MAKING TRANSIT FUNCTIONAL

A guide to a frequent, affordable, and accessible system in Winnipeg

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"Transit works best where there are many destinations along something that feels like a straight line."

– Jarrett Walker, Human Transit

PREFACE

This report was compiled by Functional Transit Winnipeg

Functional Transit Winnipeg is a grassroots group of Winnipeggers who volunteer their time to research and advocate for improved public transit. This group came together over the concern that the Southwest Corridor will make public transit worse for Winnipeggers. We advocate for improving bus frequency within Winnipeg Transit's existing service.

This report was compiled in order to explain the deficiencies of the current plan for the Southwest Corridor in Winnipeg, and to lay out an alternative strategy that would have a far more positive impact on public transit for the same price as the current project being undertaken by the City of Winnipeg.

Our conclusions are drawn from publicly available data, reports from the City of Winnipeg and transit research. We have made every effort to be factually accurate in our assessment of transit service and investment in Winnipeg. The views expressed in this document are those of the author and contributors only.

We welcome response and input from those individuals who may have a different interpretation or access to more information.

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1 EXECUTIVE SUMMARY

This report has been compiled by Functional Transit Winnipeg in order to present an assessment of the Southwest Transitway and present a transit funding alternative based on frequency, accessibility and affordability.

Functional Transit Winnipeg is a grassroots group of Winnipeggers who volunteer their time to research and advocate for improved public transit. This group came together over the concern that the Southwest Corridor will make public transit worse for Winnipeggers. We advocate for improving bus frequency within Winnipeg's existing transit service.

Based on extensive primary and secondary research, including the City's own studies, we have concluded that to best serve all Winnipeggers, the City should abandon plans for the second phase of the Southwest Corridor and redirect all of the funding into bus frequency on existing routes. This would not only help current riders but make the transit system competitive with private automobiles and thus attract new riders.

In this report, we outline the essential components of effective transit, provide a detailed critique of the Southwest Corridor based on that framework, and offer an alternative plan for transit investment based on frequency, accessibility and affordability.

1.1 ESSENTIAL COMPONENTS OF EFFECTIVE TRANSIT

This report breaks down the components of a transit trip and the needs of transit riders, clarifying the factors that make for a positive transit experience. A transit trip is made up of more than just riding the bus. Transit consultant Jarrett Walker has broken down a trip into seven steps:

1. Understanding the trip
2. Accessing the bus stop
3. Waiting for the bus
4. Boarding and paying
5. Riding the bus
6. Transferring
7. Accessing the destination from the bus stop

Our analysis of the Southwest Corridor shows that the only step that it improves is "Riding the bus." Steps 2, 3 and 7 are actually made worse. The planned route is significantly more difficult to access from the existing urban form than current routes along Pembina Highway.

Additionally, most bus stations will be located in isolated areas that will make waiting for the bus feel less safe.

This report points to the importance of walkability, safety, the existing urban form and competing forms of transportation that must be considered in transit planning. Winnipeg's existing transit network is already located within areas that are relatively walkable and in areas where there are more "eyes on the street," providing more frequent service to these stops will vastly improve the practical usefulness of transit.

1.2 ANALYSIS AND CRITIQUE OF THE SOUTHWEST CORRIDOR

This report questions both the improvements to speed that the corridor is projected to have and the necessity of in-bus speed improvements over waiting and walking time improvements.

City reports indicate that the corridor will improve speed by 5-8 minutes, however these reports lack an explanation for how these numbers were determined. Because the corridor is 50% longer, distance-wise, than route distances on Pembina Highway and University Crescent and because the Winnipeg Transportation Master Plan does not predict Pembina Highway will become a major congested area before 2031, more information is needed from Winnipeg Transit regarding these time estimates. Using the average speed of buses on the first leg of the transit corridor (35 km/h) and comparing that speed to current schedules, we found that the corridor will provide approximately similar in-vehicle time, meaning it is not clear the Southwest Corridor will make the commuting in either direction faster.

Additionally, research shows that walking to and waiting for the bus feels up to twice as long as the same amount of time spent riding a bus. Even if there were an improvement to in-vehicle time, reducing walking and waiting time is a much more important objective.

Transit vehicle capacity requirements must also be explained in greater detail by the City. University students travel in the opposite direction of rush hour traffic down Pembina Highway. As a major arterial route, Pembina should currently have the available capacity to handle the increase in demand for transit as a result of the implementation of the U-Pass, if this increase is absorbed by super express bus service and articulated bus service. Additionally, service requirements for population increases in the Waverley West neighbourhoods could be absorbed by improving service along Kenaston Boulevard and Waverley Street, which are currently served by twice-per-hour bus service.

The following is a list of deficiencies of the Southwest Corridor, upon which we elaborate in section 4 of the report.

1. The route is located too far from the amenities on Pembina Highway. Successful rapid transit corridors are built into the existing urban form.
2. Despite promises that developments along the transitway would be transit-oriented development (TOD), the developments that have been planned so far along the transitway either do not appear to meet the City of Winnipeg's own definition of transit-oriented development or lack any guarantees that there will be commercial amenities.
3. Commercial development has been found to be an important driver of ridership along rapid transit corridors, and yet, as mentioned above, there are either no plans or very limited plans for commercial development along Phase 2 of the Southwest Corridor.
4. The Southwest Corridor will likely reduce service to existing multi-tenant residential and commercial developments along Pembina Highway.
5. Most trips made by Winnipeggers are within their own neighbourhood, even during the morning commute – these destinations should take precedence over downtown-centric transit policy.
6. The corridor is meant to bypass traffic congestion, yet traffic congestion is only a minor impediment to the speed of buses on Pembina Highway.
7. The cost for the corridor is very high for the relative impact the corridor will have.
8. It is not clear that additional transit capacity is needed for Pembina Highway routes.
9. It is not clear that the corridor will make the commute faster.
10. The Southwest Corridor doesn't consider the critical elements for transit: walkable design, eyes on the street for safety and building into the urban form.

1.3 OUR RECOMMENDATIONS

The financing and operating costs of the Southwest Corridor are: $19.7 million per year for 30 years. This project includes the widening of the Pembina Highway underpass, which has been included in the "Stage 2 Southwest Rapid Transit Corridor Project P3."[1]

If the City of Winnipeg would direct this entire amount toward improving bus frequency, the benefits would be substantial and transit across the entire city would become much more competitive with the automobile.

As a consequence of the 50/50 transit funding agreement between the City and the Province, the City could leverage an additional $19.7 million from the province leading to a total annual

[1] The City has also included the entire P3 project in Winnipeg Transit's budget.

investment in transit of approximately $40 million for 30 years. This is equal to nearly a 25% increase to Winnipeg Transit's operating budget or a 45% increase in public funding to the transit agency.

If this investment were put into operating more buses, the implications for service across the entire city would be significant.

We recommend the following:

1. Focusing investment in routes that access destinations within riders' immediate neighbourhood
2. Improving evening and weekend frequency.
3. Extending peak service hours to and from downtown to make it easier for transit riders to spontaneously plan to stay downtown later after work. This point recognize Winnipeg's ongoing objective to bring people downtown.

Frequent service would make transit a competitive form of transportation that could attract new riders, while also providing improved service to existing riders. Frequent service means shorter waits, buses coming more often to stops that are closer to riders' front doors and it means quicker transfers.

Additionally, increasing frequency has a positive effect on all but one of the seven transit steps mentioned above. An investment in frequent service makes spontaneous trips easier to plan, it improves service to every bus stop, it makes the wait for a bus shorter, it reduces overcrowding while riding the bus and it makes transferring more flexible.

Given the deficiencies of the Southwest Corridor and the significant benefits of higher frequency service, Functional Transit Winnipeg recommends investing in higher frequency bus service as an alternative to the Southwest Corridor.

2 INTRODUCTION

The purpose of transit investment is to make it easier and more comfortable for transit riders to get from where they are to where they need to go. This can be achieved by improving the experience for current riders and making public transit more competitive relative to other transportation options.

Winnipeg transit riders and Winnipeggers in general should be very concerned about the plan for Phase 2 of the Southwest Corridor. After decades of underinvestment (relative to other cities) in basic transit services, the City has chosen to spend a large amount of money on a single corridor that will be at best only marginally beneficial to a fraction of riders while making transit worse for many other riders. The Southwest Corridor Alignment Study states that the transitway "will increase ridership in the southwest portion of the city regardless of the alignment option selected."[2] Contrary to this statement, alignment does matter[3].

A functional transit service is important for serving the higher density neighbourhoods that young people today are looking for[4], it is important for social equity and it is important for reducing our carbon footprint. By serving a single specific transportation need – U of M to downtown – and significantly reducing service to the amenities along Pembina Highway, the Southwest Corridor will make it *more* difficult to live a transit-oriented lifestyle in Winnipeg.

If the City of Winnipeg is unwilling or unable to integrate a form of bus rapid transit (BRT) along Pembina Highway itself, then it must come up with an alternative to BRT altogether. This report recognizes the financial struggles facing the City of Winnipeg and offers a pragmatic alternative.

Functional Transit Winnipeg argues for a frequent, affordable and accessible transit system – a transit system Winnipeggers themselves want[5]. This can be accomplished by investing in our current transit network, rather than building Phase 2 of the Southwest Corridor. Given the significant deficiencies of the Southwest Corridor, the City must re-examine its objectives for transit.

While bus rapid transit does work in many contexts, the design of Winnipeg's corridor and the available information about the developments that will be built next to the corridor

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[2] Winnipeg, City of. *Southwest Rapid Transit Corridor Stage 2 Alignment Study: Final Report*, page 35.
[3] Babalik-Sutcliffe, Ela, "Urban rail systems: analysis of the factors behind success," *Transport Reviews.* 22 no. 4 (2002): 436
[4] Frontier Group & US PIRG Education Fund. *Transportation and the new generation – Why young people are driving less and what it means for transportation policy* (By Davis, B., Dutzik, T., Baxandall, P., 2012): 11
[5] Winnipeg, City of. *Winnipeg Transportation Master Plan*, prepared by Winnipeg Public Works Department. Winnipeg, MB, 2011: 46

demonstrate that this project will not live up to expectations. In its zeal to make a bus go as fast as possible for as cheap as possible, the City has lost sight of what riders in Winnipeg really need. For this reason, Functional Transit Winnipeg has put together a research-based report that explains why transit requires investment in frequent bus service rather than investment in the current Southwest Corridor plan.

In this report we will explain why the most important element for transit investment is service frequency. This report will also explain why the Southwest Corridor will not meet transit riders' needs, that there are no guarantees that commercial amenities will be accessible along the corridor and that it will harm the interests of transit riders. Finally, we will put forward our recommendation (purchasing and operating more buses within the existing public transit system) and explain how our recommendations will address the real transit needs in Winnipeg. This report is important not only with regard to the current Southwest Corridor project, but also for effective transit investment in general.

3 WHAT IS IMPORTANT FOR TRANSIT INVESTMENT IN WINNIPEG

In this section, we review key criteria that must be considered when investing in public transit.

3.1 UNDERSTANDING THE STEPS OF A TRANSIT TRIP

The solution to creating an effective transit service begins and ends with overall trip time and service convenience. For this reason it is important to consider all stages of a trip made on public transit.

Transit consultant Jarret Walker divides a transit trip into a series of steps[6]:

1. Understanding: finding and reading the schedule as well as calculating the routes and times necessary to complete the trip
2. Accessing: getting to the bus stop
3. Waiting for the bus
4. Boarding and paying
5. Riding the bus
6. Connecting: transferring to a different bus (which will include repeating steps 2-5)
7. Accessing: getting from the stop to the destination

This is a clear structure for calculating how to invest in transit and what types of investments will have the most benefit for transit. Each step of a trip is affected by different factors such as bus stop proximity, bus frequency, payment method, etc.

However, each of these steps are not equal. Time perception differs for each step. The most onerous parts of a trip *feel* like they take more time while easier parts of a trip *feel* like they take less time. Walking and waiting are typically the most onerous. Walker cites the *Transit Capacity and Quality Service Manual* which states that walking and waiting time feels on average twice as long as in-bus time, while time spent between transfers feels 2.5 times longer than in-bus time[7]. A majority of the research estimates out-of-bus travel time to feel 1.5-2.3 times longer than in-bus time[8]; Isecki et al states that out-of-bus travel time can feel 1.5 to 4.5 times more burdensome than in-vehicle time[9].

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[6] Walker, J. *Human Transit*. (Washington: Island Press, 2012): 34-35
[7] Walker, *Human Transit*: 36
[8] Van de Walle, S., and T. Steenberghen. "Space and time related determinants of public transport use in trip chains". *Transportation Research Part A.* 40 no. 2 (2006): 152
[9] Iseki, I., Smart, M., Taylor, B. D., & Yoh, A. 2012. “Thinking Outside the Bus.” *Access* 40: 9-15.

Given that waiting and walking time feel much longer than in-bus time, getting to the bus stop, waiting for the bus, transferring buses and getting from the stop to the destination should be considered more important in terms of overall service quality for transit riders than bus speed. Bus frequency improves speed in steps 1, 2, 3, 6 and 7 of a transit trip; it will also make step 5 less stressful. Frequent bus service on our current bus routes means current bus stops remain accessible and waits and transfers are short. We will explain more about our recommendations in section 5.

3.2 CRITICAL ELEMENTS TO BE CONSIDERED WHEN INVESTING IN TRANSIT

When making a transit investment it is important to remember some very important factors. These factors all relate to one another.

3.2.1 Walkability

Walkability is one of the most important factors to consider when investing in public transit. This means placing transit stops within easy walking distance of both riders' homes and their destinations.

Transit stations must be located in walkable areas – areas where it is easy to get from place to place on foot. Walking and transit go hand in hand[10]. According to Walker, "while there are many ways to get to a transit stop, we plan for one method above all: walking. Sooner or later, everyone is a pedestrian. You may arrive at a stop by connecting transit service or by car or by bike, but unless you take your bike onboard, you'll still be a pedestrian at your destination."[11]

3.2.2 Safety

Safety is often cited by riders as very important[12]. Safety can be improved through a number of measures including bus station patrols, better lighting at stations, surveillance cameras (recently installed in all Winnipeg Transit buses for both rider and driver safety). Bus stops and stations can also be placed in pre-existing areas of high activity where "eyes on the street" create both real safety as well as a feeling of safety[13]. Of all of the options listed above, utilizing "eyes on the streets" is most cost-effective because it creates natural perceptions of safety without having to pay for monitoring.

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[10] Wey, W.M., and Y.H. Chiu. "Assessing the walkability of pedestrian environment under the transit-oriented development". *Habitat International.* 38 (2013): 107

[11] Walker, *Human Transit*: 61

[12] Taylor, B., Haas, P., Boyd, B., Hess, D. B., Iseki, H., & Yoh, A. "Increasing Transit Ridership: Lessons from the Most Successful Transit Systems in the 1990s." San Jose: Mineta Transportation Institute, 2002: 21

[13] Oc, T. and S. Tiesdell. "The Fortress, the panoptic, the regulatory and the animated: planning and urban design approaches to safer city centres". *Landscape Research.* 24 no. 3 (1999): 276-277

3.2.3 Serving the existing urban form

The existing urban environment is the area which riders travel to and from. This is important for designing successful bus rapid transit corridors and transit investment in general[14]. Urban developments that accommodate transit should be the target of improved transit service. This means that stops must be accessible and near amenities that transit riders already use. Essentially these areas must make it easy to carry out the seven steps of a transit trip.

According to Delbosc and Currie, "integration of BRT design is important to ridership generation. This concerns both integration of BRT routes into the wider transit network and integration of street access into urban development within station catchments."[15]

3.2.4 Competing with other modes of transportation (i.e. overall trip speed, cost etc.)

Transit improvement is relative, not absolute. The effectiveness of transit investment should be considered in terms of its relative usefulness next to other modes of transportation. Usefulness can be denominated in terms of convenience or overall cost.

While private vehicles have a relatively high financial cost, buses have a relatively high time cost. How people value their time is an important consideration for why transit investment is often aimed at reducing in-bus time relative to a private automobile. Essentially, a car is expensive, while a bus is inconvenient or, alternatively, a car is convenient while a bus is affordable. Making transit relatively more attractive comes in two forms: making cars more expensive or less convenient to use or making taking transit cheaper or more convenient[16].

3.3 WHAT RIDERS WANT

Research on what transit riders prefer tends to fall into two different types: research that directly asks riders what they want and research that uses data on ridership changes as an indicator of whether investment is meeting riders' needs. Both sets of research are important.

What Winnipeggers say they want happens to be exactly what the research says people want: they want accessible stops, they want higher frequency service and they want lower fares[17].

Additionally, for public transit to stay relevant, it must provide service to the destinations to which Winnipeggers are actually going.

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[14] Ontario Professional Planners Institute. *Plain Transit for Planners*: 2-3

[15] Currie, G. and A. Delbosc. "Understanding bus rapid transit route ridership drivers: An empirical study of Australian BRT systems." *Transport Policy* 18, no. 5 (2011): 763

[16] Chen, C., Varley, D., and Chen, J. "What Affects Transit Ridership? A Dynamic Analysis involving Multiple Factors, Lags and Asymmetric Behaviour." *Urban Studies* 48, no. 9 (2011): 1894

[17] Winnipeg, City of. *Winnipeg Transportation Master Plan*: 46

3.3.1 In Winnipeg

In consultations with Winnipeggers, researchers for the *Winnipeg Transportation Master Plan (WTMP)* found that bus frequency was one of the four main priorities for transit named by citizens[18]. Consultations also found that Winnipeggers wanted transit stops to be easier to get to on foot[19].

Figure 1: Winnipeg Transportation Master Plan findings for transit in Winnipeg

3.3.2 What the research says

Research has found that frequency, low fares, safety and reliability are the factors that have the largest impact on ridership.

In a review of 12 American transit agencies that increased service in the 1990s, Taylor et al. found that increased operating hours had "by far the highest correlation between any [transit-service specific] factor and ridership increase."[20] Taylor et al. also reviewed the research literature on transit, finding that among factors that transit agencies had control over, "increasing the quantity of service (in terms of service coverage and service frequency) and reducing fares are both found to have significant effects on ridership."[21]

The direction of causation is important (whether an increase in ridership causes demand for greater service or whether better service led to more people choosing to ride public transit), and demand has been found to follow supply improvements. Taylor et al. are careful to avoid declaring the direction of causality, but in an interview process with transit managers, they

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[18] Winnipeg, City of. *Winnipeg Transportation Master Plan*: 46
[19] Winnipeg, City of. *Winnipeg Transportation Master Plan*: 42 and 46
[20] Taylor, B., et al. "Increasing Transit Ridership: Lessons from the Most Successful Transit Systems in the 1990s": 48
[21] Taylor, B., et al. "Increasing Transit Ridership": 21

found that transit professionals from agencies that increased ridership in the 1990s believed that service improvements were *followed by* increases in demand[22]. Research on service quantity and fare changes has shown that transit improvement is followed by an increases in ridership – albeit with a lag time[23].

Plain Transit for Planners, from the Ontario Professional Planners Institute, confirms that frequency is important and also emphasizes the importance of accessible urban design:

"Key considerations for transit service include frequency of service, customer service, affordability and safety. The environment, which incorporates street design, transit access points, and neighbourhood design, must be supportive of transit service. The success of the transit provided is otherwise limited."[24]

Research on bus rapid transit systems has also found that the factors most commonly associated with increased ridership are higher frequency, lower fares and network comprehensiveness. Statistically significant factors on daily ridership numbers, found by Hensher and Li, are shown below in the order of greatest impact to least. Note, that the top five factors can all be achieved without having an actual BRT system.

1. Fares
2. Frequency of service
3. Length of network
4. Shorter average distance between stations
5. Integration with existing transit routes and network
6. Pre-board fare collection
7. Maintaining a high quality service level[25]

Research on BRT in Australia concluded that "All tests, including some tests after accounting for the effects of service levels, suggest the quantity of services supplied dominates as an influence on ridership."[26]

3.4 WHY FREQUENCY IS SO IMPORTANT

"Frequency and span are the essence of freedom for a transit passenger. High-frequency, long-span service is there whenever you want to use it, even for spontaneous trips."[27]

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[22] Taylor, B., et al. "Increasing Transit Ridership": 107
[23] Chen, C. et al. "What Affects Transit Ridership? A Dynamic Analysis involving Multiple Factors, Lags and Asymmetric Behaviour": 1904
[24] Ontario Professional Planners Institute. *Plain Transit for Planners*: 2-3
[25] Hensher, D. A. and Z. Li. "Ridership Drivers of Bus Rapid Transit Systems." *Transportation* 39 no. 6 (2012): 1218
[26] Currie and Delbosc. "Understanding bus rapid transit route ridership drivers": 763

Frequent service is the most common factor in high ridership because it is the factor that makes transit convenient. Frequent service means speedy access to a moving vehicle going in the direction that the rider needs or wants to go and it also means speedier transfer times.

When riders need to get to diverse destinations, transfers are necessary. Frequent service makes transfers much less onerous because a rider knows they don't have to wait long for their connection, and if they do miss their connection, another one is coming soon. Of all the parts of a transit trip, transfers are the part that riders have the least control over – they don't control where they transfer, how long they have to wait, how many transfers they will have to make and whether their buses will arrive at transfer points on time. Frequent service makes transfer points more flexible and thus more reliable.

Ultimately, bus frequency makes public transit competitive with private automobiles – it makes it available when it is needed – and competitive transit is functional transit. The goal should be having a bus arriving when a rider needs it.

3.5 WHERE WINNIPEGGERS ARE GOING

The places that Winnipeggers are going must also be taken into account. This should be a major consideration for transit investment.

While downtown does dominate as the main single destination, the majority of trips made by Winnipeggers are within their own neighbourhoods. At present, routes to downtown during rush hour are well-served, while there is still a major need for buses that serve destinations within neighbourhoods.

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[27] Walker, *Human Transit*: 85

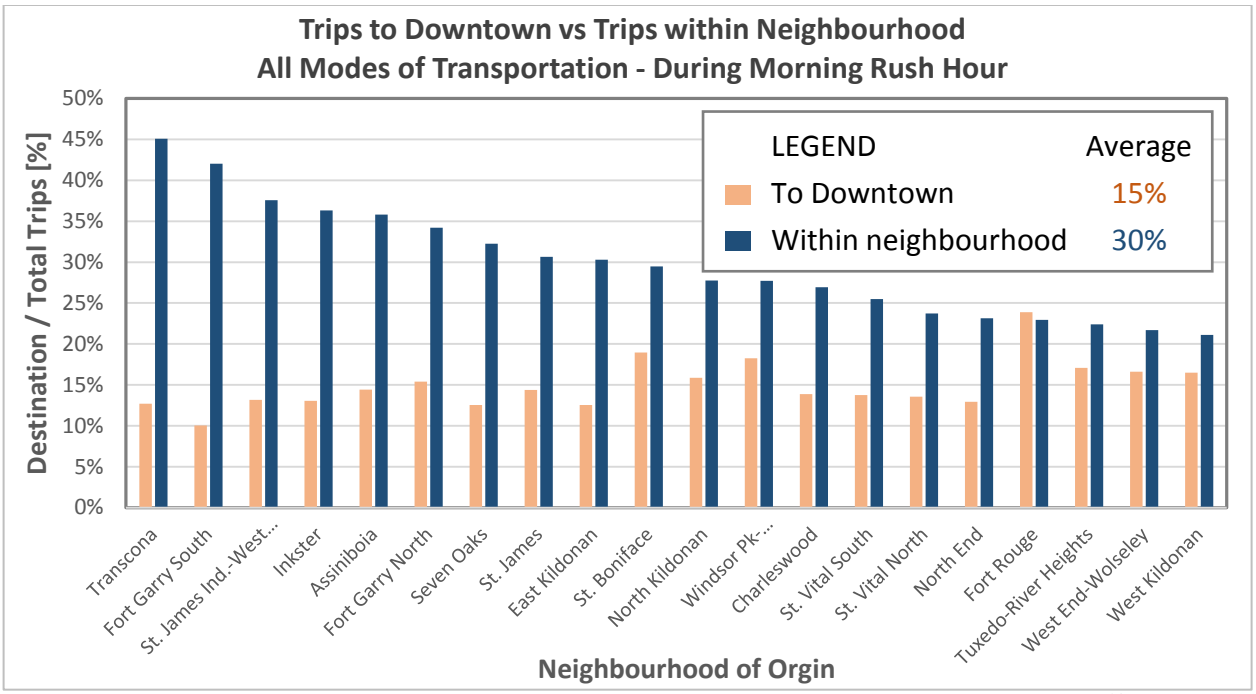

Figure 2: Graph of trip destinations, all modes of transportation, during morning rush hour[28]

Additionally, trips made by Winnipeggers are quite diverse. While trips for work are the largest single trip purpose, shopping and leisure trips combined make up an even larger proportion of trips made by Winnipeggers. Transit service should reflect these diverse needs.

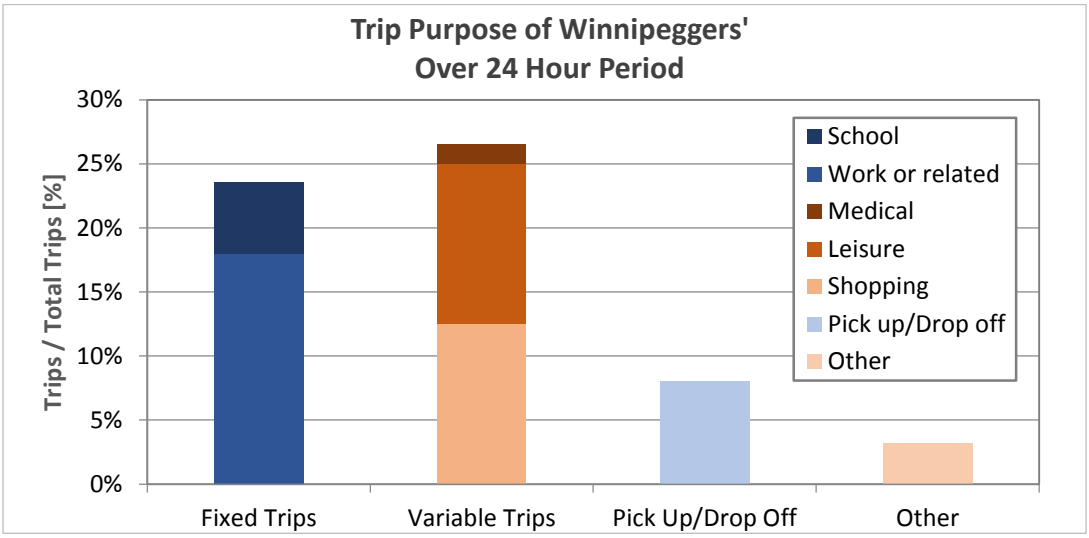

Figure 3: Purpose of Winnipeggers' trips over a 24 hour period[29]

[28] Data from from 2007 Winnipeg Area Travel Survey Results – Final Report, pages 38-79. Elmwood results not shown due to inconsistencies in the reporting of the survey results. Morning rush hour is from 7am to 9am.

[29] Data from 2007 Winnipeg Area Travel Survey Results – Final Report, page 33. Return home trip not shown on graph accounts for 39% of total trips.

4 SOUTHWEST CORRIDOR REVIEW AND CRITIQUE

Unfortunately, the Southwest Corridor will do more harm than good to our public transit system. Transit service should be frequent, accessible, affordable and safe[30]. The route choice makes stations less safe because there is less potential for having "eyes on the street" and they are less accessible than stops on Pembina Highway. The cost for the transitway is expensive and inefficient for its limited impact to speed and reliability. These are major problems and they should have been confronted before committing to the Southwest Corridor project.

The route along the Hydro corridor was chosen instead of the Letellier route along the railroad tracks despite the fact that the Letellier route is more accessible to riders on Pembina in the Crescent Park and Point Road neighbourhoods as well as riders in parts of the Maybank and Beaumont neighbourhoods[31]. The route along the Pembina Highway median was never considered because it required 16 meters of width for stations (which is much wider than the current median) and because cars making left turns over the median would interfere with the corridor[32]. Winnipeggers themselves have expressed concern about the chosen route and raised these concerns at all public consultations[33].

Unfortunately, the alignment report weights ridership opportunities as just one of many criteria, when it should be the main focus of the whole project. The report specifically says, regarding the route the City has chosen, that there are "minimal riders in the Parker Lands until development."[34] The City should not be speculating about future ridership. There should be clear evidence of demand before committing to a project like this.

If the City is not willing to find a way to integrate rapid transit service into the existing urban form on Pembina Highway, then rapid transit is not going to be helpful for riders and it should be abandoned as a policy.

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[30] Ontario Professional Planners Institute. *Plain Transit for Planners*: 2-3
[31] Winnipeg, City of. *Southwest Rapid Transit Corridor Stage 2 Alignment Study: Final Report*: Appendix D
[32] Winnipeg, City of. *Southwest Rapid Transit Corridor Stage 2 Alignment Study: Final Report*: 17
[33] Winnipeg, City of. *Southwest Transitway (Stage 2): Public Engagement Report,* prepared by Landmark Planning & Design Inc. Winnipeg, MB, 2014: 17-18
[34] Winnipeg, City of. *Southwest Rapid Transit Corridor Stage 2 Alignment Study: Final Report*: Appendix D

4.1 CRITIQUE OF THE SOUTHWEST CORRIDOR

In this section we outline our concerns with the plan for the Southwest Corridor.

4.1.1 Distance from Pembina Highway

The current route is located too far from the amenities on Pembina Highway. It is important that transit riders are able to access basic destinations such as grocery stores, retailers, daycares, schools, etc. Successful rapid transit corridors are built into the existing urban form.

The current route of the Southwest Corridor deviates significantly from Pembina Highway. Distance-wise, Phase 2 of the Corridor route is 50% longer than the existing routes along Pembina Highway (Jubilee to the U of M: The Southwest Corridor is 7.6 kilometers, on Pembina Highway it is 5.1 kilometers).

When comparing rapid transit systems worldwide, route choice is important to their success or failure. In a study of eight rapid transit systems (in this case rail), Babalik-Sutcliffe found that successful systems were usually the ones built into the existing urban form. Of the three systems considered to be failures, the rapid transit systems in Miami and Sacramento failed in part because they were built within an "inconvenient urban form."[35]

It is critical for Bus Rapid Transit systems to operate within the existing urban form. By locating the corridor hundreds of meters (as far as 1.5 kilometers in one instance) from Pembina Highway and by positioning the corridor between car-oriented industrial and low-density residential developments, it is clear that this corridor is not located within the same "existing urban form" as the routes along Pembina Highway.

Even the Letellier route (Concept 2 on Figure 7 on page 49) has been criticized for being too far from Pembina. Despite being much closer to Pembina Highway, graduate student research conducted by Chris Baker at the University of Manitoba found that locating the Southwest Corridor along the Letellier Route (along the railroad tracks) was still too far from the amenities on Pembina Highway[36]. The corridor chosen by the City is significantly further from Pembina Highway.

4.1.2 Commercial development

Commercial development has been found to be one of the most important drivers of ridership along rapid transit corridors[37], and yet, as mentioned above, there are no plans for commercial

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[35] Babalik-Sutcliffe, E. "Urban rail systems: analysis of the factors behind success": 427-433

[36] Baker, C. "Testing the Benefits of On-street and Off-street Rapid Transit Alignments: Implications for Winnipeg's Southwest Rapid Transit Corridor": 113-119

[37] Cervero, R. Public Transport and Sustainable Urbanism: Global Lesson. *University of California Transportation Center*. UC Berkeley: University of California Transportation Center, 2006: 5

development along Phase 2 of the Southwest Corridor. This leads into a discussion of transit-oriented development in the following section.

4.1.3 Transit-oriented development

Despite promises that developments along the transitway would be transit-oriented development (TOD), so far, the developments that have been planned along the transitway either do not appear to meet the City of Winnipeg's own definition of transit-oriented development or there are no guarantees that they will be built as TOD.

The City has justified locating the corridor so far from Pembina Highway by promising that areas along the corridor would be built as transit-oriented development which would complement the rapid transit corridor[38].

According to the City of Winnipeg's Transit-Oriented Development Handbook the definition of TOD is as follows:

> Moderate to higher density compact mixed-use development, located within an easy five to ten minute (approximately 400m to 800m) walk of a major transit stop. **TOD involves high quality urban development with a mix of residential, employment and shopping opportunities**, designed in a pedestrian oriented manner without excluding the automobile. TOD can be new construction or redevelopment of one or more buildings whose design and orientation facilitate the use of convenient and sustainable modes of transportation, including public transit and Active Transportation.[39]

There are four major redevelopment sites selected for development along the entire length of the Southwest Corridor: The Fort Rouge Yards, Sugar Beet Lands (Bishop Grandin Crossing), the Parker Lands and the former Southwood Golf Course.

Currently, there are two development plans that have been made public: the plan for Bishop Grandin Crossing and the plan for the Fort Rouge Yards.

While the Master Plan for Bishop Grandin Crossing states that mixed use development is a goal, the developer for Bishop Grandin Crossing has not made any guarantees as to how many commercial units will be built[40]. The developer "wouldn't speculate on how many square feet of

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[38] Winnipeg, City of. *Southwest Rapid Transit Corridor Stage 2 Alignment Study: Final Report*: 41

[39] Winnipeg, City of. *Winnipeg transit-oriented development handbook*, prepared by the City of Winnipeg and PB's Placemaking Group. Winnipeg, MB, 2011: 6

[40] McNeill, M. "Bishop Grandin Crossing development no longer just commercial." *Winnipeg Free Press,* June 9, 2014.

retail, office and industrial space is likely to be developed, saying that will be determined by market demand."[41]

Given that there is currently excellent access to commercial amenities along Pembina Highway, the City should take access to commercial amenities very seriously along the corridor.

As outlined in the development plan, potential retail activity in the Fort Rouge Yards can only be accommodated by building residential spaces that could later be converted into commercial space. The Fort Rouge Yards Area Master Plan states that "due to the nature of the existing rail lines to the west, cutting the site off from surrounding neighbourhoods and potential clientele, it is not likely that the Fort Rouge station would attract enough support for retail businesses to succeed."[42] Regarding the area around the Jubilee station, the report only states that relative to the Fort Rouge station, "its close proximity to the commercial strip along Pembina Highway would *seem* to make it a better location to incorporate small commercial spaces"[43] (emphasis added). Unfortunately, the Jubilee Station only looks close on a map, in reality, the Jubilee cloverleaf is a major physical barrier that prevents easy movement of pedestrians between Pembina Highway and the Jubilee Station.

Living without a car in these developments is likely to be difficult. There is a risk that these two developments will more closely resemble failed transit-oriented development projects, typically referred to as transit-adjacent development[44].

4.1.4 Ongoing service to Pembina Highway

There will likely be a reduction in service to existing multi-tenant residential and commercial developments along Pembina Highway. Ongoing service along Pembina Highway has been promised, however there are no promises regarding frequency. Service along Pembina Highway between Jubilee and Graham and Vaughan, once served by all the routes going down Phase 1 of the Southwest Corridor, is now served only by the #60 arriving every 20 minutes[45]. It is not unreasonable to expect the same thing to happen when Phase 2 is built.

The neighbourhoods that exist along Pembina Highway are exactly the kinds of places to which the City should be providing great transit service because they have relatively high density

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[41] McNeill, M. "Bishop Grandin Crossing development no longer just commercial."
[42] Lexington Investment Corp & Gem Equities Inc. *The Yards at Fort Rouge – A T.O.D development, Area Master Plan*, Prepared by +whitearchitecture & Meg Construction and Consultants. Winnipeg, MB. 2010: 40
[43] Lexington Investment Corp & Gem Equities Inc. The Yards at Fort Rouge – A T.O.D development, Area Master Plan:40
[44] Halbur, T. "TOD's evil twin: transit-adjacent development." *Mass Transit.* April 3, 2007. Accessed December 20, 2014.
[45] http://winnipegtransit.com/en/timetables/16298?booking=current&schedule_type=weekday

along the edges of Pembina and there are lots of retail destinations. Higher density, mixed-use developments go hand-in-hand with good transit.

Additionally, the areas to the east of Pembina Highway that will be located much further from frequent transit service will see their access to service reduced. According to the Stage 2 Alignment study, the route chosen by the City will increase transit options in Linden Woods and Whyte Ridge[46], but ridership is significantly lower in those areas. While providing good service to both Whyte Ridge and Linden Woods is important, it should not come at the expense of areas with much higher ridership.

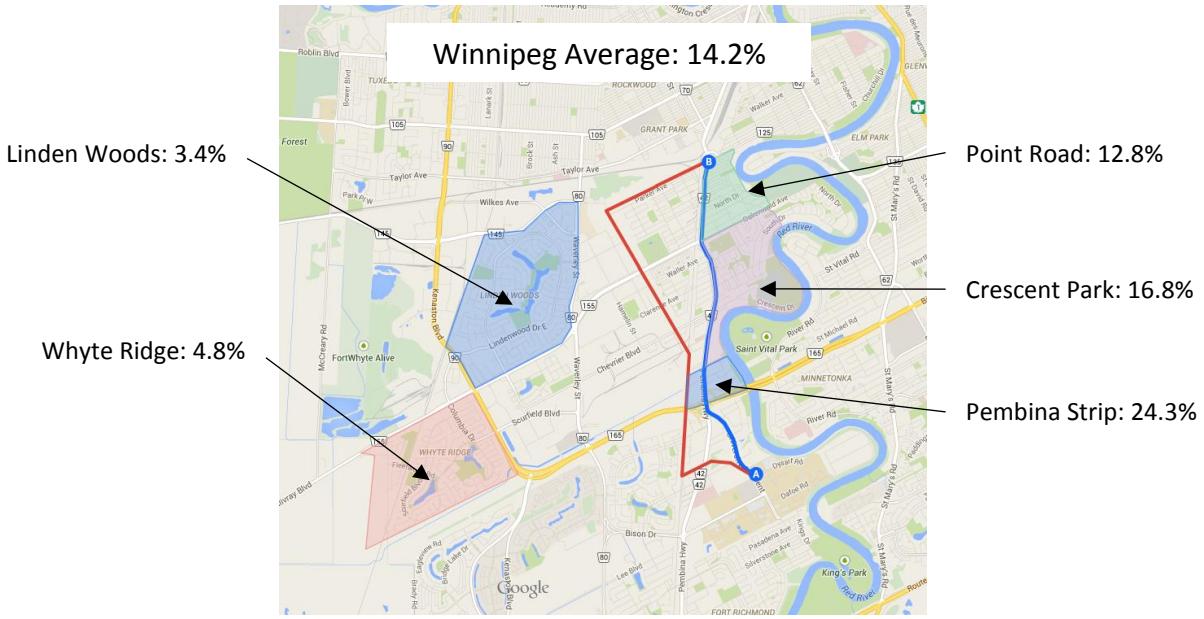

Figure 4: Map of proportion of Winnipeg Transit ridership[47]

Looking at grocery store accessibility, both Price Chopper and the Safeway at McGillivray are located 50 meters from bus stops on Pembina Highway and the Giant Tiger near South Park Drive is 110 meters from its bus stop. From the Southwest Corridor, Price Chopper is 400 meters away, the McGillivray Safeway is 700 meters away from the corridor while the Giant Tiger near South Park Drive will be just 50 meters closer to bus service than it is now. These distances are important because currently there are no plans to build commercial development along the Southwest Corridor.

4.1.5 Trip destination requirements

Downtown is not the main destination for Winnipeggers even during the morning commute. Most trips that people make are to destinations within their own neighbourhoods, not to

[46] Winnipeg, City of. *Southwest Rapid Transit Corridor Stage 2 Alignment Study: Final Report*: 35-36
[47] Data from 2006 Census

downtown. If the goal is to create a more useful transit system, Winnipeg should be addressing the real transportation needs of its citizens.

During the AM peak period, with only two exceptions, significantly more trips are made within neighbourhoods than to downtown. Only in Fort Rouge and Elmwood do more people travel to downtown than within their own neighbourhood.

While the University of Manitoba is obviously a major destination, the effects of congestion are relatively minor since buses go in the opposite direction of rush hour traffic. Building an 800 metre bus corridor through the former golf course lands adjacent to the U of M (which the U of M is already planning on developing[48]) could overcome the congestion between 8:00 and 8:30 AM and the newly created congestion problems caused by the stadium.

To create a transit system that serves all parts of the city equally would certainly be expensive since some parts of the city were built less densely than others. However, many city councillors have shown a willingness to spend hundreds of millions of dollars on transit and Mayor Bowman promised transit projects worth billions[49]. The effect this money could have on improving transit would be astronomical if it were spent on frequent bus service to the places people actually need to go, instead of on a series of corridors serving downtown.

Multidestinational transit can work well. Findings by Thompson and Matoff suggested that transit systems geared toward serving many parts of a city rather than just the downtown can actually perform better than systems strongly oriented just toward serving downtown. They find that "there is substantial demand for [multidestinational] service. The intent of the multidestinational approach is higher overall ridership per capita at lower operating cost per passenger mile, and the results of the sample indicate that this objective has been achieved."[50]

That people need to get to increasingly dispersed locations is not unique to Winnipeg. Research by Thompson and Brown found that cities with transit agencies that implemented multidestinational service saw more consistent productivity gains than agencies that maintained downtown-centric transit.[51]

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[48] Kives, B. "Group chosen to guide development of U of M's Fort Garry campus, Southwood land." *Winnipeg Free Press.* November 4, 2013.
[49] Kives, B. "Bowman pledges to finish rapid transit if elected." *The Carillon*. September 2, 2014.
[50] Thompson, G. and T. Matoff. "Keeping Up with the Joneses: Radial vs. Multidestinational Transit in Decentralizing Regions". *Journal of the American Planning Association.* 69 no. 3 (2003): 311
[51] Brown, J. R., and Gregory L. Thompson. "Examining the influence of multidestination service orientation on transit service productivity: A multivariate analysis." *Transportation* 35 no. 2 (2008): 251

This is not to say that improving downtown is not an important objective, it is just important to recognize that if Winnipeg wants to improve transit and increase ridership, it has to go to where riders need to travel.

4.1.6 Cost per kilometer

The cost per kilometer of the BRT corridor is $60 million[52]. That is one of the most expensive per-kilometer costs for a bus rapid transit system[53]. According to Deng and Nelson, the average cost per kilometer of building BRT in the United States is $8.4 million per kilometer in 2000 dollars ($11.5 million per kilometer in 2014 dollars)[54]. The cost per kilometer of the second phase of the Southwest Corridor is more expensive than the predicted cost of LRT in the 2005 Rapid Transit Task Force report.

Yet, this was the cheapest of the three options for the alignment. At this point the City should have reconsidered whether rapid transit was the right way to improve transit for Winnipeggers. One of the main features that sets BRT apart from LRT is cost. Since the capital cost of Winnipeg's BRT system will cost $60 million per kilometer, it is already 50% more expensive than the average cost of "capital intensive" LRT predicted by Winnipeg's Rapid Transit Task Force: $33 million per km in 2001 dollars ($45 million per kilometer in 2014 dollars)[55].

This is a strong demonstration of the inefficiency of the project. Ostensibly, one of the reasons Winnipeg chose to build BRT is because it is supposed to be a cost-effective way to invest in transit. However, if the price tag is so much higher than initially expected, the City needs to reassess its options. Increasing bus frequency happens to be a way to invest in transit that can boost service to far more people and in a far more dramatic way for the same price.

Some have suggested that rapid transit has a very poor return per investment dollar. J.F Kain is a transportation researcher studying transit investment in Atlanta. He argued that had Atlanta transit operator MARTA chosen to spend its rail capital money on expanding its total service hours, Atlanta could have seen double the ridership growth[56].

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[52] The projected cost of the corridor itself is approximately $425 million and it will be approximately seven kilometers long.

[53] Compared to BRT projects researched in Wirasinghe, S. C., L. Kattan, M. M. Rahman, J. Hubbell, R. Thilakaratne, and S. Anowar. "Bus Rapid Transit – a Review." International Journal of Urban Sciences 17, no. 1 (2013): 22

[54] Deng, T. and J. D. Nelson. "Recent Developments in Bus Rapid Transit: A Review of the Literature". Transport Reviews. 31 no. 1 (2011): 86

[55] Winnipeg, City of. *Made in Winnipeg rapid transit solution final report*, prepared by the Rapid Transit Task Force. Winnipeg, MB, 2005: 23

[56] Kain, J. F. "Cost Effective Alternatives to Atlanta's Rail Rapid Transit System." *Journal of Transport Economics and Policy 31,* no. 1 (1997): 43

4.1.7 Traffic congestion

The corridor is meant to bypass traffic congestion, yet traffic congestion is only a minor impediment to the speed of buses on Pembina Highway.

According to the Winnipeg Transportation Master Plan, "congestion in Winnipeg is generally isolated to river and railway crossings and the downtown. The limited number of river crossings result in recurrent congestion at some bridges, but usually only during peak periods."[57]

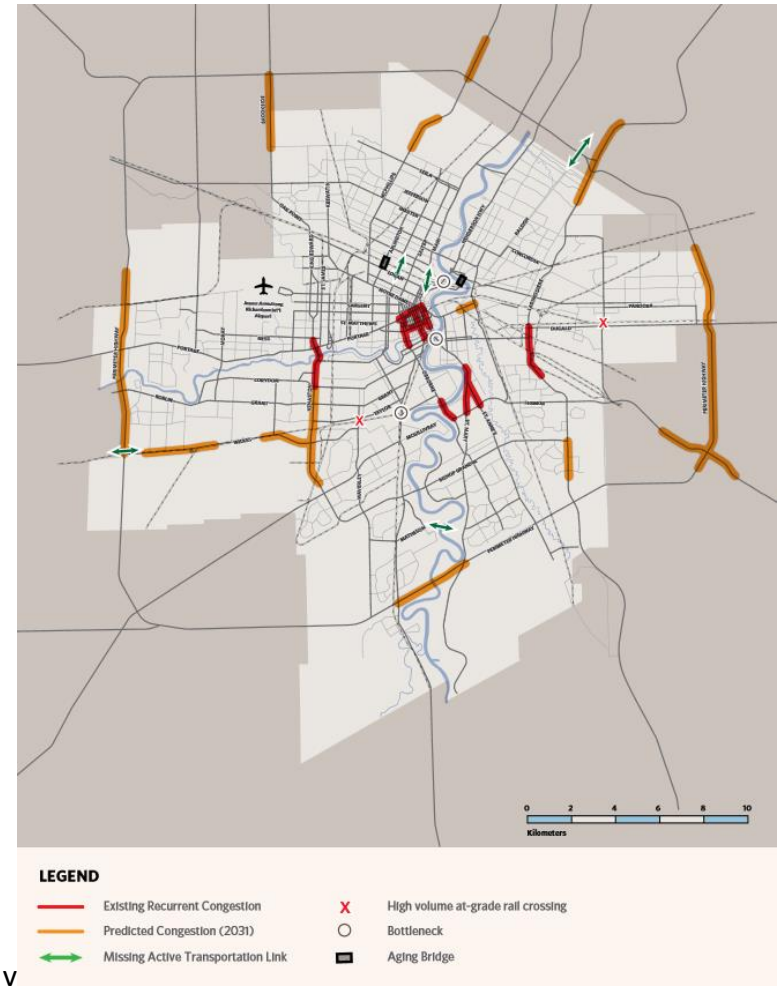

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Figure 5: Current and future traffic congestion[58]

Figure 5 shows areas of current congestion and areas of predicted congestion in 2031. The only congestion concern, present and future, along Pembina Highway is the current bottleneck at the Jubilee underpass. This bottleneck has always been bypassed by buses: formerly with a transit priority signal, presently by redirecting onto Phase 1 of the Southwest Corridor.

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[57] Winnipeg, City of. *Winnipeg Transportation Master Plan:* 26
[58] Winnipeg, City of. *Winnipeg Transportation Master Plan:* Map 3

Ironically, the widening of the Jubilee underpass is expected to remedy the bottleneck – a project that will run in tandem with the Corridor construction.

Unfortunately, the first leg of the Southwest Corridor was not even able to avoid major congestion. While trying to avoid congestion on Osborne and Donald, the first leg of the rapid transit corridor feeds buses into downtown right at a major congestion point on Main Street just north of the Queen Elizabeth Bridge.

Those familiar with Pembina Highway know that there are a few other congested areas, but for the most part those delays are minor. The congestion delay that occurs between 8 AM and 8:30 AM on southbound University Crescent could be mitigated if the University of Manitoba incorporates a bus strategy in its development plans for the Southwood Golf Course.

4.1.8 Transit capacity

One of the reasons bus corridors are built is to create additional road capacity for transit. However, it is not clear that this is currently necessary for Pembina between Jubilee and University Crescent.

Vehicle capacity reflects the number of buses that can be served by a loading area, bus stop, bus lane, or bus route during a specified period of time[59]. The greater the vehicle capacity, the greater the capacity to carry passengers.

Sourcing a study of bus operations from Manhattan, the Transit Capacity and Quality of Service Manual states that maximum bus capacity for a mixed-traffic curb lane is approximately 60 buses per hour[60]. The biggest stress on the Pembina corridor is southbound bus service to the University of Manitoba. Currently, southbound Pembina routes run at a frequency of 40 buses per hour in the morning peak period (7:00 to 9:00 AM)[61]. Of these buses, 14 buses per hour are super expresses (which don't stop between Jubilee and University Crescent). These can operate in the middle or left-most lane on Pembina highway leaving just 26 that require the mixed traffic curb lane.

The introduction of the U-Pass is expected to increase student transit usage by up to 50%[62]. Much of this increase could be absorbed by the super expresses that don't require use of the

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[59] Transportation Research Board of the National Academies. *Transit Capacity and Quality Service Manual (2nd edition).* Washington, DC. 2003: 4-11

[60] Transportation Research Board of the National Academies. *Transit Capacity and Quality Service Manual (2nd edition):* 4-37

[61] See Table 1: Buses per hour during peak periods on Pembina Highway (7:00 to 9:00 and 15:30 to 17:30)

[62] Canadian Centre for Policy Alternatives. *Taking back the city – Alternative City Budget – Winnipeg 2014:* 42

curb lane. Daily traffic counts on Pembina Highway are between 40,000 and 70,000[63]. The U-pass would require adding 20 buses per hour. Since these buses don't service bus stops between Jubilee and University Crescent, buses would be able to travel no slower than general traffic.

Additionally, articulated buses could be used in order to provide additional passenger-carrying capacity while maintaining equal vehicle capacity. Using articulated buses can increase the passenger flow rate by 15%-20%[64] for the same number of buses.

Since downtown suffers the greatest congestion and limits to capacity, rapid transit routes would likely emerge in bottlenecks in downtown long before Pembina Highway, given existing congestion (see section 4.1.7).

Traveling through downtown and bus loading and unloading downtown will present the real challenge to capacity.

Downtown commuter bus traffic might also experience an increase in demand due to the population increase in Waverley West. The expected transit needs of Waverley West and their effect on Pembina Highway need to be explained and justified by the City. Will the people moving to Waverley West be employed downtown or will they need transit service to other areas of the city? Will their ridership look like the city-wide average (14.2% in 2006[65]) or will it look more like Whyte Ridge (4.8% in 2006[66])?

Additionally, Waverley West is oriented toward Waverley Street and Kenaston Boulevard. Currently, the bus that services these streets comes twice per hour during the morning and afternoon rush hours. There is room on these streets to add transit capacity to carry Waverley West commuters northbound.

If capacity improvements are in fact necessary and super expresses cannot meet the demand, there are options available other than a transitway built far from Pembina Highway. Investments in capacity improvement must serve the existing urban form and continue to provide excellent service to riders along Pembina Highway.

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[63] Winnipeg, City of. 2012 Traffic Flow Map. City of Winnipeg, 2012.
[64] Transportation Research Board of the National Academies. *Transit Capacity and Quality Service Manual (2nd edition)*: 4-39
[65] Statistics Canada. *2006 Census*. Government of Canada, 2006. Accessed through the City of Winnipeg at http://winnipeg.ca/census/2006/
[66] Statistics Canada. *2006 Census*. Government of Canada, 2006. Accessed through the City of Winnipeg at http://winnipeg.ca/census/2006/

Table 1: Buses per hour during peak periods on Pembina Highway (7:00 to 9:00 and 15:30 to 17:30)[67]

Time of Day	AM Peak Period		PM Peak Period	
Travel Direction	**South Bound**	**North Bound**	**South Bound**	**North Bound**
Super expresses (non curb-lane) buses per hour				
Route #36	7.0	2.0	2.5	3.0
Route #137		6.0	4.0	
Route #161	7.0			4.0
Regular and express service (curb-lane) buses per hour				
Route #160	6.0	5.5	6.0	6.5
Route #180	3.0			4.5
Route #181		2.5	2.5	
Route #183		4.5	4.0	
Route #185	4.0	4.0	3.0	3.5
Route #60	4.5	3.0	3.0	3
Route #162	9.0	10.0	9.0	7.5
Total curb-lane buses	26.5	29.5	27.5	25.0
Total buses per hour	**40.5**	**37.5**	**34.0**	**32.0**
Total buses per hour with U-pass (50% increase)	**60.8**	37.5	34.0	**48.0**

If a transitway cannot meet this criteria, there are other ways of increasing bus speeds including signal priority, bus stops that can accommodate multiple buses at one time and bus pull-outs for non-express service stops (to allow express buses using the curb lane to avoid the complication of passing slower buses in heavier traffic).[68]

In the 2013 alignment study, Pembina Highway was not considered because it was deemed unfeasible to run the corridor along the median. The alignment study stated that 16 meters of width was needed between Pembina Highway for stations. The study stated many reasons why building the corridor in the median on Pembina was not possible, however, alternative strategies that would serve Pembina Highway were not considered, such as the possibility of constructing diamond lanes on the curb lanes. This would require only six metres of width[69].

[67] Information taken from Winnipeg Transit online schedules March, 2015. http://winnipegtransit.com/en/timetables

[68] APTA Bus Rapid Transit Working Group. *Designing Bus Rapid Transit Running Ways*. American Public Transportation Association. October, 2010.

[69] APTA Bus Rapid Transit Working Group. *Designing Bus Rapid Transit Running Ways*: 20.

An undated City document from between 2004 and 2007 seems to have considered diamond lanes on Pembina to be an option[70].

The planning process for increasing capacity must start with the assumption that ongoing service to the existing urban form is paramount.

4.1.9 Travel time

It is not clear how the corridor will make the commute faster since it is almost 50% longer than the distance that buses currently travel on Pembina Highway.

From Pembina and Jubilee to the stadium the distance is 5.2 kilometers, while the dogleg route is expected to be 7.6 kilometers.

Using the same average speed as the first leg of the Southwest Corridor, 35 km/h[71], travel times on the second phase don't compare particularly well to the routes that currently use Pembina Highway.

During both morning and afternoon rush hours, the #162 bus is only 30 seconds slower than a bus on the transit corridor would be between Jubilee and Markham.

The #60 – a bus route with stops spaced between 150 and 350 meters apart – is only two minutes slower in the morning rush hour and three minutes slower in the afternoon rush hour. The #161 and #137 are worse.

The #161 travels between Jubilee and Dysart Road (at the U of M) in 11 minutes during morning rush hour without stopping at any bus stops, a bus on the Southwest Corridor travelling 35 km/h would take 12 minutes.

The #137 travels between Jubilee and Markham Road in 8 minutes during both rush hours; it would take 10.5 minutes on the corridor.

The comparison of the #161 and #137 bus routes to the speed of the corridor is very important because these two routes essentially do the only thing that the Southwest Corridor should be able to improve upon: travel quickly between downtown and the U of M during rush hour. When these routes were moved onto the first leg of the Southwest Corridor their schedules were changed – while these routes used to run without stopping on Pembina Highway, they now stop at every stop on the transitway. If the same thing happens along the second stage of

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[70] Winnipeg, City of. *Moving Forward on Rapid Transit: Initial Project*. Undated.

[71] From Harkness Station to Jubilee Station the distance is 3.5 kilometers and buses travel it in six minutes resulting in an average speed of 35 km/h. Since there are five at-grade intersections along the second stage of the corridor, even with priority signals, the average speed on the second phase could be slower.

the Southwest Corridor, these routes will take more time than they currently take along Pembina Highway.

According to the Business Case Summary for the Southwest Corridor, trips being made on the second phase of the Southwest Corridor will be 5-8 minutes faster depending on the time of day[72]. The report does not explain how these time savings were determined. At a minimum, there should be an explanation for how these time savings predictions were determined and how they will be met.

4.1.10 Critical elements of transit

The Southwest Corridor doesn't consider the critical elements for transit listed in section 3.2, namely, walkable design, eyes on the street for safety or serving the urban form. The corridor will also not make transit competitive with the private automobile.

Comparing the stations along the Southwest Corridor to the bus stops along Pembina Highway, they are less accessible on foot, they are located in wide open spaces that are not close to any destinations and they are in areas where it will be very difficult to ever develop an environment conducive to "eyes on the street" for safety.

While the corridor will improve in-bus speed, overall trip time may not be affected because the corridor will be more difficult to access and the route is 50% longer than Pembina Highway. Additionally, as mentioned above, basic amenities will be more difficult to access by transit. The main advantage of a private automobile is that it gets a driver to the doorstep of their destination when she or he needs to be there. Locating frequent transit far from Pembina Highway widens the competitive gap between a car and a bus.

The Southwest Corridor ignores the basics of what people in a city need. The urban form surrounding the corridor does not provide access to even the most basic amenities. To trade service down Pembina Highway which accesses nearly every necessary amenity for service down a corridor which accesses none makes the Southwest Corridor worse than service on Pembina Highway.

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[72] Winnipeg, City of. *Stage 2 – Southwest Rapid Transit Corridor Project P3 – Business case summary*: 3

5 RECOMMENDATIONS

As described in this report, the Southwest Transitway is both ineffective and inefficient and it should be immediately canceled. However, despite the ineffectiveness of the Southwest Corridor, City Council was correct to make a large funding commitment for transit in Winnipeg.

Our recommendation is that the City redirects the five cent fare increase and annual .33% property tax increase toward purchasing and operating more buses on Winnipeg's existing network. This is necessary in order to make public transit a practical and useful mode of transportation for Winnipeggers.

These recommendations are based on publicly available information on the costs of running Winnipeg Transit. As citizens, we lack access to exact transit financial information. Our calculations are meant to contextualize in public transit terms what a $19.7 million invested by the City of Winnipeg could have on Winnipeg Transit.

Given that improved bus frequency would effectively meet transit riders' needs throughout the course of an entire transit trip, we recommend that the City of Winnipeg invest in operating more buses on existing routes instead of building and moving buses onto phase two of the Southwest Corridor. Not only will this plan measurably improve service level, but because it is simply an investment in operating more buses, it will give Winnipeg Transit flexibility to provide excellent service to the parts of the city that are most responsive to improved frequency.

Given publicly available data on costs of operating Winnipeg Transit, if the City of Winnipeg committed its annual contribution to the Southwest Corridor P3[73] toward purchasing and operating more buses instead, frequency throughout the entire city could be improved by nearly 25% for the next 29 years.

Even if the City decides to move forward with the proposed plan for the Southwest Corridor, City Council should consider targeting frequency as the next major investment in transit.

Our calculations are based on the City contributing $19.7[74] million (indexed to inflation) annually to transit for thirty years. This amount is equal to the annual payments required for the Southwest Rapid Transit Corridor Project P3. Additionally, our calculations take into account

[73] According to *the Stage 2 – Southwest Rapid Transit Corridor Project P3: Business Case Summary*, the widening of the Jubilee underpass is part of the Southwest Corridor project. Since the City has made this part of this transit project, we are including the entire amount in our recommendation.

[74] This number is based on the full cost of "Southwest Rapid Transit Corridor Project P3." The city has incorporated the widening of the Jubilee underpass as part of this transit project. Since the city has chosen to refer to this whole project as a transit project, we are also using the entirety of these funds for transit.

the 50/50 funding transit funding partnership between the Province and the City. Under this agreement, the province is obligated through legislation to match the City of Winnipeg's contribution to Winnipeg Transit[75].

The increase to Winnipeg Transit's budget would be $19.7 million annually indexed to inflation. Under the 50/50 funding agreement between the Province and the City, the Province is obligated to contribute an additional $19.7 million. These numbers represent 2% of the City's operating budget and 0.1% of the Province's operating budget.

5.1 PROPOSED PLAN

Using these contributions, Functional Transit Winnipeg has put together a model for how the City could increase its transit investment with a focus on frequency. Drawing from Winnipeg Transit's average costs, Winnipeg Transit could purchase and operate an additional 135 buses to the current fleet of 580 (the number of buses operated by Winnipeg Transit in June 2014).

This increase would help us achieve a comparable level of service to other Canadian cities and perhaps set us up to surpass them. In recent years, other Canadian cities have significantly outpaced our city in the quantity of buses they operate in relative terms.

Edmonton: 1040 transit vehicles. 780 people per bus[76].
Quebec City: 613 buses. 842 people per bus[77].
Ottawa: 936 buses. 943 people per bus[78].
Winnipeg: 580 buses. 1144 people per bus[79].

With a fleet of 715 buses, Winnipeg's buses-per-capita would improve to one bus for every 927 Winnipeggers, slightly better than the City of Ottawa but still short of Quebec City and Edmonton. Maintaining the exact same cost per bus operating hour, would improve Winnipeg's transit frequency by nearly 25%. A more detailed breakdown of our calculations can be found in Appendix A.

The City should target the biggest deficiencies first and most aggressively. Peak service is generally good[80], but it may require additional buses in order to reduce overcrowding – generally speaking, peak service should not be the primary target of increased frequency. The

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[75] Manitoba, Province of. "The Municipal Taxation and Funding Act, C.C.S.M.c.M265." Province of Manitoba: 6
[76] Edmonton, City of. *ETS Statistics*. Website. Accessed August 20, 2014
[77] Reseau de transport de la Capitale. *L'enterprise*. Website. Accessed August 20, 2014
[78] OC Transpo. *Bus Fleet*. Website. Accessed August 20, 2014
[79] Winnipeg Transit. "Bus Operator Career Overview"
[80] The U-Pass will cause increased need for peak service improvement, however we assume that increased service needs have already been accounted for.

biggest deficiency in Winnipeg's transit service is non-peak frequency on all routes. Winnipeggers' diverse transportation needs must be reflected in the way that the City invests in transit. The following sections list Functional Transit Winnipeg's recommended priorities for transit investment starting with priority one.

5.1.1 Increase frequency for intra-neighbourhood destinations

Most trips made by Winnipeggers are within their own neighbourhoods (see Figure 2 on page 17), so buses that serve communities should take priority. Initially, lower frequency routes in higher density neighbourhoods with higher ridership should be targeted, but neighbourhoods with relatively lower density should also receive significantly improved service.

The advantage of adding buses to the fleet rather than building a corridor is that there is ongoing flexibility to where service is provided. Since transit ridership is often a function of city-specific conditions, it would be beneficial for the City to track and record accurate data on ridership. This data would then be used to increase frequency in neighbourhoods that show highest responsiveness.

Research has shown that transit agencies can be more effective when investment is directed toward a multi-destinational approach rather than directing all major bus service toward the central business district[81]. According to Brown and Thompson, "results indicate that [cities] whose transit systems have decentralized service to serve dispersed destinations have not been penalized with lower productivity. The results suggest that such systems actually enjoy higher productivity as a result of this service decision."[82]

Transit service has to arrive with reasonable frequency to make it convenient for riders to get to diverse locations.

5.1.2 Increase frequency for all routes during evenings and weekends

Winnipeggers need transit to take them to more places than just their workplace. Buses can play as important a role in getting riders to recreational activities as it does in getting them to work. As mentioned in section 3.5, shopping and leisure make up 25% of all trips made by Winnipeggers.

Improving all routes in the evenings and weekends will make it possible for riders to get to diverse locations. Winnipeg's transit system should make it easy to run errands, meet friends, pick up the kids from daycare, etc. When buses arrive less often than every 10 minutes, the

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[81] Thompson, G. and T. Matoff. "Keeping Up with the Joneses"

[82] Brown, Jeffrey R., and Gregory L. Thompson. "Examining the influence of multidestination service orientation on transit service productivity: A multivariate analysis." *Transportation* 35 no. 2 (2008): 251

time cost of using transit for trips of this nature becomes very high relative to private vehicles. This deters individuals who have a choice between a bus and a car from choosing transit.

As described above, research confirms that frequency has the biggest impact on ridership. This should make it the primary target of investment.

5.1.3 Extend evening peak service from downtown

Winnipeg's leadership have long wanted to encourage its citizens to come more often to downtown. This is our chance to make it happen. Currently, transit riders incur a major time-penalty if they stay downtown after 5:30 when buses begin operating on infrequent evening schedules. The system promotes a rationale of rushing home during peak service periods rather than staying and enjoying the amenities downtown has to offer.

Extending peak service from downtown would be exactly what downtown needs to induce workers to remain for an hour or two after work. Stopping in for a bite at a downtown restaurant, getting some shopping done or going out with colleagues after work are all spontaneous activities that frequent transit would encourage. Furthermore, extending service would have a positive effect on over-crowding on buses by enticing some riders to take the bus a little later.

5.1.4 Summary

Our recommendations do not require increasing frequency on *every* route and they do not require investing in all three recommended areas. For example, bus frequency could be increased by 50% on half of all routes, or it could be doubled on 25% of all routes. The intention of these recommendations is to demonstrate the significant improvement the City of Winnipeg could make to public transit if improving frequency was the objective.

As this plan does not call for an emphasis on increasing frequency for peak periods, the entire improvement to these routes could be directed toward improving evening and weekend frequency by much greater than 25%.

The aim of this plan is to target the aspects of transit that make it inconvenient: low frequency at times other than the morning and afternoon rush hours.

5.2 EFFECTS OF PROPOSED PLAN

5.2.1 The effect of our recommendations on the steps of a transit trip

Increasing bus frequency has the following benefits for the steps of a transit trip as outlined in section 3.1[83]:

1. Understanding (figuring out the route)
   - Spontaneous decisions to ride the bus become possible. Higher frequency means that riders are more likely to catch a bus when spontaneously choosing to make a trip.
   - There is less need to consult timetables. Higher frequency at all stops means that transfers become less burdensome to calculate because the rider can count on a bus arriving at any bus stop shortly.
2. Getting to the bus stop
   - Some bus stops are more useful than others. While most people in Winnipeg are within walking distance of a bus stop, many Winnipeggers are far from bus stops that offer frequent service. Increasing frequency on all routes will make bus stops that are closer to riders' homes more useful – this makes transit more accessible.
3. Waiting for the bus
   - Simply put, when buses come more often, the wait is shorter. This means less time in cold shelters (if there is a shelter) and more time in warm buses.
   - Frequency creates reliability for someone waiting for a bus. If a rider misses the bus, the next bus will come very soon. Missing a bus causes negative cascade effects on trips that require transfers. If buses come frequently at transfer points, it is possible to make the trip without significant waits at transfer points even when a late bus causes the rider to miss the intended transfer.
   - Most trips take an unknown amount of time (grocery shopping, doctor's appointments, etc), meaning riders are often forced by circumstance to show up at a bus stop at random times. Waiting for a bus at these times can be a huge burden that frequent service can relieve.
4. *No change for Boarding and Paying step*
5. Riding the bus
   - More buses means less overcrowded buses.
   - Riding a bus can be stressful when the total trip involves transferring to an infrequent bus at any point on the trip. In these cases a bus running behind schedule is very stressful. When buses come often at transfer points, getting the exact right connection

[83] These steps are taken from Walker, *Human Transit*: 34-35. How frequency will impact these steps in Winnipeg is our own analysis.

becomes less critical and the overall trip is more relaxing.

6. Transferring
   - This is the most important aspect that frequent service improves. Frequent service benefits transfers in three ways: it makes them faster, it makes them more flexible if buses are running off schedule and it makes them less difficult to plan.
   - Riders dislike having to transfer, but on any useful transit service it is necessary. Despite their best efforts, transit authorities cannot create routes to destinations that will be convenient for every single transit rider. The transportation needs of transit riders are diverse enough that transfers will always be a practical necessity.
   - Because riders have no control over the specific time that buses arrive at a connection bus stop, higher frequency is the best way to ensure the wait is as short as possible.
7. Getting from the stop to the destination
   - Just like getting to the initial bus stop must be convenient, it is also important that destinations be accessible by frequent bus service. Since riders have diverse destinations, each destination must be within reasonable walking distance of a bus stop.

5.2.2 Critical elements of transit considered

Our plan takes into account the critical elements we listed in section 3.2. Below we elaborate on how our plan affects each of the elements.

1. Walkability

Stops that are more accessible to riders' homes and workplaces become more useful with higher frequency service. Pembina Highway continues to be accessible to riders.

2. Safety

Transit stops continue to be in built-up areas where "eyes on the street" make stops safer. Additionally, higher frequency service means that buses come more often so riders spend less time waiting at a bus stop that might feel unsafe.

3. Serving the existing urban form

Winnipeg's conventional transit system is already built into the existing urban form, the current bus stops just need to become more effective by having higher frequency service.

4. Competing with other modes of transportation

While the Southwest Corridor might decrease in-vehicle time, frequent service would decrease overall trip time, with more accessible stops, shorter waits and quicker, more reliable transfers. Frequent service is competitive with a private vehicle because it makes transit available when the rider needs it. By concentrating on service, rather than inefficient capital projects, dollars

invested in frequency provide much higher service levels per dollar spent making the system overall more affordable.

Additionally, frequent service within neighbourhoods provides service to areas people actually need to go. The *2007 Winnipeg Area Travel Survey Results – Final Report* showed the diversity of destinations that Winnipeggers need to reach. Cars can get to those destination easily. In order for transit to compete with the automobile, higher frequency service must also reach these destinations.

6 CONCLUSION

Bus frequency and transfer times are the biggest problems with transit in Winnipeg. Riders know and studies show that increasing frequency is one of the most consistently successful ways to improve transit ridership.

Other Canadian cities have significantly outpaced Winnipeg in the quantity of buses they operate in relative terms. We need to concentrate on providing excellent service that meets transit riders' diverse transportation needs. Frequency is a critical investment in Winnipeg. Winnipeggers have demanded it and transit reports and the Winnipeg Transportation Master Plan corroborate this fact.

We can afford to improve our transit system. Investments in conventional transit are far more efficient and go much further.

By approving a plan that commits nearly $20 million a year to a transit project, City Council showed its commitment to transit in Winnipeg. But we need to make sure that this investment is done right.

Let's invest in transit the right way. Let's make a transit system that will actually meet our diverse needs and one that won't relegate transit riders to the wilderness of hydro corridors.

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APPENDIX A: METHODOLOGY AND NUMBERS

A.1 Cost of Transit

Our calculations used publicly available figures to determine estimates for the costs per unit of service. We recommend redirecting the annual payments for the Southwest Corridor toward purchasing and operating more buses. Under this scheme the City and the Province would increase their contribution to transit by $19.7 million. These are rough estimates only and are based on transit statistics from 2013 – they are meant to contextualize the value of $19.7 million in transit terms.

Table 2: Transit numbers used in calculations

Cost of a 40 foot bus	$ 470,690[84]
Winnipeg Transit total operating budget (2013)	$ 166,511,000[85]
Cost per hour of running a bus	$ 100.00[86]

Total service hours (2013)	1,517,237 hours[87]
Total buses in fleet (2013)	570 buses[88]
Bus life expectancy (years)	18 years[89]

Proposed increase to operating budget

Increase in contribution from City	$ 19,700,000[90]
Increase in contribution from Province	$ 19,700,000[91]

[84] "Transit buys 58 New Flyer buses." *Winnipeg Free Press.* September 10, 2014; (Winnipeg Transit website states the price of a bus to be approximately $400,000, this report opted to use the more recent figure).
[85] Winnipeg, City of. 2015 Preliminary Budget (Volume 2). City of Winnipeg: Winnipeg, MB, 2015: 2015 Preliminary Operating Budget – All Services, 12
[86] Approximate cost; Canadian Centre for Policy Alternatives. *Taking back the city – Alternative City Budget – Winnipeg 2014*: 40
[87] Winnipeg, City of. 2015 Preliminary Budget (Volume 2). City of Winnipeg: Winnipeg, MB, 2015: 2015 Preliminary Operating Budget – All Services, 12
[88] Winnipeg, City of. 2015 Preliminary Budget (Volume 2). City of Winnipeg: Winnipeg, MB, 2015: 2015 Preliminary Operating Budget – All Services, 12
[89] Winnipeg Transit. "Transit Facts. Website. Accessed December 2, 2014.
[90] Winnipeg, City of. Stage 2 – Southwest Rapid Transit Corridor Project P3 – Business case summary, prepared by Deloitte LLP. Winnipeg, MB, 2014, 10 and 11

A.2 Calculations

Average daily hours operated per bus

$$= \left(\frac{1{,}517{,}237\ \frac{hours}{year}}{570\ buses}\right)\left(\frac{year}{365\ days}\right) \quad \text{Eq. 1}$$

$$= \mathbf{7.29}\frac{\boldsymbol{hours}}{\boldsymbol{day \cdot bus}}$$

Annual cost of operating a bus

$$= \frac{\$470{,}690}{18\ years} + \left(7.29\frac{hours}{day \cdot bus}\right)\left(\frac{\$100\ bus}{hour}\right)\left(\frac{365\ days}{year}\right) \quad \text{Eq. 2}$$

$$= \$\mathbf{292,311}$$

Total additional buses per year

$$= \frac{\frac{\$19{,}700{,}000}{year} + \frac{\$19{,}700{,}000}{year}}{\$292{,}311\frac{bus}{year}} \quad \text{Eq. 3}$$

$$= \mathbf{135\ buses}$$

% increase in service

$$= \frac{135\ buses}{570\ buses} \times 100\% \quad \text{Eq. 4}$$

$$= \mathbf{24}\%$$

Notes:

a. The roll-out of this project would take a number of years and require planning beyond the purview of this report. As with the funding for the Southwest Corridor, our model assumes an immediate start date (as opposed to a ramp up of funding) and that this $39.4 million would be used in the initial years to purchase buses, meaning that bus

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[91] Determined based on the 50/50 transit operating budget funding agreement be the Province and City; Manitoba, Province of. "The Municipal Taxation and Funding Act, C.C.S.M.c.M265." Province of Manitoba, 9(1.1) pg 6

purchases would not have to be financed and interest charges would not be applied to the cost of the buses. Given the 18 year life expectancy of a bus, replacement buses would have to be purchased again near the mid-point of this program.

b. A transit garage would also have to be purchased at some point in the project to accommodate 135 extra buses. In order to keep the costs to the City equal between our proposal and the Southwest Corridor P3, one year of the program would need to be sacrificed in order to construct the bus garage. (Approximate cost is likely $22.6 million[92]; we allow a full $39.4 million to be sure all costs, included land acquisition, are covered.)

c. The cost per hour of operating a bus was found in the Canadian Centre for Policy Alternatives' "Alternative City Budget." Multiplying this number by the number of transit buses in operation in 2013 finds that the total operating cost of Winnipeg Transit is 10 percent more than the cost of the actual bus service (i.e. 10% of transit expenditure is unrelated to the cost and operation of standard transit buses). If this number seems too high to the reader, running our calculations with $110 (i.e. the cost per hour of running a bus if Winnipeg Transit's entire operating budget was directly associated with running regular service buses) used instead of $100 finds that the increase in service would be 22%.

d. Federal funding is available for bus purchasing through the P3 Canada fund (the same fund being used for the Southwest Corridor) and through the federal gas tax (currently being used by the City for bus purchasing). This money was not included in our calculations but can be applied for.

[92] Pontanilla, Bernice. "Winnipeg Transit unveils new $22.6-million garage." *Metro*. February 21, 2014

APPENDIX B: THE SOUTHWEST CORRIDOR

The following is a description of the Southwest Corridor plan.

B.1 History

The City of Winnipeg has been considering some form of rapid transit for many decades. One of the earliest plans was for a subway system consisting of three routes that would serve the central neighbourhoods of Winnipeg[93]. A plan for a rapid transit network was first recommended in 1981. It included three dedicated bus corridors[94]. Under Mayor Glen Murray (1999-2004), a plan to build the Southwest Corridor was approved with funding promised from both the Provincial and Federal Governments. In 2004, however, Sam Katz became mayor and cancelled the project, choosing to use municipal money on community centre upgrades instead[95].

Three years later, the City, under Mayor Katz, returned to the idea of building the Southwest Corridor and in 2012, the first leg of the Southwest Corridor was opened. The total cost of the first leg was $138 million.[96]

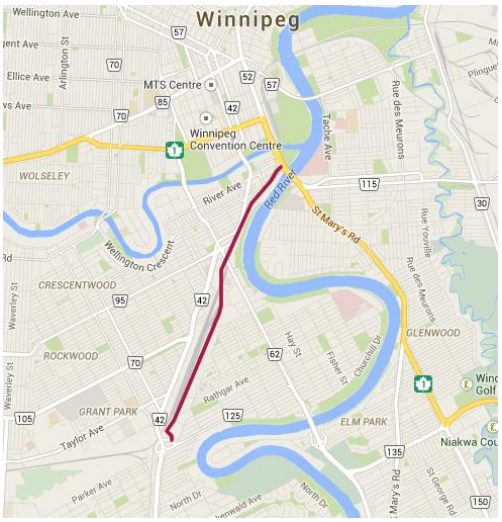

Figure 6: Southwest Transitway phase 1.

In 2013, after a number of years of discussion between various levels of government and indecision on whether the City should instead build a light rail corridor, the plan for the completion of the Southwest Bus Rapid Transit Corridor began to gain traction in 2013.

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[93] Kives, B. "The Wheels on the Busway." *Winnipeg Free Press*. April 7, 2012.
[94] "Not-so-rapid transit." *Winnipeg Free Press*. April 7, 2012.
[95] "Not-so-rapid transit." *Winnipeg Free Press.* April 7, 2012.
[96] A more detailed history up until 2012 at http://www.winnipegfreepress.com/opinion/fyi/timeline-for-rapid-transit-fyi-bk-146513845.html

In January of 2013, the *Southwest Rapid Transit Corridor Stage 2 Alignment Study*, undertaken by Dillon and Associates, was completed with the recommendation that the route of the second phase of the transitway deviate from Pembina Highway. The path would run west through the Parker Lands and then angle back to Pembina along a hydro corridor, it would then follow a railroad track and end at the University of Manitoba.

Over the course of the project, the cost changed significantly.

The original projected cost of the project was $275 million[97].

In November of 2013 the final cost of the second phase of the Southwest Corridor was projected to be $425 million. Additionally, the project would be grouped together with a project to widen Pembina Highway at the Jubilee underpass as well as some other infrastructure upgrades to land drainage. The total price for the bundled capital projects is $590 million[98].

On June 25 2014, City Council approved the construction of the second phase of the Southwest Corridor. The Council vote was 9 – 6, with councillors from the two wards through which the transitway will run voting against the project[99].

As of February 2015, the City of Winnipeg is planning to begin tendering bids for the project. For more information about the Southwest Corridor, see the History section under the Southwest Transit heading on the Winnipeg Transit Website[100].

B.2 The project plan

The intention of the Southwest Corridor is to increase bus speed and reliability for service between the Southwest portion of the city and downtown[101].

In order to accomplish this goal, an alignment study was undertaken to find a suitable location for a dedicated bus lane. Three routes were analyzed: the Letellier Route and two different versions of the Hydro Corridor Route, as shown in Figure 7. The route recommended by the report and the one chosen by the City was the route along the hydro corridor, Concept 1B.

The corridor will increase the total distance that buses have to travel between Jubilee and the University of Manitoba from five to seven kilometers but buses will be able to reach top speeds

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[97] Kives, Bartley. "City plan calls for four rapid transit corridors by 2031." *Winnipeg Free Press.* October 28, 2011.
[98] Winnipeg, City of. Stage 2 – Southwest Rapid Transit Corridor Project P3 – Business case summary, prepared by Deloitte LLP. Winnipeg, MB, 2014: 3
[99] Kives, Bartley. "Bus path the U of M cleared." *Winnipeg Free Press*. June 26, 2014.
[100] Southwest Transitway History http://winnipegtransit.com/en/major-projects/southwest-transitway/transitdevelopment/
[101] Winnipeg, City of. "Rapid Transit Backgrounder." Accessed January 5, 2015: 5

of 80 kilometers per hour. Speed will also be improved by positioning bus stops between 600 metres and a kilometer apart.

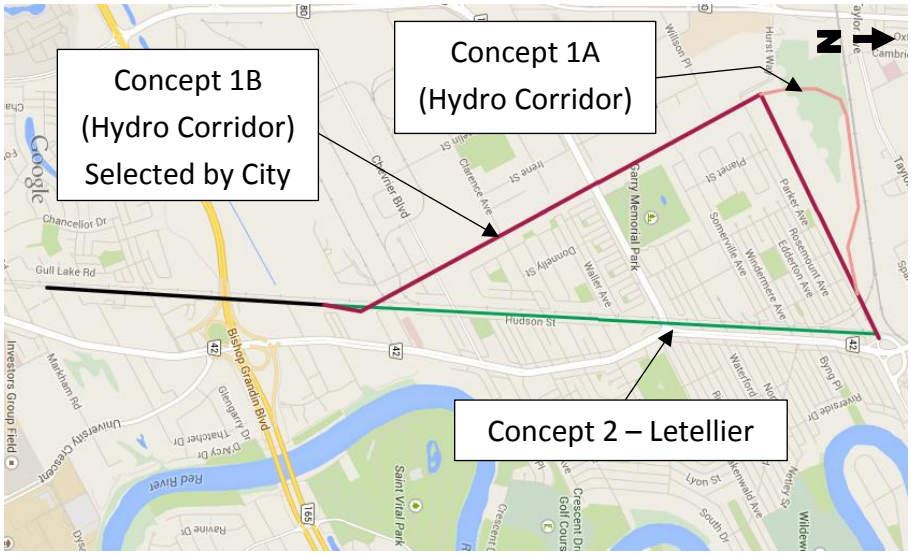

Figure 7: Initial Southwest Transitway alignment options.

The Southwest Corridor route was selected because it was the route that buses could go fastest on, it was the cheapest of the three possible routes, it would be possible to do a future build-out and it had the best opportunity for transit-oriented development.

Many of the bus routes that will use the transitway currently use Pembina Highway. How many buses are moved to the corridor is yet to be determined. When the first phase of the transitway was opened, many buses that once operated on Pembina Highway were moved to an area that was inaccessible to neighbourhoods along Pembina. These included the #162, #163, #180, #183, and #185. The #60 was split into two routes (#60 and #160), with the #160 following the corridor as well. The #60 is now the only bus that travels the whole length of Pembina from Jubilee to Osborne Village and it runs every 20 minutes.

The buses that use the corridor are expected to reach top speeds of 80 kilometers per hour (including stops, the current average speed of buses on the first leg of the Southwest Corridor is 35 kilometers per hour). In addition to speed and reliability, the City claims (without further explanation) that this transit investment will lead to a "significant reduction in the need to transfer (between buses)," it will support downtown development and it will help Winnipeg become a more environmentally friendly city[102].

[102] Winnipeg, City of. "Rapid Transit Backgrounder": 5

B.3 Project cost

The cost for the transit corridor is $425 million and that cost is being included with the widening of the Pembina Highway at the Jubilee underpass. Together these projects cost a total of $590 million. The City and the Province will be committing $225 million each while the Federal Government is expected to provide $140 million through a fund that incentivizes the use of Public-Private Partnerships (P3s). By carrying out the project as a P3, the City can access up to 25% of the total cost of the project in federal funding. The annual payments from the City required to fund their share of the P3 are $19.7 million for 30 years[103].

B.4 Transit-Oriented development (TOD)

The City is expecting to take advantage of the placement of the corridor to create transit-oriented neighbourhoods. Along the second phase of the Southwest Corridor there are four areas designated for TOD: the Parker Lands, the Sugar Beet Lands, the Fort Rouge Yards and the former golf course near the University of Manitoba. The Fort Rouge Yards development is currently underway along stage 1 of the Southwest Corridor and is labelled as TOD. The City plans to use a special tax scheme called tax-increment financing on TOD development in order to help pay for the construction of the corridor.

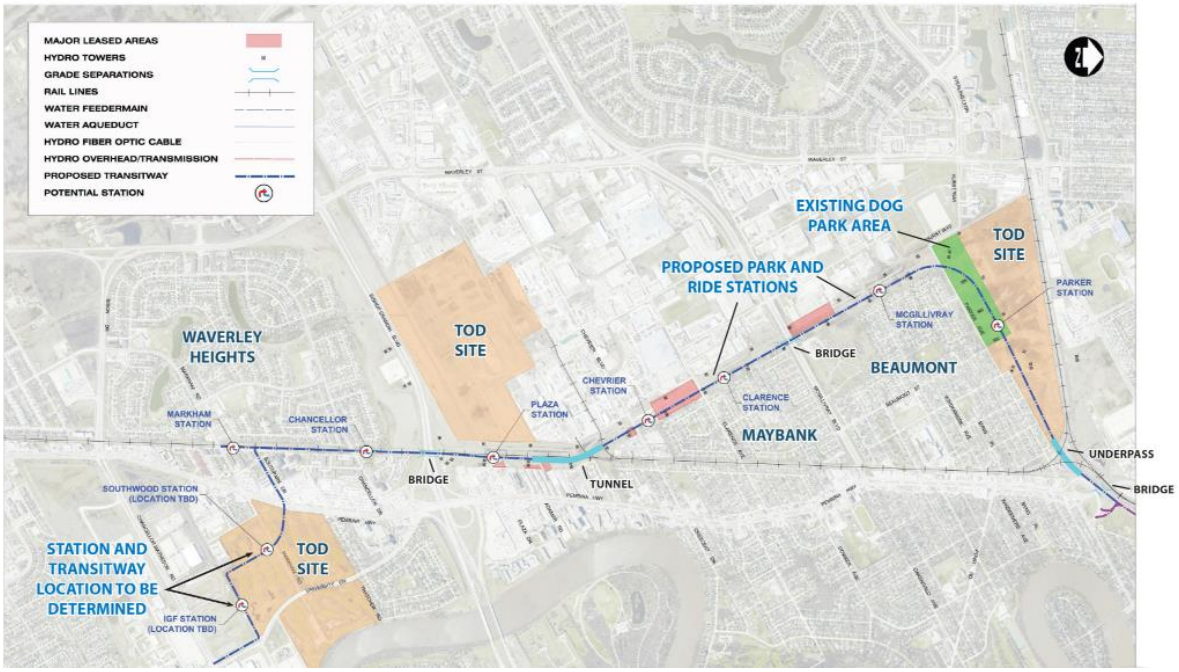

Figure 8: Route selected by the city of Winnipeg[104]

[103] Winnipeg, City of. Stage 2 – Southwest Rapid Transit Corridor Project P3 – Business case summary: 11

[104] Winnipeg Transit. *Southwest Transitway Stage 2*. Website: Accesssed Mar 10, 2015. http://winnipegtransit.com/en/major-projects/southwest-transitway/stage-2---southwest-transitway/southwest-transitway-stage-2-overview/