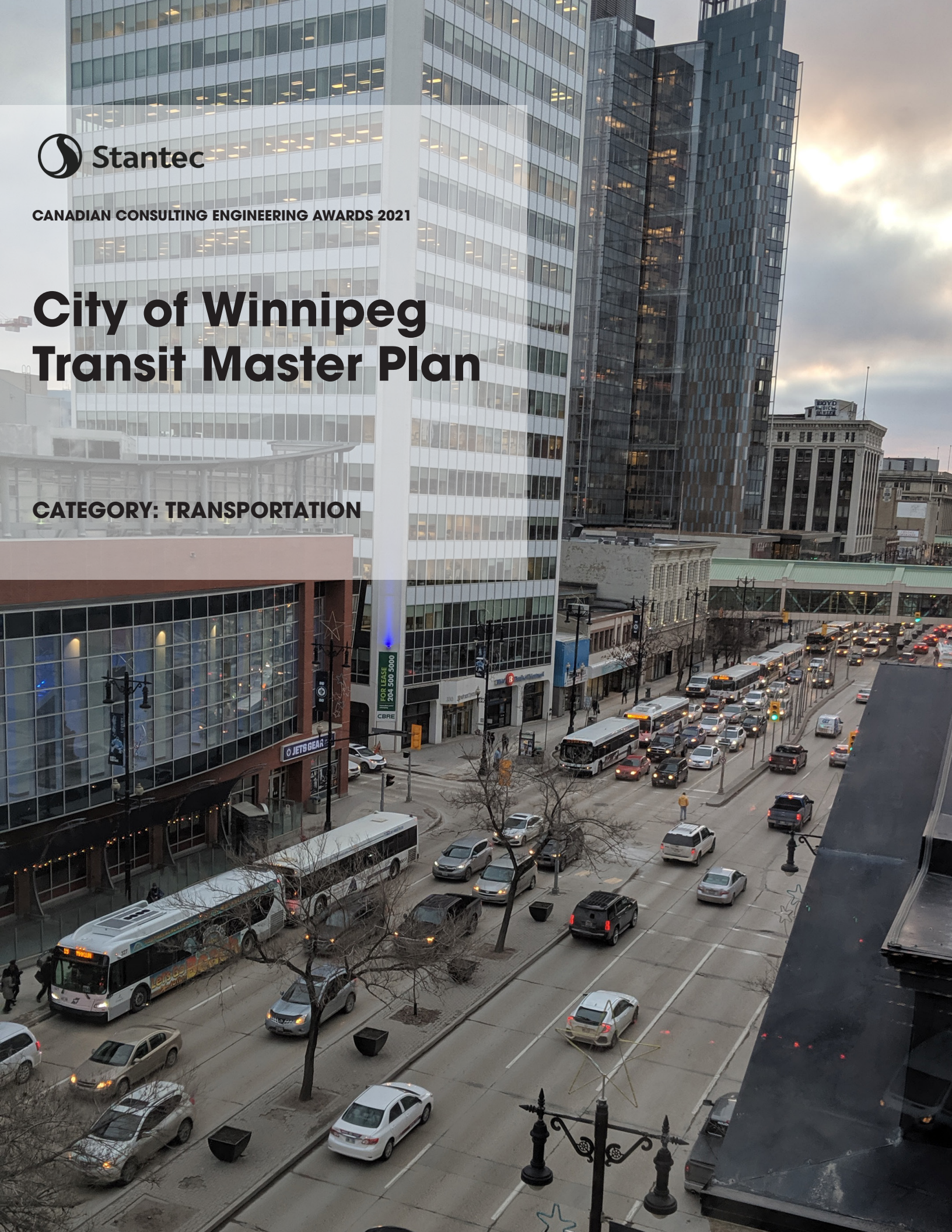




CANADIAN CONSULTING ENGINEERING AWARDS 2021

City of Winnipeg Transit Master Plan

CATEGORY: TRANSPORTATION



Q1 INNOVATION

Winnipeg Transit has operated for more than a century with the network growing organically. With a vision to combine operations and long term planning, came a desire to take a fresh view of the system.

A standard transit review would examine transit statistics, focus on high value routes and make localized modifications to routes to link into those routes. This was not that standard review. The goal was a complete re-think of the system. To do so meant taking a fresh approach and considering how people move regardless of the mode. To understand those movements, we had to leverage the transit data, location based data services, GIS databases and public opinion to analyze and understand the desire lines for the major movements. The data could also be used to verify the community focus for individual routes rather than just assume adjacent communities interact. We made sure we understood how people moved around the City and tailored the network using an equity lens. We asked why people were reluctant to use transit, why they felt it didn't serve their needs and we also determined what people liked about the service.

With the permission to design a new transit network, we focused upon the key origins and destinations and designed the network to reflect these desire lines. At the same time, we provided access via transit to services used by those with the fewest mobility options. We created a custom data dashboard to complete queries quickly and perform analysis of multiple datasets to test route options. The ability to quickly map routes, stops, and boardings, together with the analysis of data such as income, locations (educational, recreational, and work), shopping and demographic composition on a GIS-platform, we were able to test each route against community needs and confirm that we were addressing the equity lens evaluation. We also used a layered transit network structure that featured a Primary network focused upon ridership and getting 85% of the population within a 10-minute walk of a frequent service. This was supplemented by a Feeder network that included local routes and a large degree of flexibility at the community level to support the system in a Post COVID world where travel patterns have changed.

The result – a brand new network for the future.



Q2 COMPLEXITY

The sheer size of the undertaking contributed to the complexity. There were nine goals identified.

Achieving each of the nine goals presented their own unique challenges and they were often in conflict.

1. Enhance Customer Experience – required the team to provide appropriate amenities to provide safe, accessible, and simple access to stops and stations

2. Increase Ridership – the team needed to strike a balance of providing service on high use corridors and covering more isolated communities

3. Improve Downtown Mobility – The team needed to reduce transit congestion in the downtown while maintaining high levels of service

4. Complement Land Use Development – The Transit service had to be flexible to support future development plans

5. Improve Multi-Modal Mobility – Integrate Active Transportation and connectivity to other services (ride share)

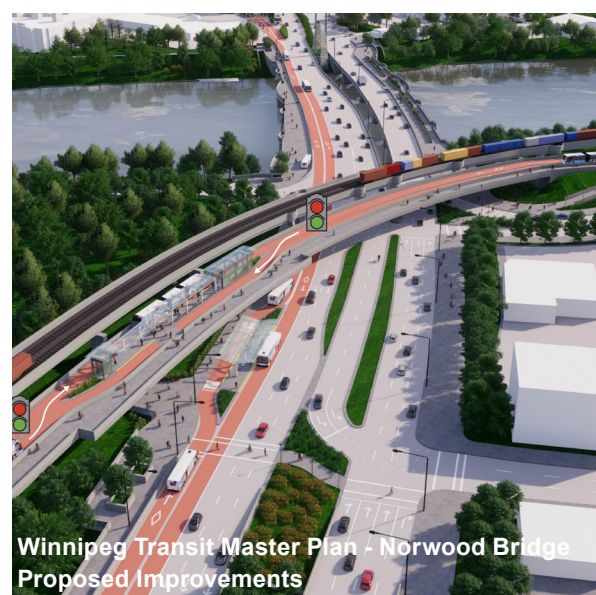
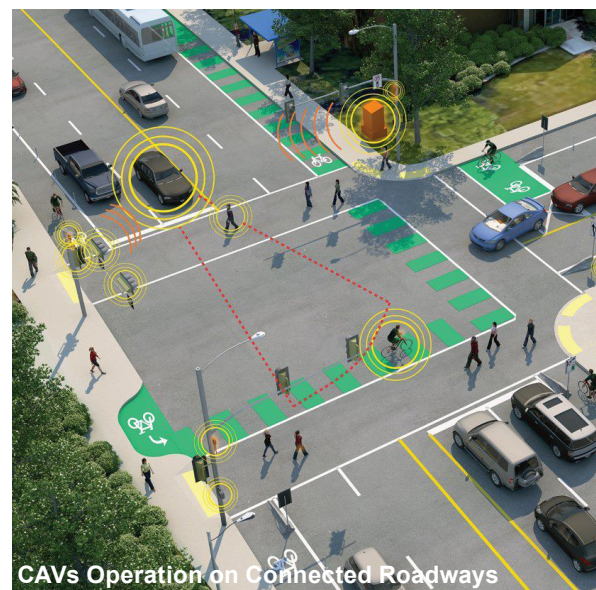
6. Ensure Inclusiveness- Make transit available to as many people as possible

7. Continuously Innovate – Design a system that is flexible enough to integrate new technology

8. Empower Healthy Communities – Provide services that match the needs of the community – services and amenities

9. Balance Investment with Affordability – Be aware of ability to pay for the services

The goals were developed with input from the public, decision makers and the technical teams. The current transit system tried to do too much with each route– coverage and service - and as a result, the transit system was failing in the eyes of the customers. The new routes were developed with specific purposes in mind. Community routes provide service to both primary lines and community amenities. The need to make transfers was established to increase route options. The transfer locations became a focus of the route design with the desire to make the transfer locations as efficient and safe as possible. Transit Hubs were developed to facilitate multiple Feeder routes to Primary routes, Junctions were developed to facilitate transfers between intersecting Primary routes. Both were structured to minimize the interaction distances and were provided with high design standards for accessibility. Stations were designed with the intent of providing additional amenities for users.



Q3 SOCIAL AND/OR ECONOMIC BENEFITS

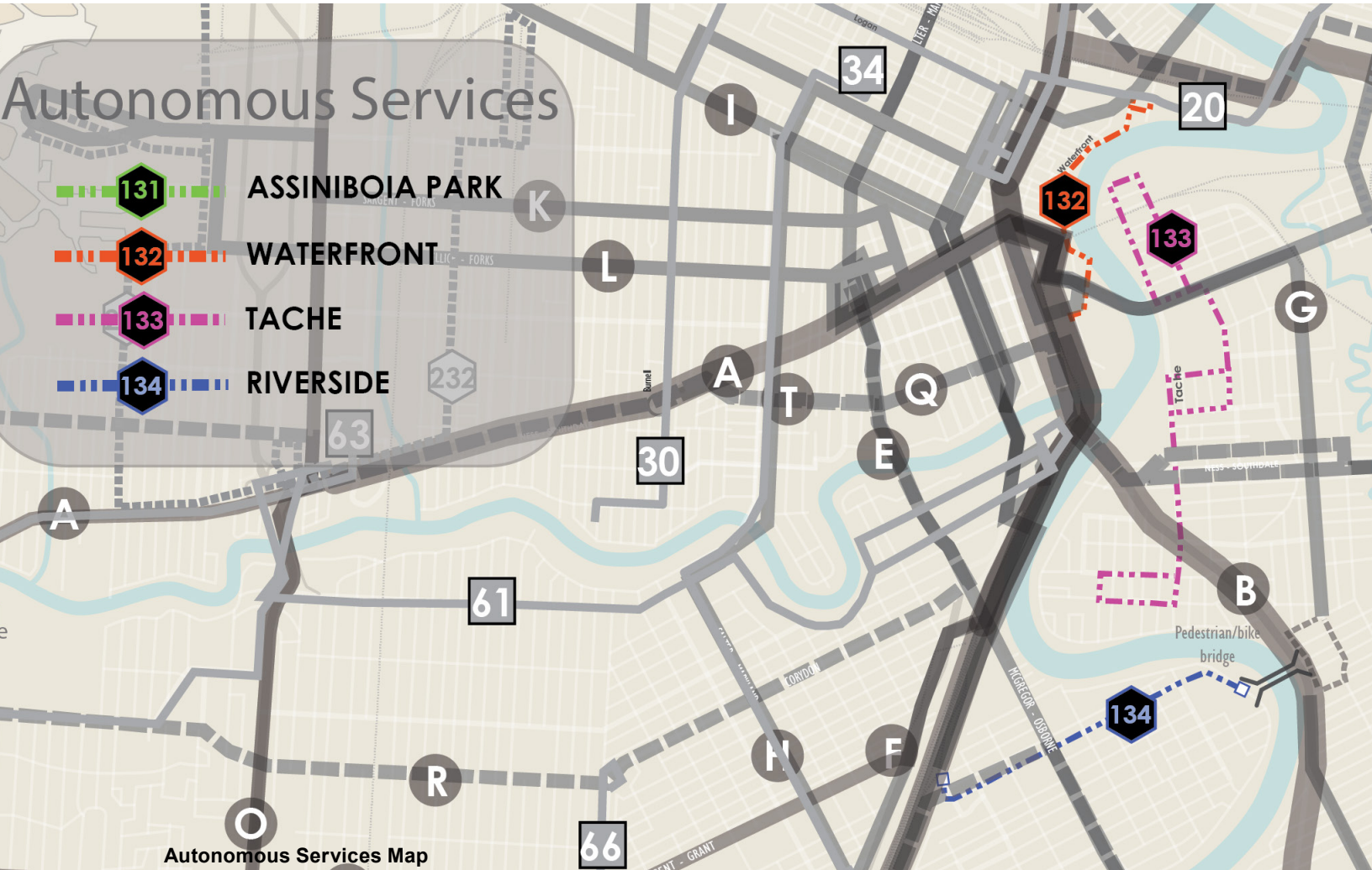
The cost of additional service and transit infrastructure improvements were identified in such a way that it does not create an unrealistic financial burden to taxpayers or necessitate drastic increases to transit fares. The WTMP created a focus for investment first by reallocating service hours to more productive routes, by creating straight, simple, and direct routes, and through restructuring the network from a radial, downtown-focused service to a modified grid network. Rapid transit construction costs are kept low by utilizing existing infrastructure where feasible. Investments focus on generating long-term returns by minimizing operating costs per passenger. The long-term legacy of major investments like rapid transit will be a more affordable transportation system for the City of Winnipeg.

This change in focus allowed for an increase in reliability and increase in service in communities without increasing the cost of that service. By reducing the need for community routes to travel on congested roads, the reliability of that service increased, allowing customers to be able to schedule their travel days with confidence.

The community service routes focused on roads with services and amenities that are essentials to those in the community. Local grocery stores and other retail locations were provided with access via community transit and major attractions were provided access via primary routes. Providing reliable transfers between Community/Feeder and Primary routes was a priority.



Transit Plus Workshop and Stakeholder Sessions



Q4 ENVIRONMENTAL BENEFITS

Through the Master Plan the City formalizes its commitments to transition to Zero-emission buses (ZEBs). There are two types of ZEBs considered for operation in Winnipeg's transit fleet: fuel-cell battery-electric buses (FC-BEBs) and battery-electric buses (BEBs). FC-BEBs are refueled with hydrogen while BEBs can either charge on-route or at a depot/transit garage. The advantages and disadvantages for each technology were identified in a white paper as part of the plan.

Winnipeg Transit has been developing a Transition to Zero-Emission Bus Program for the purpose of setting the direction for establishing a zero-emission fleet and following through on initiatives around the integration of zero-emission transit.

The transition to zero-emission is purposely planned to be gradual to allow Winnipeg Transit sufficient time to plan and adjust its zero-emission roll-out strategy based on data collected through in-service validation and testing. Zero-emission bus technology is constantly evolving and the Winnipeg Transit needs to be flexible to adapt to these changes.

The other Environmental consideration involves size of vehicle. The current route network is very complex and subsequently little opportunity exists for targeting particular vehicle types and technologies where they make most sense. The simpler route structure will allow for dedicating appropriate vehicle types, ranging from automated vehicles, small or large buses, zero-emission buses, or eventually light rail, according to the service needs. This includes the designation of 4 autonomous vehicle services, and the inclusion of active mode bridges and connections to the system.



Rapid Transit Station Harkness Ave



Desmeurons Transit Stop



Kildonan Place Transit Station

Q5 MEETING CLIENT'S NEEDS

While the specific client needs changed throughout the project, and there was more information gathered as a result of this, the team adjusted to this change while the basic goals remained consistent. The study team addressed the needs of the clients in the following way.

1. Enhance Customer Experience – required the team to develop route type specific amenities to provide safe, accessible, and simple access to stops and stations

2. Increase Ridership – the team developed a route network that balanced service on high use corridors and a range of coverage for more isolated communities that could be scaled up as demand increases

3. Improve Downtown Mobility – by simplifying the route structure the team reduced transit and vehicle congestion in the downtown while increasing mobility service

4. Complement Land Use Development – The new network was designed to complement and support future development plans

5. Improve Multi-Modal Mobility – Connectivity to Active Transportation and other services (ride share) was addressed as a priority, with on request service reconfigured to serve areas with low demand for transit

6. Ensure Inclusiveness - Transit routes were designed to increase coverage in most areas, reducing population further than 400 metres from a route

7. Continuously Innovate – The system becomes flexible enough to integrate new technology and with feeder routes adaptable to community needs as demographics and opportunities change

8. Empower Healthy Communities – services match the needs of the community – services and amenity locations were used to develop routes

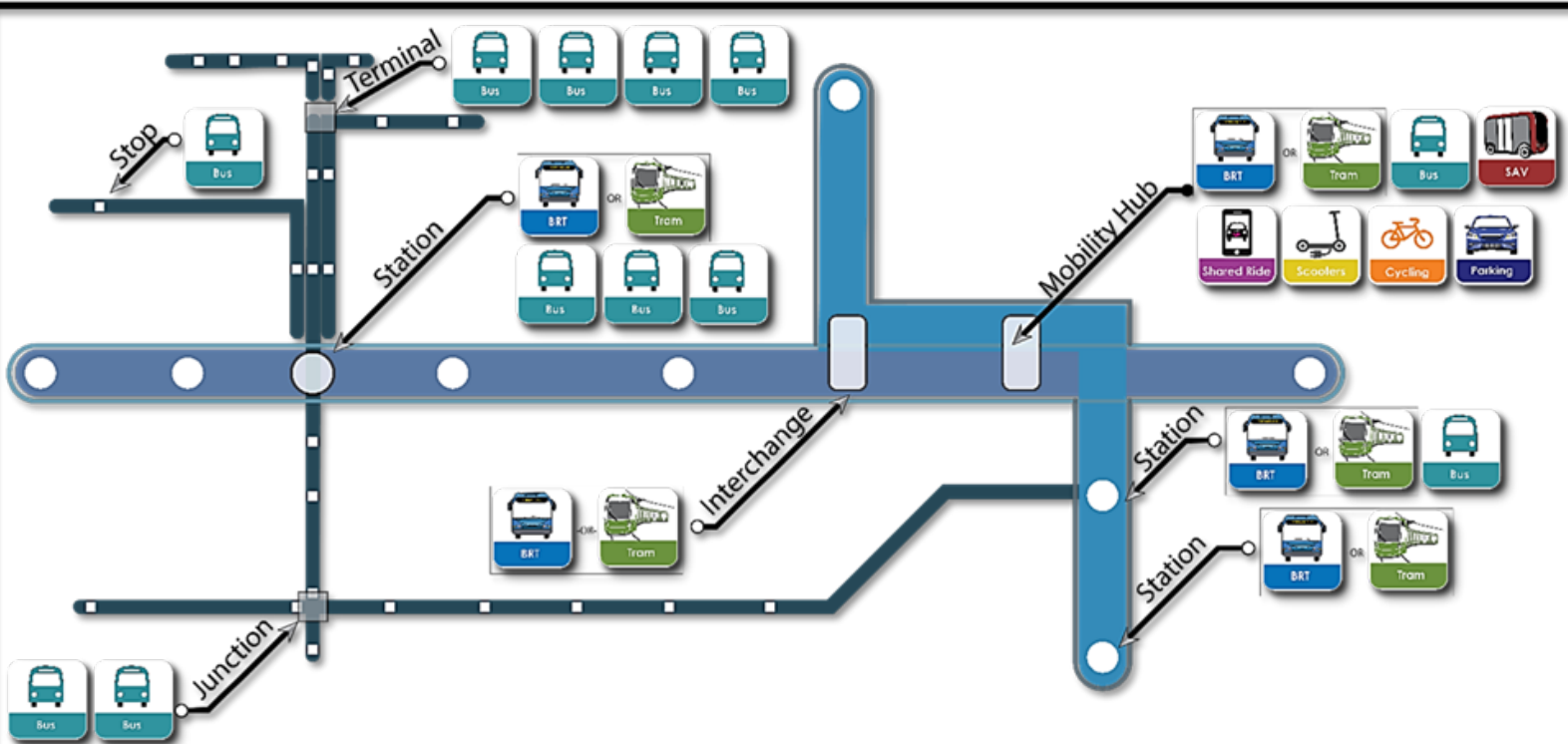
9. Balance Investment with Affordability – the new network maintained the service hours currently being used and improved coverage and reliability

THE EVOLUTION OF TRANSIT STOP HIERARCHY

With the new network design, Winnipeg Transit required a parallel way of identifying Bus Stops to match the route structure components. The proposed standards serve two purposes: (1)- to provide customers with a standard of service matching the running service, with expectations for amenities and accessibility met and (2)-to provide Winnipeg's Public Service with a design standard for capital improvements when they are being planned.

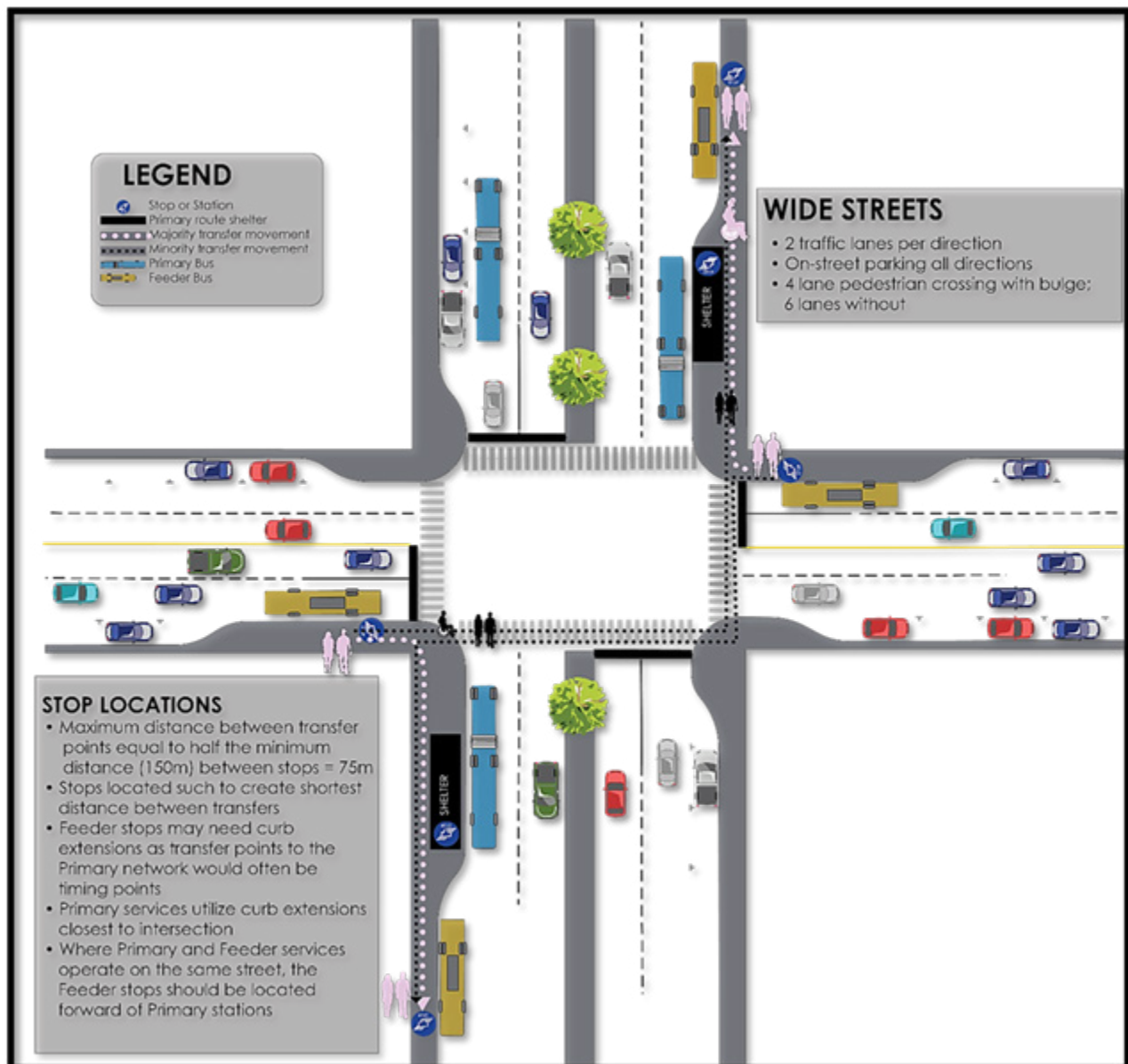
- Bus Stops – Stops that meet minimum accessibility provisions, single route, no transfers
- Junctions – Stops with enhanced accessibility provisions, multiple crossing routes; designed for transfers and minimal walking distance during transfer
- Interchanges – Stops where multiple rapid and lower order routes meet, and active modes are accommodated; transfers accommodated with minimal walking distances
- Mobility hubs – Integrated facilities that accommodate multiple routes as well as multiple modes and is integrated with other land use developments at major destinations.

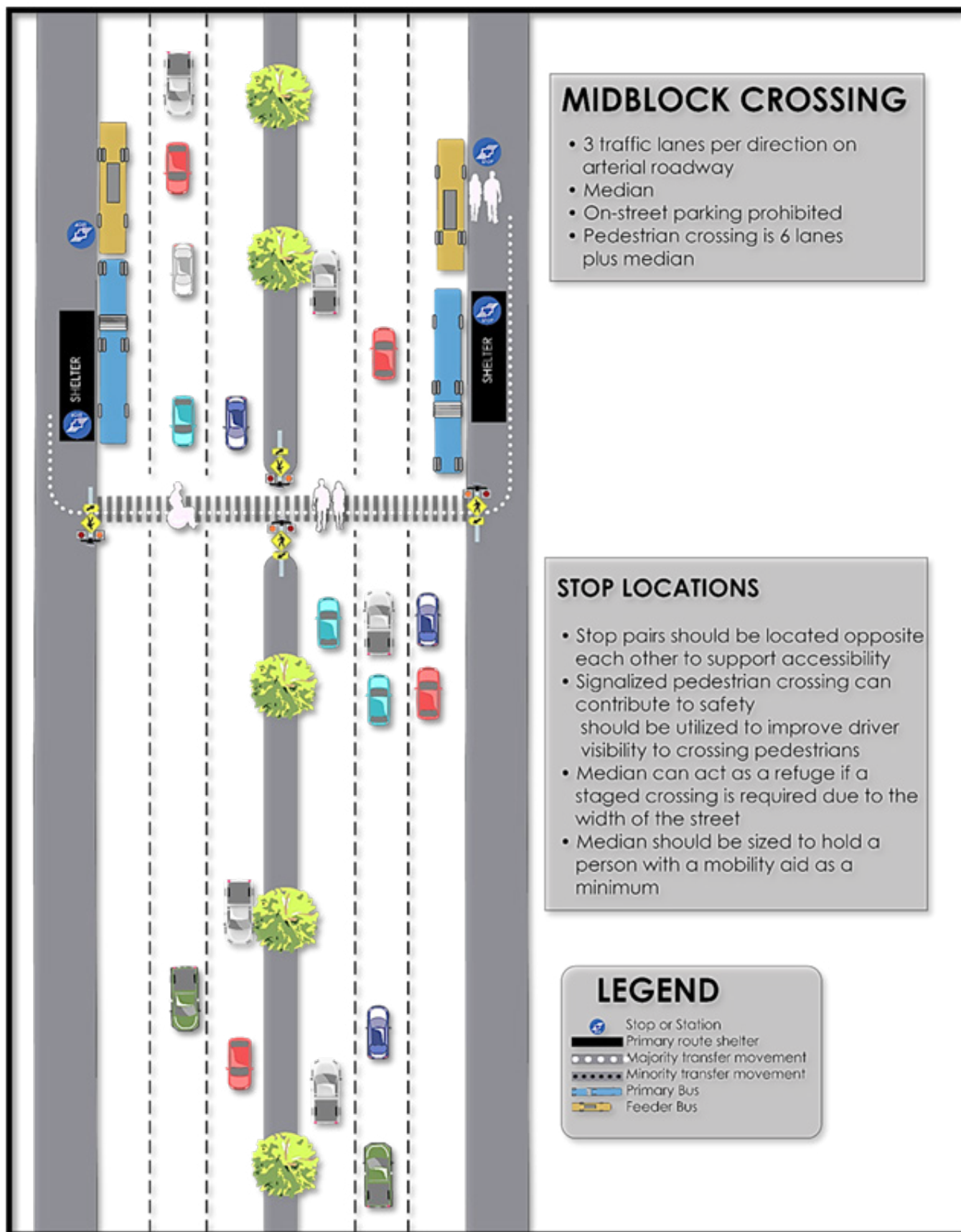
Locations where multiple routes meet and transfers occur are to include the provision of crosswalks and road infrastructure improvements on roads, locating stops to create matched pairs in different directions, the relocation of existing stops to be in closer proximity to another or other infrastructure improvements. The goal is to reduce the distance a person must travel to transfer between routes where they cross.



INTERSECTION DESIGN SKETCHES

The following two intersection design sketches illustrating stop locations for Primary and Feeder Networks at junction points show how they should be placed to consider the walk/roll distance between transfers. Accessibility and walking distance, in conjunction with primary and secondary transfer movements are considerations when planning Transfer Stops and Junctions.





MIDBLOCK CROSSING

- 3 traffic lanes per direction on arterial roadway
- Median
- On-street parking prohibited
- Pedestrian crossing is 6 lanes plus median

STOP LOCATIONS

- Stop pairs should be located opposite each other to support accessibility
- Signalized pedestrian crossing can contribute to safety
- Median can act as a refuge if a staged crossing is required due to the width of the street
- Median should be sized to hold a person with a mobility aid as a minimum

LEGEND

- Stop or Station
- Primary route shelter
- Majority transfer movement
- Minority transfer movement
- Primary Bus
- Feeder Bus

RESULTS

The Winnipeg Transit Master Plan established a long-term vision for transit service and infrastructure in Winnipeg by focusing on mobility patterns. It is supported by strategic policy guidance that creates structure and transparency. The transit vision is supported by nine objectives that provide better transit options. The result is a simpler, more efficient, more effective, and more accessible transit system - one that is better positioned to become people's first choice for traveling around Winnipeg.

