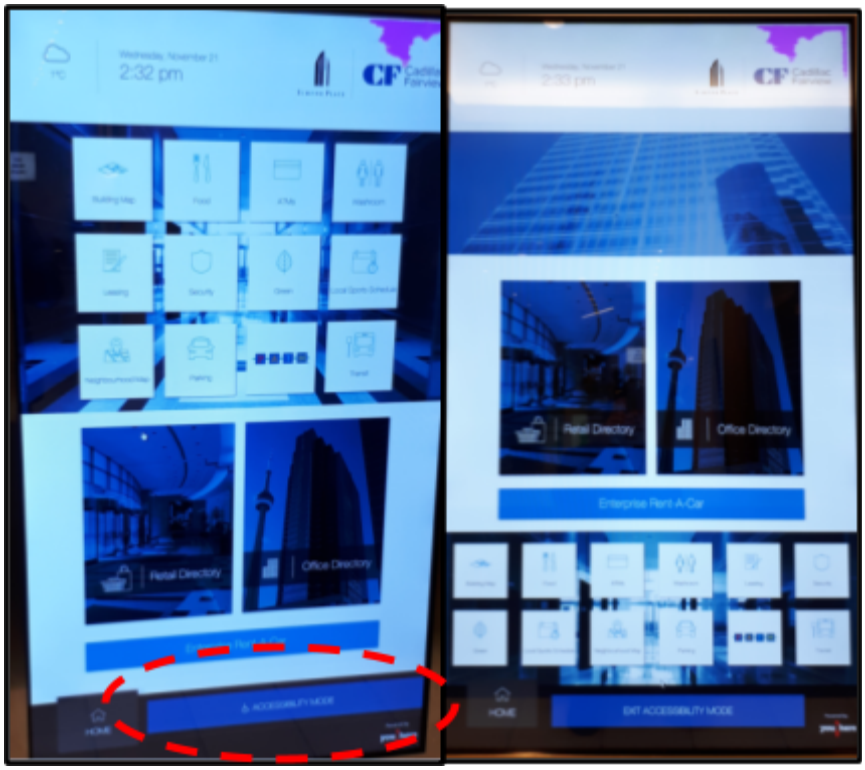

Figure 7-2 Wayfinding Interactive Screen (2 of 4)

Figure 7-3 Wayfinding Interactive Screen (3 of 4)

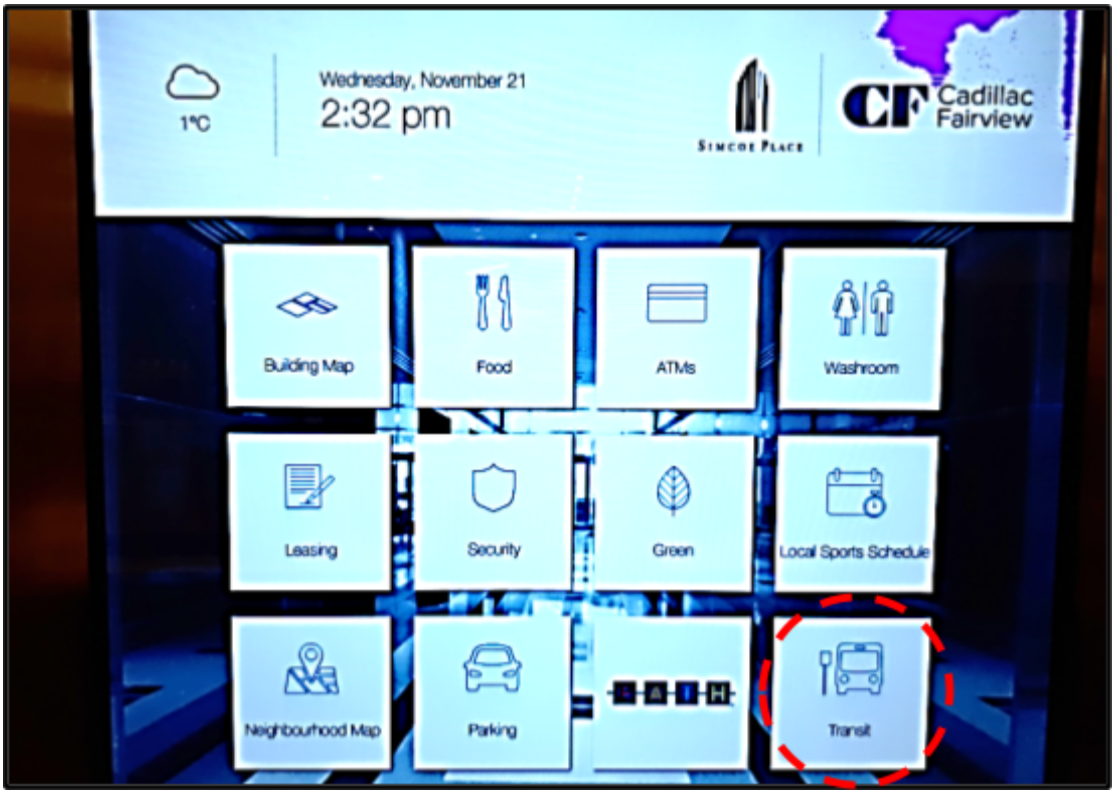

Figure 7-4 Wayfinding Interactive Screen (4 of 4)

If the “Transit” option is selected, a menu showing real time information for various transit systems will pop up, as shown in **Figure 7-5.** There is real time information for Union Station, TTC Service Alerts, and GO Transit Alerts. **Figures 7-6 and 7-7** show detailed examples of those. This is a very useful wayfinding feature for transit.

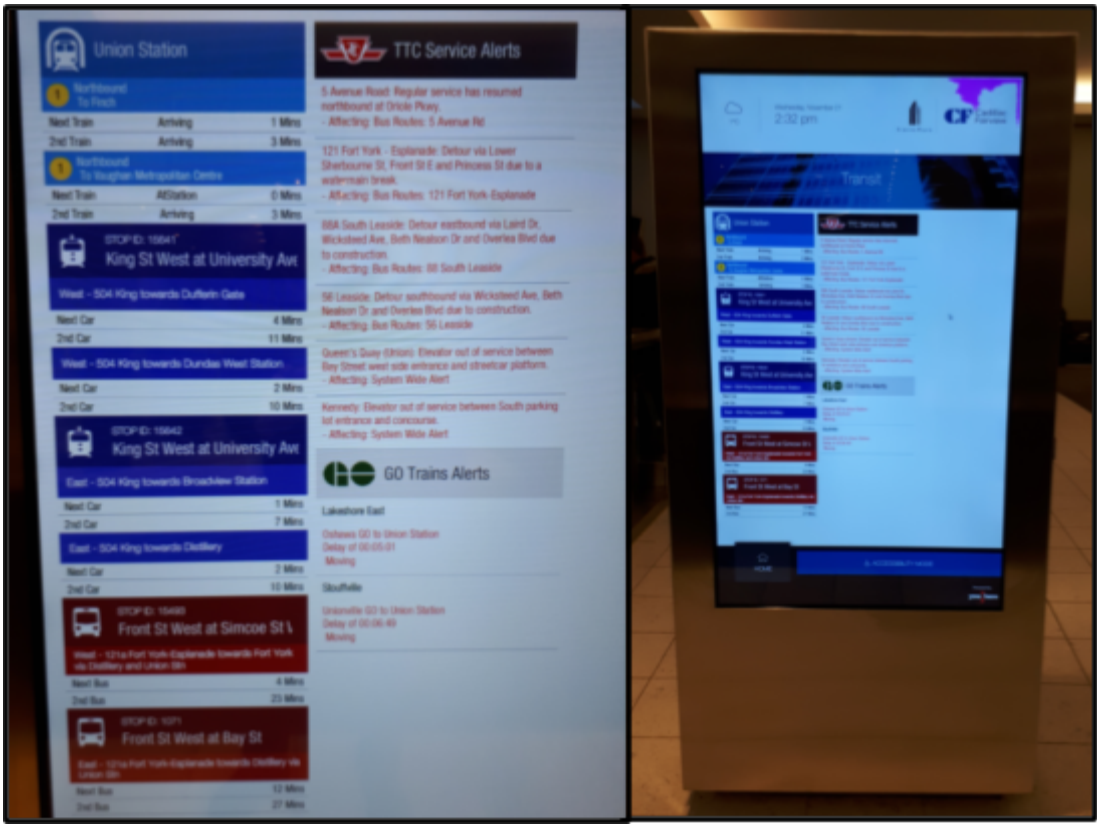

Figure 7-5 Wayfinding Transit Information Screen (1 of 3)

Figure 7-6 Wayfinding Transit Information Screen (2 of 3)

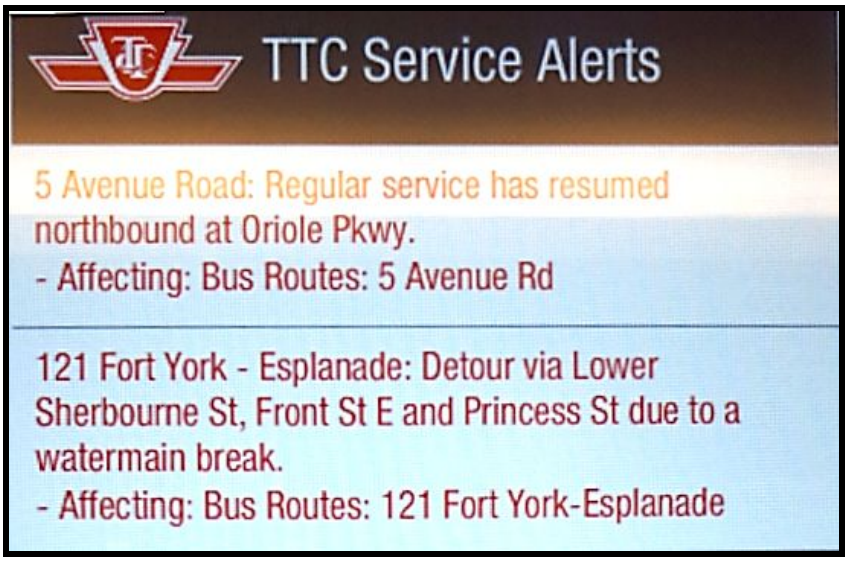

Figure 7-7 Wayfinding Transit Information Screen (3 of 3)

If the "Neighbourhood Map" option is selected (on the screen in **Figure 7-4**), a map of the downtown area will show up, including the current location and main destinations in the area. This screen is shown in **Figure 7-8**. Similarly, if the "Building Map" option is selected, a building map will show up including all levels, your current location, entrances, access to parking, and key features such as the food court and location of security personnel among others. This screen is shown in **Figure 7-9**.

Figure 7-8 Wayfinding Neighbourhood Map Screen

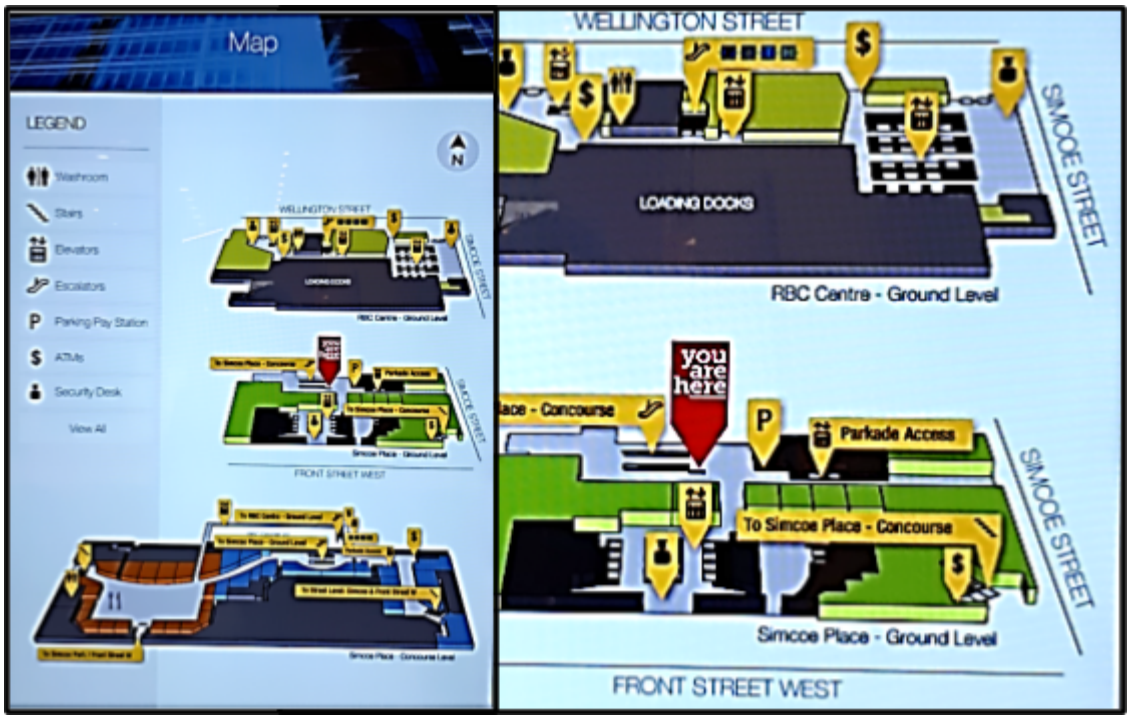

Figure 7-9 Wayfinding Building Map Screen

If the "Security" option is selected (on the screen in **Figure 7-4**) a map showing the location of security personnel will appear. The map includes your location and relevant information such as the security desk numbers as shown in **Figure 7-10**.

Figure 7-10 Wayfinding Security Map Screen

If the “Parking” option is selected (on the screen in **Figure 7-4**) a map showing the location of the building parking will show up. The map includes your location, the parking location and how to reach it, as shown in **Figure 7-11**. If the “Food” option is selected (on the screen in **Figure 7-4**) a list of restaurants and related businesses at the mall will show up on the screen, as shown in **Figure 7-12**. If any of the options are selected further details and a wayfinding map will be displayed.

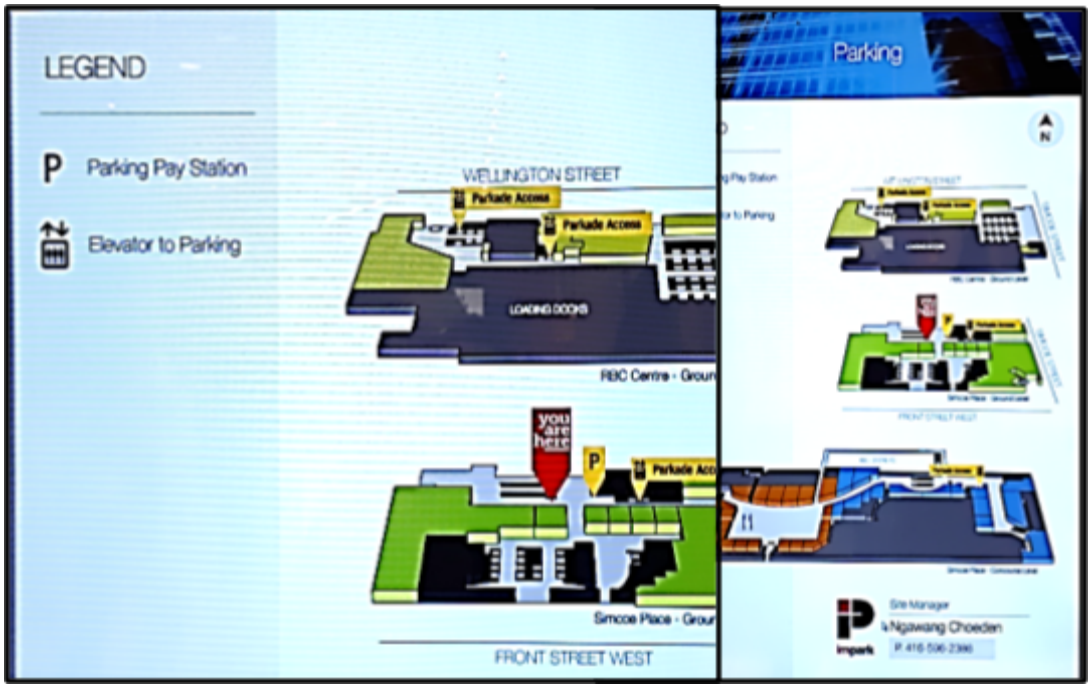

Figure 7-11 Wayfinding Parking Map Screen

Figure 7-12 Food and Drink Screen

Figure 7-13 shows the screens in the case where the “PATH” option is selected from the screen in **Figure 7-4**. This option allows the user to select a destination by name with the screen shown in **Figure 7-15**. The PATH option also allows the user to directly access the walkway system map. In addition, **Figure 7-13** shows a detail of the Legend as an example of all the comprehensive information provided on the map which even includes future walkways and outdoor connections.

Figure 7-13 PATH wayfinding map Screen

Figure 7-15 shows a PATH wayfinding map example. In this case the destination is the Atrium on Bay, and the map shows the user current location and the walkway route to reach the destination.

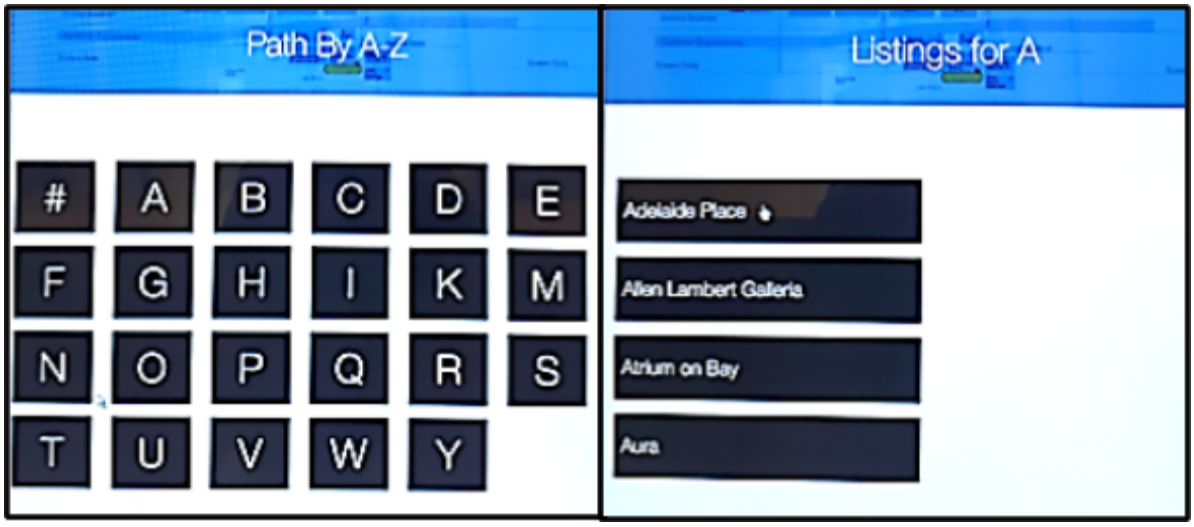

Figure 7-14 Search PATH A-Z Detailed Screen

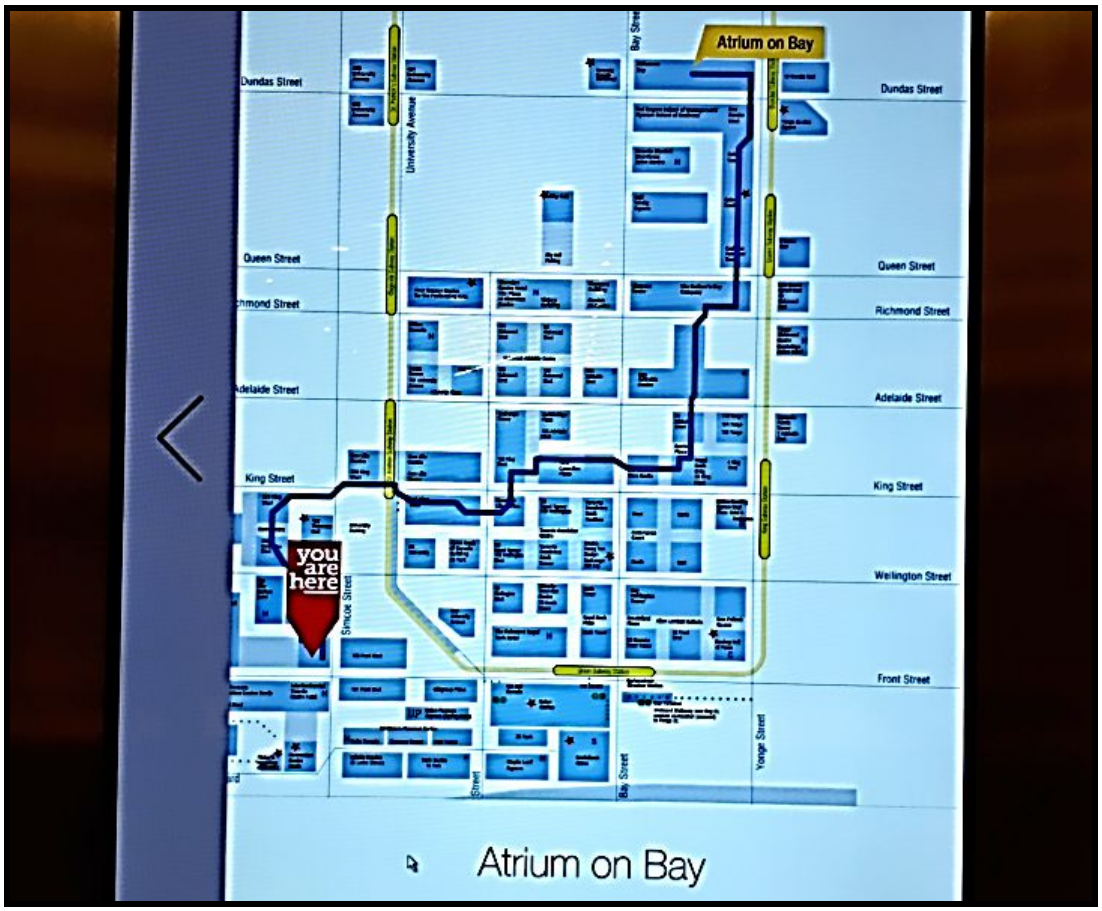

Figure 7-15 PATH Wayfinding Map Example Screen

Figure 7-16 shows screens that will appear if any of the options of **Figure 7-3** are selected. Both retail and office directories will show Simcoe Place and RBC Centre buildings, with different themes for each case. If either of these options are selected, a menu of the available businesses will appear. Wayfinding maps and relevant information will be provided for any business selected. Similarly, Enterprise Rent-A-Car will show up in the wayfinding map on the bottom.

Figure 7-16 Food and Drink Screen

Currently, many Edmonton malls are using interactive screens for advertisements and store wayfinding (i.e. West Edmonton Mall, Southgate Centre, City Centre). These devices are quite similar to those discussed in this section. Therefore, it is the Board's understanding that it may be possible to get agreements with the owner of those devices to also provide wayfinding capabilities related to transit routing and schedule information, real time information, important messages, trip planning, and more. Information similar to that which is currently available on the City's transit trip planning website could be provided.

8. Potential Solutions for Edmonton's Transit System

This section provides potential solutions to improve wayfinding practices for Edmonton's transit system. The team has made an effort to identify at least one potential solution to the wayfinding issues identified in section 4 above. The solutions presented here are not intended to cover all possible options, or to be comprehensive of all best practices on wayfinding systems.

8.1. Viable Options

1. **Use of recognizable, visible, and conspicuous transit landmarks and a consistent brand**
   A very identifiable ETS brand should be used consistently for the various transit services that are provided. In addition, visible ETS brand landmarks should be used so people can easily identify where bus stops, LRT entrances, or universal access are located.
   Figure 8.1-1 shows an illuminated cube that is readable from many angles and far away, with clear and iconic symbols for transit stops, at S-Bahn, Berlin (Andreas Levers on Flickr, link: https://www.flickr.com/photos/96dpi/6001607062).

Figure 8.1-1 Conspicuous and Recognizable Transit Landmark in Berlin

Figure 8.1-2 shows other symbols for transit facilities that are recognizable, visible, and conspicuous transit landmarks and brand. Examples correspond to:
A - Hong Kong MTR (http://www.hongkongextras.com/trainservices.html)
B - "H" German bus stop sign (https://commons.wikimedia.org/wiki/File:Zeichen_224.svg)
C - London Underground (https://www.visitlondon.com/traveller-information/getting-around-london/london-tube).

Figure 8.1-2 Conspicuous and Recognizable Transit Landmarks

Ideally, these recognizable signs should be placed at the location of the transit station entrance and should indicate if the entrance points are universally accessible. Wayfinding signs should be designed in such a way that there is consistency in all aspects of the design such as color scheme, letter size and font, symbols, and themes. The wayfinding system should also use the same type of sign or icons to identify the transit service provided (i.e. LRT vs. bus stops). Furthermore, services could be designed using one unique but consistent wayfinding system. The *Vision BRT System* in the Toronto Area, is a good example, in which the color of the buses, icons for services, station design, and even the pavement for the prioritization lanes are unique to the system.

2. Use Universal Design

The facilities and services provided by ETS should be fully developed using Universal Design, in addition to the wayfinding system. As this report focuses on

wayfinding, it is important to ensure that the wayfinding system should be developed for universal accessibility. This requires considering all segments of the population to ensure the wayfinding system is available to serve everyone. Developing a wayfinding system that it is not accessible to some vulnerable users and that will require fixes and improvements in the future will be more costly that including Universal Design from the beginning.

3. Identify Universal Accesses for ETS Services

The reality is that not all ETS facilities are universally accessible, therefore, it is important to provide wayfinding tools (maps, overheads, etc.) that identify the location of any universal access in the vicinity. Clear directions should be provided as well as the intended use (private, semi-private, public), schedules of operation, updates on maintenance and operability, and sufficient universal access alternatives.

4. Wayfinding Information Accuracy, Updates, and Quality

It is important to have ETS personnel accountable for the accuracy, updates, and quality of the information provided within the wayfinding system. Permanent maps should be updated when the services are disrupted or changed (i.e. during construction projects, indicate the nearest universal access for the time being. It may be a different one than usual due to construction closures and detours).

Figures 8.1-3 and 8.1-4 show permanent wayfinding maps (Boston Transit System) that have been updated to reflect the current status of the services provided. A simple sticker or piece of paper showing the recent changes works adequately.

Figure 8.1-3 Information Accuracy, Update, and Quality (1 of 3)

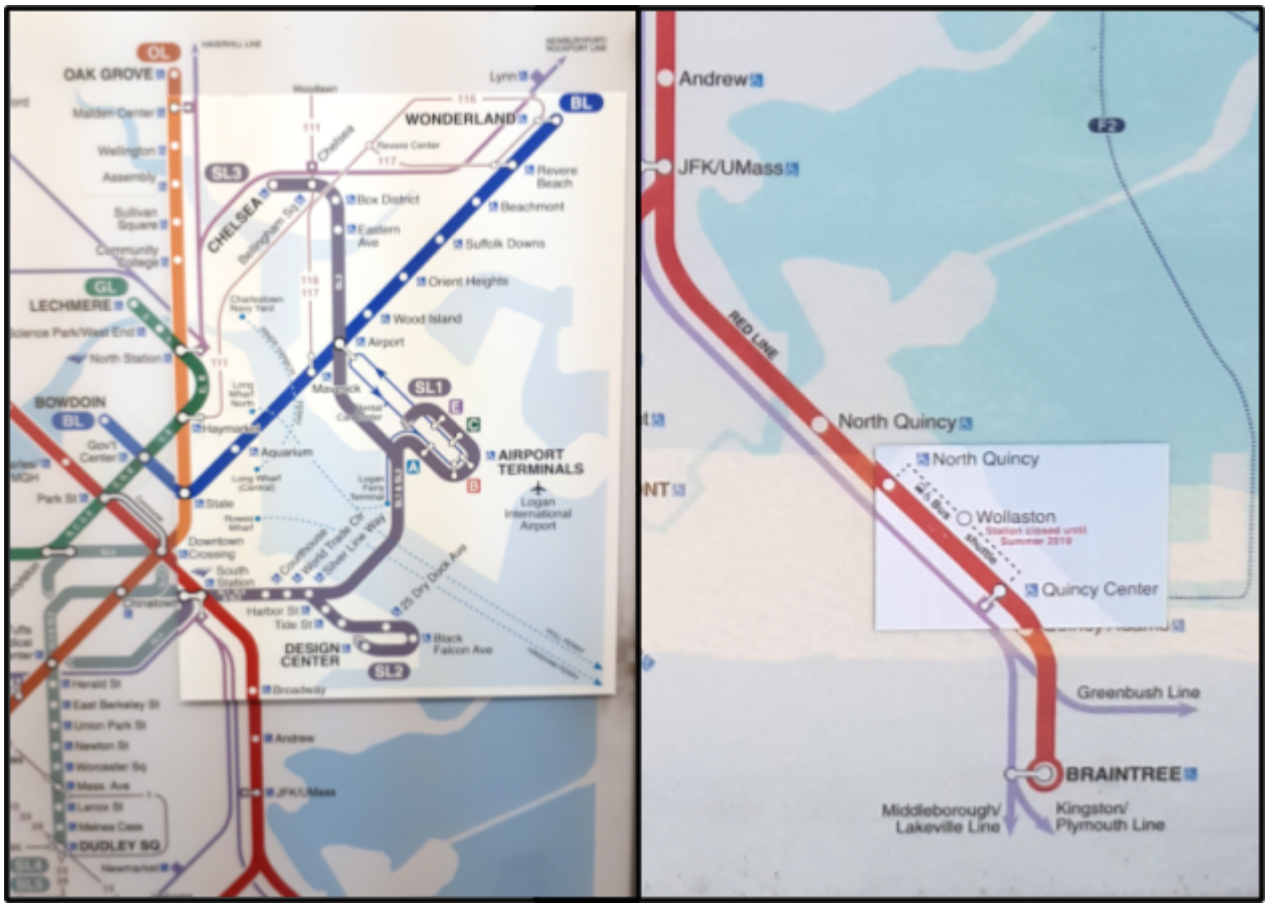

Figure 8.1-4 Information Accuracy, Update, and Quality (2 of 3)

The quality of the information also relates to the real intent of what ETS wants to communicate to the users and particularly those who are less familiar with the system. The proper information can really help the user to find their destination, the closest pathway to a bus transfer, or an element of the transit system. The wayfinding tools should complement each other (i.e. overheads signs with wayfinding maps). **Figure 8.1-4** shows examples of simple information provided at the right place.

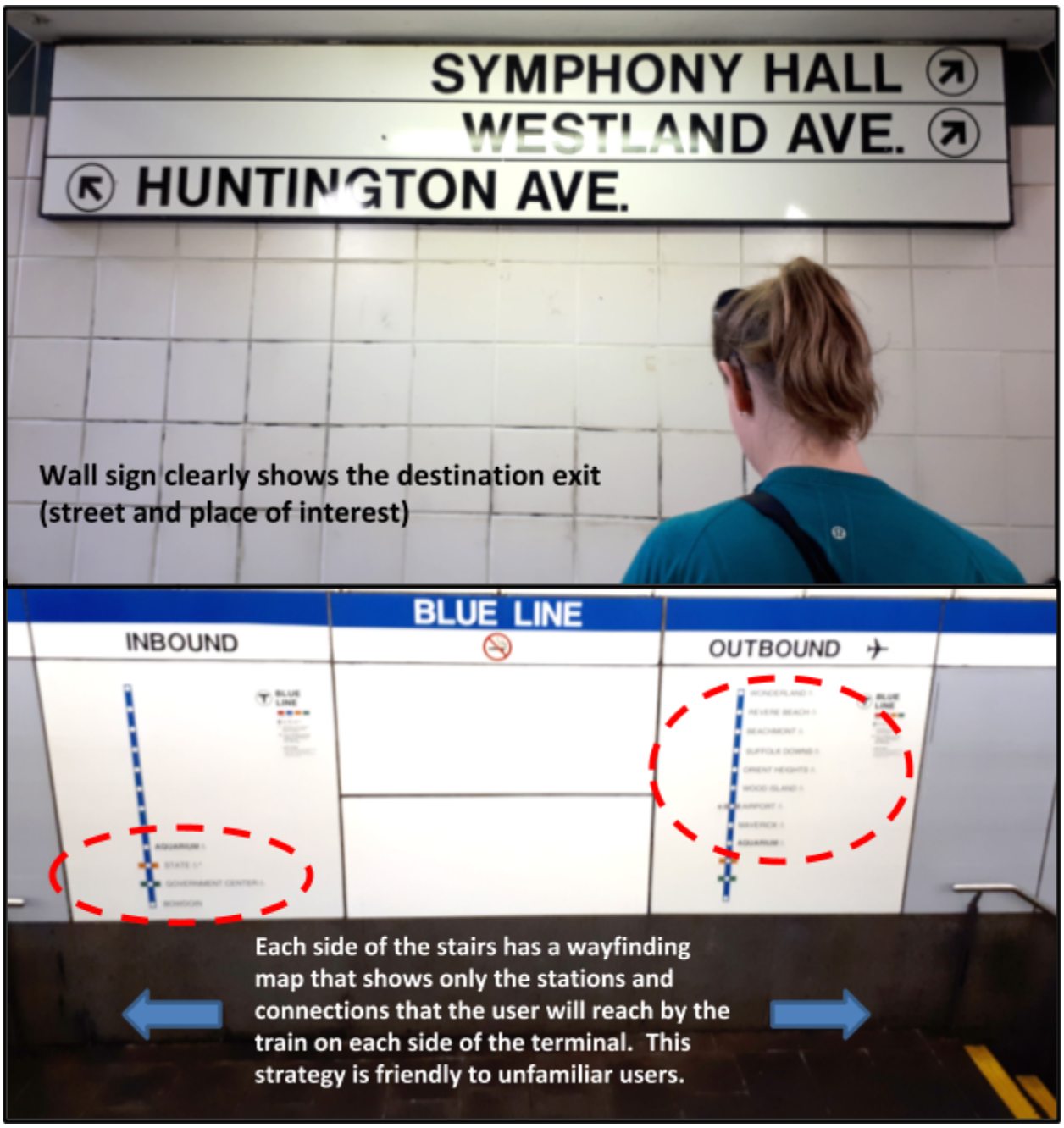

Figure 8.1-5 Information Accuracy, Update, and Quality (3 of 3)

5. Provide wayfinding tools throughout the ETS system

Some spaces within ETS stations are unwelcoming, lack wayfinding tools, and have ample empty space. It is recommendable to use those places to provide wayfinding signage and tools (i.e in the future interactive maps and devices could also be provided in joint efforts with advertisement companies), as well as adding art to make a more pleasant environment. **Figure 8.1-6** shows stations where wayfinding tools are placed strategically using the space.

Figure 8.1-6 Wayfinding Displays at Available Spaces

6. Provide wayfinding tools onboard transit vehicles

Wayfinding tools are recommended throughout the entire ETS system. It is no less important to include effective and comprehensive wayfinding tools onboard the transit vehicles, which would allow users to do trip planning, trip changes, identify potential transfers, and so on. While, it is possible to do this from a smartphone, not all transit users have access to the internet when travelling on the transit system.

7. Use of technology

It is strongly recommended to use available technology for the purposes of wayfinding. As presented in Section 7 of this report, interactive maps can be used instead of the outdated wayfinding devices at LRT stations. Similarly, interactive maps could be provided at main Transit Centres, pedways throughout the LRT stations, key decision points, and other locations within the ETS system. The interactive maps should be able to provide information to help users navigate the station, to reach destinations within and outside the stations, to identify closest and accessible pathways to destinations, entrances or exits, to perform trip planning, to

review real time transit information, to review schedules, frequency and available transit routes and services, among other functions.

Furthermore, these interactive maps should be also placed at key locations such as government buildings, shopping malls, etc. Partnerships could be established to use the existing interactive devices at shopping malls and to allow them to provide wayfinding information as well as other transit service related information (in Toronto, this sort of interactive device allows several functions, including access to real time transit information, undertaking origin-destination queries in the neighborhood area and within the shopping mall, identify parking locations, etc.). **Figure 8.1-7** shows an interactive device at West Edmonton Mall.

Figure 8.1-7 Interactive Map at West Edmonton Mall (From Signmedia.ca)

8.2. Recommendations

The following key general recommendations summarize the solutions provided in Section 8.1 suggested to address the wayfinding issues identified in this report.

1. **Uniform, Consistent, and Predictable Wayfinding Practices**
   It is recommended to adopt a wayfinding practice, documentation, standards or by-laws that set up best practices for the planning, design and maintenance of the ETS and LRT wayfinding system. Ideally, this practice should be part of a comprehensive wayfinding strategy for the City of Edmonton, including the pathway system, park systems, etc. Key issues to consider are the use of strategies that are uniform, consistent, and predictable so they are user friendly.

2. **Universal Design**
   It is recommended to adopt a universal design policy and by-law so the elements of the wayfinding system are universally accessible to all users. In general, if something is designed for the most vulnerable users, it will most likely serve everyone adequately. Universal Design practices relate to both the physical devices used in the wayfinding system and also to how the information is presented to people, and how people can access and use the transit system in conjunction with the municipal and inter-municipal transportation systems.

Table of Figures