Transit Strategic Plan

City of St. Thomas

Final Report

Prepared for St. Thomas Transit
Prepared by Stantec

February 2020

Stantec

ST. THOMAS
THE RAILWAY CITY

St. Thomas Transit Strategic Plan

Final Report

February 18, 2020

Prepared for:

City of St. Thomas

Prepared by:

Stantec Consulting Ltd.

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 4

2.0 INTRODUCTION 7

3.0 WHAT WE'VE SEEN AND HEARD 7
3.1 STAKEHOLDER ENGAGEMENT FINDINGS 8
3.2 BACKGROUND INFORMATION AND DATA REVIEW FINDINGS 9

4.0 SERVICE PLANNING AND OPERATIONS ANALYSIS 11
4.1 OVERVIEW 11
4.2 ROUTE-LEVEL ON-TIME PERFORMANCE 12
4.3 ROUTE-LEVEL PASSENGER ACTIVITY 14
4.4 VEHICLE CAPACITY UTILIZATION 15
4.5 FINANCIAL FACTORS 17

5.0 TRANSIT VEHICLE MARKET OVERVIEW 18

6.0 VISION, GOALS, AND OBJECTIVES 21
6.1 VISION STATEMENT 21
6.2 OBJECTIVES 22
6.3 EVALUATION CRITERIA 23
6.4 KEY PERFORMANCE INDICATORS 24
6.5 ACHIEVING THE VISION 26
6.6 DATA COLLECTION 28

7.0 GAPS ANALYSIS 29
7.1 SERVICE PLANNING AND OPERATIONS 29
7.2 TECHNOLOGY 31
7.3 FARES 32
7.4 MARKETING 34
7.5 FLEET 36

8.0 POSITIONING FOR THE FUTURE 37
8.1 CONTRACT CONSIDERATIONS 37
8.2 POSSIBLE PARTNERS 38
8.3 DEMAND-RESPONSE TRANSIT CASE STUDIES 39
8.3.1 Belleville, Ontario 39
8.3.2 Guelph, Ontario 39
8.3.3 Waterloo Region, Ontario 39
8.3.4 Case Study Take-Aways 40
8.4 PARALLEL TRANSIT IMPACTS 40

9.0 SERVICE PLANNING & OPERATIONS RECOMMENDATIONS 41
9.1 GUIDING NETWORK PRINCIPLES 41
9.2 NETWORK OPTIONS 42
9.2.1 Option 1: Existing Network 42

9.2.2 Option 2: Major Trip Generators 44
9.2.3 Option 3: Two-Way Service 44
9.3 NETWORK EVALUATION AND COMPARISON 47
9.4 FINAL PREFERRED NETWORK OPTION 50
9.4.1 Implementation of Option 3A 50
9.4.2 Implementation of Option 3B 51
9.4.3 Demand-Response Services 52
9.5 CROSS-BOUNDARY TRANSIT POSSIBILITIES 54
9.5.1 Existing Cross-Boundary Services 56

10.0 TECHNOLOGY RECOMMENDATIONS 57

11.0 FARE RECOMMENDATIONS 59

12.0 MARKETING RECOMMENDATIONS 61
12.1 BRANDING CONSIDERATIONS 61
12.2 INFRASTRUCTURE CONSIDERATIONS 63

13.0 FLEET RECOMMENDATIONS 66
13.1 FLEET AND MAINTENANCE 66
13.2 ELECTRIC PROPULSION OPPORTUNITIES 68
13.3 VEHICLE BRANDING OPPORTUNITIES 69

14.0 IMPLEMENTATION PLAN 70
14.1 SHORT-TERM ACTIONS 71
14.2 LONG-TERM ACTIONS 72

APPENDIX A: INTERIM BACKGROUND REPORT 73

FIGURES

Figure 1: Option 3- “Two-Way Service” 5
Figure 2: Residential population density 10
Figure 3: Employment density 11
Figure 4: Route-level on-time performance (2018) 13
Figure 5: Daily passenger kilometres traveled by route (2018) 14
Figure 6: Average daily passenger activity by route (2018) 15
Figure 7: Route 1 maximum load by stop 16
Figure 8: Route 2 maximum load by stop 16
Figure 9: Route 3 maximum load by stop 17
Figure 10: Route 4 maximum load by stop 17
Figure 11: Change in ridership, expenses and revenue (2015-2017) 18
Figure 12: Peer Transit Agency Fares 33
Figure 13: City of St. Thomas current fares (2019) and per trip discounts 34
Figure 14: Current St. Thomas Transit signage 35
Figure 15: Branding examples of bus stops and signage among peer transit agencies 36
Figure 16: Option 1 – “Existing Network” 43
Figure 17: Option 2 – “Major Trip Generators” 44
Figure 18: Option 3A – “Two-Way Service” 45
Figure 19: Option 3B – “Two-Way Service” 46
Figure 20: City of St. Thomas Logo 61
Figure 21: Collingwood Transit bus wrap 62

TABLES

Table 1: Route-level overview 12
Table 2: Summary overview of available front engine cutaways in the Canadian market 20
Table 3: Summary overview of typical smaller rear engine vehicles currently available in the Canadian market 21
Table 4: Existing performance criteria for St. Thomas Transit 25
Table 5: Outline to achieve St. Thomas Transit’s vision 27
Table 6: Network evaluation results 49
Table 7: Annual low-income cut-offs 59

1.0 EXECUTIVE SUMMARY

The City of St. Thomas is a unique community, serving as a historic railway hub connecting the Windsor-Niagara region to the northeastern United States via rail. Since then, St. Thomas has experienced steady growth, with its population approaching 40,000, mostly supported by industrial employment. It is anticipated that St. Thomas will continue to be an industrial community with additional economic drivers from service and institutional employment by 2036 leading to a projected population of 48,500.

A city is only as good as its transit system. St. Thomas Transit, like many agencies of its size across North America, is faced with the need to reconsider how it designs and delivers its services to make them financially sustainable and attractive into the future. Today, the City of St. Thomas stands at a crossroads. In the coming years, the City faces challenges of providing services for an increasing population (and an aging population) while supporting economic growth and job creation. St. Thomas' Transit Strategic Plan builds on the success of past planning while recognizing the evolving lifestyle changes in the city. This plan aims to attract new riders to transit in St. Thomas while maintaining the loyalty of those who depend on the service today.

There are many of the necessary ingredients required for transit in St. Thomas including density of population and jobs, mixed land uses, serving populations with little or no other travel options, and the future projected growth within the city including proposed urban expansion areas which may offer potential ridership growth over the upcoming years. The City currently operates five fixed conventional transit routes, operated under contract, as well as a specialized transit service for eligible riders. Regional Rideshare is also offered through a partnership with the City of London. A peer system analysis shows that St. Thomas aligns with its peers with a conventional ridership decrease seen over the last few years and a corresponding specialized transit ridership increase. St. Thomas sees a lower operating cost to its peers, maintaining a consistent cost recovery despite a decline in ridership. Through stakeholder feedback, emerging themes arose surrounding service provision, transit affordability and service coverage. Majority of survey respondents indicated their primary use of transit was to make commuting trips. Overall satisfaction was seen with the service, with a desire for additional service hours, shorter wait times, lower trip costs and route directness identified.

Through analyses and stakeholder feedback a number of gaps have been identified related to service planning and operations, technology, fares, marketing and fleet. To address these gaps and position St. Thomas Transit for the future, recommendations have been crafted. As part of the service planning and operations recommendations, several new network options have been devised and evaluated against the existing network. An evaluation criterion was developed to assess each network option based on ridership, financial and implementation and operational factors.

Overall, Option 3 'Two-Way Service' scores the highest, given the removal of one-way loops and direct routing, this network offers greater route simplicity and directness while still offering a comparable level of coverage to the existing network. This network option provides the greatest potential for ridership growth and will be able to leverage a significant portion of the existing network infrastructure. This new network will leverage demand-response services to serve areas with lower ridership including the industrial areas in the northeast, representing a significant employment area in the city. The benefits of demand-response services include flexible routing or scheduling to meet customer demand and the use of technology (mobile apps) to corelate supply and demand to ultimately optimize the vehicle fleet. This option also gives St. Thomas Transit the ability to provide frequent service along Talbot St. while interlining the other routes, freeing up resources which may be reallocated a Sunday service pilot.

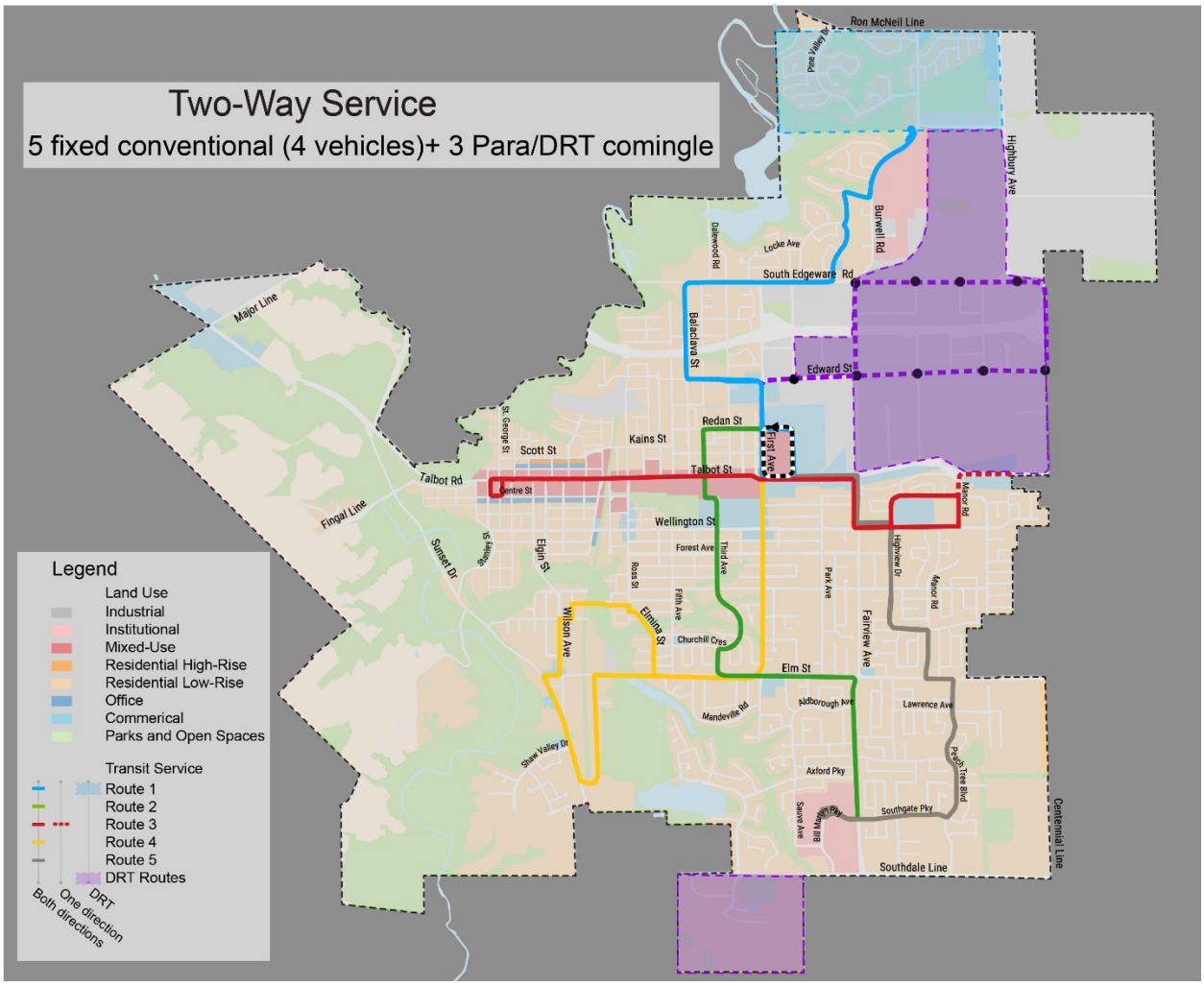


Figure 1: Option 3- "Two-Way Service"

This new network will be further enhanced by the regional transit pilot offering greater connectivity between St. Thomas, Elgin County and London. Based on the final proposed network and supporting recommendations, an implementation plan was created which outlines short-term and long-term action items to achieve the proposed recommendations and the overall future vision for St. Thomas Transit. The action items have been summarized below.

<u>Short-Term Actions</u>

Service Planning and Operations

- Make route revisions as per the final preferred network outlined in Section 9.4 of this report.
- As part of the proposed network implementation, demand-response services will need to be explored. Preliminary discussions for a pilot should be discussed with Voyago and a third-party technology provider to outline service details.
- Improve the collection and monitoring of KPIs, allowing for more informed decision making.

Technology

- Generate a GTFS feed to provide real-time service updates to application developers.
- Invest in dynamic scheduling software to enable microtransit and demand-response solutions.

Fares

- Ensure permanency of low-income pass program for qualified riders. As an extension of the current arrangement with Social Services, transit passes could be purchased in bulk by participating not-for-profit organizations and distributed to members who demonstrate need.
- Consider developing pass programs with local business partners, large employers (EcoPasses) and post-secondary institutions.

Marketing

- Establish consistent and creative branding including unification with the City of St. Thomas brand.
- Update the St. Thomas Transit brochure to be compliant with AODA legislation.
- Revamp the transfer location to create a more attractive and visible presence.

Fleet

- Assess future ridership demand and select a vehicle size accordingly.
- Explore demonstrated testing for zero emission bus technology.
- Utilize vehicle exteriors to advertise cultural and heritage features of St. Thomas.
- In tandem with the three points above, explore in more detail the possibility and implications of implementing Lion Bus, Mission Bus, or a similar vehicle in the form of a pilot program.

Long-Term Actions

Service Planning and Operations

- Based on pilot results, consider permanent implementation of demand-response services in the areas recommended as well as additional low-ridership areas or to provide service coverage in underserved areas.

Technology

- Modernize the fare collection system through the adoption of an open-source electronic fare collection system to allow transit users to pay fares onboard using their credit card, debit card or smartphones.
- Install annunciators and accompanying digital displays to increase the accessibility of St. Thomas Transit.
- Outfit fleet with Closed Circuit Television (CCTV) cameras to ensure customer and operator safety. This will protect St. Thomas Transit and its riders.

Fares

- Extend low-income pass offering through additional channels as appropriate. This pass can be offered at a user price of $40, considering any modifications determined from the pilot and results in the short-term.
- Develop non-fare revenue sources to help fund St. Thomas Transit including but not limited to advertising, parking fees and government grant funding programs.

Marketing

- Introduce new stop infrastructure which will simultaneously serve as additional marketing opportunities to improve brand visibility and demonstrate the unified St. Thomas Transit brand.

Fleet

- Move forward with the appropriate vehicle procurements as identified in the further studies completed in the short-term.

2.0 INTRODUCTION

The City of St. Thomas, located in Southwestern Ontario just north of Lake Erie, is a vibrant city that is home to nearly 40,000 residents. Widely known as the Railway Capital of Canada, it was once a bustling railway hub with over 26 railways passing through it. Following the gradual decline of the railway industry, much of the economic success of St. Thomas has been centered around the rapidly expanding automobile industry. Today, the city continues to grow and evolve as many new companies and industries have flocked to Elgin County. Its rich history and small-town charm play major roles in the city's current industries and culture. As a relatively compact city with growing pressure for new residential and other developments, St. Thomas has been working on an Urban Area Expansion Strategy, firmly acknowledging the desire for compact growth and intensification, along with new mixed-use developments. Overall, St. Thomas is looking at a future that will encourage density and diverse land uses to help ensure sustainable and equitable development for its residents.

With added pressure for growth comes added pressure for transportation; simply put, more people means more travel. Nevertheless, roads can only be expanded so much and new highways can only add limited capacity. While building a new roadway infrastructure is necessary when accommodating population growth, it shouldn't be the only solution. In order to foster sustainable growth, a variety of travel options becomes necessary, and St. Thomas Transit, providing over 180,000 trips in 2018, currently plays a vital role in moving people around the City of St. Thomas.

St. Thomas Transit provides service six days a week across 5 routes covering an area of 35.6 square kilometres. Current ridership trends reveal a gradual decrease in ridership over recent years.[1] While operating costs of St. Thomas Transit are relatively low compared to its peers, improving service effectiveness and efficiency could help, together with other strategies, to stimulate ridership gains.

St. Thomas Transit retained Stantec Consulting Ltd. (Stantec) to help devise a strategic plan aimed at ultimately growing transit ridership while identifying new and innovative ways to provide transit more efficiently and effectively in the future. By reviewing current operating procedures, operating data, and city demographics, and by conducting stakeholder outreach and providing market scans of best practices in service delivery approaches, technology, marketing, and other topics, Stantec aims to develop with the City a strategic plan that steers St. Thomas Transit forward with fresh and bold ideas and recommendations.

3.0 WHAT WE'VE SEEN AND HEARD

A series of activities were conducted throughout the project to understand the strengths and weaknesses of St. Thomas Transit and its services. These activities included, but were not limited to, first-hand observations of the system, meetings with agency staff and various stakeholder groups, an online survey for riders and non-riders, a peer agency comparison, data analysis of existing St. Thomas Transit services, and a review of planning and policy documents. Common themes arose from these activities, which are summarized in Sections 3.1 and 3.2 below and described in greater detail in section 6 of the study's Interim Background Report, which is appended to this report as Appendix A.

[1] It is unclear whether the decrease in ridership is a decrease in actuality or if it is a result of different (more accurate) ridership tracking processes that have been recently implemented. It is highly likely that it is the latter.

3.1 STAKEHOLDER ENGAGEMENT FINDINGS

Overview of Activities

In the context of the Transit Strategic Plan, a variety of stakeholder engagement strategies were undertaken, which were designed to get a full picture of the state of transit in the City from all perspectives. Stakeholder engagement strategies included the following:

- Service ride-alongs and off-board rider and non-rider engagement at and around Walmart and at the Home Show.
- One-on-one interviews with stakeholder groups including Voyago, the Health Unit, Central Elgin, Southwestern Student Transportation Services, Social Services, and the Downtown Development Board.
- Operator workshop and engagement.
- Committee of Council presentation and meeting.
- Municipal Accessibility Advisory Committee (MAAC) open house.
- Online and hard copy surveys, promoted during the activities described above.
- St. Thomas Transit planning workshops among a diverse group of City staff to discuss and vet the different opportunities for improving the route network and service operation.

Findings

Based on stakeholder feedback, there were several prevalent or noteworthy comments and themes that emerged, including the following:

- The City of St. Thomas and Voyago (the service provider) have a very good working relationship.
- The marketing and visibility of the service is currently lacking, with room for improvement.
- Transportation is a major barrier for individuals and families who are low-income or who are trying to enter the workforce. There may be opportunity to better address the needs of low-income individuals.
- There is a general preference for improved service within St. Thomas, and additional service to destinations outside of St. Thomas such as London or Lynhurst should not come at the expense of service levels within the City.
- Later weekday service (past 6:45pm) is high on the wish lists of many.
- The industrial lands in the northeast and the residential neighbourhoods in the southeast were identified as prime underserviced areas. In particular, the industrial lands hold over 64% of the City's jobs but have minimal to no transit service.
- Riders are generally satisfied with the drivers, vehicle capacity, safety, cleanliness, and their ability to transfer. Riders are generally unsatisfied with route directness, route frequency, fare levels, comfort, and the prevalence of user information.

- There seemed to be minimal resistance with respect to restructuring the network if there are opportunities to do so to improve service effectiveness and efficiency.

These findings were acknowledged and addressed, where appropriate, in the Transit Strategic Plan's recommendations.

3.2 BACKGROUND INFORMATION AND DATA REVIEW FINDINGS

St. Thomas' Suitability for Transit

A market conditions assessment illustrated that there are many of the necessary ingredients required for transit in St. Thomas including density of population and jobs, mixed land uses, populations with little or no other travel options, and future projected growth within the city including proposed urban expansion areas which may offer potential ridership growth over the upcoming years.

Between 2001 and 2011, the population of St. Thomas grew by 14.05%, from 33,326 people in 2001 to 37,905 by 2011, and exceeded that of Ontario in percentage terms (14.05% vs. 12.64% during the same period). The densest neighbourhoods are in the west end of the city along Talbot Street around the downtown core. Residential density is comparatively lower in the east and south ends of the city due to many detached single-family housing communities.

The map in Figure 2 also outlines the catchment or service areas of bus stops in St. Thomas—the areas within the dashed outlines are within a 400-metre or a five-minute walk from a bus stop. About 78% of the city's population lives within a five-minute walk of a bus stop. Most of the densest pockets of the City are within the service area of the current transit network. Furthermore, new developments described in the Urban Area Expansion Strategy are anticipated to add some additional density that will build future demand for public transit.

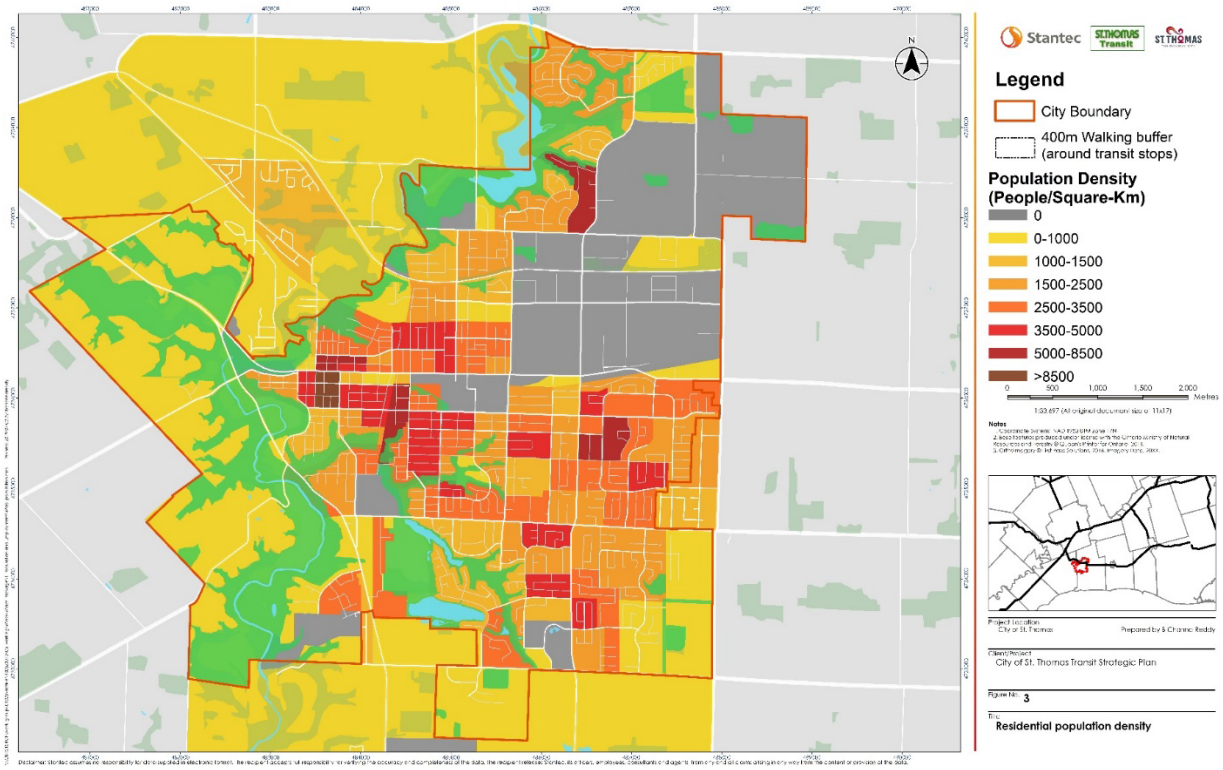


Figure 2: Residential population density

Employment density is another necessary ingredient for transit and having the ability to commute by transit (i.e. having a bus stop near one's work). This can often be a stronger predictor of transit ridership than residential density. Figure 3 displays the number of jobs per square kilometre by census tract. The densest area for jobs is the downtown or city centre as well as the employment lands in the northeast. These areas provide four times as many jobs per square kilometre than the retail malls and institutional campus neighbourhoods which constitute the next densest job centres across the city.

The downtown area currently provides the greatest level of transit service in the city. The employment lands in the northeast of the city employ over 13,141 people translating to over 64% of the jobs in the city. At present, the area is comparatively underserved with only the Northside route (Route 1) and the Express commercial route (Route 5a) serving Burwell Rd. and Talbot St. (east of the city centre) respectively. SmartCentres St. Thomas, which is the home of the primary transfer hub and all the retailers around it, employs a considerable number of the city's labour force though the employment density is low because of the vast spatial area the site covers with surface parking lots.

It is important for transit to reach jobs both downtown and in other neighbourhoods in a quick and efficient way so that transit is a viable option for commuting. Otherwise, coupled with an abundance of available free or cheap parking, the private automobile offers the quickest and most convenient way to commute—there is little travel-time incentive to take the bus. Overall, the city centre's employment density supports transit use where short trips can be made due to proximity between housing and work, ultimately enabling transit to compete with other mode shares.

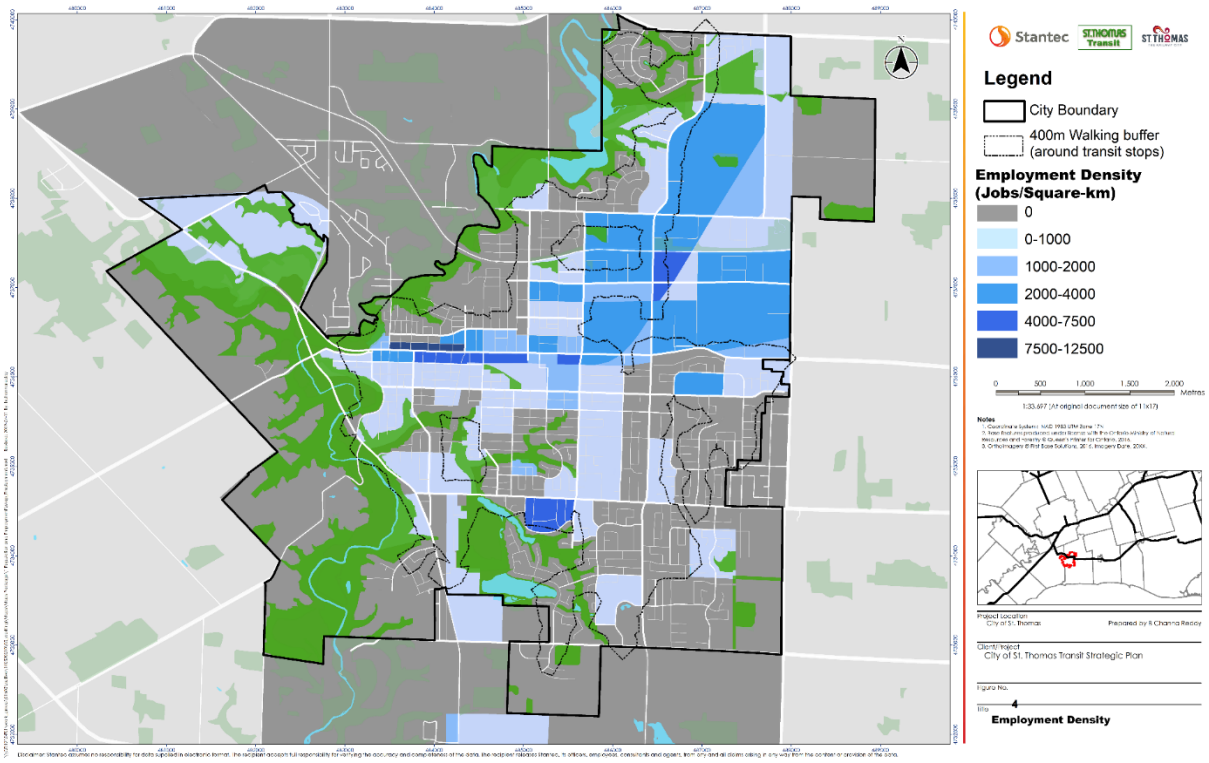


Figure 3: Employment density

Peer Analysis Findings

The peer analysis completed shows that St. Thomas scores lower that its peers in terms of ridership and service utilization (productivity), with the largest conventional ridership decrease seen between 2015 and 2017 relative to its peers despite having the largest increase in service population. Notably, an overall decreasing trend can be seen among all peer agencies. However, a corresponding increase in specialized transit ridership is seen during this same period.

Building off of the background analysis and public feedback, additional analyses related to service planning, operations and the vehicle fleet have been completed below. All of these analyses have been used to evolve St. Thomas Transit's vision, goals, and objectives, and identify a number of gaps with proposed recommendations for improvement.

4.0 SERVICE PLANNING AND OPERATIONS ANALYSIS

To supplement the existing system review outlined in the Interim Background Report (included in Appendix A) and summarized above in Section 3, a deeper dive into the system performance was conducted to identify opportunities and challenges with the existing system. This was ultimately used to inform the service planning and operations recommendations identified later in this report.

4.1 OVERVIEW

To evaluate the performance of the St. Thomas Transit system, several analyses were completed to evaluate various components of the service and understand how each route performs in relation to other routes and the system as a

whole. Key metrics are outlined in Table 1 which consider averages over the calendar year 2018. Additional analyses are expanded on in the subsections below.

Table 1: Route-level overview

Routes	Avg. daily boardings	% of system ridership	Early time points	Late time points	Passenger Kilometres Traveled (PKT)
1 - Northside	113	17%	1.6%	8.8%	731
2 - Elgin Mall	130	19%	0.0%	11.9%	1123
3 - Talbot	231	34%	0.5%	13.4%	1005
4 - Hospital	127	19%	0.3%	15.3%	1199
5a - Express Commercial	82	12%	1.7%	12.1%	553
Average	**137**	**-**	**0.8%**	**12.3%**	**922**

Overall, Route 3 sees the greatest ridership in the system, contributing to approximately one-third of the total system ridership (34%). Routes 2 and 4 are the next most productive in terms of ridership, with each route contributing to approximately one-fifth of the system ridership. The on-time performance suggests that service generally operates on schedule, with service occasionally running late. Although service is generally on schedule, with an average of 12% of trips being more than 5 minutes late, there is room for improvement. To improve, modifications to routing or scheduling may be required, which is discussed in more detail below. Lastly, Route 4 operates with the greatest passenger kilometres indicating a high utilization, with average passenger trip lengths being longer on Route 4 compared to the other routes. Routes 2 and 3 see similar utilization in terms of passenger kilometres travelled. Route 3, despite having total ridership significantly higher than any other route, shows fewer passenger kilometres travelled due to shorter average trip lengths. This suggests that Route 3's passengers are likely using the service primarily to get across Talbot St., and are less frequently using it as a means of accessing residential areas in and around Stanley St., Sunset Dr., Wilson Ave., and Elgin St.

4.2 ROUTE-LEVEL ON-TIME PERFORMANCE

On-time performance serves as a critical measure in assessing schedule adherence and service reliability. To evaluate on-time performance, several timepoints along each route were considered for each month in 2018, to measure what percentage of the service is early, late, or on-time. For the purpose of this analysis, on-time was considered to be service that arrives no more than five minutes before the scheduled time or five minutes after the designated time, consistent with how this is being tracked by St. Thomas Transit today. Figure 4 illustrates the on-time performance for all five routes.

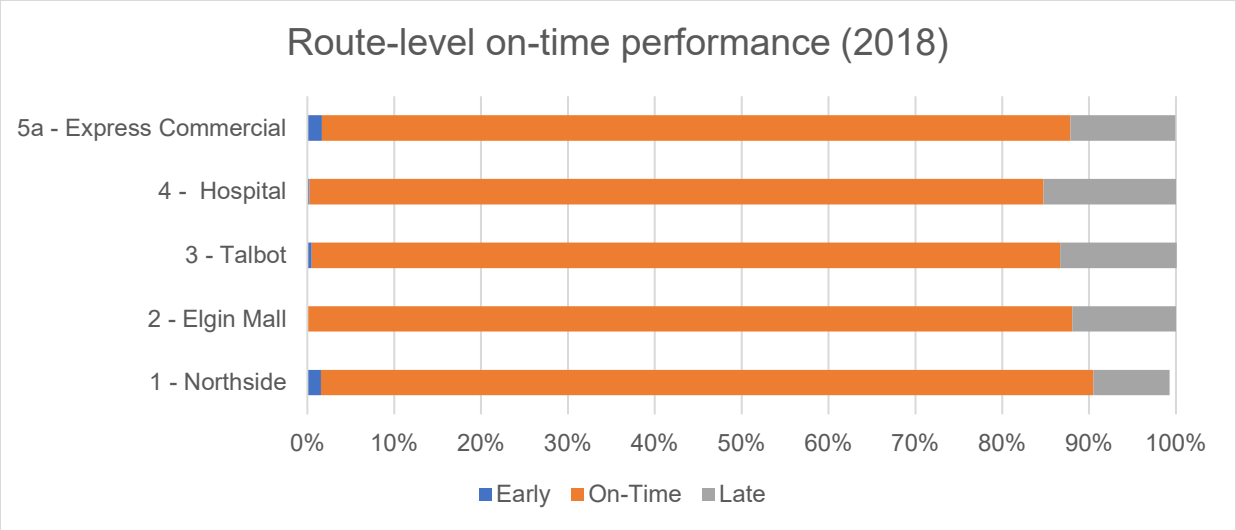


Figure 4: Route-level on-time performance (2018)

The on-time performance for all routes reveals an average of 87%. Although a high percentage, best practice is to be at least 90% – ideally in excess of 95% – but no higher than 99% as this is often a sign that there is too much slack in the schedule. It is also noted that best practice typically defines on-time performance as in between 0 and 5 minutes late. Early trips are generally not acceptable because users plan their travel according to the bus schedule. When a bus is late, it means an extra few minutes of waiting for the customer, but when a bus is early, it could mean close to 30 additional minutes of waiting for the next cycle, which creates reliability concerns for the customers affected. If on-time performance is recalculated based on 0 to 5 minutes late, the percentages would be lower, with early trips taking up a higher proportion of the total.

The poorest on-time performance is seen along Route 4 which has an on-time performance of 85%, with 15% of the service running late. Routing and/or schedule changes, specifically with regards to ensuring runtime is not excessive and that there is adequate layover time built into the schedule, should be considered as a means of improving on-time performance along this route (and others). In addition, instilling a culture of holding the vehicle at a timed stop location if it is running early would help to ensure that buses remain on-schedule (or no more than 5 minutes late).

A conversation with Voyago suggested that there may be a flaw in the data and that in practice vehicles do not run early. Anecdotally, the following comments were made, which are in alignment with the relative on-time performance statistics from route to route:

- Route 1 does not have issues with being late and is routinely the first bus to arrive back at the transfer location.
- Routes 2 and 3 can also comfortably be run on 30-minute headways most of the time, unless there are high volumes of passengers which create dwell time significantly above the average.
- Route 5 did not have issues with being late until the extension was added in the east to Southwestern Public Health and now it is routinely the last bus to arrive back at the transfer location and there are significant challenges with maintaining on-time performance.
- Route 4 also has challenges with respect to maintaining on-time performance and is routinely the second-last bus to arrive back at the transfer location.

Currently many routes are greater than 12 km in cycle length. Considering the average operating speed of 24 km/h reported in 2017, this suggests a runtime of over 30 minutes. This indicates that updates to the schedule may be required to reflect accurate travel times or route modifications may be necessary (or both). When exploring potential future routing, accurate runtimes were considered.

4.3 ROUTE-LEVEL PASSENGER ACTIVITY

To provide further insight into the productivity of each route, the average daily passenger kilometres travelled and average daily passenger activity (boardings and alightings) in 2018 was calculated. The daily passenger kilometres represent the distance travelled by all passengers per day, measuring the use of each route. Similarly, the average daily passenger activity considers the utilization and productivity of each route.

Route 4 has the greatest passenger kilometres, which suggest this route sees a high utilization and supports travel to key trip generators, including a number of healthcare facilities, educational institutions and commercial areas. While Route 3 sees the greatest ridership, the passenger kilometres are lower. As mentioned above, this is likely due to the fact that people are using it as a means of travelling back and forth across Talbot St., but an additional explanation is that this is the shortest route, so even customers travelling between Walmart and Stanley St., Sunset Dr., Wilson Ave., or Elgin St. are likely making shorter trips compared to those that take other routes. Notably, Route 1 has one of the greatest route lengths but also one of the lowest daily passenger kilometres, indicating this route has a poor utilization and is a candidate to be reevaluated in the context of the Transit Strategic Plan.

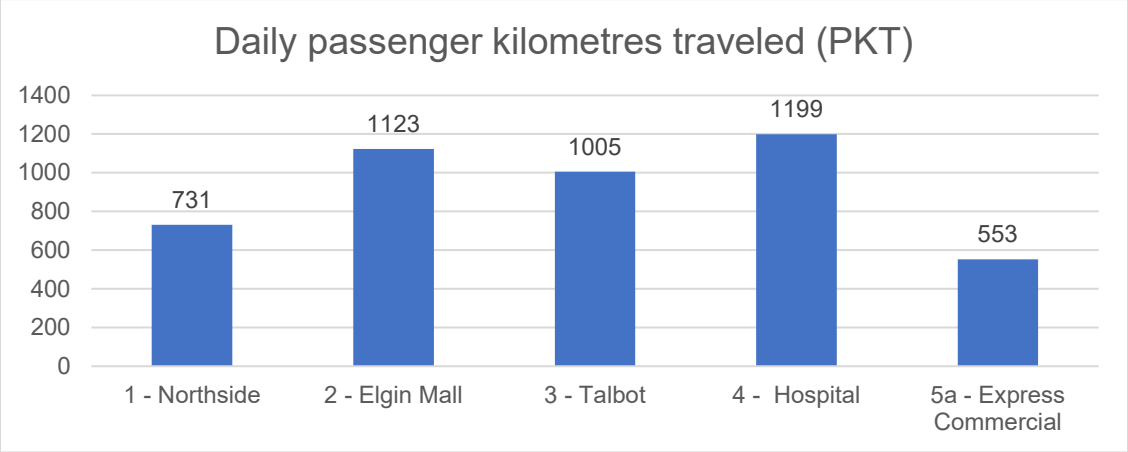


Figure 5: Daily passenger kilometres traveled by route (2018)

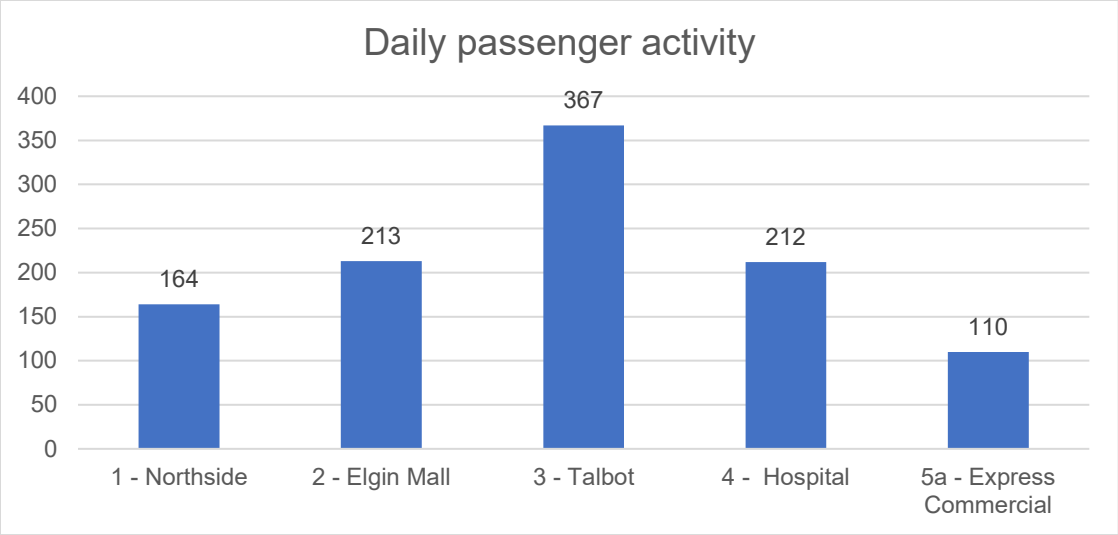


Figure 6: Average daily passenger activity by route (2018)

4.4 VEHICLE CAPACITY UTILIZATION

As another measure of utilization, the maximum load on each route was considered at the stop level using a three-day average[2] from 2018 ridership data (between April/May 2018). The maximum daily load for each route was considered to understand the utilized capacity of the transit vehicles. The seated capacity of the vehicles is noted to be 19 with an estimate of five standing riders to determine a total capacity of 24. The utilization along each route at the stop-level is illustrated below.

The highest loads are generally seen at the beginning of the route at the transfer point, which is expected given the transfer opportunities to other routes and connectivity to the large shopping centre. The greatest utilization (in three-day average terms) is seen along Route 2 with a maximum load of 21 at the transfer point and remains above 15 along the entire route, although it is noted anecdotally that Route 3 may have higher loads during particular times of the month. Otherwise, Route 3 appears to have a lower maximum load despite having the highest ridership likely due to the fact that people are taking shorter trips along this route. Route 1 sees the lowest utilization with a maximum load of 9. Given that this is a 3-day average, it expected that variances may occur from day-to-day or during various periods of the day where this data provides a snapshot.

Anecdotally, an issue with student overcrowding has been noted which is difficult to capture in a 3-day average. Greater frequency on key routes, such as Route 3 along Talbot Street or routes that serve large student populations may help to relieve some overcrowding. The crowding should continue to be monitored to determine if this issue is resolved or if additional options should be explored including working with school boards in St. Thomas to provide additional trips during peak school travel hours. Additionally, overcrowding may be alleviated through larger transit vehicles as discussed further in Section 13.1.

Overall, the stop-level data suggests that the existing vehicle capacity is sufficient to meet the current demand on all routes. In terms of fleet planning, large vehicles may be considered to accommodate future growth, or to accommodate higher trip activity during particular days or weeks of the month, but there are other options to address capacity limitations that should be considered in tandem, for instance by improving the frequency on the route affected.

[2] The specific three days included in the three-day average varied from route to route depending on dates for which there was data availability, and ensuring that only non-holiday weekdays were considered.

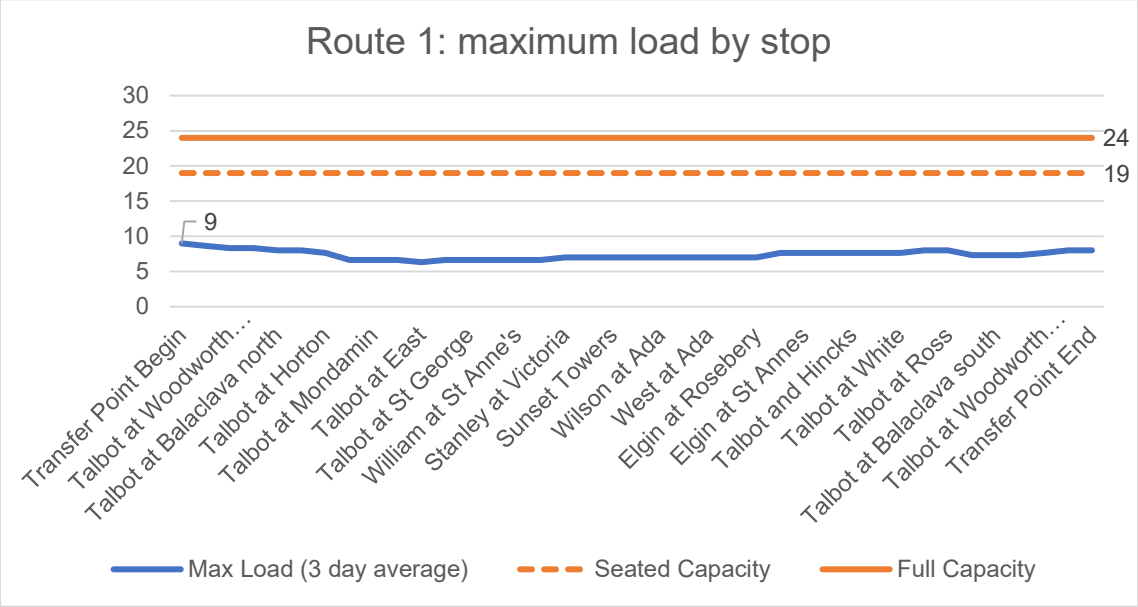


Figure 7: Route 1 maximum load by stop

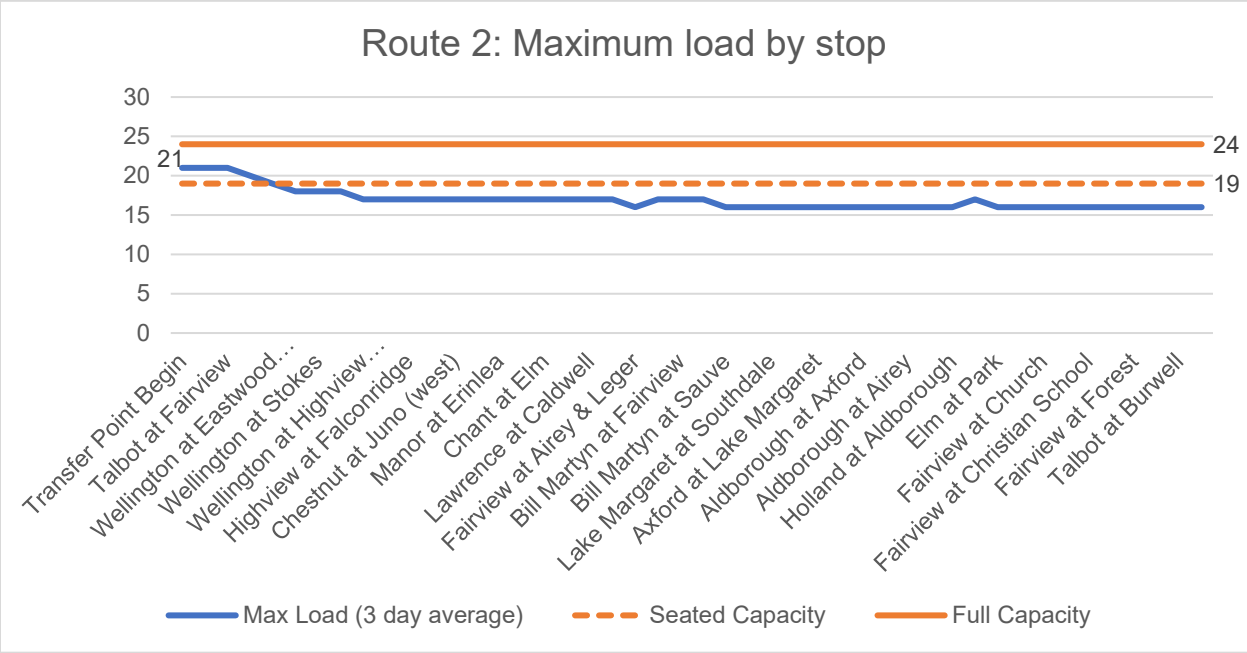


Figure 8: Route 2 maximum load by stop

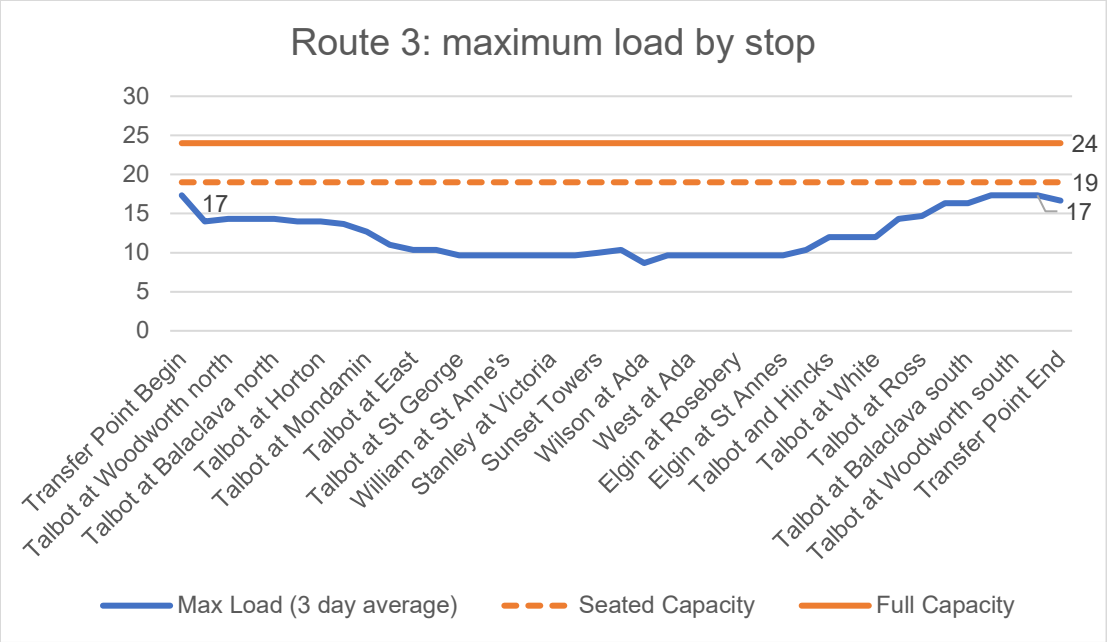


Figure 9: Route 3 maximum load by stop

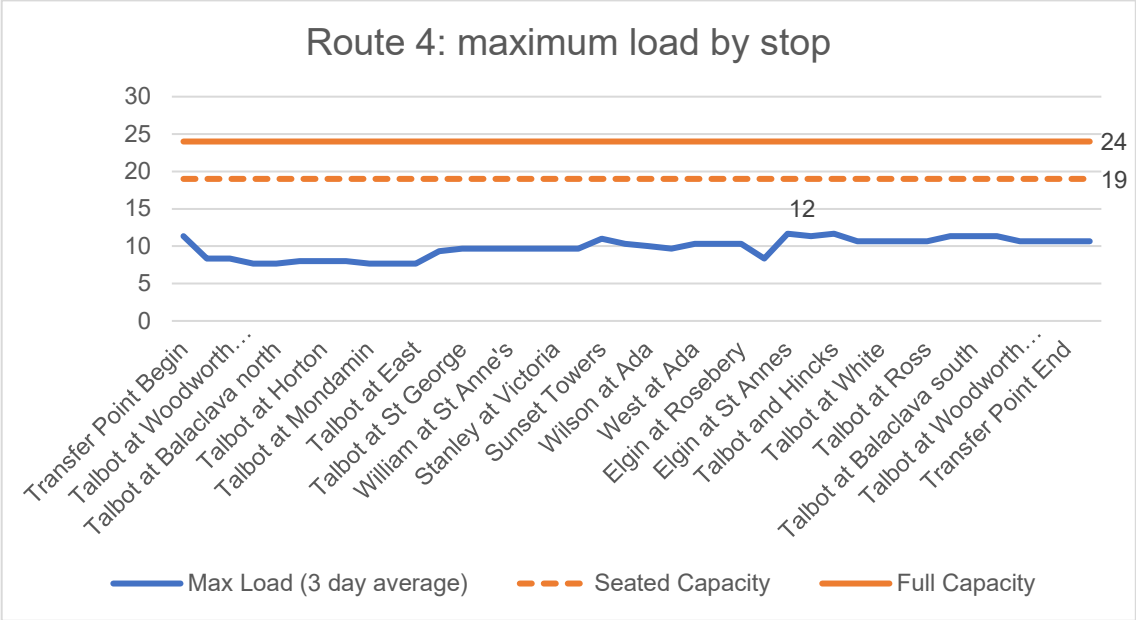


Figure 10: Route 4 maximum load by stop

4.5 FINANCIAL FACTORS

To understand the financial implications of the service the change in ridership over the last three years was considered in relation to the change in total expenses and revenue. The results illustrate that over the last three years the conventional ridership has decreased (-23% over three years), although as has been discussed in the Interim Background Report included in Appendix A, this ridership decrease is likely due to a change in how ridership is being reported rather than a material change in the number of riders in actuality. At the same time, the results illustrate that

specialized transit (Parallel Transit) ridership has increased, alongside increases in expenses and revenue. The increasing expenses (11% over three years) are attributable to the increase in specialized transit trips which are more costly to deliver relative to conventional trips. However, a stagnating conventional ridership suggests that changes to the conventional service, and potentially to conventional-specialized service integration, are required to better meet the travel needs of St. Thomas residents while more efficiently deploying resources in a cost-effective manner.

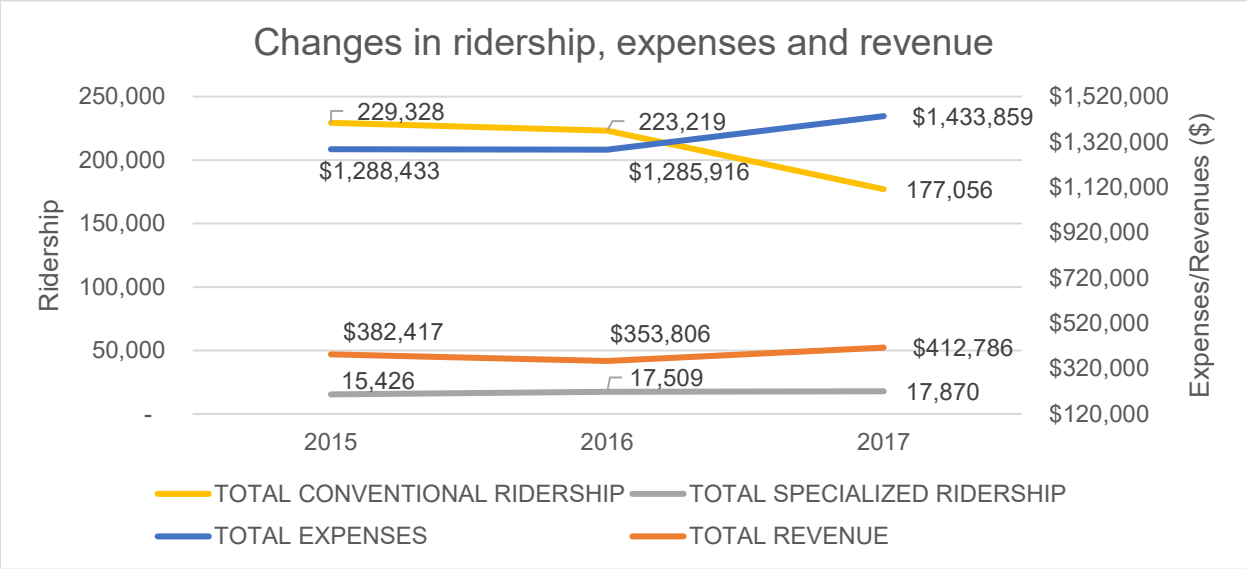


Figure 11: Change in ridership, expenses and revenue (2015-2017)

5.0 TRANSIT VEHICLE MARKET OVERVIEW

St. Thomas Transit is an established transit service whose fleet profile has been impacted by the ongoing evolution of the transit vehicle marketplace. Over the last three decades, the principal guiding factors in new transit bus features have been exhaust emission reductions and accessibility (accommodation for persons with disabilities). Both of these focus areas have evolved through legislated mandates. While the Original Equipment Manufacturers and Vendors (OEMs) have addressed these challenges, they are not without some impact on function (i.e. passenger capacity and maintenance routines).

Recurring challenges for transit agencies have involved the selection of a viable and compliant vehicle (commercially and legislatively speaking) from what is available in the marketplace at a given time. The vehicle types available have varying suitability with respect to the needs of the operation, and the vehicle selected is often not without its strengths and limitations with regards to serving the local area. In St. Thomas, for example, traditional 40-foot buses would not make sense due to their excessive capacity, but at the same time the smaller Crestline and ARBOC vehicles procured by the City, while more appropriate, are often cited by the riders to be uncomfortable.

When funding challenges arise, this sometimes hampers the maintaining of a regimented fleet turnover plan that matches the service design life of the particular vehicle type. Vehicles may remain in service longer than planned with potential excess and non-recoverable operating budget expenditures. Additionally, the bus market being common between Canada and the United States is driven by the needs of the latter which accounts for about 90% of the vehicle volume. As all vehicles must also meet any unique Canadian-based compliance issues, a few vendors do not pursue

the Canadian market, no doubt feeling it would not generate sufficient sales to warrant the cost of compliance testing and product support.

Virtually all current rear engine heavy duty transit buses (i.e. 30, 35, 40, and 60-foot lengths) are of low floor design eliminating the need for lifts. Smaller cutaway/body on chassis buses in the 20 to 29-foot range continue to have a large number of products produced in high floor design with lifts either aft of the entrance door or aft of the rear axle. However, low floor designs with provision to address clearance of the rear axle differential or of front wheel drive design are becoming more commonplace. The high floor vehicle advantages include potentially greater mobility aid device capacity and simpler technology as well as lower capital costs. On the flip side, however, are the disadvantages of longer boarding and alighting dwell times, and potential customer concerns regarding the lack of dignity of being lifted into a bus compared with the alternative of boarding via a ramp.

Changes in propulsion technology have evolved due to both emission controls and the corresponding challenges as well as a concern for non-renewable resources and carbon footprint. Generally, there is a higher capital cost for vehicles with alternative propulsion (zero emission) technologies, as well as one-time costs for infrastructure. However, there are financial incentives that could be used to defray the higher capital and out of pocket costs for zero emission technology. Research and market claims suggest that the higher capital cost will generate some savings in operating cost over the life of the vehicle. Also, in the smaller vehicle range based on a cutaway chassis, there has been a discontinuance of diesel engines over the last few years in favour of only gas. However, the more recent Ford Transit chassis has introduced a diesel option. One of the challenges with recent diesel cutaway products has been to generate enough interior heat in cold weather (particularly if stored out of doors overnight) to afford passenger comfort in the rear of the unit.

It is noted that St. Thomas currently operates a contemporary all cutaway fleet with low floor types for the fixed routes and high floor types for the para transit operation. This practice is not uncommon today among smaller municipalities. Also, some of the earlier versions of smaller rear engine accessible buses have had some “teething issues” whereby in-service lives did not match the more robust pre-low-floor or larger-sized models.

No doubt an important factor to be considered is that St. Thomas contracts out operations and maintenance to a third party. While more expensive and innovative vehicles may be available in the marketplace, when the contract is out for bidding through a competitive Tender or Request for Proposal, proponents will factor in out of pocket maintenance based on the fleet profile. This will include the cost of training for staff to become conversant with maintenance requirements.

The current service level of five units on the conventional service, three units on Parallel Transit, and two spares for an active total fleet of ten units is reasonable, but precludes permanent expansion as that would dip into the spare pool and disturb the ratio. (Typically 20% is seen as an appropriate spare ratio, however various factors may influence this and it is better to err on the side of a higher spare ratio, especially in consideration of St. Thomas’ overall fleet size and anticipated wait times for parts). It should be recognized that contemporary vehicles are more maintenance intensive than those in the pre-accessibility era. The addition of air conditioning, emission control devices, power steering, air ride drivers’ seat, ramps and lifts, securement devices, etc., which were not typically present years ago in Canadian transit buses are all now present and are subject to maintenance and repairs.

The low floor cutaway products, while improved over the last decade do have space limitations. If ridership growth is to be pursued and absorbed through the existing service level, overcrowding may occur on some trips. Adding additional buses and service hours to address current trip capacity would generate additional costs and the need for a larger fleet. Interior dimensions can play a critical point in the accommodation of mobility aid devices. While a “space

envelope" compliant to legislation is provided as is access to it, mobility aid devices are becoming increasingly large in size and some devices may exceed the outlined dimensions.

The tables below capture some key points in bus product offering. High floor designs are not included as low floor designs are generally preferable despite some of their drawbacks.

Table 2: Summary overview of available front engine cutaways in the Canadian market

Vehicle	Length	Width	Comment
Promaster Van	19' 8"	83"	Front wheel drive
Arboc Spirit of Independence based on Promaster (G) Chassis (narrow body)	21'8"	80.5"	Front wheel drive
New England Front Runner based on Promaster (G) Chassis	22'8'	93.2"	Front wheel drive
Arboc Spirit of Independence based on Ford Transit (G), (D) Chassis	23'9"	96"	-
Arboc Spirit of Freedom based on GM4500 (G) van Chassis	3 lengths	96"	-
Arboc Spirit of Mobility based on GM 4500 (G) Van Chassis (with Air Ride)	4 lengths	96"	-
Champion LF Transport based on Ford E450 (G) van, Chevrolet G4500 (G), (D) van, and International UC Chassis (D)	5 lengths	102"	International Chassis is pickup style

NOTES:

- (G) = Gas, (D) = Diesel
- A "length" refers to a passenger box whereby a seating configuration can be outlined. One "length" typically corresponds to 21'6" or 23'9".
- Modern diesels generally do not generate significant heat for interior warmth in the rear of the unit, and they are less effective in slow speed limit environments. If possible, gasoline is advised.
- Specifications and availability are subject to change without notice
- As products are manufactured by American companies, a second passenger door is required for compliance to Ontario HTA, Regulation 629. Most of the products above have been already been built to comply for Ontario customers.
- Larger vehicles would involve going to rear engine heavy duty types such as the 30 or 35 foot Alexander Dennis Midi, the 30 or 35 foot Grande West Vicinity or the 32 or 35 foot Eldorado EZ Rider II. See the table below.
- It is recommended that St. Thomas Transit vehicle candidates have parts readily available and be products that are already in revenue service for a transit agency or bus company in Canada or in the northern United States that has similar climatic conditions.

Table 3: Summary overview of typical smaller rear engine vehicles currently available in the Canadian market

Vehicle	Nominal Length	Width	Comment
Grande West Vicinity	30’	98”	V Drive arrangement, may accommodate 3 mobility aid devices, also offered in 35’ version; (D), (CNG),
Eldorado National Corporation EZ Rider II Max	30’ 32’	102”	T drive arrangement, 32’ may accommodate 3 mobility aid devices, also offered in 35’ version; (D), (CNG), (LNG), (DH)
Alexander Dennis Limited Enviro 200	30’	96’	T drive arrangement, also offered in 35’ version; previously sold as New Flyer Midi; (D)

NOTES:

- (D) Diesel, (CNG) Compressed Natural Gas, (LNG) Liquified Natural Gas, (DH) Diesel Electric Hybrid
- Specifications and availability are subject to change without notice
- Models of the above units have been produced compliant with Ontario HTA Regulation 629
- It is recommended that a vehicle if selected be a product that is already in revenue service for a transit agency or bus company in Canada or in the northern United States that has similar climatic conditions.

As an alternative to the above, a new Canadian-built product has just entered the marketplace. It is the Lion M Electric midibus. It has a flat front, full low floor and at just under 27 feet, the capacity between the cutaway products and the 30-foot units noted above. Range with two batteries is claimed to be 240 kilometres. Because of the lack of an engine compartment at the rear, there is a door on the rear wall, like a school bus thus making it compliant to Ontario HTA Regulation 629. The electric bus manufacturer BYD also offers a 30-foot bus in addition to its larger models. The Diesel powered Arboc Spirit of Equess is available as a 29-foot model but as built is not compliant to Ontario HTA Regulation 629. This product also comes in a 34-foot model which is compliant. New Flyer offers a 35-foot model with various propulsions and electric models of this length are available from BYD and Proterra.

6.0 VISION, GOALS, AND OBJECTIVES

Through the Transit Strategic Plan, the demand for local transit service was evaluated and recommendations are included with respect to enhancing the effectiveness and efficiency of service delivery, while best matching supply with demand today and into the future. Due to the multifaceted nature of transit operations, preparing for the future is best approached with a clear vision that acts as the transit agency’s compass. Utilizing the desired outcomes of the Transit Strategic Plan, a vision was devised for the future of transit in St. Thomas. This vision is supported with high level objectives, evaluation criteria and key performance indicators (KPI) to measure and monitor progress towards this vision. The proposed vision statement and subsequent objectives and evaluation metrics are discussed below.

6.1 VISION STATEMENT

The purpose of a vision statement is to outline the future state of St. Thomas Transit and provide a long-term goal for the agency. The vision serves as a communication tool to riders, staff, and other stakeholders as to what the agency is striving for. The vision statement is intended to be high-reaching and inspiring to management, front-line staff, and the riders, and relatable for all groups of stakeholders. Input from background documents, stakeholder engagement,

and other key findings from the Interim Background Report (Appendix A) have been used to develop a vision statement for St. Thomas Transit. The proposed vision statement is as follows:

A connected, prosperous, and green St. Thomas that is supported by transit as a preferred mode choice.

In working towards the above vision statement, several objectives and subsequent evaluation criteria have been developed and discussed below.

6.2 OBJECTIVES

A vision in itself is an abstract statement and it is difficult for even the most successful agencies, companies, and organizations to confidently say they have achieved their vision. Herein lies the role of having clear and concise objectives. Objectives are supportive of an organization's vision and are more easily tracked and measured. Objectives act as a guideline for day-to-day activities throughout an organization. For St. Thomas Transit, objectives in support of the vision statement include the following:

1. **Build ridership.** This will be accomplished through ensuring as best possible that routes and service levels adequately address all targeted areas during relevant time periods (peak hours, evenings, weekends) as warranted and desired by residents. The network will aim to connect origins and destinations as best possible. A balance between service frequency and geographical coverage will be considered in an effort to ensure that reliable, high quality transit service is available for as many residents as possible. Improving frequency and coverage are two strategies that are effective in growing ridership. It can be difficult to accomplish this keeping budgetary restrictions in mind, however, there are opportunities to explore alternative service delivery strategies which have proven effective in other jurisdictions.

2. **Value customers' time.** This refers to the provision of convenient and reliable service. The transit system will be designed in such a way to reduce customer wait times and travel times through the provision of frequent and on-time service. Routing and scheduling will be optimized to allow for smooth and efficient transfers to provide direct connections to key destinations around the city. Route directness is an important consideration here. Best practice is to structure routes to be as direct as possible between origins and destinations, however, this usually comes at the detriment of coverage. In a city of St. Thomas' size, coverage is especially important as trips are shorter and there will be little motivation to take transit if a long walk to the bus stop is involved. However, opportunities to improve route directness will be explored.

3. **Consider transit in the context of sustainability and economic prosperity.** The accessibility, convenience, safety, environmental-friendliness, and affordability of transit all impact the extent to which it is a viable or desirable option for all residents of St. Thomas. The development of the City of St. Thomas is inherently related to the development and provision of transit service. To ensure the two complement each other, development should be encouraged along major corridors to easily facilitate transit coverage in these areas, allowing transit to be accessible and convenient. As the City of St. Thomas experiences an increase in population and employment, there should be consideration of access to transit at the development phases. Additionally, the pricing of transit is most effective when it is comparable to industry standards, keeping in mind local characteristics such as the average income. Lastly, transit systems are best supported by relevant policies and infrastructure to ensure all riders feel safe while traveling; and are best in support of other City objectives such as carbon footprint reduction.

4. **Increase brand and service awareness.** St. Thomas Transit is best communicated to residents under a single brand to facilitate easy recognition of transit service across the city. This also includes increased

brand awareness and recognition at major transit hubs and key transfer points. Building a strong and recognizable brand will make transit more attractive and accessible to riders, creating an environment where residents make discretionary trips on transit.

5. **Optimize the return on the investment in transit.** Tax dollars need to be used optimally in order for transit service to be deemed efficient. This is an important consideration not only for the riders, but also for the non-riding taxpayers. Through planning and operations, it will be determined how to best use resources to serve the greatest number of individuals. Applicable technologies will be used to optimize transit operations and planning to best meet customer needs.

6.3 EVALUATION CRITERIA

The measurement and tracking of the objectives set above can be accomplished through evaluation criteria. Together with the objectives, the evaluation criteria will help ensure that St. Thomas Transit does not stray from its vision. Evaluation criteria related to the above objectives are summarized as follows:

- **Service quality criteria**: assess the extent to which transit service is attractive, frequent and convenient. Key metrics to evaluate service quality include service hours, average headways, service area, and travel time. The correct parameters for service will be set and monitored to track ridership growth and customer satisfaction, including how well the system values customer's time. Another important consideration is whether desired destinations in and around St. Thomas are being travelled to, including whether commuter services to neighbouring communities are warranted. Service quality will measure how desirable transit is as a mode choice for residents.

- **Financial efficiency criteria**: determine whether St. Thomas Transit is financially sustainable and feasible in both the short and long term, considering how efficiently resources are being used to serve the greatest population. Through financial monitoring, resource deployment can be assessed in terms of how well supply is meeting demand. A critical measure of efficiency will be how well the system utilizes technology to optimize processes and customer experience. This can be measured by various KPIs including cost recovery ratio, operating cost per boarding, and operating cost per service hour.

- **Transit accessibility criteria**: measure how easily residents may access transit, as well as who is able or unable to access the service. This will enable the evaluation of both physical and equitable access to transit. A common industry measure is the percentage of the population within walking distance to transit (400 metres[3]). Additionally, the cost savings between using transit versus driving will identify how affordable and equitable transit is in St. Thomas, especially for transit-dependent populations.

- **Infrastructure prevalence criteria**: measure how predominant transit amenities are within the service area, including bus stops, shelters, benches, lighting and schedule information. Evaluation metrics will be based on applicable standards and design guidelines – infrastructure prevalence in and of itself is not satisfactory if it is not compliant with St. Thomas' Design Guidelines Manual, or with legislation such as the Accessibility for Ontarians with Disabilities Act (AODA). Infrastructure prevalence evaluation criteria will evaluate how well the infrastructure available supports accessible and convenient transit use throughout the city. Key metrics

[3] Although 400 metres is taken as a common measure, acceptable walking distances in reality vary depending on the quality and frequency of service. People tend to be willing to walk more than 400 metres if it means they can access frequent, reliable, and direct service. 800 metres is another common rule-of-thumb in terms of acceptable walking distances.

include the number of bus stops and key transfer locations with transit amenities as a percentage of total bus stops.

- **Marketing consistency criteria**: evaluate the unity of the St. Thomas Transit brand and the clarity of external messaging. This impacts the residents' awareness of how to use transit and how positively the service is perceived. This information is best measured and evaluated through customer feedback surveys.

The adoption of key performance indicators (KPIs) is an effective means of engendering a culture of accountability throughout the St. Thomas Transit organization with respect to these evaluation criteria. More specific commentary regarding data tracking and performance evaluation is provided below in Section 6.4.

6.4 KEY PERFORMANCE INDICATORS

As discussed above the evaluation criteria provide a means of measuring the objectives in support the vision of St. Thomas Transit. KPIs will be utilized within each evaluation criterion to quantify how well the objectives, and ultimately the vision, are being achieved. KPIs were considered from a dual-lens – one, from the lens of a transit provider, concerned with fiscal and operational efficiencies, and two, from the lens of the transit rider, concerned with service quality and performance.

Performance indicators are useful because they provide an indication of trends in performance, helping identify areas that need attention and correction, as well as areas of success. Performance indicators are also useful for tracking the implementation of priority items as well as recommendations contained in studies such as this Transit Strategic Plan. Industry best practice generally categorizes transit system measures into three fields:

- **Financial**: involves evaluating the affordability of transit and engaging with the monetary viability of the agency in conjunction with suggested development opportunities
- **Operational**: involves an in-depth technical evaluation of how the transit agency is functioning, to determine which sectors of the agency are performing well and where to focus future efforts
- **Social**: involves evaluating the impact of transit on general daily resident functions in terms of factors such as equity, accessibility, environmental sustainability, and safety

Both the financial and operational fields fall under the close watch of the transit provider while the social measures are linked to the transit rider and their experience on the system, and therefore should be equally important for the transit provider as the financial and operational measures. Useful performance indicators, once adopted, measured, and reported, will help St. Thomas Transit to build a culture of accountability and the data gathered can be used to formulate diverse transit policies, expose underutilized resources, reduce fare evasion, and increase transit efficiency vis-à-vis route effectiveness and travel time. The performance criteria can be further used for comparative purposes to determine the extent of issues that St. Thomas Transit may be experiencing, which in turn may facilitate a recalibration of goals based on agency preferences and community values.

Existing KPIs

As a starting point, the existing KPIs measured by St. Thomas Transit were reviewed to see what is currently being collected. Then, based on the proposed vision statement as well as findings from background studies, analyses, and stakeholder engagement, a number of proposed KPIs were devised.

The KPIs that St. Thomas Transit currently uses to evaluate its transit system are outlined in Table 4.

Table 4: Existing performance criteria for St. Thomas Transit

Financial	Operational	Social
Cost recovery ratio (total operating revenues divided by total operations costs) Municipal operating contribution per capita (municipal operating contribution divided by service area population) Cost per passenger (net direct operating cost per regular service passenger) Average fare (total passenger revenues divided by total trips) Cost effectiveness (operating costs divided by total trips) Cost efficiency (operating costs divided by revenue hours)	Service uptake (total trips divided by service area population) Service utilization (total trips divided by revenue hours) Service levels (revenue hours divided by service area population) Average speed (revenue kilometres divided by revenue hours)	(No existing performance criteria were apparent)

Based on what is measured, there is a focus on financial and operational performance measures. There currently are no apparent measures that are directly social in nature to evaluate how the transit system impacts riders (although the financial and operational measures are indirectly related). The KPIs measured presently provide a good indication of system efficiency, with some measures of the operation as well. There is an opportunity to capture more operational and social measures that highlight the service quality offered to riders which will help St. Thomas Transit understand important successes and shortcomings of the system. Proposed opportunities for developing additional KPIs along with a rationale are discussed in the section below.

Future Opportunities for KPIs

The KPIs recommended are operational and social in nature. As noted above, the City of St. Thomas already comprehensively captures the financial efficiencies of the system. The KPIs recommended will serve to monitor the quality and use of the service through capturing the on-time performance, annual ridership change, and available stop amenities. It is noted that some of these measures are tracked already through the NextBus platform, therefore the future opportunities in some cases are not related to capturing the data, but rather are more focused on ongoing reporting in a way such that trending can be observed leading to more effective decision-making. In addition to the operational KPIs, a number of social KPIs are proposed to capture the convenience, affordability and equity of the system.

The recommended key performance indicators to achieve the vision and objectives for St. Thomas Transit are outlined below.

Operational metrics:

- On-time performance by route (percentage of buses that are operating 0-5 minutes late)
- Missed trips (percentage of trips that are missed or excessively late)

- % of bus stops or key transfer locations with amenities, including benches, signs, route information etc.
- Average fuel expenses per 1,000 passenger-km

Social metrics:

- Travel time ratio (travel time on transit as a percentage of travel time when driving)
- Customer feedback rate (total compliments and complaints per 50,000 boardings)
- Transit coverage (percentage of population within 400m of routes)
- Concession ridership (number of riders paying concession fares as a percentage of total riders)
- Average savings (cost to the consumer of taking transit as a percentage of the cost to the consumer of driving)
- Parallel Transit travel frequency (average trips per month on Parallel Transit for registrants, as a proxy for understanding their reliance on this mode choice, compared to conventional transit)

Each KPI recommended is intended to uniquely measure a component of the transit service. On-time performance will measure the reliability of the service which is a direct measure of service quality. Similarly, missed or late trips will highlight the reliability of the system and will impact the desirability of transit. The percentage of stops with amenities will measure the prevalence of infrastructure throughout the service area to support the accessibility and convenience of transit.

Of the social factors recommended, the travel time ratio will help to evaluate how the system values customer's time and how attractive transit is as a mode choice. The customer feedback rate will evaluate the satisfaction and perception of transit in St. Thomas. Transit coverage will measure accessibility of transit in St. Thomas. Additionally, the concession ridership will speak to the equity of the system. Lastly, the average savings will measure the affordability of transit, relative to other travel modes. Together, all of these measures will evaluate the sustainability and success of the system, including the desirability of transit as a mobility option in St. Thomas.

Furthermore, a key consideration in reporting and monitoring includes compliancy with CUTA reporting requirements. Currently, a number of relevant metrics are not being collected. Some key metrics include a breakdown of revenue passenger trips by fare type (concession fares are not shown), average passenger trip length, total passenger kilometres and operating revenue broken down by fare media (only passes documented). Additionally, the operating expenses are only documented as the overall contract fee, however for greater transparency the operating expenses can be broken up by the categories listed by CUTA. It is recommended that St. Thomas re-evaluate its tracking processes and adjust measurement practices to facilitate alignment of reporting requirements with what is requested in the annual CUTA submission. This brings the added benefit of additional peer comparison information for St. Thomas Transit, as well as the improved evaluation of the system relative to larger industry trends.

6.5 ACHIEVING THE VISION

A vision statement was created to outline a desired future state and the role that St. Thomas Transit would play. This vision was supported by five key objectives. To measure and monitor these objectives a set of evaluation criteria was outlined. Then, to quantify the evaluation criteria, a set of KPIs are recommended which are comprised of the existing KPIs and additional recommended metrics.

The table below outlines each evaluation category, the objectives each category evaluates, and which KPIs can be used to measure this. To serve as a tool for future tasks, current opportunities have been identified. Together, these tools aim to achieve the vision set out for St. Thomas Transit.

Table 5: Outline to achieve St. Thomas Transit's vision

The text in orange represents the new proposed KPIs to be collected

Evaluation Categories	Objectives Measured	Performance Indicators	Challenges and Opportunities
Service Quality	1,2,3	- Service uptake - Service utilization - Service levels - Average speed - Annual ridership growth - On-time performance - Missed trips - Travel time ratio (transit versus driving)	- Stagnating ridership seen over the last five years, despite a service area population growth and consistent service hours - The exploration of alternative service delivery can grow ridership and improve access to transit - Technology improvements will be seen through all aspects of the system – the contract states that any introduction of new technology resulting in cost savings can be reduced from the contract amount
Financial Efficiency	5	- Cost recovery ratio - Municipal operating contribution per capita - Cost per passenger - Average fare - Operating expense per passenger) - Operating cost per revenue hour)	- St. Thomas saw a larger % increase in fares over the last five years relative to peers – evaluate the appropriateness of this and be mindful of increasing fares too frequently or too quickly going forward
Transit Accessibility	1,2,3	- Concession ridership - Average savings (transit versus driving) - Transit coverage	- St. Thomas Transit already offers concession discounts. Evaluate further opportunities for fare structure improvements especially with respect ensuring a permanent solution for low-income individuals - Identifying what percentage of ridership concession groups represent can show how accessible this service is to these populations - Consider what percentage of the population is within an accessible range for transit service
Infrastructure Prevalence	1,3	- % of bus stops with amenities - % of key transfer locations with amenities	- Current transfer point at the Walmart is underutilized in terms of infrastructure and branding. There may also be opportunities to build out a secondary transfer point. - Generally, there is opportunity to enhance bus stops with passenger amenities.
Marketing Consistency	4	- Customer feedback rate	- Match St. Thomas Transit brand to updated City of St. Thomas branding - Provide better signage at stops, transfer points to create stronger brand recognition and consistency

6.6 DATA COLLECTION

Further guidance on the collection of data for the recommended KPIs is outlined below.

Service Quality

- **On-time performance**: This directly speaks to the reliability of the system. While this metric is already collected by St. Thomas, it is recommended that on-time performance be more actively monitored and targets be set for this KPI based on service availability and resources. An example target may be 90% of trips arriving less than 5 minutes late, with the intention to take remedial actions should routes repeatedly miss this target.

- **Missed trips**: This can be tracked using existing NextBus technology to measure the percentage of trips that are missed or excessively late on each route. Ideally a daily number of missed trips per route can be tracked and averaged throughout the year, however, depending on resource and data availability, various days can be tracked for each route to provide a representative sample throughout the year. When repeated trips are missed on certain routes or buses are excessive late at certain time points, further investigation should be conducted, and the schedule should be re-visited where applicable.

- **Travel time ratio (transit versus driving)**: This can be measured between two locations, ideally popular and/or familiar destinations within St. Thomas. The time on transit can be compared to the driving time (collected on google maps) at various points of the day to understand transit's competitiveness with driving. In the case where driving may be significantly faster, routing and stop spacing may be considered to determine if these can be further optimized.

Transit Accessibility

- **Concession ridership**: This would include the number of riders paying concession fares as a percentage of total riders which can be difficult to measure with paper fares but can be tracked more easily with the implementation of modern fare payment technologies. Using the existing fares, sample days can be counted manually to determine the breakdown of fare types paid.

- **Average savings (transit versus driving):** This can be estimated using high-level costs of a monthly transit pass compared to the cost of owning, maintaining and operating a car in St. Thomas. It would not need to be tracked on an ongoing basis, but rather recalculated at defined intervals with updated gas prices and fares, if applicable.

- **Transit coverage**: The coverage offered along the system can be tracked using a mapping tool such as ArcGIS where a buffer analysis (400 metres and/or 800 metres) from each transit stop or route can be determined.

Infrastructure Prevalence

- **% of bus stops with amenities**: This would require the development of an asset inventory, ideally through an audit of the stop infrastructure in St. Thomas. It is important to also define "amenities" which may include benches, shelters and stop markers. If this is not available currently, this can be tracked moving forward as bus stops are reviewed, maintained and upgraded, and it can be integrated with larger asset management objectives and activities.

- **% of key transfer locations with amenities**: Similar to the metric above, all transfer locations can be monitored (annually or biannually) for amenities available.

Marketing Consistency

- **Customer feedback rate**: This would be collected through customer feedback and complaints. Consideration of customer feedback both in terms of content and quantity (as a percentage of ridership over a given month) is important.

St. Thomas Transit might also consider consulting other transit agencies' guidelines with respect to the collection and monitoring of KPIs, and the setting of benchmarks for performance[4].

7.0 GAPS ANALYSIS

Through all background and analysis completed in the context of the Transit Strategic Plan, a number of gaps have been identified, which will act as a basis for identifying opportunities for improvement, and ultimately for forming the recommendations included within this plan.

Gaps are summarized below and have been organized into the following categories:

- Service planning and operations
- Technology
- Fares
- Marketing
- Fleet

7.1 SERVICE PLANNING AND OPERATIONS

Transit service standards are an industry-wide best practice—they tell the public and agency staff how goals and values are translated into service levels that the agency strives to maintain. Furthermore, standards provide systematic and objective ways of planning, monitoring, adjusting, and evaluating transit service provision. Service planning aims to ensure that transit service is attractive for the present, but also responsive to the future, and relies on community engagement, value-informed goals and objectives, and data-driven metrics.

St. Thomas's current service standards should be reviewed and monitored to ensure they continuously reflect current industry standards and community goals while also serving to identify triggers for changes in service. Without consistent application of guiding standards and commitments that are visible to the public, it is difficult to chart a clear direction with respect to service design and provision. As described above in Section 6, data for each of the outlined key performance indicators (KPIs) should be collected and tracked to work towards achieving the overall system vision and goals.

[4] The TransLink system in Vancouver publishes Transit Service Guidelines which can be referenced and applied to St. Thomas Transit where applicable. The guidelines can be found online here: https://www.translink.ca/~/media/documents/plans_and_projects/transit_service_guideline/transit%20services%20guidelines%20public%20summary.ashx.

Additionally, findings from the background analysis and stakeholder engagement suggest some gaps in service planning and operations that might be addressed through the implementation of alternative service delivery. This should be explored as a possible solution for areas with low ridership productivity. Replacing or augmenting conventional fixed-route service with a demand-response service offers a more cost-efficient option than operating buses on a fixed schedule – these are costs that can be reallocated more effectively elsewhere in the system to maximize systemwide ridership. With demand-response service it is easier to calibrate the service level to the demand, while also providing a more compelling service offering compared to a fixed schedule route that runs on low frequencies.

Transit agencies are increasingly exploring demand-response or dynamic scheduling software solutions to unlock the opportunities of microtransit. Fixed-route services can be costly and not advantageous in areas where land use is singular and/or residential densities are low – the ridership generated in those areas often do not warrant the fiscal investment. Gaining tremendous interest, demand-response solutions allow agencies to create “pop-up” routes in real-time based on demand for service.

Furthermore, a number of community priorities were identified through the customer survey. St. Thomas residents are generally dissatisfied with the indirectness of routes and the time spent waiting for the bus. Residents also identified a desire for an expansion of service hours later into the evenings on weekdays and Saturdays as well as Sunday service. The most important factor when deciding how to travel was noted to be reliability followed by travel time, speaking to the importance of on-time performance and route directness. In terms of system trade-offs, customers identified that they would prefer frequent bus service, even though they may have to walk further to reach the bus stop. Residents also identified that they would prefer to travel on one bus (no transfers) even though the route may be less direct.

The gaps related to service planning and operations have been identified are as follows:

- St. Thomas does not have a fiscally sustainable alternative to low performing (low passengers-per-revenue-hour) routes. As alluded to above, there may be opportunities for St. Thomas to explore the implementation of alternative service delivery to applicable communities, to deliver service more efficiently and adapt to ridership changes in the area. These concepts will be explored further in Section 9 of this report.

- St. Thomas has challenges with regards to attracting riders who live on the city’s outskirts, in neighbouring municipalities, or who are visitors to the City.

- St. Thomas has a basis of transit service standards, but there is room for expansion and further development for the purpose of tracking system performance and promoting a culture of accountability internally and to the public.

- St. Thomas Transit is unable to meet the needs of customers who need to travel during hours outside of the current service span. Consideration of expanding the service hours would help to attract new riders and develop a strong customer base, but this must be balanced against costs to ensure it is a worthwhile investment.

- St. Thomas has room to reimagine its route network to improve route directness, eliminate duplication, and reallocate resources to provide high frequency service along the most productive corridors.

7.2 TECHNOLOGY

Technology is now playing a fundamental role in not only transit service planning and delivery, but in the provision of mobility services. Citizens now expect seamless travel between modes using smartcards or open payments to pay for service, live arrival schedules, and up-to-date information at their fingertips. Staying relevant and attracting new ridership for transit agencies now hinges on exploiting technology for providing customer information, trip planning capabilities, as well as for internal operations. Moreover, technology can improve customer and operator safety. Overall, technology has made public transportation more effective and efficient, and is enabling riders to personalize their riding experience.

St. Thomas Transit's contract with Voyago states that any introduction of new technology resulting in cost savings can be reduced from the contract amount, offering financial incentives to technology advancements in addition to an enhanced customer experience. Though, technology use at present is currently limited. Aboard its buses, St. Thomas Transit has limited technology use and should consider modern technologies that are increasingly used by peer transit agencies. Annunciators with accompanying digital displays are often used onboard buses to inform passengers about upcoming stops, especially in Ontario where this is mandated under the AODA. These technologies work by tracking a vehicle's GPS coordinates that trigger an automated announcement when the bus passes a predefined geographical "ring-fence." Real-time audio and visual next-stop announcements ensure accessibility of transportation systems, especially for passengers who have vision or hearing loss. For safety and security purposes, most transit fleets are equipped with onboard cameras which help protect the operators, customers and the transit agency. Footage is not often stored indefinitely but is actively sought and used by law enforcement to assist in its investigations. Onboard cameras also have the added benefit of capturing boarding and alighting data to be used in service planning and operations. Both annunciators and cameras are considered transit best-practices and should be explored by St. Thomas Transit.

Our world is becoming increasingly digital and real-time, with the need for information instantaneously. Riders expect transit to be as nimble and easy to understand as the many other services they use daily. Currently St. Thomas Transit advertises its use of NextBus.com for riders to obtain real-time information on bus arrival times for any chosen route and stop number. Transit users also have the option of calling a phone number provided on the website and using a stop ID, receiving the predicted arrival time of the next bus over the phone. Though these methods for communicating with riders are acceptable, many transit agencies now utilize trip-planning technologies to allow riders to plan multi-modal trips and compare different modes of transportation within the same platform, such as Google Maps. Trip-planning technologies not only provide riders with real-time updates on bus arrivals and travel times, but give information on distance to bus stops, walking distance, and fare costs, all from a mobile app or computer. Adopting advanced technologies that disseminate real-time information to customers can improve service operations while also attracting new riders and improving the overall customer experience. In addition, technologies such as trip planning apps can be used to collect information on ridership, loading profiles, on-time performance, travel times and so on that are necessary performance indicators to diagnose issues, develop corrective plans, and monitor progress.

Cash handling and paper-based fare media are administrative cost drivers for transit agencies and are sources of fare evasion. In St. Thomas Transit's case, the exclusive use of these products can be considered a gap and these products should be minimized in the future. While cash options are important to maintain for the foreseeable future for users

without alternative means to pay, cash should be discouraged in favour of modern payment methods which are more convenient for users, involve fewer costs of collection, and operationally can help to minimize dwell time at stops associated with boardings.

Peer agencies such as Woodstock Transit currently accept fare payments using electronic “smart” cards that can be purchased and loaded online with fares and monthly transit passes. However, closed source payment methods such as e-fare cards are also becoming obsolete, so moving to open-source fare payment methods, which allow use of debit card, credit card or smartphone, is a much more viable option. Belleville Transit is an example of a peer agency that employs an open-source payment system that allows riders to pay using any of these methods. The use of mobile payment or e-fares can speed up operations, increase customer loyalty, and collect data and analytics from location, time and service-specific transactions. At this time, monthly passes, tickets and cash fares are the only forms of fare payment accepted on-board St. Thomas Transit buses, and tickets and passes can only be purchased using cash at the downtown transit terminal. St. Thomas Transit should consider adopting modern fare payment technologies to reap the service and operational benefits they offer.

7.3 FARES

Farebox revenue should form a substantial portion of operating revenue for any transit agency. In 2017, St. Thomas Transit recovered approximately 31% of its operating costs through the farebox, a ratio well within the range of other peer agencies of similar size. A similar metric to the farebox recovery ratio is the cost recovery (revenue-cost) ratio. By analyzing the amount of operating costs recovered by revenue, that is, cost covered through fares and non-fare revenues (advertisements, parking, etc.), we can consider how reliant an agency is on the regional or municipal tax base. Indeed, in an effort to be respectful to both riders and non-riding taxpayers, most transit agencies strive to recover a substantial amount of operating cost through transit fares or other revenue sources.

Another important measure of the financial health of a transit agency is the average or effective fare, that is, the total fare revenue divided by annual boardings or ridership. It is important to note that this average fare accounts for the fact that not all passengers pay the full cash fare, and use discounted monthly fares, for example, as well as concession fares such as for senior and student populations. The average fare per rider collected by St. Thomas Transit increased by 38.3% over a two-year horizon, from $1.43 in 2015 to $1.97 in 2017. Though, as alluded to earlier, there was a change during this period with regards to how ridership is reported, artificially resulting in a ridership decrease. This ridership decrease explains the increase in average fare per rider, and similarly it is reasonable to suggest that, similar to ridership, the change in average fare is likely relatively insignificant in actuality. A small increase is still expected, however, as a result of the increase in price of a monthly adult pass, and a possible decrease in fare evasion. Over the same two-year period, the peer average fare increased by 5.8%, from $1.63 in 2015 to $1.67 in 2017.

St. Thomas Transit charges a flat rate for bus travel, typical of most North American systems. The agency’s fare table is straightforward and offers single-trip cash fare, advanced tickets in booklets of 10, and unlimited-use monthly passes. Advanced tickets and monthly passes are discounted for seniors, students under 18 and children over 5 by $6 and $10, respectively. At $2.75 cash fare and $70 for a monthly pass, St. Thomas Transit adult fares are in the middle of the spectrum among peer transit agencies. Any time transit agencies are compared to one another, we must be cautious when drawing conclusions since cities develop differently over time, and no two agencies or cities are exactly the same.

It is important to note that the agency of North Bay Transit tends to skew the peer average with a substantial cost-recovery ratio of 47%, likely due to its above-average fares combined with the fact that it has one of the largest populations out of the peer group.

Agency	Exact Change Fare	Adult Monthly Pass	Student/Senior Monthly Passes	Low-Income/Reduced Monthly Pass*
St. Thomas Transit	$2.75	$70	$60	-
Woodstock Transit	$2.50	$60	$48	-
Chatham-Kent Transit	$2.50	$75	$60	$40
North Bay Transit	$3.00	$86	$71 (student) $61 (senior)	-
Elliot Lake Transit	$2.50	$62	$52	-
Cornwall Transit	$3.00	$65	$53 (student) $46 (senior)	$46
Belleville Transit	$3.00	$76	$60	-
Stratford Transit	$2.75	$65	$55	$55
Timmins Transit	$3.00	$78	$63 (student) $56 (senior)	-
Welland Transit	$3.00	$85	$75 (student) $65 (senior)	-
Owen Sound Transit	$3.00	$70	$30 (student) $55 (senior)	-
Average	**$2.82**	**$72**	**$57 (student) $56 (senior)**	**$47**

Figure 12: Peer Transit Agency Fares
All values represent Canadian dollars.
**Note: does not include disability (ODSP) pass options or discounts.*

There is room to further improve the fare structure for St. Thomas Transit, ensuring it is tailored to the community to ensure the right fare exists for the right person and trip. Throughout North America, communities are increasingly vocalizing the sentiment that disadvantaged members of their communities should pay less for transit—arguments of environmental justice or social equity suggest that people who can pay more should pay more, and people who can afford less should pay less. In St. Thomas, neighbourhoods in the central part of the city are low-income and display some of the highest transit use. Areas with low income residents are often the same ones that display low levels car ownership and whose residents tend to be dependent on public transit, with households devoting a substantial amount of income to transportation. As such, these areas are prime markets for transit and could benefit from low-income transit options. It is acknowledged that there is an existing pilot program involving Social Services funding transit passes (via Ontario Works) for individuals who cannot afford these passes. This is an important and productive development, however, there is need to ensure that a solution is sustainable through the long-term. Survey responses revealed that 26% of transit users in St. Thomas have an annual income less than $20,000.

Fare Type	Fare	Unit Price	Multiplier	Discount Per Ticket
Exact Cash	$2.75	-	-	-
Adult Advance Tickets (10-pack)	$22.50	$2.25	10	9%
Student/Senior/Child Advance Tickets (10-pack)	$16.50	$1.65	10	40%
Adult Monthly Pass	$70.00	$1.75	40	36%
Student/Senior/Child Monthly Pass	$60.00	$1.50	40	46%

Figure 13: City of St. Thomas current fares (2019) and per trip discounts

The prospect of free fares arose in discussions with St. Thomas stakeholders. A high service quality justifies the fare that riders pay. A study by the Center for Urban Transportation Research out of the University of South Florida identified that the implementation of free transit can undervalue the service and cause riders to be disrespectful towards it. It can also attract unwanted individuals such as vandals, vagrants, and drunks, which can serve to alienate the loyal ridership base. When considering free fares, there is also the issue of fairness – by offering free transit, St. Thomas would be placing an arguably unfair burden on the taxpayers of the city. Although there is no guarantee that free fares will induce significant ridership gains, the current fleet may be unable to handle increased capacity resulting from fare removal. For these reasons, Stantec does not recommend that St. Thomas Transit implement free fares, but rather explore alternative fare strategies predicated on one's ability to pay, to increase ridership. At the same time, it is acknowledged that offering free fares temporarily, over the span of one or several months, is a similar but separate strategy that transit agencies sometimes use to rejuvenate interest in the public transit system. This strategy has varying degrees of success in terms of fostering a loyal ridership base that will continue to use the service after fares are reintroduced. Nonetheless, any changes to the fare structure should be done following the implementation of proposed system modifications.

7.4 MARKETING

The visibility of public transit plays an underappreciated role in attracting new ridership and retaining existing ridership. Cities and municipalities make significant investments into their transit systems but have historically tended to starve the marketing and communications aspects of them. The transit industry is becoming increasingly cognizant of the need for a long-term marketing and communications strategy which evolves the agency's brand, engages riders, and promotes discretionary trips as primary activities. The necessity of marketing transit cannot be overstated particularly in light of increasing transit industry disruptors that are swaying market share. The need to stay relevant in the minds of transit's customers has never been more prevalent. Stantec identified brand visibility and recognition as an opportunity area for St. Thomas Transit. Creating a strong brand helps generate buy-in from community members and public officials and can be a game-changer if done well. Many transit agencies go through rebranding exercises in effort to modernize their agency and develop a "transit is cool" culture, which in turn brings ridership benefits.

An advantage of fixed infrastructure, such as bus stop signage and shelters, is that they can be leveraged for marketing purposes, which is something not currently being done by St. Thomas. Implementation of new physical bus stop infrastructure such as bus shelters and more eye-catching stop posts can identify designated stops and increase visibility of the service to non-riders. Limited to vehicles and bus stops, current transit branding in St. Thomas is not

overly striking or memorable. Bus stop signage is not prominent or distinct, especially when next to other simple, white signs posted across the city (Figure 14). Transit signage does not include the St. Thomas Transit logo and is inconsistent across the system (different type faces and colours), which can be confusing or misleading for customers.

The transfer location at the SmartCentres is the major hub for transit, co-located with shopping destinations in St. Thomas. It is a high-traffic area and is the final destination for transit users making trips to Walmart, Staples, Real Canadian Superstore, or any bank or fast food restaurant located in the plaza. The transit hub is visited by all daily bus routes and is the transfer location for any riders changing buses. Currently, the transfer location near Walmart has little to no branding on bus shelters or benches and does not convey a welcoming nor inviting environment for would-be transit customers. The hub itself is not noticeable upon exiting Walmart or the other retail locations, and therefore does little to persuade those unfamiliar with St. Thomas Transit to consider it as a viable mode of travel. Both drivers and riders have also voiced their concerns over the cleanliness of this area and have expressed desire for the location to be looked after more frequently. High-traffic transit hubs like the Walmart are prime locations for marketing efforts and should be well-maintained and branded to ensure transit is attractive and visible in the community.

Figure 14: Current St. Thomas Transit signage

The current design and colour scheme for St. Thomas Transit's branding is somewhat lackluster, and often causes signage to blend into the natural environments. It is also very different from the City of St. Thomas branding, which was recently redesigned using a vibrant, maroon colour scheme and a nod to the city's railway heritage. Throughout the city, it is evident that St. Thomas proudly embraces its historic roots and connections to the Canadian railway system. In combination with a new branding strategy, St. Thomas Transit could consider presenting one of its most used buses (ex. for use on Talbot Street) in a railway or trolley theme (see Section 12.1 for further recommendations). The

community's unique link to transportation is advantageous for transit marketing and should be leveraged to increase both community pride and transit ridership.

Figure 15: Branding examples of bus stops and signage among peer transit agencies

The above images show some samples of high-quality stop identifiers and branding used in transit, showing colour, user information, and branding tools to create a unique, memorable and recognizable identity for the agency. In addition, these are all examples of good communication of stop information. St. Thomas should utilize similar branding and infrastructure deployment strategies such as to increase visibility of the St. Thomas Transit brand and encourage transit use among new and existing riders.

7.5 FLEET

Considerations related to St. Thomas Transit's fleet in the context of the North American bus manufacturing industry is discussed in detail in Section 5. What is important to highlight is that St. Thomas contracts out operations and maintenance to Voyago. While more expensive and innovative vehicles may be available in the marketplace, the additional costs related to maintenance, training and more must be factored into the contract. At the same time, Voyago has a deep bench of resources along with the requisite skillsets to be able to adapt to changes in fleet deployment, including the deployment of alternative propulsion technologies, so these are opportunities that should be considered. Additionally, through public feedback, many comments were made related to the quality and comfort of the existing transit fleet whereby many respondents identified the small buses as uncomfortable and dated.

Furthermore, the increasing awareness and political initiatives towards zero emissions are now realities that are becoming increasingly important, relevant, and feasible for transit agencies to address. Awareness and concern on carbon footprint and climate change are now in the forefront of transit focus, with agencies of all sizes considering (or already implementing) different forms of zero emission buses for their fleets.

Based on a review of the current fleet, data analysis and stakeholder feedback, the following opportunities have been identified:

- Vehicle overcrowding can be a concern at certain hours of the day and during certain days of the month. With the implementation of the recommended route network, growth of the City, and other elements of the Transit Strategic Plan designed to improve service and boost ridership, concerns about overcrowding can become magnified. If ridership increases to the amounts projected, it will become necessary to evolve the fleet composition alongside other aspects of St. Thomas Transit's operations, to ensure overcrowding does not emerge as a critical gap. This can be addressed by procuring different (larger) vehicles with greater capacity to replace the existing fleet, and/or it can be addressed by growing the fleet size with the procurement of additional vehicle(s). It is also noted that the interior dimensions of a transit vehicle can play a critical role in the accommodation of mobility devices.

- Given the industry's move towards zero-emission vehicles, more sustainable vehicles including electric vehicles should be explored when determining future fleet purchases. This is contingent on the existence of capital funding that has been secured to support such initiatives, as industry-wide zero-emission vehicle rollout is still in its earliest stages when it comes to small operations such as St. Thomas Transit, so there is little to go on at present in terms of benefiting from lessons learned elsewhere.

8.0 POSITIONING FOR THE FUTURE

To allow St. Thomas Transit to grow with industry changes and meet community needs it must uniquely position itself for the future and make critical decisions regarding various aspects of the service. A significant driver of future needs will be those associated with demand-response transit, which impacts not only service planning and operations, but also technology, fares, marketing, and fleet. As many transit agencies across North America are utilizing various alternative service delivery strategies to most efficiently and effectively serve riders, there are number of service considerations that must be made. The following sections outline key considerations to position the St. Thomas Transit service for a future that will involve alternative service delivery strategies in addition to the traditional fixed route service.

8.1 CONTRACT CONSIDERATIONS

St. Thomas Transit services are currently operated by Voyago. The contracted transit services are beneficial to the City of St. Thomas for a number of reasons, most notably the limited internal capacity at the City to operate the transit service in-house. The current contract with Voyago also offers favourable hourly operator rates for both City-owned and operator-owned vehicles. Furthermore, a contracted service allows for greater flexibility to meet changing demands and adjust services accordingly. The contract with Voyago allows the City to make necessary adjustments to the fare structure, service hours and other critical factors of the service. The contract with Voyago also helps minimize the barriers to entry into the electric propulsion market (discussed further in Section 13.2), as Voyago has existing expertise in this field that can be tapped into. Lastly, to date, the working relationship between Voyago and the City of St. Thomas has been beneficial and positive on both ends. As such, it is recommended that this contractual agreement be continued.

In the future, with the proposed implementation of adjusted service hours, fare structure, routing and demand-response service, various considerations for contact adjustments will be required. This includes identifying accountability and roles of tracking metrics and reporting. St. Thomas Transit will have to have determine in consultation with Voyago who is best equipped to track this and how this will be done given the new KPIs and metrics proposed in Section 6. Ideally, the City of St. Thomas should review performance metrics regularly (quarterly, monthly, weekly, or in real-time, depending on the metric) to track operations and provide more informed decision-making.

The tracking of KPIs on Voyago's end can be further incentivized through shifting to a performance-based contract – a consideration for the City's upcoming contract negotiations. Performance-based contracting involves a provision for financial bonuses for attaining and exceeding performance standards. In addition to incentivizing KPI tracking, this strategy will help foster a high quality of service. For transit agencies such as York Region Transit, a shift to performance-based contracting has resulted in not only improved service quality, but also has helped attain cost savings. Standards that can be considered for inclusion in a performance-based contract might include:

- Achievement of 100% of scheduled service delivered, or in other words, no missed trips
- Attainment of 90% on-time performance (0-5 minutes late)
- Rider complaints of no more than 5 per 50,000 boardings
- Zero preventable accidents
- No fewer than 12,000 kilometres of service between road calls

Liquidated damages are often factored into performance-based contracts and are issued when one or more of the standards are not met, however, they also tend to drive up the base price of a contract and are not proven to create additional incentives for the contractor to perform well. Therefore, they are not deemed crucial for inclusion in performance-based contracts.

Further consideration will be required to establish the interoperability of third-party dynamic scheduling systems and the existing vehicle fleet. Parameters will need to be set by the City of St. Thomas to guide the provision of this demand-response service.

8.2 POSSIBLE PARTNERS

To deploy demand-response services a third-party technology partner will be required to provide the scheduling software required. There are various providers that St. Thomas may consider and as a first step in the implementation of demand-response service, St. Thomas should begin exploratory conversations to determine which service and delivery model is best suited in the local context. Given that St. Thomas will be operating this service with its own vehicles, two possible partners, Pantonium and RideCo, have been summarized below including what role they may play in the service delivery. Although these organizations have been highlighted, St. Thomas' exploratory conversations should not be limited to only these two, as other organizations may be suitable partners as well.

<u>Pantonium</u>
The technology system provided by Pantonium offers a software platform that will allow riders to book trips either from a specified starting point or from a pre-determined stop network with a desired pick-up time or window. Using inputted parameters such as maximum trip times and minimum number of passengers, the software algorithm optimizes the route and scheduling of trips to create travel routes for drivers. This software works with a transit agency's existing fleet. The system has a web-based management system and requires a driver device (i.e. a tablet or mobile device) which will track the vehicle and direct drivers where to travel, as well as an online platform (i.e. a mobile app) for riders to book and track trips. Pantonium oversees this software and collects ridership data while also providing an interface for transit agencies to use.

<u>RideCo</u>
RideCo offers a similar a software-as-a-service platform as Pantonium where transit agencies can purchase this software to use with their existing fleet. RideCo offers a number of planning, software and operation support services including ridership data analysis, service design, cost structure and payment development, fare system integration, training and support, data collection, stop integration, driver training, system maintenance and monthly reporting.

Others

Additional service providers exist that offer similar services and may be investigated when selecting a partner for demand-response services including Via, Best Mile, Transdev and several others. Overall, both St. Thomas Transit and the third-party partner would be involved in managing and operating the demand-response service. The relationship typically works best when the agency (i.e. St. Thomas Transit) is closely involved in managing the demand of the service and altering the service structure to best suit the City's needs.

8.3 DEMAND-RESPONSE TRANSIT CASE STUDIES

Several transit agencies across Canada have been deploying demand-response services to provide the right-size service in communities that are not adequately served by conventional fixed-route services or to expand coverage areas of transit service. Case studies in Belleville and Guelph are highlighted below.

8.3.1 Belleville, Ontario

Belleville Transit launched a demand-response pilot in September 2018 where they replaced two fixed route late night services with a demand-response service. The agency utilized a mobility app on their existing 40-foot conventional buses to provide dynamic routing and scheduling. This service was stop-to-stop as opposed to door-to-door, meaning users were transported to and from existing bus stops, rather to and from their homes. Trips were booked via phone, mobile app, or web booking. A significant increase in ridership was observed- with the number of monthly trips tripling over the pilot period. This resulted in a growth in fleet from 2 to 5 buses with certain trips operating at full capacity. An average utilization of 30 people per vehicle in the evening (9pm to 12am) was observed where there used to be an average utilization of 3 people per vehicle during these hours. This resulted in a trip cost of $4.60 per ride. The demand-response service was implemented quickly, in approximately one week, due to the convenience associated with using the existing fleet for service delivery.

8.3.2 Guelph, Ontario

As part of a replacement of their specialized transit scheduling software, Guelph Transit implemented a demand-response mobile app to provide dynamic scheduling and a new trip booking interface for specialized transit riders. The new booking system is anticipated to reduce scheduling time and rider wait times. The dynamic scheduling will allow for more same-day trip requests to be made. As part of the update all specialized transit vehicles will be equipped with a tablet. This software is being tested in a pilot in 2019 and if successful, this will be expanded to low-demand conventional fixed-routes or low-ridership periods of the day.

8.3.3 Waterloo Region, Ontario

Grand River Transit, serving the Waterloo Region, offers a rural flex route service which connects Kitchener to Wilmot (New Hamburg) with a number of rural areas in between. The service is intended to serve areas that are traditionally more challenging to provide fixed-route transit service. A number of fixed-routes are available with several flex-stops which can be booked in advance. Flex-stops are required to be booked by phone an hour in advance where riders are not guaranteed flex-route stop requests. While this system does not require additional technology, phone booking may offer challenges with more real-time or dynamic trip scheduling.

8.3.4 Case Study Take-Aways

The case in Belleville illustrates the advantages of demand-response transit and the ability to scale up as required. Additionally, the potential ridership gains which can be achieved by utilizing demand-response transit to serve low ridership areas or to use during lower demand periods are evident. The implementation of demand-response transit in Guelph illustrates the added efficiencies and interoperability of comingling specialized transit services with demand-response service in lower demand areas. By utilizing a single booking system this allows for optimal trip groupings and scheduling. Lastly, the application of rural flex-routes in the Waterloo Region provides transit service in challenging areas with a service that is relatively quick to implement and does not rely on additional technology.

In both Belleville and Guelph, a software-as-a-service model was utilized where both agencies utilized their existing fleet and purchased the dynamic scheduling software from a third-party technology provider. Additionally, both agencies piloted this technology to determine the applicability and uptake in the communities they serve. Upon successful pilots, these services are being considered for permanent implementation.

8.4 PARALLEL TRANSIT IMPACTS

Specialized transit systems across Ontario were launched at a time when road and sidewalk infrastructure was less accessible, conventional transit vehicles were exclusively high floor and involved the climbing of stairs for boarding and alighting, and the AODA had not yet been enacted. Over the last several years, however, significant improvements to accessibility have been made, and as a result the distinction between conventional and specialized transit is becoming increasingly blurred. This is evident in St. Thomas Transit where the conventional and Parallel Transit fleets are interchangeable and many users with mobility devices are making trips using the conventional system. With improved accessibility comes the opportunity to improve the integration of conventional and specialized transit services – an opportunity which properties across Ontario are taking advantage of through strategies such as Family of Services (trip delivery using both specialized and conventional modes) and the comingling of specialized and conventional customers in the same vehicle. In developing recommendations for the St. Thomas Transit Strategic Plan, and in future decision-making related to transit service and operations, it is important to consider the interplay between conventional and specialized transit and understand how tweaks to one service offering will impact the other.

The recommendations discussed in the Transit Strategic Plan, while not specific to the Parallel Transit system, are also expected to bring positive impacts to Parallel Transit customers:

- Extended evening and weekend hours will benefit Parallel Transit customers too, as AODA mandates that the service span for specialized transit matches that of conventional transit (refer to Sections 9.4.1 and 9.4.2 for further discussion).
- Additional software proposed to enable demand-response transit will also benefit Parallel Transit customers by providing them additional means of booking trips (refer to Section 10 for further discussion).
- The rollout of innovative fare payment technologies will benefit Parallel Transit customers in additional to conventional transit customers (refer to Section 10 for further discussion).
- The proposed improvements to passenger amenities will further encourage some Parallel Transit customers to use conventional transit, helping to free up Parallel Transit resources to deliver a better service to those who truly need it (refer to Sections 10 and 12 for further discussion).

- The proposed comingling of Parallel Transit customers with demand-response transit customers will contribute to sentiments of inclusion while reducing feelings of Parallel Transit customers being "relegated" to another service (refer to Section 9.4.3 for further discussion).
- The fleet recommendations discussed in Section 13, although envisioned to be piloted initially on fixed routes, will ultimately benefit Parallel Transit too since the vehicles are interchangeable.
- The additional KPI tracking will facilitate the ability for informed decision-making and proactive improvements to both conventional transit and Parallel Transit going forward (refer to Section 6.4 for further discussion).

9.0 SERVICE PLANNING & OPERATIONS RECOMMENDATIONS

Based on the completed analyses and stakeholder insights, three future network options were developed which aim to build upon the successes of the existing network and address any identified challenges. The process and guiding principles utilized to develop the final proposed network are detailed below.

9.1 GUIDING NETWORK PRINCIPLES

Based on stakeholder engagement and considerations for transit planning best practices, a set of guiding principles were developed to provide direction for evaluating the current network. These guiding principles are all related to the underlying objective of delivering effective and efficient transit service. They are summarized as follows:

1. **Strengthen what is working and eliminate what is not working**. Most notably this includes increasing frequency along heavily used corridors (Talbot Street) and to/from major destinations. Some things that work well include the existing relationship with the contracted service provider, the safety and comfort of the service as well as driver attitudes and behaviour. These factors work to provide a positive transit experience that gains long-term ridership. Residents are less satisfied with route directness, wait times, and transit fares. There are additional opportunities to enhance the marketing and visibility of the service and form partnerships with schools and employers to grow ridership.
2. **Improve route directness where possible.** This leads to a simpler network and quicker travel times for the customers. Noted to be an area of improvement for the service, route directness relates to rider's perception of the service and desire to use transit. In designing direct routes, main trip generators were considered, and direct connections were created though leveraging convenient transfers.
3. **Improve the reliability of transit service**. That is, improvements to the route network should formally account and budget for sufficient recovery time to improve on-time performance. When designing the network, route lengths were considered to ensure adequate run times were accounted for based on the desired frequency of each route.

Keeping these principles in mind, the need to improve St. Thomas Transit's frequency, routing, and reliability are heavily factored into the plan recommendations, however these elements have been balanced against finite resources and fiscal realities.

9.2 NETWORK OPTIONS

Utilizing the above noted network principles, several network options were developed in collaboration with St. Thomas Transit staff. Out of these network options the top two (Options 2 and 3) were shortlisted for a more detailed evaluation with respect to the existing network (Option 1). These two network options, plus the existing network, were analyzed in detail. The network options discussed below are intended to be solutions that can be implemented without significant impact to operating expenses, meaning they are 'zero sum solutions'. Commentary regarding the highest priority service additions has also been included in the event that additional funds become available for expanding the St. Thomas Transit service.

9.2.1 Option 1: Existing Network

Option 1 involves maintaining the current network. It is the baseline upon which Options 2 and 3 will be compared. An evaluation of Option 1 is critical in order to support (or theoretically refute) the business case behind any proposed transit network changes. The primary advantages of Option 1 are that it has excellent coverage of the City of St. Thomas, ridership and costs are very predictable, and no incremental efforts or one-time upfront costs are required to implement. Contrastingly, the major disadvantages to the existing network involve the limited potential to attract new ridership or create further efficiencies in the system.

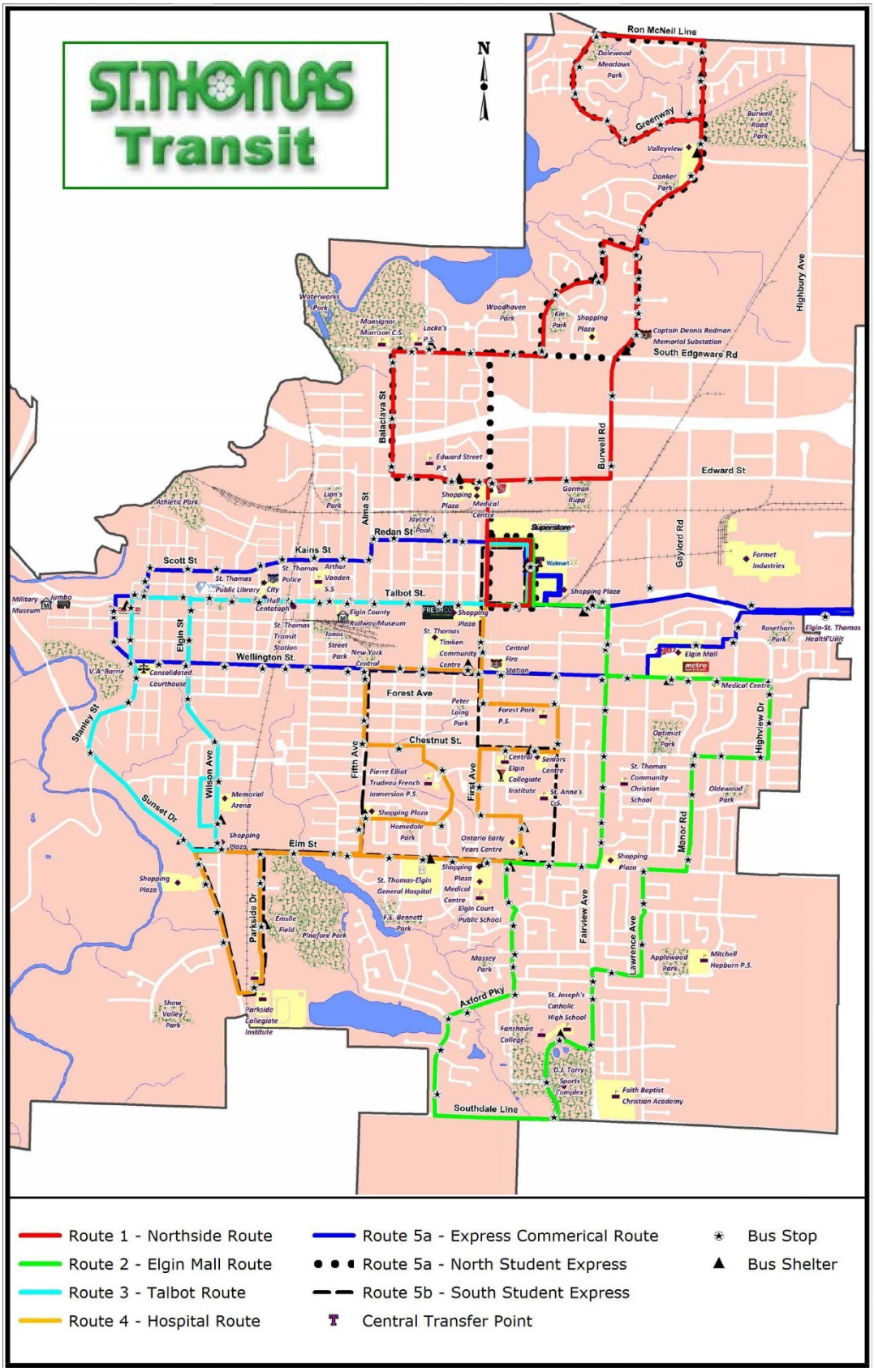


Figure 16: Option 1 – "Existing Network"

9.2.2 Option 2: Major Trip Generators

Option 2 draws inspiration from the City of St. Thomas' route network brainstorming session and is focused on providing service to major trip generators. In this network, a higher frequency service along Talbot St. is possible (~20 minute service), and the routes are simplified to focus on major trip generators, with low-density areas in the north and southeast of St. Thomas serviced by demand-response transit (DRT), which can be comingled with the existing specialized transit service, rather than by fixed route. The simplified routes are both shorter and involve less turns compared to the current network, enabling improved service reliability and on-time performance. Option 2 represents a 'zero sum solution' because it involves the same quantity of vehicles operating over the same service span as the present network.

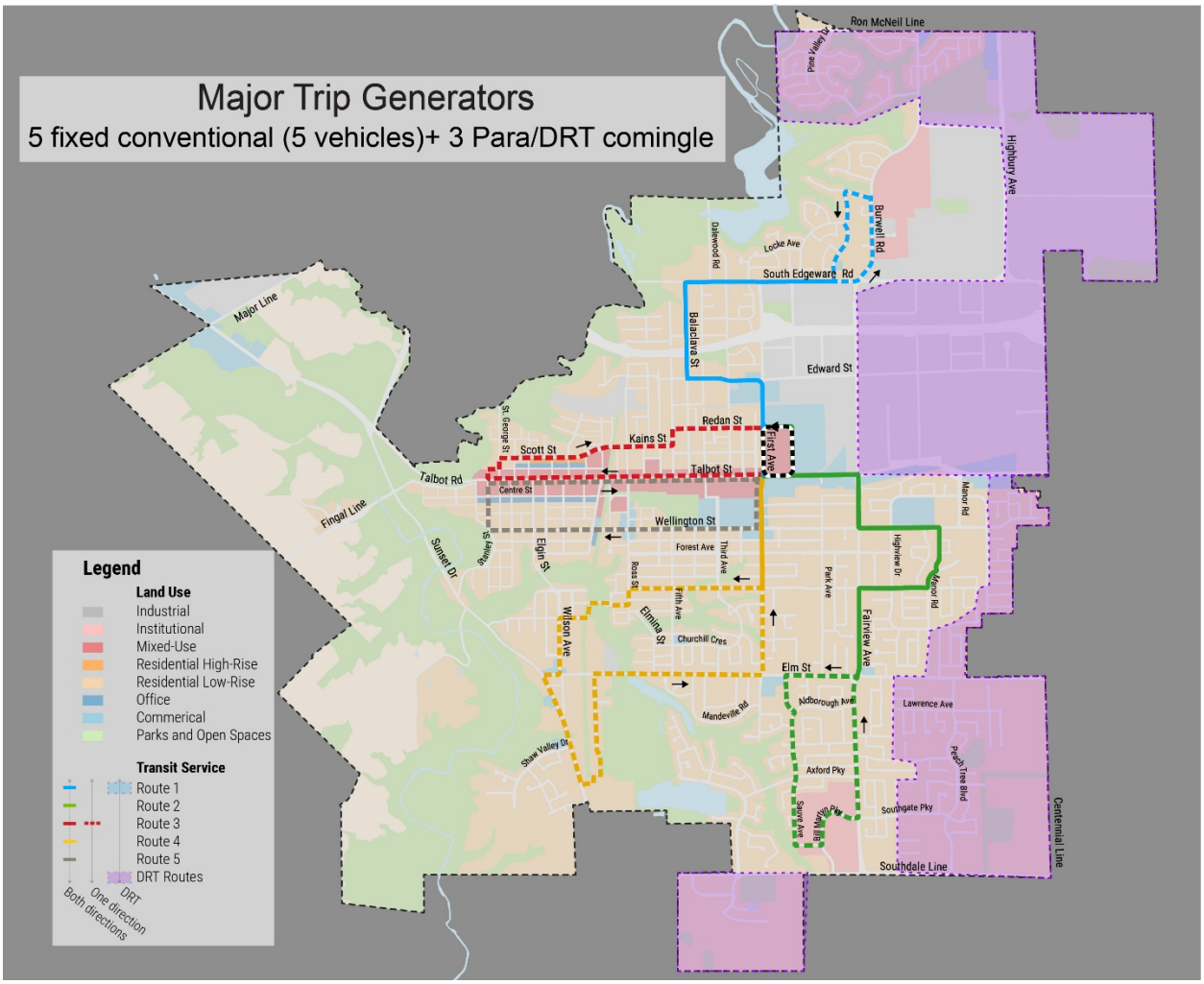


Figure 17: Option 2 – "Major Trip Generators"

9.2.3 Option 3: Two-Way Service

Option 3 involves a more transformative network update compared to Option 2 in that one-way loops are eliminated allowing for two-way service throughout the network – making it easy for customers to get both to and from their destinations in a short travel time. The drawback of eliminating one-way loops is that service coverage is lower, however, the majority of residents remain within an acceptable walking distance of fixed route service and the

incremental time spent walking to the nearest bus stop can be more than made up for in time savings from more reliable and direct service. Option 3 is envisioned to operate with slightly different service span parameters, but as illustrated further down in Section 9.4 it also represents a 'zero sum solution'.

Option 3A: Interline Routes 1 and 5

In this network option, it is recommended for Route 3 to be serviced by two buses, allowing for high-frequency 15-minute service along the Talbot St. corridor, while a trade-off is made whereby Routes 1 and 5, with the lowest anticipated performance, may be serviced by one bus, resulting in 60-minute service. Should incremental operations and maintenance funding become available in the future, the first priority would be to add another bus so that each route can have one dedicated bus, instead of one shared interlined bus, bringing both these routes back to 30-minute service.

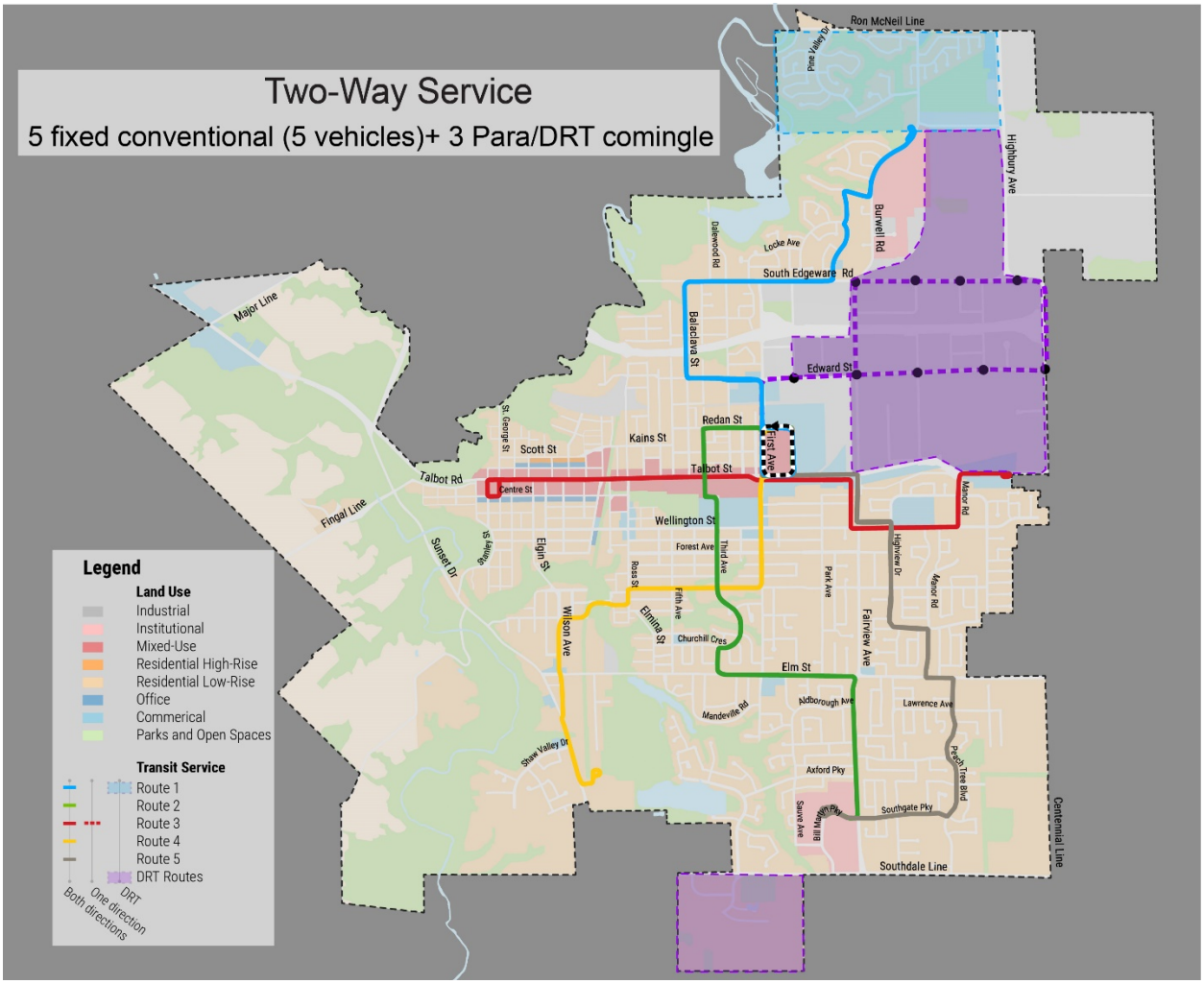


Figure 18: Option 3A – "Two-Way Service"

Option 3B: Interline Routes 1 and 5, and also Routes 2 and 4

Similar to Option 3A, in this network option, it is recommended for Route 3 to be serviced by two buses, allowing for high-frequency 15-minute service along the Talbot St. corridor. In addition to interlining Routes 1 and 5, Option 3B also involves the interlining of Routes 2 and 4. Doing so frees up resources which may be reallocated to piloting Sunday service in response to stakeholder feedback and considering the higher levels of economic activity on Sundays compared to years past. For Option 3B, a modification to the alignment of Route 4 is proposed to ensure the St. Thomas Elgin General Hospital continues to be serviced every 30 minutes, with users having the option to travel there on Route 2 or Route 4 depending on their schedule. Fanshawe College also receives service every 30 minutes, as users have the option to travel there on Route 2 or Route 5. Option 3B includes another route alignment modification, to Route 3, whereby the route is proposed to loop around Elgin Mall rather than continue east towards Southwestern Public Health. Doing so frees up runtime, which facilitates the ability for the vehicle to pull into the transfer location at SmartCentres in the westbound direction.

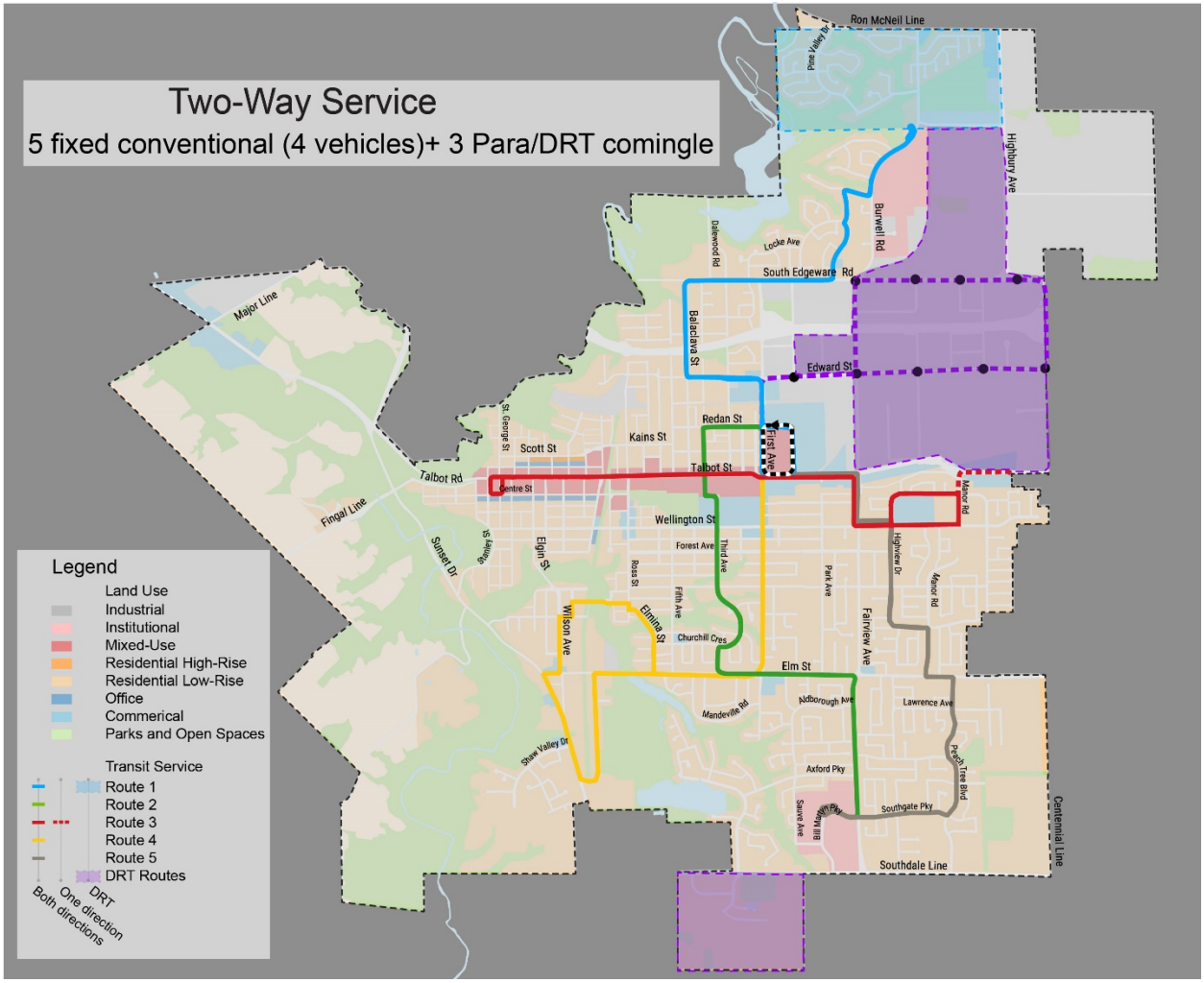


Figure 19: Option 3B – "Two-Way Service"

9.3 NETWORK EVALUATION AND COMPARISON

In determining which of the three options is recommended for implementation, an evaluation matrix to weigh the advantages and disadvantages of each option was developed. The premise is that by evaluating each option in the matrix, it can be determined which of the three options represents the solution that best maximizes and balances the upsides of increasing ridership, reliability and convenience while minimizing the downsides of increased financial strain or overcomplicating the usability of the system. The criteria have been grouped within three broad categories: Ridership Factors, Financial Factors, and Implementation and Operational Factors. The individual evaluation criteria under each category are described as follows:

Ridership Factors

- **Service Coverage**: considers the percentage of the population that lives within 5- and 10-minute walking distances of transit.
- **Route Directness/Simplicity**: considers the percentage of routes that are simple rather than complex, examining factors such as route lengths, termini locations, and number of turns.
- **Frequency**: considers the frequency of service, with frequent service scoring more favourably.
- **Service Span**: considers the span of hours in which transit operates.
- **Service Effectiveness**: considers projected ridership by route in comparison to the proposed revenue-hours of service for each route, with higher ridership on a per revenue-hour basis considered to be more effective.
- **Accessibility**: considers the extent to which key destinations, including employment centres, can be accessed by the transit network within 5- and 10-minute walks.

Financial Factors

- **Operating Costs**: considers the anticipated annual operating costs of the network, assumed to be proportional to the anticipated annual revenue-hours.
- **Capital Infrastructure Costs**: considers the extent to which new capital infrastructure is required, most notably including new or relocated stop infrastructure and passenger amenities. (Note: in theory, fleet capital costs should be considered here too, but in the case of Options 1-3 there are not anticipated to be fleet considerations that are specific to any one option).
- **Passenger Revenues**: considers total projected ridership and the passenger revenues that can be expected.

Implementation and Operational Factors

- **Operational Impacts:** considers how easily the proposed network changes can be implemented from an operational perspective, taking into account things such as timed transfers, ease of driving, etc.
- **Customer Service Impacts**: considers how safe, comfortable, and straightforward the network is from the customers' perspective, taking into account things such as vehicle crowding, understandability of the network, etc.

- **Public Acceptance:** considers how likely the public is to accept the transit network's changes (or lack thereof), taking into account the items that were found to be important during stakeholder engagement.

The evaluation of all three networks is illustrated in the table below. Overall, Option 3 scores the highest. Given the removal of one-way loops and direct routing, this network offers greater route simplicity, directness, and service quality relative to the other two networks. While all networks provide adequate coverage and accessibility, the existing network still offers the greatest level of fixed-route coverage and therefore direct access to key population and employment areas, although the deficiencies of Options 2 and 3 may be addressed through demand-response service. Moreover, it is important to point out that additional journey time in the form of walking to the nearest bus stop (due to reduced fixed-route coverage) is expected to be more than offset by reduced wait time (due to improved service reliability) and reduced travel time (due to more direct routes). Therefore, despite the more limited fixed-route coverage of Option 3, it is expected to be the most desirable from the customers' perspective in terms of ensuring as best possible that travel times on transit are competitive with those of driving.

With respect to financial factors all three networks score the same. The existing network offers the greatest savings in terms of capital infrastructure cost since the existing infrastructure can be used as well as a predictable operating cost. Options 2 and 3 will require some relocation of transit stop infrastructure and amenities, though a significant portion of the existing stop network may still be used. (In saying this, the benefits of Option 1 are minimized in this regard if St. Thomas Transit plans to refresh its branding, which is expected to warrant the need for the creation of replacement stop signage). Options 2 and 3 will offer greater potential to increase passenger revenues through increased ridership, particularly Option 3 which is expected to offer the greatest potential ridership growth.

Lastly, with respect to implementation and operational factors, the existing network naturally scores highest in terms of ease of implementation as there is no implementation required. With respect to customer service impacts, Options 2 and 3 offer more simple and direct routes, with Option 3 providing additional customer convenience with increased two-way service. Similarly, a greater public acceptance is anticipated for Options 2 and 3 as these networks address certain dissatisfactions noted with the existing network including indirect routing and longer wait times.

Table 6: Network evaluation results

Categories		Existing Network		Major Trip Generators		Two-Way Service
Category 1: Ridership Factors						
Service Coverage	4	- The existing network offers the greatest coverage of St. Thomas, considering both a 400 m and 800 m walking distance from the network	4	- The network offers more limited fixed-route coverage relative to the existing network, but this is largely offset by the proposal of DRT service.	4	- The proposed network will offer slightly lower fixed-route coverage to the existing network with additional coverage proposed in the industrial area in the east end of the city via DRT service
Route Directness/ Simplicity	2	- The existing network is comprised of complex routes consisting of many loops and turns. There are no simple routes	4	- The network is comprised of 60% simple routes, with the remainder being complex routes	5	- The network is comprised of 83% simple routes, with the remainder being complex routes
Frequency	3	- The existing network will maintain 30 min headways across the entire network	4	- 30 min headways will be maintained on all routes - Routes 3 and 5 will provide unidirectional 20 minute service on Talbot St.	4	- This network will offer 15 min two-way service on Talbot Street, the most productive portion of the network - 60 min headways will be maintained on Routes 1 and 5, matching supply with demand - 30 min headways will be maintained on all other routes
Service Span	3	- The existing service hours will be maintained which offers no evening or Sunday service	5	- Additional service proposed in the evenings with the possibility to explore Sunday service pending additional funding	5	- Additional service proposed in the evenings with the possibility to explore Sunday service pending additional funding
Service Effectiveness	3	- The network is expected to see an increase of 1% per year in ridership, offering minimal growth	4	- The network is expected to see an increase of 3% per year in ridership, as the network prioritizes major trip generators in St. Thomas - The reduced revenue km relative to the existing network will help to offset the additional resources required for additional service hours	5	- The network is expected to see an increase of 6% per year in ridership - This network offers a potential to capture new ridership via the on-demand service and additional coverage in the southeast, as well as through simplifying the route network and providing more direct two-way service
Accessibility (to employment, institutions, key destinations etc.)	5	- Offers coverage to a significant portion of the population and to employment areas	4	- Connects to several main destinations but lacks access to various population and employment areas	4	- Offers a similar degree of coverage to the existing network and a larger number of jobs can be accessed, however, requires longer walking distances in some cases
Sub-total (out of 30)	**20**		**25**		**27**	
Category 2: Financial Factors						
Operating Costs	5	- The current operating costs remain minimal and predictable, particularly given the limited service span relative to the other networks	5	- This network prioritizes connections to major trip generators and offers the lowest service km which will help to offset the cost of expanding the service span	4	- May be more challenging to manage operating costs due to the uncertainties surrounding demand-response uptake combined with the broadened service span
Capital Infrastructure Costs	5	- Can continue to operate without any capital investments	4	- A small capital investment will be required to alter the route alignment including bus stops and amenities (roughly 10% change from the existing network) - Additional marketing expenses may be required to communicate changes to the public	4	- A small capital investment will be required to alter the route alignment including bus stops and amenities (roughly 30% change from the existing network) - Additional marketing expenses may be required to communicate changes to the public
Passenger Revenues	3	- No new opportunities to grow ridership and increase passenger revenues, the current passenger revenues will be maintained with minimal growth	4	- The projected 3% growth in ridership (including DRT) is expected to result in additional passenger revenues	5	- The projected 6% growth in ridership (including DRT) is expected to result in additional passenger revenues
Sub-total (out of 15)	**13**		**13**		**13**	
Category 3: Implementation and Operational Factors						
Operational Impacts (Ease of Implementation)	5	- No implementation required to maintain the existing network	3	- The implementation of various routing changes will result in additional training and requires a communications strategy to highlight changes, however in the long-term this network offers more direct and efficient service	3	- The implementation of various routing changes will result in additional training and requires a communication strategy to highlight changes, however in the long-term this network offers more direct service and additional service to new areas
Customer Service Impacts (Safety, comfort, ease of use)	3	- Current issues of crowding on busier routes during peak times was identified through public feedback - Complex routing may disincentivize new riders from using the system	4	- The network is more simple than the existing network and provides more direct trips - The proposed 15 min service on Talbot St. will ease issues of crowding	5	- The network is more simple than the existing network and provides more direct trips - The proposed 15 min service on Talbot St. will ease issues of crowding - Increased amount of two-way service provides additional customer benefits
Public Acceptance	3	- St. Thomas residents noted dissatisfaction with the indirect routes and long wait times for buses - There is a desire for longer service hours	4	- The network offers more direct service to major destinations in St. Thomas - Expanded service span will address customer feedback - The more direct service will reduce wait times across the network - The reduction of fixed-route coverage in various areas may impact the community acceptance of this plan	4	- The network offers more direct service throughout the city - Expanded service span will address customer feedback - The additional frequency on Talbot St. will reduce wait times along the busiest corridor on the network - The reduction of fixed-route coverage in various areas may impact the community acceptance of this plan
Sub-total (out of 15)	**11**		**11**		**12**	
TOTAL (out of 60)	**44**		**49**		**52**	
Weighted TOTAL (%)	**76%**		**81%**		**86%**	

9.4 FINAL PREFERRED NETWORK OPTION

Based on the results of the evaluation matrix, it is recommended that St. Thomas Transit implement the "Two-Way Service" (Option 3) network. In doing so, it is important for St. Thomas Transit to begin by identifying the current technological barriers to implementing demand-response transit (DRT) and working with third-party providers to ensure a solution can be put in place. A number of considerations have been detailed in Section 8 above. This should not preclude the implementation of the changes to fixed routes, as coverage is still maintained in the Two-Way Service network relative to the existing network within acceptable walking distances. If the fixed-route coverage north of Valleyview Home is a concern, there is the option for St. Thomas Transit to maintain the loop along Ron McNeil Line, Pine Valley Dr., and Greenway Blvd., just until demand-response service is ready to go, keeping in mind there may be challenges with respect to maintaining on-time performance in the short term. These challenges may be particularly prevalent if this route (Route 1) is interlined with the proposed Route 5 through the southeast, whereby unexpected incidents in the southeast limiting on-time performance on that route can have a ripple effect onto Route 1.

We now examine the nuances of Option 3 implementation, discussing unique considerations with implementing the network presented in Option 3A versus that presented in Option 3B.

9.4.1 Implementation of Option 3A

Route 3 along Talbot Street will not travel into the transfer hub at SmartCentres but rather bypass it along Talbot Street to provide more direct routing. Bypasses of a transfer point are common across the transit industry. Route 3 is still within close proximity (250 metres) to connect to other routes at the transfer hub and will provider numerous direct connections to all routes along other segments of the route. This will allow the service on Talbot Street, the busiest corridor on the network, to be more frequent and direct, providing faster end-to-end service, while also conserving resources that can be deployed on other components of the network.

The Two-Way Service (Option 3) network is estimated to result in a systemwide ridership boost of approximately 5.9% in the first year, and is recommended to be implemented taking the following parameters into consideration:

- All fixed routes begin operation at 7:15 AM on weekdays and 9:15 AM on Saturdays.
- All fixed routes end operation at 5:45 PM, 60 minutes prior to the current end time.
- Citywide demand-response to operate from 5:45 PM to 9:45 PM with two vehicles.[5] In addition to facilitating transit use to and from residents' evening recreation and leisure activities, the additional service span helps to provide service for more industrial workers with shifts beginning and ending outside of the traditional 9-to-5 hours. At the same time, it must be appreciated that shift work for many employers runs through the early hours of the morning, so this expanded service span, while helpful for shift workers, is not a perfect solution for everybody. However, 24-hour service operation would be cost prohibitive for a city (and a transit operation) of St. Thomas' size.

[5] By ending fixed route (and Parallel Transit) operations 60 minutes earlier, 8 revenue-hours are saved per day, allowing for the implementation of two vehicles @ 4 service hours each as evening demand-response service for both conventional and Parallel Transit customers. It is noted that Belleville Transit, servicing a community larger than St. Thomas, originally implemented its evening demand-response service with two vehicles, so this same level of service is expected to suffice for St. Thomas in the short-term. However, the demand-supply relationship for evening service should carefully be monitored and St. Thomas Transit should be prepared to either adjust the parameters of the demand-response service, or implement a third vehicle, depending on need and available budget.

- Demand-response in the industrial area and in the north, near Ron McNeil Line, to operate from 7:15 AM (or 9:15 AM on Saturdays) to 5:45 PM, and these areas will be rolled into the citywide demand-response from 5:45 PM to 9:45 PM.

- All demand-response service is expected to involve the comingling of Parallel Transit customers with able-bodied demand-response customers.

Given the parameters above, it is important to note that the demand-response service is considered to be taking advantage of the efficiencies to be gained in the operation of Parallel Transit, rather than resulting in incremental operations and maintenance costs over and above what are already being committed. That is, the comingling of Parallel Transit with demand-response customers can result in an increase in the average vehicle load. This is particularly evident given that much of the demand-response service is focused on industrial areas, which have peak demand outside of the hours of Parallel Transit's peak demand. Additional considerations for demand-response services are detailed in Section 9.4.3 below.

9.4.2 Implementation of Option 3B

The primary advantage of implementing the Option 3B network is that resources become freed up which may be redeployed into a Sunday service pilot. To help mitigate the negative impacts of the additional interlining of Routes 2 and 4, the route alignments have been adjusted such that they both provide service to the St. Thomas Elgin General Hospital, as noted above. In doing so, a one-way loop has been created in the southwest, but it remains a relatively small one-way loop compared to those present in the existing transit network (Option 1). It will be important to test drive this route to ensure there is sufficient buffer time in the schedule to allow for the extension of the loop up to Palm St. If on-time performance will be a challenge with the proposed alignment's runtime, it may be necessary to truncate the loop at Elm St., sacrificing some coverage at Palm St. and environs. This would warrant the need for further investigation of productivity benefits against the downsides of reduced fixed-route coverage, and analysis of the extent to which the bandwidth of demand-response resources might accommodate additional demand-response coverage in this area. As alluded to above, the importance of maintaining on-time performance becomes compounded for a network reliant on interlining routes, so it is not recommended to simply accept the risk of lower on-time performance.

Implementation of Option 3B is anticipated to bring similar ridership benefits (estimated at a 5.9% increase in the first year), and is recommended to be implemented with the same service span considerations as Option 3A, with one additional consideration:

- Sunday fixed-route service to be operated identical to Saturday fixed-route service (9:15 AM to 5:45 PM), but without the supplementary demand-response service in the evening hours.[6]

It is recommended that St. Thomas proceed with implementation of Option 3B as shown above in Figure 19. Although the anticipated net benefits of Options 3A and 3B are effectively identical, Option 3B is more transformative and will give St. Thomas Transit the ability to pilot different strategies and respond more directly to customer feedback. At the same time, it is recommended that St. Thomas closely monitor post-implementation performance and consider modifying service as needed. In the event that ridership trending necessitates additional budget for transit, the budget

[6] The additional interlining of Routes 2 and 4 allows for the removal of one bus throughout fixed-route operating hours (7:15 AM to 5:45 PM on weekdays, and 9:15 AM to 5:45 PM on Saturdays). This corresponds to 61 revenue-hours saved per week. The operation of Sunday fixed-route service from 9:15 AM to 5:45 PM requires 7 vehicles (4 fixed-route plus 3 specialized transit / DRT) multiplied by 8.5 hours of service, for a total of 59.5 hours per week. The balance of 1.5 revenue-hours, while insufficient for evening DRT, may be invested elsewhere into the St. Thomas Transit operation at the City's discretion.

should be focused first on expanding the fleet size as well as the number of revenue-hours to bring Routes 1, 2, 4, and 5 back to 30-minute headways. This would require adding 2 new buses. Further down the road, additional service expansions may also be considered, budget permitting. If 30-minute headways are achieved, it may be appropriate to revert to the Option 3A concept for Route 4, to help further minimize one-way loops and because the overlap between Routes 2 and 4 will become less critical. City growth and ridership increases will also create a need to add to the DRT fleet or revert DRT zones into new conventional routes.

9.4.3 Demand-Response Services

When considering demand-response service, there are various operating models and service delivery models which can be explored. To operate this service, some agencies opt for dedicated agency resources, while others employ dedicated contracted resources which are procured by a contractor and overseen by an agency. A third model is to opt for fully contracted services that are overseen by contractors. In the case of St. Thomas, it is recommended that a contracted model be explored which is either overseen by St. Thomas or a contractor, given that the current fixed-route system is operated via a contractor. The current contract with Voyago can be reviewed, with the operation of demand-response transit potentially forming some of the terms in the contract renewal, with the intention to also leverage a third-party technology provider to provide a dynamic scheduling software compatible with demand-response and Parallel Transit scheduling as these services are proposed to be comingled.

With respect to service models, demand-response services can take many forms. A curb-to-curb service is one option which is similar to the current deployment of specialized transit (Parallel Transit) service. Other models include a home-to-hub service which will transport riders from their designated pick-up point – often a home location – to a hub to continue their journey on fixed-route transit. The reverse trip can also be made (hub-to-home). Additionally, designated stops can be used where vehicles will transport riders between the fixed-route system (usually a hub) and designated locations. This stop-to-hub model provides benefits in the form of more structure and predictability, and better cost management, but has drawbacks in that it is less convenient from the riders' perspective.

For St. Thomas, the use of a stop-to-hub or home-to-hub service is recommended to be explored for the area north of Route 1 and the industrial area in the northeast. A stop-to-hub model is suggested for an initial pilot, where the same stops that are used on the northern component of the existing Route 1 can be utilized as demand-response stops which will minimize confusion, maximize trip grouping possibilities, and minimize additional infrastructure costs. However, these stops should be reviewed to determine which are necessary, as it may not make sense to carry forward all of the stops in the launch of the demand-response service. In the industrial area, a stop review would assist in identifying landmarks and logical stop placement. Customers travelling to/from locations within the designated demand-response service boundaries will be picked up and transported to the SmartCentres hub to either access this destination or transfer to fixed-route service for onward travel to anywhere in the City.

For the demand-response service hours proposed in the evening for the entire network, implementation is envisioned to follow a similar model to that of Belleville Transit. The same fixed-route stop network can be used for evening demand-response service deployment, or a modified network can be considered. Some level of stop consolidation may make things simpler and more cost-efficient from an operational perspective, but it would add a new layer of confusion from the riders' perspective. Different stop considerations can be tested and modified during a pilot period, and it is recommended for St. Thomas to begin the pilot by including all fixed-route stops in the evening demand-response stop network.

The cost efficiency of demand-response service is dependent on driving distances to/from the transfer location with fixed-route service. The furthest point from the SmartCentres in the northeast industrial area (S Edgeware Road) is

within a 4-kilometre driving distance (one way), which is a manageable distance. In the case of the proposed demand-response area north of Route 1, 1-2-kilometre driving distances beyond the proposed Route 1 alignment would be required.

Given that this new system delivery will need to be piloted, there are uncertainties with respect to demand forecasting, however, it will be important for St. Thomas Transit to play an active role in managing demand, especially in the short term, to ensure the solution can still be delivered with at most 7 vehicles (4 conventional + 3 Parallel/DRT) operating at one time (or 8 vehicles including a fifth conventional vehicle if Option 3A is selected), and within existing operations and maintenance budgets. Necessary parameters will be required to build a service which is achievable within these identified constraints. St. Thomas would need to work with Voyago and a third-party technology provider to devise a comprehensive service plan.

Prior to implementation, several decisions will need to be finalized, including:

- Service area boundary for demand-response service;
- Designated stops and hubs;
- Appropriate time period required to book a trip;
- Balancing travel time and optimizing vehicle load – can develop service parameters including passengers per trip/hour, maximum wait times, and maximum in-vehicle time;
- Trip request structure, which can include a guaranteed drop-off time with a pick-up window or a guaranteed pick-up time with a drop-off window;
- The cost of a demand-response trip which is recommended to reflect the same costing structure as the fixed-route system to ensure interoperability with the fixed-route system;
- Fare payments which can potentially leverage the same system as specialized transit vehicles, notably these are interchangeable with conventional transit vehicles in St. Thomas;
- Missed trips or late cancellation policies can be developed or based on the same policies which apply for specialized transit trips; and
- Privacy, liability and safety of working with a third-party technology provider.

In terms of demand forecasting, it is challenging to forecast a steady-state demand for this service prior to pilot implementation as oftentimes the initial pilot stage may see fewer trip groupings due to lack of awareness and ongoing optimization of the scheduling system. As such, a sufficient pilot period is beneficial to allow for demand to be determined and scheduling optimization to be refined. It is noted that in no circumstances should demand-response customers be given priority over Parallel Transit customers, and in the unlikely event that St. Thomas Transit needs to start denying trips due to demand, it is the demand-response trips that should be denied rather than the Parallel Transit trips.

As determined in earlier phases of the Transit Strategic Plan, there is a significant opportunity to capture the industrial employment lands in the northeast of the city which employ over 13,141 people translating to over 64% of the jobs in the city. This area is currently serviced by Route 1 and the express commercial route (Route 5a) on the existing network. Route 5a travels into this area along Burwell Road, however this is still 1.5 kilometres away from the most easterly

industrial facilities, requiring a significant walk. With 30-minute headways along Route 5a and operating hours catering to the school demand, this makes transit a less convenient option for work trips in this area.

Additionally, the entire network currently operates between 7:15 AM and 6:45 PM, which has limited alignment with industrial shift work which often begins prior to 7:15 AM and/or ends after 6:45 PM. The limited service span makes the service less accessible to these employees. The transit mode share is shown as 0% in this industrial area, likely because of the limited viable service options for industrial workers. If increased coverage and flexibility were offered, there is an opportunity to capture a larger transit mode share – particularly among the 13,141 employees who commute to the industrial area in the northeast daily. For illustrative purposes, if 1% of this population was captured via transit trips, similar to that of the overall transit mode share seen in St. Thomas, this would result in approximately 70,000 additional trips (assuming a five day work week and two trips a day) - approximately a 40% increase from the annual ridership reported in 2017.

In summary, the benefits of demand-response services include:

- Flexible routing or scheduling to meet customer demand;
- Use of technology (mobile apps) to correlate supply and demand;
- Optimized fleet deployment resulting from the comingling of different customer types; and
- Connections provided between several transportation services to complete trips.

9.5 CROSS-BOUNDARY TRANSIT POSSIBILITIES

It is important that St. Thomas residents understand that their voices are heard. Many survey respondents indicated the desire/need for a daily bus or shuttle between St. Thomas and the City of London for travel to and from work. Currently, about one-third of the St. Thomas labour force works in nearby London, and approximately 16% of St. Thomas' workforce consists of Londoners. It is understood that there is pre-existing funding from the provincial and federal governments to be used in the pilot of an interregional service that goes beyond the City's borders.

In response, St. Thomas in collaboration with neighbouring municipalities has proposed a Regional Transit Pilot between St. Thomas, Elgin County and London. The service will offer regional transit connectivity for residents of St. Thomas, London, and in certain locations within Elgin County such as Aylmer, Central Elgin, Southwold, and Malahide. The service is proposed to operate 7 days a week from 7:00am to 8:00pm with one-hour frequencies (30-minute trips in one direction). The service is proposed to begin at the SmartCentres St. Thomas and maintain the following route branches:

- North route: terminating in London at White Oaks Mall, with potential stops in Lynhurst and the 401/Wellington commercial district.
- East route: terminates in Aylmer with a potential stop in New Sarum.
- South route: terminates in Port Stanley with a potential stop in Union.

The fares for this service will be $10 one-way or $15 return. Funding for this pilot is being planned for three years with annual reporting to inform operational adjustments and final recommendations throughout the pilot and upon its

conclusion. The proposed vehicle is an accessible low floor cutaway, similar to what is used currently by St. Thomas Transit.

Out of these three routes, the north route is expected to yield the highest ridership due to the size of London and its popularity as a destination for a myriad of trip purposes, with the terminus at White Oaks Mall being a destination in its own right. The driving distance between SmartCentres St. Thomas and White Oaks Mall is approximately 20 minutes, which makes this route well suited to be run on a 60-minute round trip cycle time. The Regional Transit Pilot envisions nine trips to/from London every day, with an additional two round trips for each of the east route (to Aylmer) and the south route (to Port Stanley).

It is not recommended at this time for the pilot to extend westward to communities such as Shedden because resources should be deployed initially where they are most likely to succeed, and Aylmer represents a location within Elgin County where the pilot is most likely to succeed due to its higher population combined with a higher number of survey respondents expressing interest in travel to and from Aylmer. Pending the success of a shuttle service to/from Aylmer, the launch of service westward from St. Thomas towards Shedden may become a priority if there is desire for an equitable distribution of public transportation options to the communities surrounding St. Thomas in all directions.

The familiar operating arrangement for the Regional Transit Pilot would be for the City of St. Thomas to procure the vehicle. However, in this case, because a contract would be formed separate to the operation of St. Thomas Transit, the City might instead request in the service delivery RFP that the proponent supply its own vehicle of predetermined specifications. There are a couple advantages of this. First, given the small scope of the pilot, it negates the need for the City to concern itself with managing a spare ratio; and second, since the regional partners in Elgin County and London would have a stake and be expected to contribute a fair share of funding, this would avoid any perceived conflicts of interest that might arise from comingling the shuttle vehicle(s) with the rest of the St. Thomas Transit fleet.

Costs as well as ridership should be monitored to assess the cost-benefit of this cross-boundary transit pilot. It will be important to monitor ridership at the trip level and understand the extent to which there is two-way demand, as this may influence the post-pilot form of the shuttle, assuming there is merit to continuing it past the pilot stage. It may also impact the future funding arrangements between the City of St. Thomas and the partnering agencies depending on which jurisdiction's residents are relying on the service the most. If there is merit to continuing this service past the pilot stage but external funding is not in place, it will be important to ensure that this regionally focused service does not fall solely on the backs of the City of St. Thomas' taxpayers.

In addition, it is noted that there is political desire for a Central Elgin demand-response service option that provides service to Lynhurst, to Lyndale and Norman, and on/around Coulter Ave. to the east of St. Thomas, connecting these adjacent areas with the City. This desire has grown as a result of the absence of fixed-route service to these communities and the difficulty of conceptualizing a service that could be run out of the SmartCentres transfer location with minimal route overlap and on 30-minute headways, consistent with the rest of the network. Similar to the principles described above, if this demand-response option is to be pursued, it is recommended that this form a separate contract for two primary reasons: one, to more easily facilitate a pre-negotiated cost sharing arrangement with Central Elgin, and two, because it is unclear until pilot launch the extent to which the proposed demand-response services within City boundaries represent a match of supply and demand. That is, if St. Thomas Transit is in a position where it is struggling to keep up with the intracity demand, expanding the demand-response service to these Central Elgin communities

would not be a prudent course of action. Moreover, a demand-response service to Central Elgin need not necessarily be delivered by the St. Thomas Transit fleet. Ridership forecasts may suggest that smaller vehicles would suffice, as is the case for the RIDE WELL program in Wellington County, for example. An order-of-magnitude cost estimate suggests such a service might require incremental funding of approximately $362,000 per year.[7] However, if less funding is in place, the parameters may be adjusted, or a pilot duration of less than one year might be considered.

An important caveat regarding the cross-boundary service pilot is that St. Thomas Transit's top priority should always remain within city boundaries. If cross-boundary pilots are launched but the intracity St. Thomas Transit service is not perceived by St. Thomas residents to be high quality, a perception may foster among residents that tax dollars are being "wasted" on outsiders instead of being invested to address real issues within the City. Such a perception can bring negative consequences that transcend public transit, and it is paramount that these be avoided.

9.5.1 Existing Cross-Boundary Services

The currently available interregional transportation options available in St. Thomas are detailed as follows.

Commute Ontario Regional Rideshare

Regional Rideshare, a stem of the provincial Commute Ontario program, offers an online platform to connect similar commuters in Ontario to share rides to-and-from work. The Southwest rideshare program, which is managed by the City of London, allows website users to sign up using their employer or organization. The program has no current employers or organizations based out of St. Thomas, but the town can still be accessed by the service as an origin or destination when requested by a user. Commute Ontario partners in the southwest region include 3M, Fanshawe College, Western University, Labatt Brewery, EG Industries, North Star Windows and Doors and St. Josephs Health Care.

Summer Beach Shuttle

In Summer 2019, Erie Fun Tours launched a Saturday shuttle service travelling from London to St. Thomas, to Port Stanley beach. The pick-up location in London alters every other week between East and West London. The company launched the service in response to beachgoers who wished to visit the beach without having to drive their own vehicles. Tickets are $20 round-trip and can be purchased in advance for pickup in London or St. Thomas. The seasonal shuttle service is now unavailable but is advertising for summer 2020 operations. Some initial feedback from Erie Fun Tours in early August suggested ridership figures were coming in slightly in excess of the break-even ridership, with 23 riders over the span of one week in late July, only 3 of which have boarded in St. Thomas (the rest boarded in London).

Port Stanley Terminal Rail

Port Stanley Terminal Rail (PSTR) trains operate on selected days and travel from Port Stanley Station to St. Thomas and back. The trains are an opportunity for tourists to ride an original caboose, take photographs along the historic rail line and visit attractions such as the Elgin County Railway Museum. Trains depart at 11 AM, 1 PM and 2:30 PM on Saturdays and Sundays, with exceptions for special events and selected weekdays during the summer months. A roundtrip fare costs $15 or $9 for an adult or child, respectively.

[7] Assumes one vehicle operating for 14.5 hours per day, 6 days per week, 52 weeks per year, and at a rate of $80 per hour.

London VIA Rail

London is home to a major VIA Rail station on the Quebec-Windsor Corridor. Rail passengers boarding in London can access major cities including Toronto, Niagara Falls, Montreal, Sarnia and Windsor.

London Greyhound

Greyhound Bus Lines connect London to multiple cities across southwestern Ontario daily, including many that aren't accessible by rail. Greyhound Express also offers cross-border trips from London to selected American cities including Atlanta, Chicago, Detroit, Nashville, and Cincinnati.

10.0 TECHNOLOGY RECOMMENDATIONS

While there is a plethora of emerging transportation technologies that are impacting the provision of transit service around the world, a select portfolio emerges that is of direct benefit to St. Thomas Transit for the term of this business plan and the future of the city.

General Transit Feed Specification (GTFS) technology

Transit apps and websites that disseminate real-time information to users demand General Transit Feed Specification (GTFS) to feed transit data and relevant geographic information. Stantec recommends that St. Thomas generate a GTFS feed such as to provide real-time updates about service to application developers in an open data format. Through the adoption of GTFS, necessary data will be created for the use of third-party transit applications such as Google Maps or the Transit App. Riders and non-riders will be able to use these applications using their mobile phones or computers, and compare current travel times, view maps and routes, and make real-time transit decisions. Generating a GTFS feed should be done in the short-term to encourage app-use among riders.

Modernize the fare collection system

Modernization of the fare collection system is a prudent step to reduce an agency's administrative and fare collection costs that affords riders more choice in how they want to pay for service. Therefore, St. Thomas Transit should adopt the use of an open-source electronic fare collection system to allow transit users to pay fares onboard using their credit card, debit card or smartphones. It will provide additional convenience to riders while simultaneously lowering revenue collection costs including the handling of cash, selling of paper and plastic fare products and maintaining revenue collection equipment. Furthermore, mobile fare payments speed up service, increase customer loyalty, and collect data and analytics for measuring performance and improving operations. Electronic fare systems can be quickly adopted and require a simple validator on board fixed route buses and paratransit vans.

Online survey respondents also voiced concerns about being unable to purchase St. Thomas Transit advanced tickets and monthly passes using a credit card. It is recommended that St. Thomas install a point-of-sale terminal at their ticket sale location to allow transit users to purchase fares using alternative payment methods such as credit card, debit card, or an electronic device.

Install annunciators and accompanying digital displays

In the interest of encouraging barrier-free lifestyles for persons with disabilities and mobility challenges, St. Thomas Transit should adopt the use of annunciators and accompanying digital displays on their buses. GPS-linked audio and visual announcements alert all riders, including those who are visually or hearing impaired, to upcoming stops in a clear and legible manner. As of 2017, the Accessibility for Ontarians with Disabilities Act (AODA) requires that operating public transportation vehicles in Ontario announce and display route stops and destinations through electronic means. Outfitting the bus fleet with this technology as soon as possible will ensure St. Thomas Transit is responsible to all riders and is accessible for everyone. In the meantime, St. Thomas Transit should ensure as a temporary solution that bus operators are verbally announcing the next stops to the passengers on board.

Outfit fleet with Closed Circuit Television (CCTV) cameras

Ensuring customer and operator safety is paramount for St. Thomas Transit. It is recommended that St. Thomas Transit install internal CCTV cameras on each bus in the fleet. This is a worthwhile investment that helps to ensure the safety of both bus operators and customers. CCTV cameras capture important footage that can assist investigations of disputes, criminal activity and vehicle accidents. They can also monitor routes and capture boarding and alighting data to be used for service planning and operations. Lastly, their presence on buses will even deter acts such as vandalism from occurring. The use of CCTV cameras on St. Thomas Transit will foster a safe work environment for operators, safe trips for passengers, and help to protect the City of St. Thomas in civil suits.

Invest in dynamic scheduling software

To enable microtransit and demand-response solutions, it is recommended that St. Thomas Transit invest in demand-response/dynamic scheduling software. Fixed-route services are costly and not advantageous in areas where land use is poor and residential densities are low – the ridership generated in those areas often do not warrant the fiscal investment. Demand-response solutions such as the one envisioned for St. Thomas allow agencies to create “pop-up” routes in real-time based on demand for service, improving productivity and efficiency. Many of these newer software packages require only a tablet onboard as well as a cellular connection and can provide additional benefit of improved specialized transit scheduling within the same system. A superior scheduling software will be necessary if use of demand-response and specialized services increases in St. Thomas.

To begin, it is recommended that St. Thomas engage in conversation the software providers reviewed in Section 8.2 to discuss software needs. Each of these providers offer varying software capabilities and at varying price points. Some providers offer a full turnkey solution and will supply the tablets for each vehicle, provide platforms for fare collection, and an app for users to book trips with their smartphone. To ensure that St. Thomas gets the best value for money, it is recommended following these discussions that St. Thomas outline its desired specifications in a Request for Proposals document and encourage each software provider it has engaged with to submit a proposal response.

11.0 FARE RECOMMENDATIONS

Every transit system faces difficulty when setting fares and developing concessions—what should we charge that riders are willing and able to pay, so that fare revenue covers a portion of operating costs, but that isn't too expensive to burden low-income riders? The choices a transit agency makes regarding fares should reflect the values of the community it intends to serve, while also being accountable to taxpayers who may or may not use transit. Opportunities are identified below for the expansion of fare options to best ensure riders are contributing fare amounts based on their ability to pay. A caveat of expanding fare options is that it implies additional moving parts that the City must manage, however, given the simplicity of the current fare structure this is deemed to be a warranted tradeoff. In the interest of maintaining a simple fare structure, however, and given that these additional fare categories are not applicable to the general public, it is recommended that these categories not be included in the public-facing fare table in the Ride Guide, such as not to cause confusion among the customers.

Ensure permanency of low-income pass program

St. Thomas needs a low-income fare product to enable riders with low or fixed incomes to avoid devoting a large portion of income to transit. By continuing the Social Services subsidy and ensuring the permanency of a low-income pass program, St. Thomas will increasingly meet the needs of riders, particularly as low-income passes become distributed through additional channels.

It is recommended that individuals or families applying for a low-income pass submit a document from the Canada Revenue Agency, the Ontario Disability Support Program, or Ontario Works to assess eligibility. It is important to clearly define the parameters of who qualifies for the low-income pass, such that revenue and cost-recovery objectives, and operating budgets, are not severely impacted. To qualify for the low-income pass, an income threshold can be established using low-income cutoffs defined by Statistics Canada, as displayed in Table 7. Based on peer transit agencies and best practices, transit passes can be offered to qualifying low-income customers at a discounted price. The transit passes could be purchased in bulk by participating not-for-profit organizations and distributed to members who already demonstrate need, on a first-come-first-served basis. Based on outcomes of the pilot (such as number of passes demanded, revenue, estimated ridership, and feedback), the low-income monthly pass can become more widely distributed by St. Thomas Transit at a price of $40.

Table 7: Annual low-income cut-offs

Family Size	2017 Low-Income Cut-Off After Tax (base: 1992)
1 person	$17,536
2 persons	$21,344
3 persons	$26,577
4 persons	$33,157
5 persons	$37,757
6 persons	$41,874
7 persons or more	$45,989

*Based on community size of 30,000 to 99,999.
Source: Statistics Canada. Table 11-10-0241-01. *Low income cut-offs (LICOs) before and after tax by community size and family size, in current dollars.*

Establish reciprocal partnerships and employer passes

St. Thomas Transit is recommended to strategize with local businesses – especially those along Talbot St. – and develop partnerships whereby transit users get discounts for showing their pass. These types of partnerships are win-win because it encourages transit usage for St. Thomas Transit and patronage for the local businesses. Alternatively, customers at retail partners might receive a discounted transit pass the day of their purchase to encourage transit use.

An additional incentive for businesses to participate is for the arrangement to be viable, that they can count on frequent transit service along busy streets that will generate more customers – another reason why Talbot St. businesses would make the most desirable partners. Riders will be incentivized to shop and dine at local Talbot St. businesses.

St. Thomas might further partner with employers across the city, whereby St. Thomas Transit supplies discounted monthly passes for employers to distribute to their staff (usually free of charge or at a significant discount, as part of an employee benefits package) in exchange for a guaranteed number of passes purchased every month. These passes, often known as EcoPasses, are a reliable revenue source for transit agencies and assist with transit planning efforts in ensuring that the transit demand from certain places of employment is matched with adequate supply and service quality. This type of arrangement may be of interest for St. Thomas, as 49% of survey respondents indicated their primary trip purpose is commuting to and from work. While employers such as North Star Windows may have used shuttles in the past, it should also be appreciated that service provision to areas outside of the City's boundaries require additional considerations. Moreover, St. Thomas should be aware that if any employers located in the industrial area are interested in an EcoPass arrangement, it may be necessary to introduce fixed-route service on a schedule that aligns with their start of business. Demand-response service in and of itself may not be compelling enough for the interested organization to actually participate, and may not be adequate to meet the demand in a cost-efficient manner.

U-Passes, which work similarly to EcoPasses, could also be negotiated for post-secondary students at Fanshawe College's St. Thomas/Elgin Regional Campus for trips to and from campus. By working to improve the effectiveness and efficiency of transit in St. Thomas through multiple avenues, it may become possible to lure current drivers onto transit.

Develop non-fare revenue sources to help fund St. Thomas Transit

Transit is funded by fares, City taxes, and provincial taxes. Any increases in transit's level of service will require a commensurate increase in the quantity of funding. A critical question in the Transit Strategic Plan is who will pay for the improvements that are desired. Non-fare, or ancillary, revenue can provide a substantial revenue stream for transit agencies, alleviating the burden on fare-paying riders and the local tax base. Important sources for non-fare transit revenue include advertising, parking fees and government grant funding programs. Ontario's Ministry of Transportation provides operational funding for community transit networks through the Community Transportation Grant Program, which could benefit the St. Thomas Transit system. In addition, the federal government offers financial support for transit system improvements and expansions through programs such as the Investing in Canada Infrastructure Program (ICIP), and formerly the Public Transit Infrastructure Fund (PTIF). Lastly, a new marketing strategy for St. Thomas Transit would allow for external advertising opportunities on infrastructure like bus stops, wraps and signage. Exploring non-fare revenue sources such as these will support operations and help ensure the cost of transit in St. Thomas is competitive with the cost of driving.

Ensure fare structure remains in alignment with the AODA

St. Thomas Transit is currently compliant with the AODA in that fare parity exists between conventional transit and Parallel Transit. That is, all fare categories that exist for conventional transit should (and do) exist for Parallel Transit in the same dollar amounts. Although there have been concerns in the past that customers of certain disability types (blindness, etc.) may warrant free transit on conventional service, the current format of the fare structure is AODA compliant and should be maintained. Introducing free fares for people of certain disability types can create equity concerns, induce human rights complaints, and create a situation of non-compliance with the AODA, and therefore this should be avoided.

12.0 MARKETING RECOMMENDATIONS

St. Thomas Transit would benefit from overhauling its identity and the method it communicates to current and prospective customers. A modern visual and written presence would elevate customer interest and experience. Establishing a "transit is cool" culture should be the primary focus of future marketing efforts. It is appreciated that financial resources are finite. In reviewing the experiences of industry peers across North America, it is clear that investments in marketing translate into sustained, as well as new ridership. A marketing investment for transit in St. Thomas should be scalable, economical, and results-oriented to build interest in transit.

12.1 BRANDING CONSIDERATIONS

Consistent and creative branding

St. Thomas Transit should consider brand consolidation with the City to ensure effective marketing and accessibility across city services. The new city logo is creative, vibrant, and proudly reflects the identity of the St. Thomas' community and its heritage as "the railway city". By using a similar colour palette and design, the branding for city services will be cohesive and consistent, and easily understood by customers. This is a strategy that has opportunity to benefit both public transit and city services as a whole. To use fixed infrastructure as a marketing tool, it is recommended that all bus stop signage and benches be replaced with colourful, conspicuous signage consistent with the new branding (shown below in Figure 20).

Figure 20: City of St. Thomas Logo

Straight-forward branding and communication on bus signage will also improve accessibility and understanding among passengers. Overall, a creative rebranding for the transit agency will better reflect its new identity and help establish a

"transit is cool" culture in St. Thomas. The redesigned City of St. Thomas logo depicts a train engine, steam and other features pointing to the city's railway heritage; therefore, it is fitting to extend the railway theme into design of public transit vehicles. That is, it is worthwhile to consider the implementation of a specially designed bus wrap for the exterior of the vehicle to fit the railway theme. Such a bus wrap might be similar to those that other transit agencies such as Collingwood have used (shown below in Figure 21), although they would have to be appropriate for the size of St. Thomas Transit's vehicles. The railway theme might be extended to the bus's interior and include the customization of inside seating for example; however, this is not recommended due to higher capital costs and reduced comfort – an area already of concern for some customers that we would not want to exacerbate.

Figure 21: Collingwood Transit bus wrap

Trolley-style bus exteriors, however, can be a cost-effective marketing technique that captures the attention of community members and raises awareness to the use of public transit. Marketing a trolley-style bus in St. Thomas will align with the City's DNA while helping to meet the City's ridership objectives for the system. Concepts of vehicle branding are explored further below in Section 13.3.

Update brochure to align with the AODA

It is important that all content in the St. Thomas Transit brochure is updated to meet accessibility regulation criteria and increase overall comprehension[8]. Under the Accessibility for Ontarians with Disabilities Act (AODA), Parallel Transit services cannot rank or prioritize trip purposes. St. Thomas Transit is compliant with these regulations operationally speaking, but the content in the brochure needs updating to reflect the accommodation of Parallel Transit trip requests

[8] It is recommended that St. Thomas Transit consult the AODA Information and Communication Standards available here: https://www.aoda.ca/what-is-the-information-and-communications-standards/

on a first-come first-served basis. It is also important to ensure the route map is designed in a way that is easy to understand. The large number of lines on the map (route alignments, roads, rivers, railway tracks, the City boundary, etc.) may be a source of confusion for people with cognitive disabilities or visual impairments, and it can be difficult to distinguish between the circles for the North Student Express and the stars marking the bus stops, for example. In addition, information on service routes and hours of service will need to be updated depending on any implemented changes. Finally, similar to the visual appearance of the buses and bus stop infrastructure, it will be important to update the brochure to be consistent with the City of St. Thomas' updated branding.

Passenger Charter

In the interest of improving agency-customer communications and better instilling a culture of accountability, it is recommended for St. Thomas Transit to introduce a passenger charter. The passenger charter should contain a list of commitments that St. Thomas Transit will make to its customers related to topics including (but not limited to) safety, on-time performance, and/or customer service. It should include some of the elements of St. Thomas Transit's vision and objectives as discussed above in Section 6. At the same time, the passenger charter should also communicate St. Thomas Transit's expectations of customers, reminding them of their responsibilities such as paying their appropriate fare, wearing headphones or earbuds when listening to music, not leaving their trash behind on the bus, and treating bus operators and other passengers with respect.

12.2 INFRASTRUCTURE CONSIDERATIONS

Stop infrastructure

As additional stop infrastructure is introduced across St. Thomas this will create more marketing opportunities and demonstrate the city's commitment to comfortable, accessible transit. Signage will relay bus stop and connecting route information to riders, while amenities such as shelters and seating contribute to a more welcoming transit experience. The presence of passenger amenities such as a bus shelter at a transit stop can have a significant impact on an individual's choice of transportation during inclement weather. In addition, benches at bus stops improve the accessibility of public transit by providing seating for riders that may be unable to stand for long periods of time and may otherwise rely on Parallel Transit services. Providing seating and shelter at bus stops where possible is now considered best practice for accessibility, and requests for such have been actively voiced by existing riders. Therefore, it is recommended that St. Thomas explore opportunities to install more infrastructure in combination with the bright, new branding discussed above, to improve customer satisfaction, accessibility and brand visibility. Stop infrastructure should be prioritized for stops that meet the following criteria:

- **Transfer points**. The greater number of routes servicing a particular stop, the more transfer activity there is likely to be, and the more boardings and alightings can be expected. Stops that act as transfer points are usually more likely to warrant passenger amenities. This applies most obviously to SmartCentres St. Thomas, but may also be applicable to locations such as Talbot St. / Inkerman St., Chestnut St. / Third Ave., Wellington St. / Highview Dr., and Fanshawe College.
- **Major trip generators**. Hospitals, malls, and academic institutions are points of interest that tend to generate significant ridership as well as non-rider pedestrian activity. Passenger amenities are usually appropriate here to benefit the large ridership and to entice non-riders to try transit.

- **Nearest transit stops** for neighbourhoods requiring walks of >400m to reach the stop. That is, for stops that are important in the network because a significant number of people use the stop and have long walks to reach it, these stops are usually appropriate to be set up with passenger amenities. This might apply to locations such as Avon Rd. / Confederation Dr., which would be the closest stop location for residents living along the western portion of Confederation Dr. or on adjacent streets such as Lakeview Cir. or Warren Cresc.

- **Senior citizen-oriented points of interest**. In addition to certain hospitals and shopping centres as listed above under "major trip generators", senior citizen-oriented points of interest can also include retirement homes, community centres, and day program centres. Senior citizens in particular are more likely to be averse or unable to use transit if passenger amenities are absent.

- **Open areas affected by the elements**. Shelters are useful in areas where there are significant winds or where there is little natural protection from sun, heat, cold temperatures, or precipitation.

- **Total passenger activity**. Related to "transfer points" above, the greater the number of boardings and alightings, the more likely bus stops are to warrant passenger amenities. Boardings are typically more important than alightings where passenger amenities are concerned, unless passengers are alighting and then waiting for a connecting bus.

- **Total pedestrian activity**. Passenger amenities are more desirable in areas with high pedestrian activity not only to ensure passengers remain out of the way of pedestrians passing through, but also to hopefully attract discretionary riders to use St. Thomas Transit more frequently.

- **Demographics**. Related to "senior citizen-oriented points of interest" above, neighbourhoods that have a higher concentration of senior citizens may be more appropriate to have bus stops with passenger amenities, regardless of the existence of points of interest.

- **Vehicular traffic**. Passenger amenities may be more appropriate in areas with significant or fast-moving vehicular traffic as a safety measure.

- **Crime levels**. If there are areas where safety or perceived safety is a concern, passenger amenities may help create a safer space for passengers to wait. The exception is areas that may be prone to high levels of vandalism, as transit infrastructure can become a target.

- **Neighbourhood planning**. Depending on urban and transportation planning initiatives being spearheaded by other departments within the City of St. Thomas, it may be appropriate to prioritize passenger amenities as part of a larger corridor infrastructure upgrade or revitalization. The opposite is also true, if passenger amenities cannot be integrated well into a bus stop's surroundings without creating adverse effects such as obstructed pedestrian flow, amenities should not be prioritized.

- **Number of requests**. St. Thomas Transit may receive resident requests for passenger amenities, giving some bus stops a political edge over others for the prioritization of passenger amenities.

- **St. Thomas Transit discretion**. In addition to the above criteria, discretion comes into play if St. Thomas Transit has deemed any corridors, routes, or neighbourhoods to be priorities for strategic ridership growth. Passenger amenities may be appropriate in these locations. Based on feedback from St. Thomas Transit staff, bus stop amenity upgrades should be prioritized at the following locations: Talbot St. near William St., Talbot St. near Moore St., Talbot at SmartCentres, and Wellington St. at Elgin Mall.

The relative importance of each of the criteria listed above varies from jurisdiction to jurisdiction depending on local mandates, so it is recommended for the City of St. Thomas to discuss internally and consider developing a prioritization framework for bus stop infrastructure improvements accordingly.

Revamp transfer location

St. Thomas Transit should work with other stakeholders to help give the transfer location at SmartCentres a more attractive and visible presence. This includes implementing new transit branding on signage, shelters and benches to increase visibility and use among riders and non-riders. Using bright and colourful marketing techniques will increase visibility of the transit hub from farther away and create a more inviting atmosphere for riders. There is also a lack of trash cans and recycling bins at the transit hub and as a result, the rocky area used to separate the two bus shelters acts as a place for garbage to collect (and makes garbage removal somewhat more challenging). Not only is litter harmful for the environment, but when juxtaposed with the adjacent transit infrastructure it weakens the image of St. Thomas Transit and works against the green image that St. Thomas Transit desires to portray through other initiatives such as electric bus implementation (described further below). It is recommended that the City and the transit agency work together to install multiple trash cans and recycling bins to the area, so shoppers and transit users will have a place to properly dispose of their waste.

It is not recommended for St. Thomas Transit to explore other transfer locations at this time. SmartCentres is an ideal transfer hub due to its central location geographically-speaking, combined with the large area to deploy the hub and minimal disruption to vehicular traffic. If the City is successful in extending the curb length along the SmartCentres transfer location to accommodate greater maneuvering room for the existing vehicles (and accommodate more vehicles pending any overlap of demand-response pick-ups and drop-offs), that would bring improvements operationally-speaking to the current SmartCentres transfer location. Alternative transfer locations located further from the City's geographical centre would cause operating inefficiencies throughout the network and may induce new challenges with providing adequate fixed-route coverage while maintaining service to thirty-minute headways. Any concerns regarding the transfer location's exposure to the elements can be ameliorated by ensuring the deployment of passenger amenities is sufficient, effective, and inviting.

Non-Transit Infrastructure

As a final consideration, it is recommended for St. Thomas Transit to work with other City departments to identify and rectify concerns regarding the larger transportation network's infrastructure. Most notably, sidewalks should be present along all roads traversed by the proposed fixed-route network (Option 3), and they should be accessible (containing curb cuts and tactile markings at intersections, etc.) and be maintained in a state of good repair. The absence of accessible active transportation infrastructure can prohibit the successful implementation of the service planning recommendations contained within the Transit Strategic Plan. Additionally, St. Thomas should ensure that sufficient technology, such as loops, controllers, and cameras, is included at signalized intersections, as this technology may provide insights into future decision-making regarding strategies such as route alignment modifications or transit signal priority.

13.0 FLEET RECOMMENDATIONS

As noted in the transit vehicle market overview (Section 5), transit fleet requirements have changed significantly over the last few years with new innovations introduced. The future needs and desired features of the St. Thomas Transit fleet will need to be considered when moving forward. The fleet recommendations for St. Thomas Transit have been detailed below.

13.1 FLEET AND MAINTENANCE

Assess future ridership demand and select a vehicle size accordingly

The review of vehicles noted above in Section 5 provides an opportunity to capture a variety of fleet options. If the status quo with low floor cutaways is deemed advisable on account of projected limited ridership growth or funding limitations, every effort needs to be made to configure the vehicles in a rugged and functional fashion. In addition, the design life of seven years (maximum) must be adhered to. Specifications for either low floor or high floor must include narrative to address the weather and road conditions which are more demanding than other markets in which the vehicles are sold (for instance, California). Small items such as stainless steel screws and extended corrosion treatment are important.

With a view to an improved or enhanced transit product, particularly when there is a desire to include railcar theming for the bus's exterior, it is suggested that the nominal 30-foot sized bus products be considered for a pilot order. A 30-foot bus can address passenger volume growth and occasional surges in demand, while offering improved customer comfort and a stronger endorsement of the provision of public transit as a municipal service compared to the image of a modified van that the cutaway products might suggest. With the importance of space for mobility aid devices in a community with a high percentage of senior citizens and where conventional bus ridership is being encouraged among the Parallel Transit registrants, then one of the vehicle makes with the ability to accommodate three mobility devices might be considered. Nominal 30-foot units have been successfully implemented in a number of Ontario communities such as Collingwood, Barrie, York Region and Fort Erie. Although there are not anticipated to be any concerns, prior to the selection of a 30-foot bus, the City is recommended to consult with Voyago to understand if there might be challenges with respect to operating a vehicle with a longer wheelbase on any of St. Thomas Transit's routes.

Due to stakeholder interest, it is also recommended that St. Thomas Transit investigate further the possibility of outfitting buses with bicycle racks. Bicycle racks on buses can encourage multi-modal trips, helping to mitigate the first/last kilometre challenge, while also increasing the accessibility of St. Thomas Transit for residents of Lynhurst and other outlying areas. A caveat of bicycle racks is that due to the relatively compact nature of St. Thomas combined with the relatively low ridership compared to that of larger urban areas, bicycle rack utilization may be low and cyclists may feel more inclined to cycle all the way to their final destination. Further study of the cost-benefit of bicycle racks on St. Thomas Transit buses is required.

Explore demonstrated testing for zero emission bus technology

Given the desire for a move to zero emission technology, a demonstration test would be a viable starting point. This

would evaluate a vehicle's suitability to the operating profile, i.e. confirming whether a full battery charge will be adequate for the entire day's service hours.

Vehicle procurement can be done in a variety of ways. The City, with experience gained from the current vehicles and perhaps input from the Contractor's staff and from past procurements can create an RFP document for bidding by proponents. Bid documents from other jurisdictions can be sourced for comparison and external expertise in zero emission vehicle procurement can be sourced. Conversely St. Thomas might consider participating in the Joint Transit Bus Procurement through Metrolinx. This initiative offers a collection of useful input from several properties and the resources of Metrolinx staff with experience in this field. Terms and Conditions are strongly defined and offer the economies of scale advantages associated with group buying power. Metrolinx not only deals with the common 40-foot buses, but also in smaller bus models based on the needs of the user group. One example of the Metrolinx process is an enhanced extended warranty. While this feature may be buried in pricing, it does have the potential of reducing operating costs for parts and repairs.

A review of the provisions of the contract document with Voyago concludes that some of the maintenance related sections can be updated to reflect more contemporary conditions. Some of the items that may have been related to older buses include under Section C on page 41:

- 20. Drain air tanks and collectors. Check AD-2 air dryer for moisture. (The AD-2 air dryer was used on certain models of older heavy-duty transit buses and has been superseded by new products).
- 17. Check brake blocks and cam position and adjust manual slack adjusters and check Saab slack adjusters for travel. (Contemporary vehicles typically have automatic slack adjusters Motors line of transit buses from the 1970's such as the TDH4523N model).

Under the Tires section on page 38 a minimum tread depth of 2/32 of an inch is defined. General practices in the industry adhere to a minimum of 5/32 of an inch for the front (steering axle) and 3/32" for the rear axle. In Section 6.4 Maintenance, it is suggested that requirements be enhanced. For example, the service provider (contractor) should be required to carry a valid Service Station License and any other requirements that the Ministry of Labour or Highway Traffic Act might require. Similarly repair work shall be completed and signed off by licensed 310T Technicians and all personnel involved in vehicle operations (i.e. service persons, jockeys) should have the required driver's license (CZ).

As an aside there is a discrepancy between 6.3.2 and 6.3.4.1 under Section 6.3 Minimum Transit Driver Requirement. The former states drivers must carry a Class B license but the City reserves the right to modify this requirement to a Class BZ driver's license. In the latter, a Class BZ license is stipulated. It is suggested that Class BZ be mandated for clarity and consistency and for the fact there is an inference that large non air brake equipped cutaways or Type C school buses are envisaged as the vehicles that are operated. It is further suggested that the direct supervisors of the bus operators who may perform such duties as street supervision also be bus qualified and similarly licensed and professionally attired.

13.2 ELECTRIC PROPULSION OPPORTUNITIES

Consider investment in zero emission bus technology

The increasing awareness and political initiatives towards zero emissions are now realities that transit agencies must address. Awareness and concern on the carbon footprint and climate change have taken over the forefront of transit focus now that accessibility has been addressed and incorporated as a norm.

Over a period of more than 35 years there have been changes to reduce vehicle emissions. From the two cycle diesel engines that dominated the bus market in the past century, today's modern four cycle electronically controlled diesel engines with auxiliary emission control appendages emit a fraction of the particulate matter and nitrous oxide discharges that were evident in the past. Alternate propulsion such as cleaner emission diesel electric hybrid powerplants and engines powered by compressed natural gas (CNG) have offered further reduction in vehicle emissions. The reduced dependency on diesel fuel reduces the operating cost impact that may occur due to the world market sensitivity and potential volatility of diesel fuel.

The use of public transit to draw away persons from private automobiles, regardless of the fuel or propulsion of the transit fleet is in itself a reduction in harmful emissions. However, the current school of thought is to make transit vehicles that have zero emissions.

In this regard, there are two options that can provide this scenario. One is the battery electric bus where buses carry large rechargeable storage batteries on board. The batteries provide electric power for motors. When brakes are applied, power is fed back into the batteries. Batteries can be recharged in two ways. One is to recharge in the bus maintenance facility when buses are stored overnight. In the alternative, batteries can be recharged enroute throughout the day while in service. In St. Thomas' case, the recharge process would likely take place at the SmartCentres transfer location and would take a few moments. In the latter case, smaller battery capacity yields a shorter operating range (distance) so periodic recharging is necessary. Depot charging is typically done on buses with larger battery packs that have a longer operating range. Battery range has generally not yet been able to match the range of a diesel or CNG bus which typically can reach 350 miles/560 kilometres. However, given St. Thomas' small size, the battery range on current electric vehicle offerings may be adequate. A key factor in bus battery charging is the time of day and applicable electricity rates when charging occurs. Generally overnight charging would occur at off-peak rates. For the enroute charging, power could be drawn in cheaper off-peak times and stored in battery installations and the power transferred during the operating day.

The key aspects of using battery electric buses is to ensure that schedules, elapsed in service times of runs, etc. are modified as and if required to allow this propulsion type to be effective. For example, it may be necessary to slightly increase the spare ratio if the service hours profile has a duration beyond the battery range; i.e. a fully charged bus would enter service later in the day but prior to the existing in-service bus exhausting its range. This would apply to the in-depot charging profile. Also, in Canadian climates, the additional power draw for cold weather heating may be of concern. Again, depending on type of charging process, the duration of runs would be a determinant. Some battery electric buses are outfitted with an auxiliary diesel fuel fired heater. While this renders the bus not truly zero emission,

it does mitigate the use of fuel to only when there is a heating need to maintain interior comfort. Also, charging infrastructure must be provided at either garage facilities or enroute.

The other clean emission technology is hydrogen fuel cell propulsion. Compressed hydrogen is supplied to storage cylinders and a mechanical process converts the hydrogen gas to electricity with water as a waste. The electricity passes through a battery pack and powers motors. Even if the bus was to run out of hydrogen, there is a reserve of power remaining in the batteries. Hydrogen is transferred to the bus in a similar service line / fueling process to diesel or CNG. However, a supply of hydrogen and a compressor station are required.

There is a premium cost to these zero emission products. A battery electric bus would be approximately twice the cost of purchasing a diesel bus and a hydrogen fuel cell bus would be about 2.5 times the cost of a diesel bus. However, over the vehicle service life, there would be several economies of operation that would be realized. Some costing exercises suggest that based on a full-service lifecycle, the operating savings will essentially offset the higher capital cost. However, as battery electric buses are still relatively new to the industry there is little empirical data at present to validate these forecasts. At the same time, it is recognized that current government funding is conducive to greater capital investment in transit equipment.

Both of the conventional heavy-duty bus builders in Canada (New Flyer and Nova) offer battery electric versions of their current products. Nova's model is offered only in the enroute charging mode and Nova does not offer a version smaller than 40 feet. New Flyer offers both enroute and depot charging types and has a 35-foot model, which is likely still too large of a vehicle for St. Thomas' purposes, but both Nova and New Flyer should be monitored for ongoing developments in the battery electric bus space. New Flyer also offer the hydrogen fuel cell model.

Lion Bus out of Quebec offers a small low floor transit bus that is electrically powered, complementing its electric school bus offerings. This vehicle is slightly under 30 feet and except for small wheelhousing protrusion has a flat floor and complies to Ontario Highway Traffic Regulation 629. With two batteries, a range of 150 miles/240 kilometres is claimed. The Lion Bus might be a suitable option for the City of St. Thomas, and would facilitate the City's ability to pilot a battery electric bus and a larger ~30-foot bus at the same time with the same vehicle.

The Mission bus, from UMS in Holland is entering the Canadian marketplace in 2019 for demonstration and testing. This vehicle is also under 30 feet with a flat floor and is based on front wheel drive technology. This is another vehicle worth further consideration by the City, and no doubt this organization's product offering will grow as the move is made to zero emission technology. The legislated mandate for zero emission attainment in California for transit agencies to follow will accelerate the process of overseas manufacturers entering the North American market.

13.3 VEHICLE BRANDING OPPORTUNITIES

Utilize vehicle exteriors to advertise cultural and heritage features of St. Thomas

Vehicles presented in a nostalgic theme can offer enhanced marketing value to the transit system and to the local community. Many cities and towns have a rich heritage in particular activities, products, services or other economic

activity. Reflecting on and displaying such a notable historic fact can enhance community pride and serve to strengthen economic viability.

The prominence of St. Thomas as a “railway town” is a notable feature and heritage fact. The Port Stanley tourist rail line approaches St. Thomas from the south on the former London and Port Stanley Railway line. A local railway museum is in town, and there is significant infrastructure and theming in and around Talbot St. that pay homage to the City’s past as a railway town. There are also electric railway vehicles displayed or in operation from the former London and Port Stanley Railway that went through town. It is worth noting that the Talbot St. bus route traverses part of the route of the former Talbot streetcar line, so the possible implementation of a railway themed bus (perhaps the same vehicle as a battery electric bus) would not only be the most appropriate implementation strategy from a public visibility perspective, but also from a historical perspective. In summary, there would be some marketing benefit and potential economic enhancement if the buses used on this route were presented to replicate the image of the streetcars (trolleys) that were present a hundred years ago. Marketing benefits of this are discussed earlier in Section 12.1.

There are bus vendors that supply vehicles stylized to look like vintage streetcars. While there are options that incorporate a full look with lookalike exteriors and imitation wood slab seats and stanchions as interior furnishings, these are not recommended for St. Thomas Transit as it reaches a point of diminishing returns for the investment required and may further detract from vehicle comfort. Instead, a less complex image can be created by applying a vinyl wrap that looks like a vintage trolley on a conventional bus (providing the shape of the bus is conducive to a realistic look). Most if not all of such bus models are built in the USA but some are compliant to the Canadian market. Like conventional buses without such vinyl wraps, all are accessible. There are high floor types available that use lifts for accessibility. However, this vehicle type would not be recommended as it would be seen as a step back from low floor style and impact the schedule through longer stop dwell times. Also available are vehicles produced by conventional vehicle manufacturers using their standard designs but with the aesthetic differences made in the factory. It should be noted that replica type vehicles are no less expensive than conventionally finished vehicles and there are no advantages such as in operating economies.

The strongest impact of using a replica or vintage looking vehicle that matchings an old trolley car would be to introduce a vehicle that is electrically powered just like the vintage trolleys would, further strengthening the business case for integrating prospects for the ~30-foot bus, the railway branded vehicle, and the battery electric bus into a single pilot. There would be marketing, economy and environmental synergies, and it would show strong civic commitment to the environment as well as enhance the historical aspects of the railway heritage. The dynamic of what’s old is new would be present and this could outpace other electric bus initiatives that in many cases are still on the drawing board.

14.0 IMPLEMENTATION PLAN

Based on the recommendations noted above, an implementation plan has been created to serve as a guide to make changes throughout the St. Thomas Transit organization. Action items have been prioritized into short- and long-term actions.

14.1 SHORT-TERM ACTIONS

Service Planning and Operations

- Make route revisions as per the final preferred network outlined in Section 9.4. In the short-term, initial works to achieve this plan include necessary planning for demand-response services, additional service monitoring and tracking, and identifying available funds allocated for the plan, while noting that the proposed network is intended to be cost neutral with minimal investments required.
- As part of the proposed network implementation, demand-response services will need to be explored. Preliminary discussions for a pilot should be discussed with Voyago and a third-party technology provider to outline service details.
- Begin/continue collecting the noted KPIs and ramp up ongoing evaluation efforts to perform more comprehensive monitoring which will allow for more informed decision making.

Technology

- Generate a GTFS feed to provide real-time updates about service to application developers in an open data format.
- Invest in dynamic scheduling software to enable microtransit and demand-response solutions.

Fares

- Ensure the sustainability of a low-income pass solution for qualified riders, and expand as appropriate. The transit passes could be sold in bulk to participating not-for-profit organizations, who may then distribute to their members based on who demonstrates need.
- Consider developing partnerships with local business partners, EcoPass programs with large employers, and a UPass program with Fanshawe College.

Marketing

- Establish consistent and creative branding including consolidating the St. Thomas Transit brand with the City's. Fixed infrastructure can be used as an additional marketing tool; all bus stop signage and benches can be replaced with colourful, conspicuous signage consistent with the new branding.
- Update the St. Thomas Transit brochure content to be reflective of actual service operation and reflect compliance with AODA legislation.
- Revamp the transfer location to create a more attractive and visible presence.

Fleet

- Assess future ridership demand and evaluate in more detail the appropriateness of considering other (larger) vehicle sizes.
- Explore demonstrated testing for zero emission bus technology.
- Utilize vehicle exteriors to advertise cultural and heritage features of St. Thomas.

- In tandem with the three points above, explore in more detail the possibility and implications of implementing Lion Bus, Mission Bus, or a similar vehicle in the form of a pilot program.

14.2 LONG-TERM ACTIONS

Service Planning and Operations

- Based on pilot results, consider permanent implementation of demand-response services in the areas recommended as well as potentially other low-ridership areas, or in providing service coverage for underserved areas.

Technology

- Modernize the fare collection system through the adoption of an open-source electronic fare collection system to allow transit users to pay fares onboard using their credit card, debit card or smartphones.
- Install annunciators and accompanying digital displays to improve the accessibility of St. Thomas Transit.
- Outfit fleet with Closed Circuit Television (CCTV) cameras to ensure customer and operator safety. This will protect St. Thomas Transit and its riders.

Fares

- Continue the low-income pass program and make tweaks as appropriate based on pilot and short-term implementation results. Modify the price point of $40 as needed, and continue to distribute the pass through an increasing number of channels, as appropriate.
- Develop non-fare revenue sources to help fund St. Thomas Transit including but not limited to advertising, parking fees and government grant funding programs.

Marketing

- Introduce new stop infrastructure which will simultaneously serve as additional marketing opportunities to improve brand visibility and demonstrate the unified St. Thomas Transit brand.

Fleet

- Move forward with the appropriate vehicle procurements as identified in the further studies completed in the short-term.

APPENDIX A: INTERIM BACKGROUND REPORT

Transit Strategic Plan

City of St. Thomas

Interim Background Report

Prepared for St. Thomas Transit
Prepared by Stantec

August 2019

Stantec

ST. THOMAS
THE RAILWAY CITY

Interim Background Report

August 2, 2019

Prepared for:

St. Thomas Transit

Prepared by:

Stantec Consulting Ltd.

TABLE OF CONTENTS

1.0	**INTRODUCTION**	**1**
1.1	ABOUT ST. THOMAS	1
1.2	ABOUT ST. THOMAS TRANSIT	5
2.0	**BACKGROUND INFORMATION REVIEW**	**8**
2.1	PROVINCIAL POLICY STATEMENT, 2014	8
2.2	CENTRAL ELGIN OFFICIAL PLAN PLANNING REPORT, 2012	8
2.3	TECHNICAL ANALYSIS FOR THE PROPOSED URBAN AREA RESIDENTIAL EXPANSION (UAE)- PHASE 1, 2008	9
2.4	URBAN AREA EXPANSION: TRANSPORTATION MASTER PLAN, 2008	9
2.5	URBAN AREA EXPANSION: TRANSIT MASTER PLAN, 2008	10
2.6	CITY OF ST. THOMAS UPDATE OF THE POPULATION FORECAST HOUSING DEMAND AND RESIDENTIAL LAND NEED, 2018	11
2.7	CITY OF ST. THOMAS EMPLOYMENT LANDS REVIEW, 2018	11
2.8	POSITION FOR GROWTH (2019)	12
3.0	**MARKET CONDITIONS**	**13**
3.1	POPULATION DENSITY	13
3.2	EMPLOYMENT DENSITY	15
3.3	LAND USE DIVERSITY	18
3.4	TRANSIT MODE SHARE	21
3.5	INCOME	23
3.6	FUTURE DEVELOPMENTS	25
3.7	MARKET CONDITIONS SUMMARY	27
4.0	**PEER ANALYSIS**	**28**
4.1	RIDERSHIP	29
4.2	SERVICE UTILIZATION (OR PRODUCTIVITY)	32
4.3	FINANCIAL PERFORMANCE	35
5.0	**ROUTE PERFORMANCE**	**41**
5.1	ROUTE 1 – NORTHSIDE	42
5.2	ROUTE 2 – ELGIN MALL	43
5.3	ROUTE 3 – TALBOT	43
5.4	ROUTE 4 – HOSPITAL	43
5.5	ROUTE 5A – EXPRESS COMMERCIAL	44
5.6	ROUTE 5B – NORTH AND SOUTH STUDENT EXPRESS	44
6.0	**STAKEHOLDER ENGAGEMENT FINDINGS**	**46**
6.1	STAKEHOLDER ACTIVITIES	46
6.2	PREVALENT THEMES EMERGING FROM STAKEHOLDER INTERVIEWS	48
6.3	ONLINE SURVEY FINDINGS	49
7.0	**STAKEHOLDER ENGAGEMENT HEAT MAPS**	**57**

FIGURES

Figure 1: City of St. Thomas 3
Figure 2: St. Thomas Transit Routes 7
Figure 3: Residential population density 14
Figure 4: Employment density 17
Figure 5: Current zoning in St. Thomas 19
Figure 6: Transit trip generators 20
Figure 7: Transit mode share (commuting trips) 22
Figure 8: Median household income 24
Figure 9: Future developments 26
Figure 10: Ridership and population change, 2015 to 2017 30
Figure 11: Rides per capita, 2015 to 2017 31
Figure 12: Revenue hours per capita, 2015 to 2017 32
Figure 13: Trips per revenue hour (conventional service), 2015 to 2017 34
Figure 14: Trips per revenue hour (specialized service), 2015 to 2017 35
Figure 15: Operating cost per revenue hour (conventional service), 2015 to 2017 36
Figure 16: Operating cost per revenue hour (specialized service), 2015 to 2017 37
Figure 17: Operating cost per trip, 2015 to 2017 38
Figure 18: Fare revenue per rider, 2015 to 2017 39
Figure 19: Cost recovery ratio, 2015 to 2017 40
Figure 20: Ridership and revenue hour trends 41
Figure 21: Seasonal Ridership trends 2017 and 2018 42
Figure 22: Monthly Ridership by Route 2017 and 2018 45
Figure 23: Average Daily Boardings - 2018 46
Figure 24: Stantec staff engaging with riders, non-riders, and operators at the transfer point 47
Figure 25: Online survey responses per day 49
Figure 26: Survey respondents with access to a car 51
Figure 27: How long transit survey respondents have used the service for 51
Figure 28: Purpose of respondents' primary transit trip 52
Figure 29: Average satisfaction by component of the transit system 52
Figure 30: Proportion of respondents who has a positive impression of St. Thomas Transit 53
Figure 31: Respondent satisfaction with existing transit service 53
Figure 32: Preferred external community connection 55
Figure 33: Preferred service expansion options 56

TABLES

Table 1: Demographics 4
Table 2: Primary mode of commuting 5
Table 3: St. Thomas Transit service span and frequency 6
Table 4: Peer transit agencies 28
Table 5: Online survey age distribution vs Census 50
Table 6: Online survey income distribution vs Census 50
Table 7: Preference of Trade-Offs 55

1.0 INTRODUCTION

The City of St. Thomas, located in Southwestern Ontario just north of Lake Erie, is a vibrant city that is home to nearly 40,000 residents. Widely known as the Railway Capital of Canada, it was once a bustling railway hub with over 26 railways passing through it. Following the gradual decline of the railway industry, much of the economic success of St. Thomas has been centered around the rapidly expanding automobile industry. Today, the city continues to grow and evolve as many new companies and industries have flocked to Elgin County. Its rich history and small-town charm play major roles in the city's current industries and culture. As a relatively compact city with growing pressure for new residential and other developments, St. Thomas has been working on an Urban Area Expansion Strategy, firmly acknowledging the desire for compact growth and intensification, along with new mixed-use developments. Overall, St. Thomas is looking at a future that will encourage density and diverse land uses to help ensure sustainable and equitable development for its residents.

With added pressure for growth comes added pressure for transportation; simply put, more people means more travel. Nevertheless, roads can only be expanded so much and new highways can only add limited capacity. While building a new roadway infrastructure is necessary when accommodating population growth, it shouldn't be the only solution. In order to foster sustainable growth, a variety of travel options becomes necessary, and St. Thomas Transit, providing over 180,000 trips in 2018, currently plays a vital role in moving people around the City of St. Thomas.

St. Thomas Transit provides service six days a week across 5 routes covering an area of 35.6 square kilometres. Current ridership trends reveal a gradual decrease in ridership over recent years[1]. While operating costs of St. Thomas Transit are relatively low compared to its peers, improving service effectiveness and efficiency could help, together with other strategies, to stimulate ridership gains.

St. Thomas Transit retained Stantec Consulting Ltd. (Stantec) to help devise a strategic plan aimed at ultimately growing transit ridership while identifying new and innovative ways to provide transit more efficiently and effectively in the future. By reviewing current operating procedures, operating data, and city demographics, and by conducting stakeholder outreach and providing market scans of best practices in service delivery approaches, technology, marketing, and other topics, Stantec aims to provide a strategic plan that steers St. Thomas Transit forward with fresh and bold ideas and recommendations.

The purpose of this report is to set the stage for developing strategic initiatives for St. Thomas Transit by providing a commentary on the current state of the City of St. Thomas and of St. Thomas Transit through a review of background documents and data and through conversing with stakeholders including riders, non-riders, operators, and special interest organizations. A clear understanding of St. Thomas Transit and of St. Thomas will help identify gaps and needs, identify strengths on which to build, and identify opportunities for improvement.

1.1 ABOUT ST. THOMAS

The City of St. Thomas is home to nearly 40,000 residents. Although the city celebrates its railway history, it is slowly transforming to be a budding industrial hub. The industrial or secondary sector which includes manufacturing,

[1] It is unclear whether the decrease in ridership is a decrease in actuality or if it is a result of different (more accurate) ridership tracking processes that have been recently implemented.

construction and utilities accounts for around 42% of employment in St. Thomas while manufacturing alone accounts for 39% of employment.

St. Thomas is strategically well-positioned to attract future industrial growth. It is located close to the Highway 401 corridor as well as Highway 402 and has access to the Canadian National and Canadian Pacific Rail lines. Figure 1 shows the map of the city and the municipal boundary.

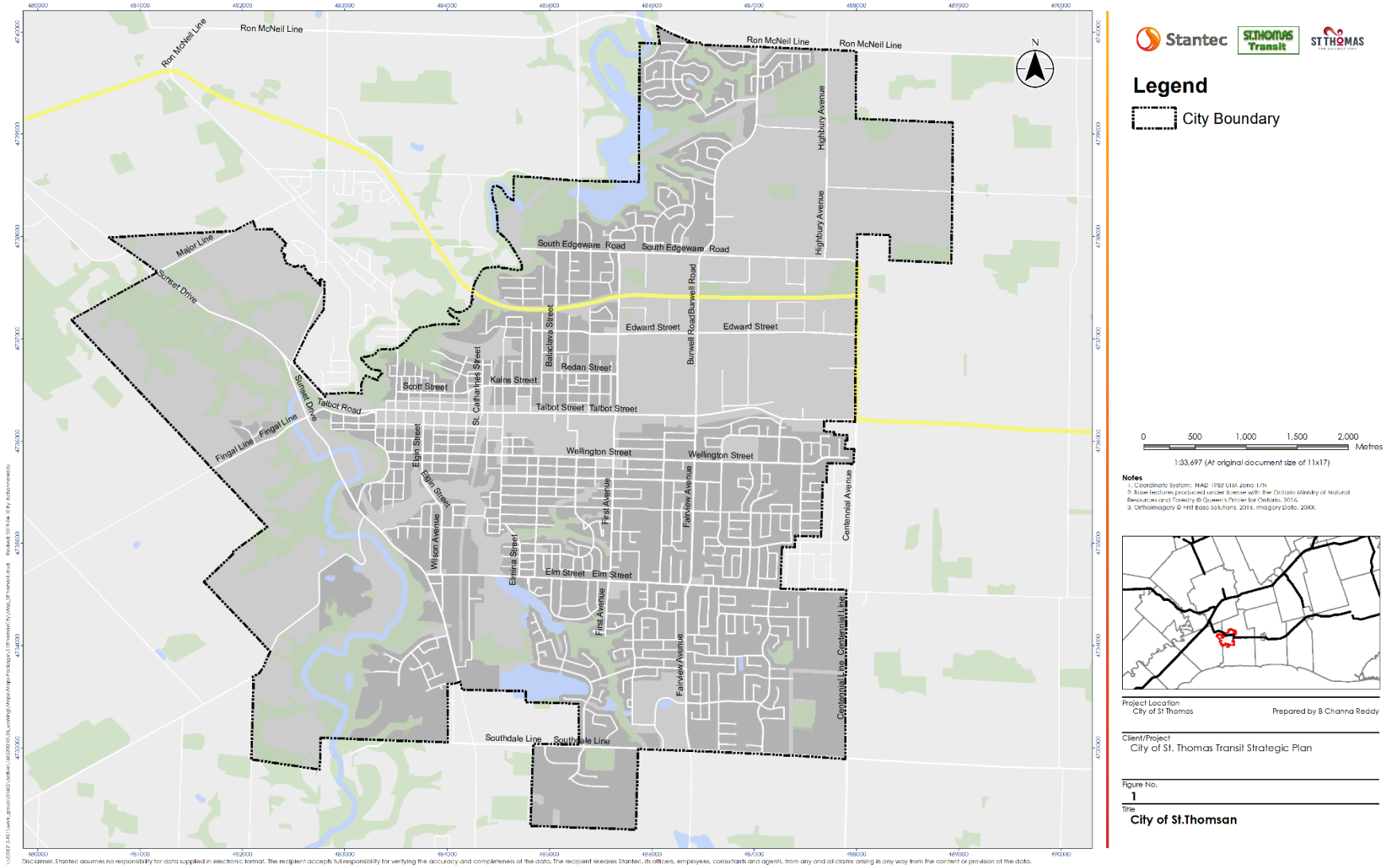


Figure 1: City of St. Thomas

Understanding the demographic composition of St. Thomas is essential in developing transit tailored to the city's needs. Table 1 compares demographic statistics of the city with those of the Elgin County region, the province and Canada.

Table 1: Demographics

Characteristic	St. Thomas	Elgin County	Ontario	Canada
Total population (2016)	38,909	88,978	13,448,494	35,151,728
Total population (2011)	37,905	87,461	12,851,821	33,476,688
Population change (2011 - 2016)	2.6%	1.7%	4.6%	5%
Dwellings	17,114	36,613	5,598,391	15,412,443
Average household size	2.27	2.43	2.40	2.28
Median household income	59,755	66,494	74,287	70,336
Unemployment rate	6.42%	6.34%	7.41%	7.72%
Labour force	19,300	44,950	7,141,675	18,672,475
Recent immigrants	180	685	472,170	1,212,075
Minority groups	1,645	2,585	3,885,585	7,674,580
First Nations	795	1,355	238,680	977,235
Male	48.02%	49.15%	48.77%	49.10%
Female	51.98%	50.85%	51.23%	50.90%
14 and younger	17.53%	18.77%	16.42%	16.61%
15-34	22.12%	22.32%	25.62%	25.27%
35-64	41.11%	40.77%	41.22%	41.23%
65 and older	19.22%	18.14%	16.74%	16.89%
No degree	21.27%	25.14%	17.53%	18.29%
High school only	31.41%	29.35%	27.41%	26.45%
College degree	28.28%	26.01%	20.82%	19.39%
University degree	11.44%	10.31%	26.02%	23.25%
Other	7.60%	9.20%	8.21%	12.62%
Owned	67.47%	75.44%	69.68%	67.80%
Rented	32.56%	24.56%	30.17%	31.80%
Single detached home	65.72%	77.51%	54.31%	53.59%
Semi-detached home	6.69%	4.04%	5.61%	4.97%
Apartment (<5 storeys)	15.92%	10.10%	10.11%	18.05%
Apartment (>5 storeys)	4.64%	2.21%	17.15%	9.89%
Other	7.02%	6.13%	12.81%	13.51%
% Spending >30% of income on housing	23.47%	20.95%	27.65%	24.10%

Source: *Statistics Canada, 2016*

Table 2: Primary mode of commuting

Characteristic	St. Thomas	Elgin County	Ontario	Canada
Car (driver)	83.14%	85.92%	71.81%	73.99%
Car (passenger)	8.06%	7.15%	6.11%	5.47%
Transit	0.99%	0.61%	14.59%	12.40%
Walked	5.60%	4.59%	5.25%	5.53%
Bicycle	1.45%	0.82%	1.24%	1.40%
Other	0.78%	0.92%	0.99%	1.22%
Average commuting time (min.)	16.69	19.00	24.39	22.11

Source: *Statistics Canada, 2016*

The City of St. Thomas has grown nearly 2.6% since the 2011 Census. Although comparably lower than the Canadian average of 5% growth, St. Thomas' growth is substantial for a city of its size and especially given that Elgin County's total population grew by only 1.7% between 2011 and 2016. Furthermore, St. Thomas's unemployment rate is 6.4%, slightly lower than the Canadian and provincial averages. However, the household median income is $59,755, also substantially lower than Canadian, provincial, and County medians.

With an average commute time of 17 minutes, and only 1% of commuting trips made by transit, the perceived convenience of driving, with generally well performing roadway operations, presents a challenge in terms of attracting transit ridership. With nearly 8% of residents choosing to walk or bike to work, this suggests that not all trips within the City are long-distance and that there is still a need for short-to-medium distance trips. As a result, there may be opportunities to leverage transit as a complementary mode for active transportation within the broader multimodal transportation network, and there may be opportunities to leverage transit as a more convenient alternative for short trips made by foot or by bicycle, especially in inclement weather.

1.2 ABOUT ST. THOMAS TRANSIT

The City of St. Thomas is the only community in the Elgin County area that provides public transportation. Voyageur Transportation, a bus company recently acquired by Transdev Canada, is subcontracted by the City of St. Thomas providing both conventional and parallel transit services (specialized transit). Table 3 lists the routes and provides operating hours and cost per trip. Figure 2 shows the network map and the location of the stops.

The City of St. Thomas's conventional transit service has five routes available across the City connecting major businesses, shopping areas, schools, and medical facilities. The central transfer point is located near Talbot St. and First Ave., across from Wal-Mart. Operating hours are from 7:15 am to 6:45 pm on weekdays and from 9:15 am to 6:45 pm on Saturdays, with buses running every 30 minutes[2]. The cost per adult, child, student or senior is $2.75 per trip, with discounts given for pre-purchasing tickets and monthly passes. Transfers are free and are given upon request at the time of initial boarding. Transfers cannot be used on previously travelled routes or if they are expired.

The City of St. Thomas's Parallel Transit service is a door-to-door specialized transit service available to people with disabilities who are unable to use the conventional service. The cost per adult, child, student or senior is the same as conventional transit at $2.75 per trip, with discounts given for pre-purchasing tickets and monthly passes. The users must be registered in advance, with their eligibility determined through an "assessment of health conditions" form.

[2] At times, detours due to construction may necessitate the need to run buses every 60 minutes. This is currently the case with Route 4 due to the construction along Elm St.

Bookings must be completed three to four days in advance by calling the Parallel Transit booking office. The service runs between the hours of 7:15 am and 6:45 pm, Monday to Friday and between 9:15 am and 6:45 pm on Saturdays.

Table 3: St. Thomas Transit service span and frequency

Conventional Transit Services				
Route	**Schedule**	**Single-Use**	**Advance Tickets**	**Monthly Pass**
Route 1 Northside	Weekdays 7:15 am - 6:45 pm Saturdays 9:15 am - 6:45 pm	Adult $2.75 Child $2.75 Student $2.75 Senior $2.75	Adult $2.25 Child $1.65 Student $1.65 (must show ID) Senior $1.65	Adult $70.00 Child $60.00 Student $60.00 (must show ID) Senior $60.00
Route 2 Elgin Mall				
Route 3 Talbot				
Route 4 Hospital				
5a Express Commercial	School days 8:15 am - 2:45 pm & 3:45 pm - 6:45 pm Non-school days: 7:15 am - 6:45 pm Saturdays 9:15 am - 6:45 pm			
5b North Student Express	School days 7:15 am & 3:15 pm			
5b South Student Express				
Parallel Transit Services				
Route	**Schedule**	**Single-Use**	**Advance Tickets**	**Monthly Pass**
Door-to Door Service (3-4 days in advance)	Monday to Friday 7.15 am to 6.45 pm last pick up at 6.30 pm Saturday 9.15 am to 6.45 pm last pick up at 6.30 pm No service Sundays or Holidays	Adult $2.75 Child $2.75 Student $2.75 Senior $2.75	Adult $2.25 Child $1.65 Student $1.65 (must show ID) Senior $1.65	Adult $70.00 Child $60.00 Student $60.00 (must show ID) Senior $60.00

Source: St. Thomas Transit Website

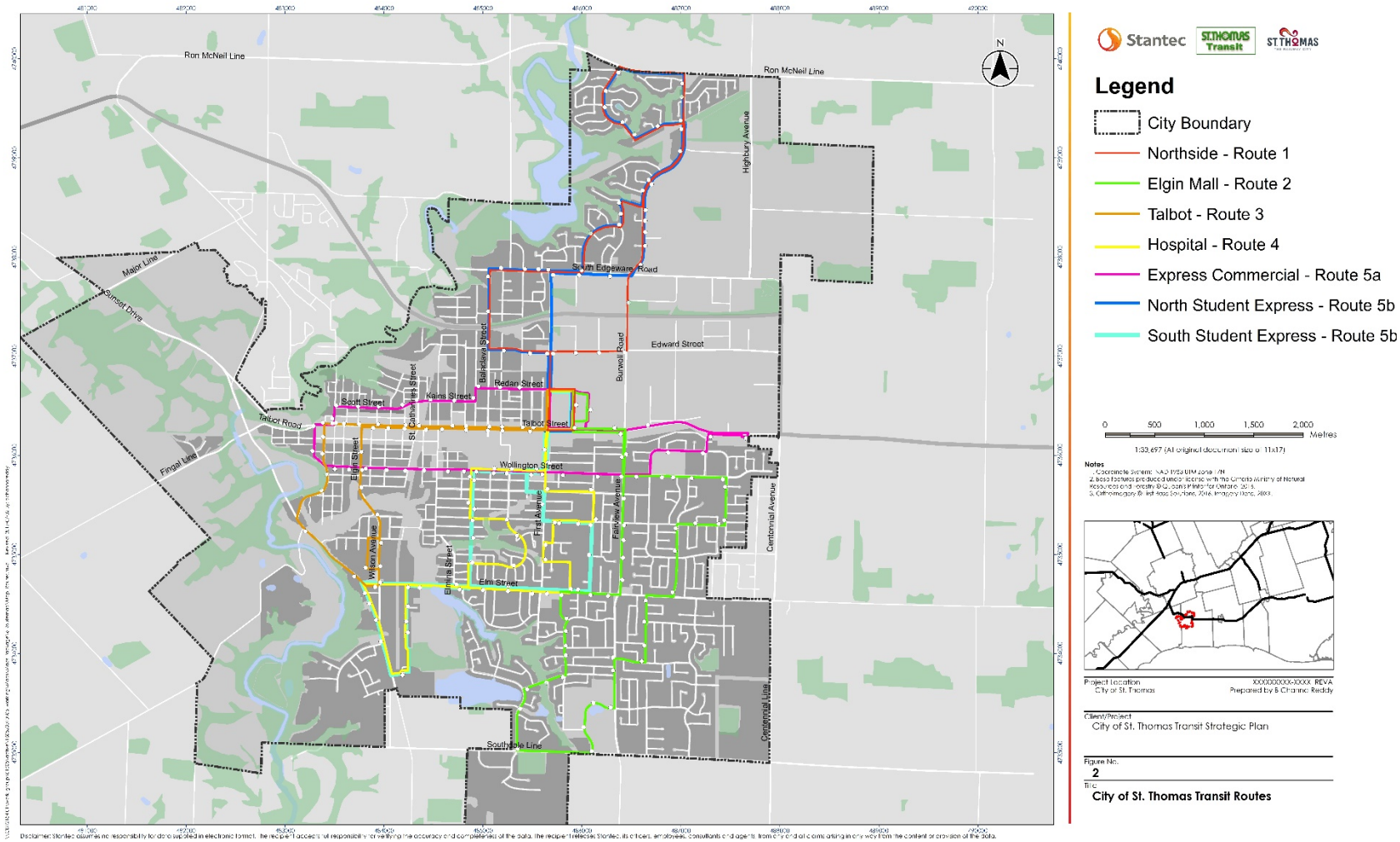


Figure 2: St. Thomas Transit Routes

2.0 BACKGROUND INFORMATION REVIEW

The current planning process relies on an understanding of previous planning efforts, successes, and challenges. This section provides overviews of some important planning documents and plans relevant to transit.

2.1 PROVINCIAL POLICY STATEMENT, 2014

The Provincial Policy Statement (PPS) provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the PPS sets the policy foundation for regulating the development and use of land.

The PPS includes a number of transit-supportive planning policies and transit-supportive guidelines. The transit-supportive guidelines provide strategies, case studies, and resources to assist land use planners, transit planners, municipal politicians, developers, transportation engineers and others in creating an environment that is supportive of transit and of increasing transit ridership.

Municipalities in Ontario are required to demonstrate that their official plans conform to the transportation-related policies in the Provincial Policy Statement and in other relevant provincial plans. The Central Elgin official planning report (2012) which provides guidance for land use and development for a 20-year planning period is summarised in the following section.

2.2 CENTRAL ELGIN OFFICIAL PLAN PLANNING REPORT, 2012

The Official Plan is a policy document that guides the short-term and long-term development of the community. It applies to all land within the county's boundary and the policies within it provide direction for the size and location of land uses, provision of municipal services and facilities, and preparation of regulatory by-laws to control the development and use of land.

The Plan was prepared in accordance with the Planning Act through extensive public consultation. It establishes the goals, objectives, and policies to manage and direct physical change within Central Elgin in a sustainable manner. The plan is based on a 20-year planning horizon and is in accordance with the 2005 provincial policy statement.

The Official Plan was prepared to achieve the following goals and objectives:

- Ensure consistency with Provincial Policy;
- Protect prime agricultural resources;
- Promote sustainable development;
- Promote sound environmental management and decision-making;
- Ensure transparency and accountability in governance; and
- Foster fiscal responsibility through sound decision-making.

Being consistent the Provincial Policy and promoting sustainable development means developing several transit-supportive planning policies and strategies to promote development patterns that make transit less expensive, less

circuitous, more efficient and more convenient, and to enhance the service and operational characteristics of transit systems to make them more attractive to potential transit users.

2.3 TECHNICAL ANALYSIS FOR THE PROPOSED URBAN AREA RESIDENTIAL EXPANSION (UAE)- PHASE 1, 2008

Phase 1 Technical Analysis for the Proposed Urban Area Residential Expansion (UAE) is a high-level review of lands (six areas) that are located within the boundary of the City of St. Thomas but are outside of the urban built area and current Settlement Area of the City as defined by the 2005 Provincial Policy Statement. The six areas were looked at from a land use planning, natural heritage, water and sanitary servicing, road and transit access, and municipal finance perspective as directed by the Provincial Policy Statement.

The six candidate urban expansion areas were evaluated based on the following selected screening criteria:

- Proximity to Existing Built-Up Area
- Proximity to Other Planned Areas, Facilities, Parks and Open Spaces
- Land Use Compatibility
- Housing
- Natural Heritage issues
- Surface and Groundwater
- Agricultural Impacts
- Mineral and Petroleum Resources
- Mineral and Aggregate Resources
- Cultural Heritage and Archaeology
- Natural Hazards
- Human-Made Hazards
- Transit
- Road Improvement Costs
- Water System Improvement Costs
- Sanitary Sewer System Costs
- Overall Gross Capital Costs.

The report recommended 3 of the 6 areas (Area 3, south of Southdale Line along Benjamin Parkway; Area 4, west of Centennial Road in between Elm Street and Southdale Line; and Area 6, off of Ron McNeil Line in the north) to be carried forward to Phase 2 for a more detailed review in accordance with the approved Work Plan and Budget. The Phase 2 analysis includes a detailed investigation of water supply, sanitary sewer, transportation, transit, stormwater management, parks, trails and municipal financial impacts of residential development in shortlisted Areas. The transportation and transit sections of the Phase 2 analysis are summarized in the following sections.

2.4 URBAN AREA EXPANSION: TRANSPORTATION MASTER PLAN, 2008

The City of St. Thomas completed an integrated process to identify and service the proposed Urban Area Residential Expansion (UAE). As discussed, Phase 1 involved a review of 6 possible expansion areas from a land use, natural heritage, water and sanitary servicing, road and transit access and municipal finance perspective. Phase 2 of the report involved the identification of infrastructure (water, sewer, transportation, transit) needed to service the expansion area (Areas 3, 4 and 6) and the preparation of plans to provide that service. A new proposed development study, titled “Position for Growth” has recently been completed which re-evaluates the identified areas for development found in this study. The findings of this new study will help to guide the provision of transit in emerging areas.

The Transportation Master Plan, which was part of the Phase 2 report, is a comprehensive, long-range document outlining a long-term solution for the City of St. Thomas' Urban Area Residential Expansion over the next 20 years. It is estimated that the urban area expansion could generate a total of about 22,000 vehicle trips daily and significantly impact the existing roadway network in the southern part of the city. The analysis considered the following possible alternatives to accommodate future travel demands:

1. Do Nothing
2. Improve Existing Roads
3. Traffic Diversion to Existing Roadways
4. Construct New Roads
5. Non-Structural Alternatives

The do-nothing alternative would not address the increased north-south travel demands on Fairview Avenue and might cause traffic congestion as demand increases and also exacerbate neighbourhood short-cut traffic on local streets. Traffic diversion is also not an effective solution as it would not maintain connectivity between the existing Southgate neighbourhood and the new growth areas. Providing new arterial roads would lead to substantial social and financial impacts and is not anticipated to be a practical solution.

Based on the evaluation of the alternatives it was recommended that the most effective solution would involve the widening of Fairview Avenue and Sunset Drive south of Elm Street and provide new collectors roads within the growth areas.

Ensuring that arterials and collectors are designed to provide direct routes between areas is important to enabling efficient, direct transit service. Between arterials, the introduction of a finer-grained network of collector streets capable of accommodating transit will help to minimize walking distances from transit facilities to area destinations. The widening of Fairview Avenue and addition of new collector roads to the network might help in the extension of the conventional and specialized transit services (and/or alternative service delivery strategies) into the expansion areas in conjunction with the road network improvements.

2.5 URBAN AREA EXPANSION: TRANSIT MASTER PLAN, 2008

This Urban Area Transit Master plan was a part of the Phase 2 report and focused on possible ways of extension of the existing public transit service into each of the three urban expansion areas based on the City's transit service standards. Phase 1 of the study identified that the existing conventional and specialized transit services are fully committed to meeting the needs of the current urban area. Additional investment in terms of capital cost and operating costs will be required to service the new areas.

The report analyzed four alternatives for providing transit services into the urban expansion areas:

1. Extend conventional and specialized transit into all un-serviced areas within the existing urban area;
2. Extend only specialized transit service into the new areas;
3. Provide combined conventional transit and specialized transit service; or

4. Do nothing.

Based on the evaluation of the alternatives, Alternative 1 (extending conventional and parallel transit service) was recommended as the desired alternative. As a part of the process, it was recommended that the city undertake an extensive review of the existing transit service to develop a new expanded plan. A reconstructing of the conventional transit routes, with added resources, might be required to develop an appropriate overall route network. This study could serve as an opportunity to revisit the existing routes and investigate various alternatives to expanding the network. As noted above, the new study "Positions for Growth" will reassess the proposed development areas to identify preferred locations of growth which should serve as a guide to determine any potential transit service area expansions.

2.6 CITY OF ST. THOMAS UPDATE OF THE POPULATION FORECAST HOUSING DEMAND AND RESIDENTIAL LAND NEED, 2018

The update was undertaken to proactively plan for the City's long-term housing needs and is also an important component of the City's comprehensive review of its official plan. The study forecasted population growth and housing demand over a 20-year planning horizon for the City of St. Thomas and predicted the residential land supply requirement.

Future population and housing growth within the City of St. Thomas was largely determined by measuring the competitiveness of the export-based economy within the city and its surrounding areas. The growth forecast model identified labour force growth as a key driver of the population as new job opportunities (locally and within the city's commuter-shed) support growth in net migration to the city. Due to the aging of the city's population base, population growth from natural increase (i.e. births less deaths) is forecasted to represent a declining share of forecasted population growth over the next 25 years. Consequently, a greater importance is placed on net migration to support future population growth within the city and the surrounding area. Over the long term, the City of St. Thomas' population is anticipated to reach 50,600 by 2041.

St. Thomas' existing housing supply comprises a total of 4,475 potential residential units of which 3,299 units are low density (74%), 461 units are medium density (10%), and 715 units are high density (16%)[3]. Based on the comparison of forecasted housing demand with estimated housing supply, there would be a shortfall of 1,048 low and medium dwelling density units. This translates to a residential land need for an additional 76 hectares of residential designated lands. The City has a shortfall of greenfield lands to accommodate the demand and would have to explore infill sites and densification strategies. Densification builds demand for transit without the need to increase the service area.

2.7 CITY OF ST. THOMAS EMPLOYMENT LANDS REVIEW, 2018

The Employment Lands Review documents a comprehensive review of the City's official plan in alignment with the Provincial Policy Statement, 2014. The Review was intended to proactively plan for and accommodate employment growth to the year 2037.

The key takeaways of the report where transit is concerned are:

[3] As defined in the City of St. Thomas Official Plan, low density is defined as "single detached, semi-detached, duplex and triplex residential dwellings"; medium density as "townhouse, boarding and lodging houses, triplexes, fourplexes, sixplexes, low rise apartments or other forms of low-rise multiple dwellings";

- Total employment is forecasted to increase from 17,400 in 2017 to 23,800 in 2041 – employment growth of approximately 6,500 employees, or an annual employment growth rate of 1.3%.
- As processes become more specialized and technologically intensive, the manufacturing sector is anticipated to have modest employment growth. However, it is anticipated that the automotive sector will continue to grow and comprise an important component of the City's employment base.
- It is predicted that growth in the industrial sector will account for 58% of the City's total employment growth over the 2017 to 2041 period, adding approximately 160 industrial jobs annually over the planning period.
- Approximately 63% of citywide employment growth is forecasted to occur on employment lands between 2017 and 2037.

These considerations are important given that work-related trips account for a considerable share of total transit trips. The increase in employment over the years could translate into increased demand for transit.

2.8 POSITION FOR GROWTH (2019)

Given the findings of the 2018 population and housing study, a need for an additional residential land was identified to accommodate the projected population growth. As such, this study builds on the Urban Area Expansion Study (2008), which identified potential lands for residential designation. This study reassesses the remaining expansion lands. This study will complete the required planning and engineering exercises to identify the preferred expansion lands to bring into the Urban Area boundary. The necessary citywide infrastructure and services required to support the projected growth will also be identified. This study is anticipated to be released shortly, at which time the preferred areas can be considered for inclusion into the St. Thomas Transit service area, where applicable.

3.0 MARKET CONDITIONS

Public transit is both a business and a public service—transit needs to be financially sustainable and responsible to the taxpayers who may or may not ride transit, while also ensuring that it can provide vital transportation to residents who may not have another means of travel. Typically, these conflicting goals result in difficult decisions to remove service, or to serve certain neighbourhoods over others, or designing routes that intend to provide coverage at the expense of ridership or productivity.

To understand the ingredients for successful and productive transit services we need to understand the market for transit. In other words, we need to understand the demographics of a city, its layout, and where people are going. Transit normally works best when it can provide fast and frequent service to a large number of people travelling for different purposes. Nevertheless, sometimes transit must also provide access to residents who are elderly, low-income, or unable to drive but must still travel as a basic right to the city.

This section explores some of the underlying land use, demographic, and transportation-related parameters within which the transit system operates.

3.1 POPULATION DENSITY

Between 2001 and 2011, the population of St. Thomas grew by 14.05%, from 33,326 people in 2001 to 37,905 by 2011. The absolute growth of St. Thomas exceeded that of Ontario in percentage terms (14.05% vs. 12.64% during the same period) as well as in the rate of annual growth (1.32% per year vs. 1.20% per year). Population density has also grown over the start of the twenty-first century to 1,092 persons per square kilometre. Nevertheless, because of historical growth objectives, development and legislation, population density across the city varies by neighbourhood.[4]

The densest neighbourhoods are in west end of the city along Talbot Street around the downtown core. Another dense neighbourhood is around Burwell Road in the north end of the city due to the medium and low-rise residential apartment buildings. Residential density is comparatively lower in the east and south ends of the city due to many detached single-family housing communities. The densest neighbourhood on the east side is along Wellington Street, just south of Elgin Mall, consisting of town houses and apartment blocks.

The map in Figure 3 also outlines the catchment or service areas of bus stops in St. Thomas—the areas within the dashed outlines are within a 400-metre or a five-minute walk from a bus stop. About 78% of the city's population lives within a five-minute walk of a bus stop. Most of the densest pockets of the City are within the service area of the current transit network.

Overall, the city has varying levels of residential density. Accordingly, new developments described in the Urban Area Expansion Strategy are anticipated to add some additional density that will support transit, just as infill in the city centre will build future demand for public transit.

[4] The population and employment density analysis relies on Traffic analysis zone(TAZ)-level data provided by the city.TAZ is the unit of geography most commonly used in conventional transportation planning models. The size of a zone varies, but for a typical planning and analysis, a zone of under 1,500 people is common. Note that some dissemination areas are larger, while other are smaller, but aim to contain under 1,500 people.

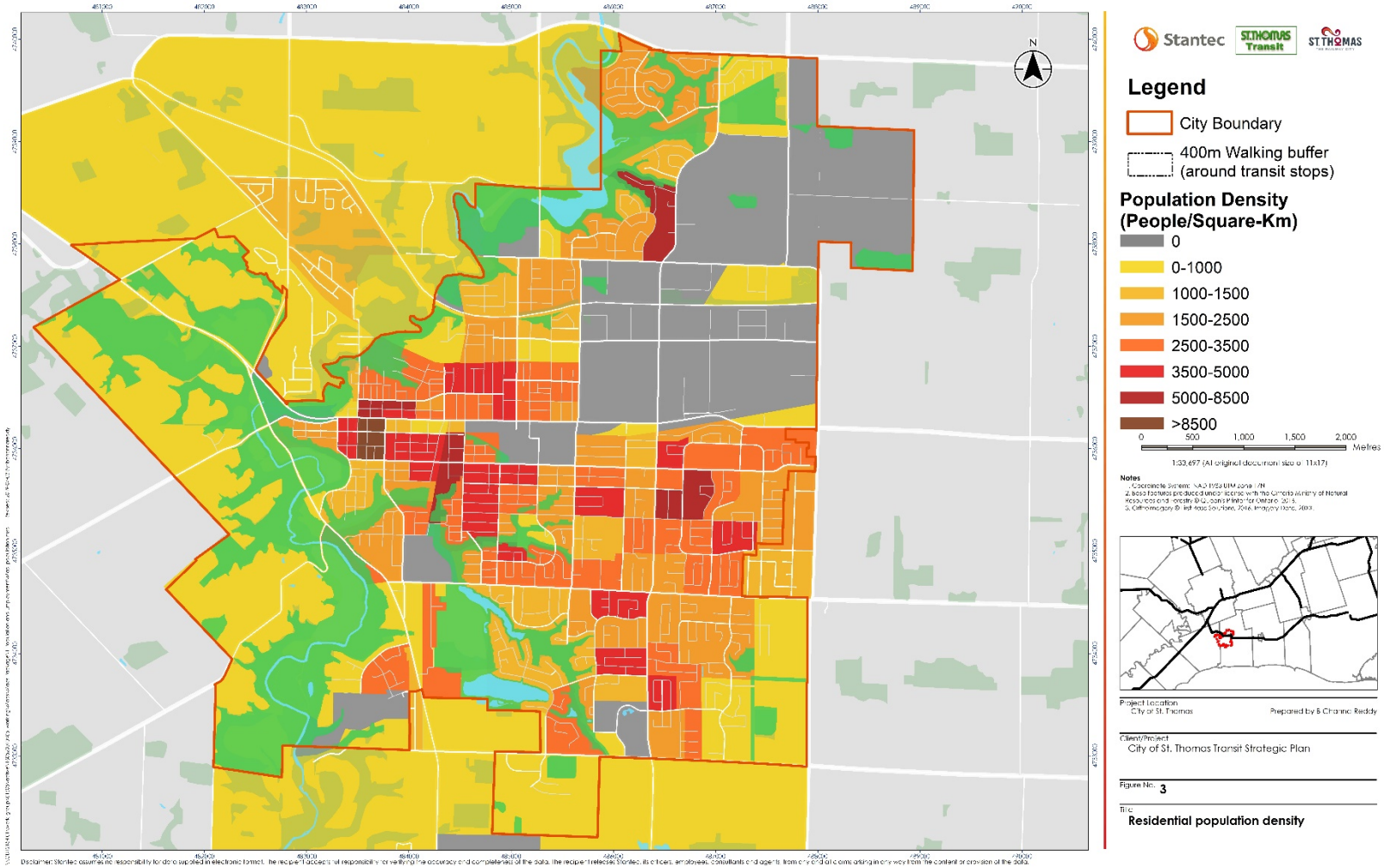


Figure 3: Residential population density

3.2 EMPLOYMENT DENSITY

Employment density is another necessary ingredient for transit and having the ability to commute by transit (i.e. having a bus stop near one's work) is a stronger predictor of transit ridership than residential density.

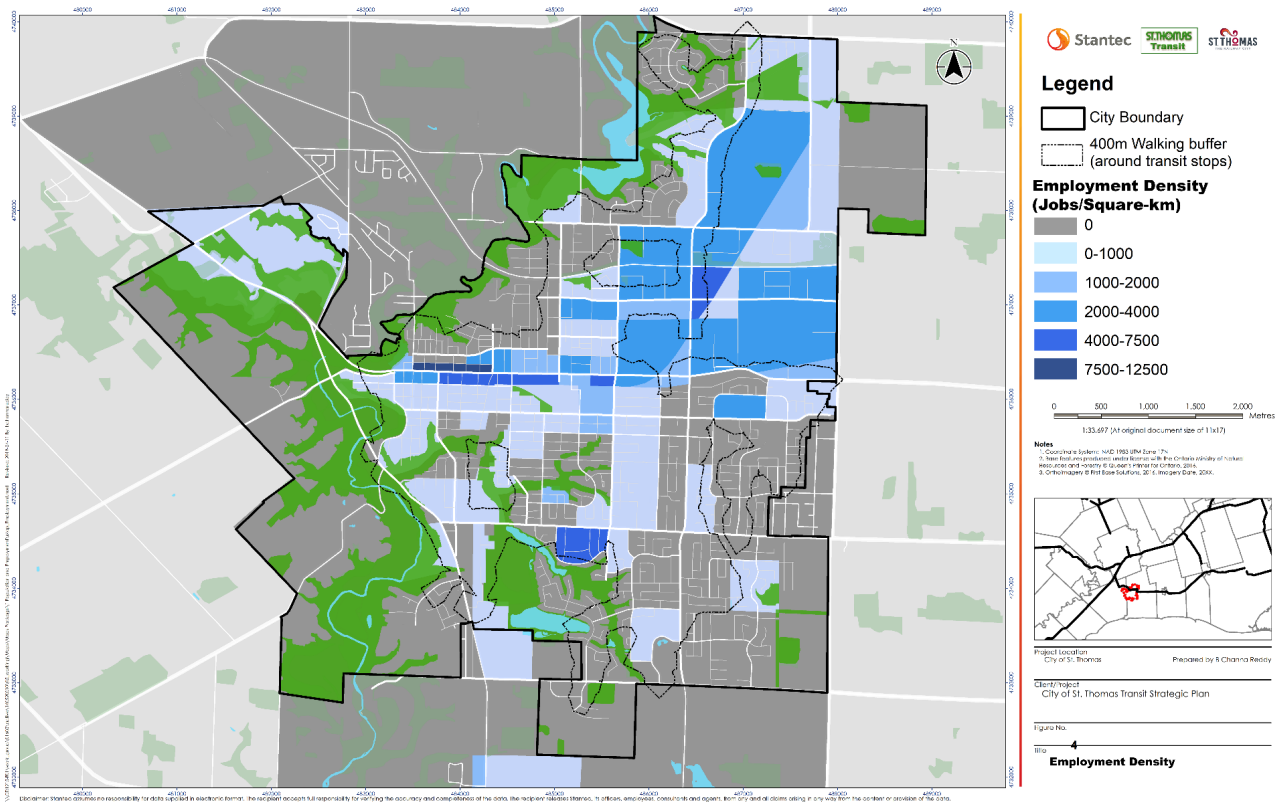


Figure 4 displays the number of jobs per square kilometre by census tract. The densest area for jobs is the downtown or city centre as well as the employment lands in the northeast.

The downtown area currently provides the greatest level of transit service in the city. The employment lands in the northeast of the city employ over 13,141 people translating to over 64% of the jobs in the city. At present, the area is comparatively underserved with only the Northside route (Route 1) and the Express commercial route (Route 5a) serving Burwell Rd. and Talbot St. (east of the city centre) respectively. SmartCentres St. Thomas, which is the home of the primary transfer hub and all the retailers around it, employs a considerable number of the city's labour force though the employment density is low because of the vast spatial area the site covers with surface parking lots.

There are also small pockets of employment density in neighbourhoods outside the city centre such as at malls like the Elgin Centre and at the St. Thomas Elgin General Hospital. Furthermore, there is some amount of employment density in neighbourhoods that have schools and educational institutions. Nevertheless, the area with the greatest job density is the city centre and industrial employment lands with over four times as many jobs per square kilometre than the retail malls and institutional campus neighbourhoods which constitute the next densest job centres.

It is important for transit to reach jobs both downtown and in other neighbourhoods in a quick and efficient way so that transit is a viable option for commuting. Otherwise, coupled with an abundance of available free or cheap parking, the private automobile offers the quickest and most convenient way to commute—there is little travel-time incentive to take the bus.

Overall, the city centre's employment density supports transit use where short trips can be made due to proximity between housing and work, ultimately enabling transit to compete with other mode shares such as a private vehicles.

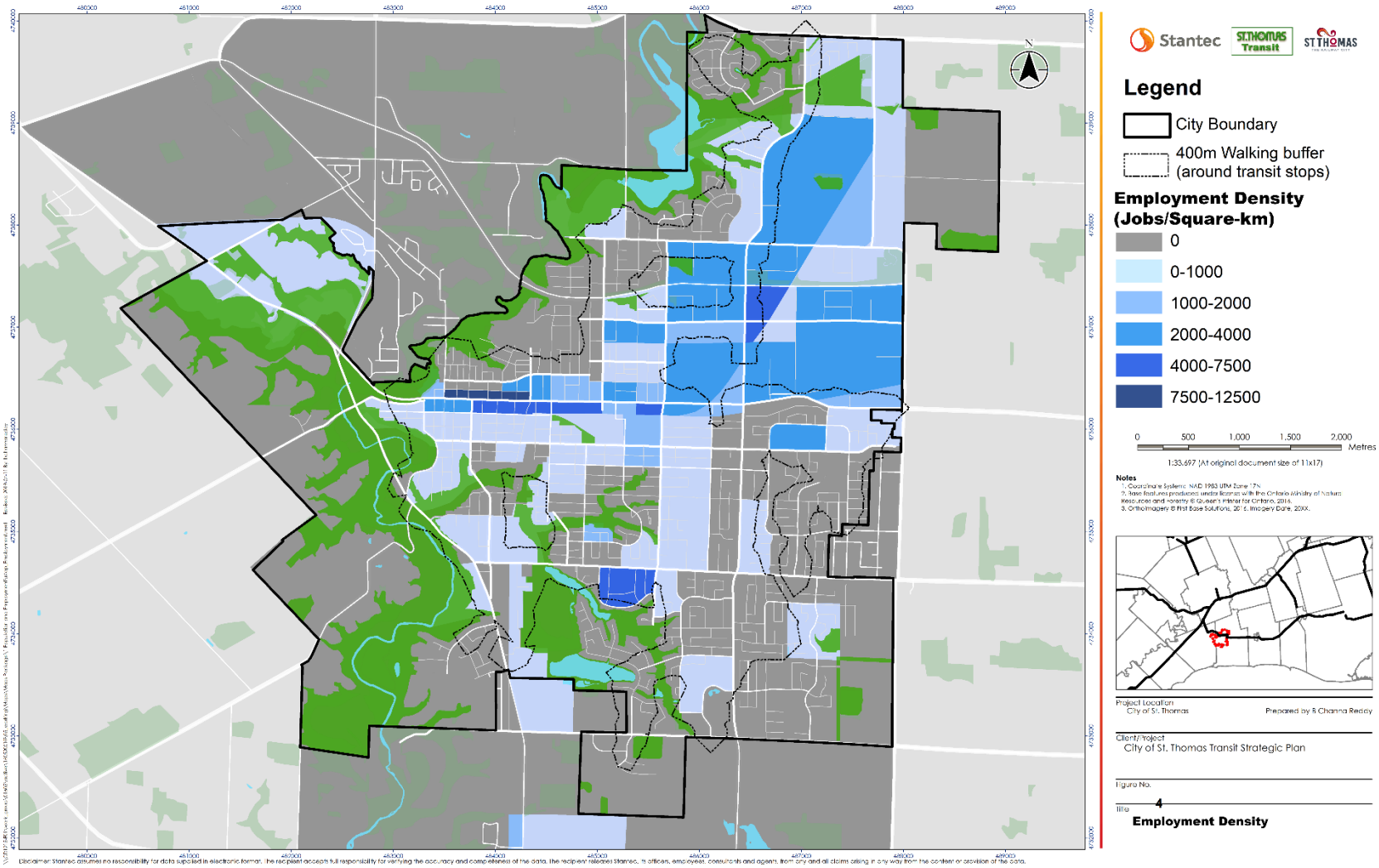


Figure 4: Employment density

3.3 LAND USE DIVERSITY

Land use is an important consideration in the planning of public transit systems. Mixed land uses in particular, such as residential and commercial or retail in close proximity to one another can stimulate productive transit trips.

While residential land uses are the predominant land use outside of the city centre (Figure 5), the centre and surrounding neighbourhoods provide a good mix of commercial and retail land uses. Moreover, the City of St. Thomas has zoned specific areas as 'mixed-use' in proximity to the central transfer point. Currently, St. Thomas Transit as a whole, as well as each route individually, provides good coverage of residential and mixed-use neighbourhoods, which is important for generating trips for many different purposes. Making transit useful for different types of trips helps attract different types of riders throughout the day in addition to those commuting to their 9-to-5 jobs. Put simply, connecting different places for different purposes for different people encourages routes with all-day, two-way demand, lowering operating costs per passenger.[5]

Moreover, mixed land use also enables walkability, and walkability is also an ingredient for productive transit service. Most people access transit by walking to a bus stop, and then walking from the bus stop to their destination. Having mixed-use areas promotes walkable environments, facilitates short trips, and together with pedestrian infrastructure, can spur transit use within those areas. Over short distances, travel times by bus can approach travel times by vehicle, offering a viable option for residents who may not wish to drive or can't drive altogether. Walkability, however, should not be mistaken to mean that riders will walk long distances to their bus stops. In a city of St. Thomas' size, riders may opt to walk for the whole journey if their walk to the bus stop is long to begin with, or if they have access to a vehicle they may opt to drive if a long walk to the bus stop creates uncompetitive travel times.

As a part of the Urban Area Expansion Strategy the City plans to encourage more mixed-use developments and infill developments. Focusing transit services on dense, mixed-used areas and connecting these dense residential neighbourhoods with downtown would promote useful trips and productive transit. Indeed, the most productive routes of the network, Route 3 especially, connect dense, mixed-use neighbourhoods with the city centre. A discussion of route by route productivity is provided in Section 5.

Certain populations tend to rely on transit to a greater degree than most of the general population, such as seniors and students who are unable to drive or who lack access to a vehicle. As such, educational facilities, recreational facilities, and seniors' centres are transit trip generators.

Figure 6 shows that key transit trip generators fall within a five-minute walk from a bus stop,[6] and nearly all are within a ten-minute walk. While St. Thomas Transit provides good connections between many points of interest and land uses, some of the difficulty of reaching one's final destination results from incomplete sidewalk or pedestrian infrastructure, which can act as a barrier to transit use.

[5] There can be exceptions to this, for instance Route 5B which fulfills the need to provide service for students, however, these services are not typically operated all-day, only at the precise moments during the day where the service is warranted.
[6] 67% of educational facilities, 58% of recreational facilities, and 1 senior centre.

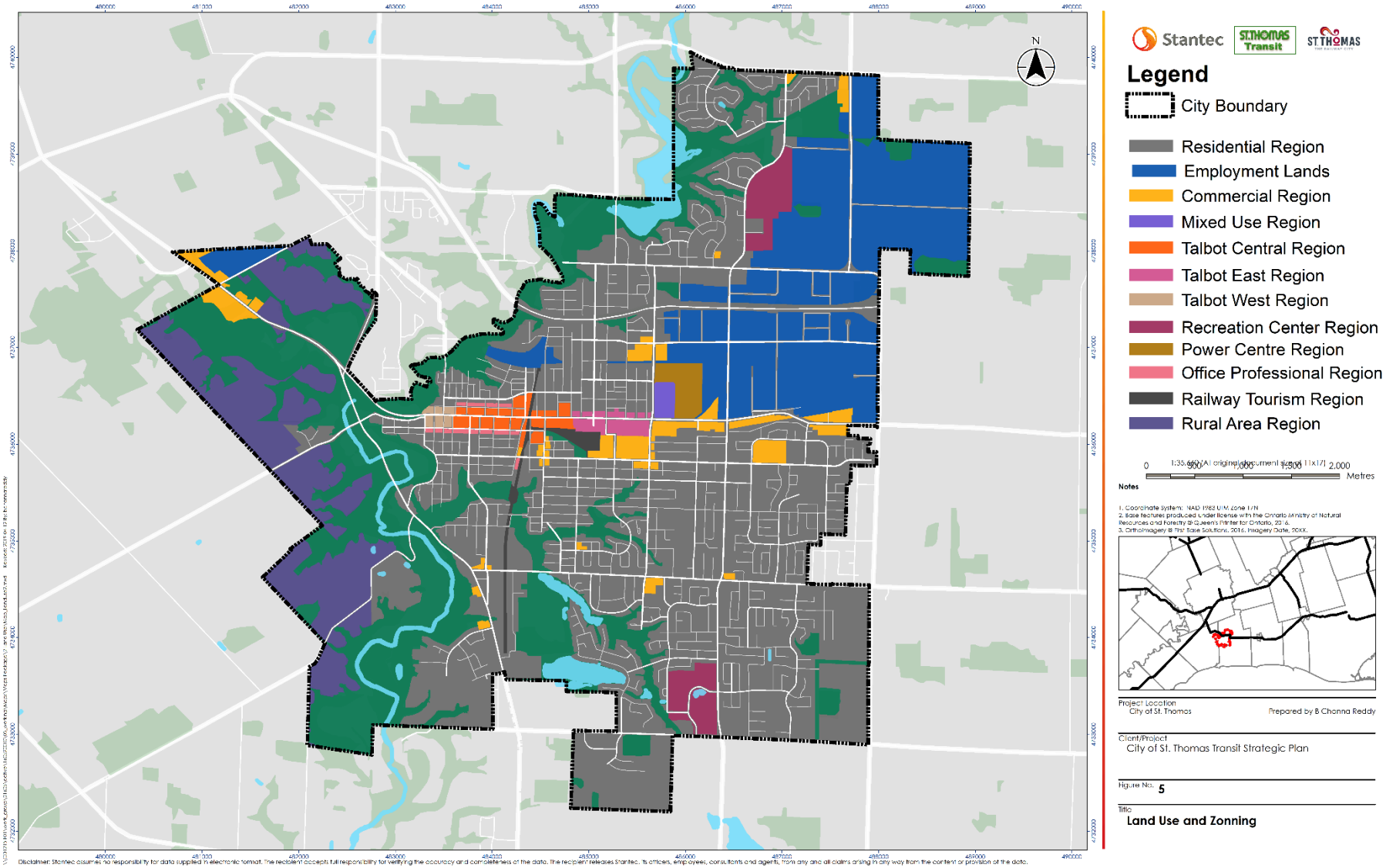


Figure 5: Current zoning in St. Thomas

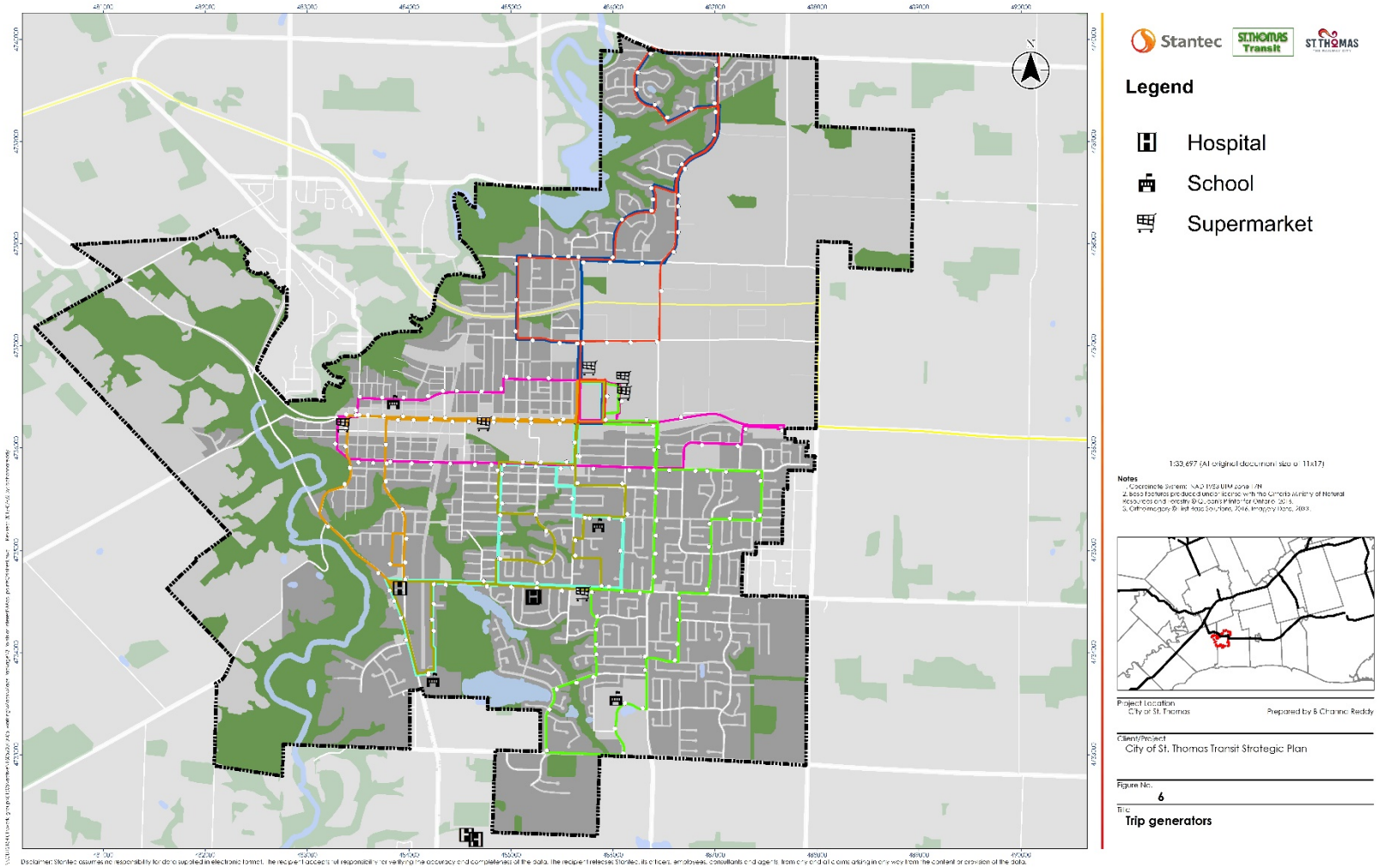


Figure 6: Transit trip generators

3.4 TRANSIT MODE SHARE

Transit mode share is typically a good indicator of transit availability, keeping in mind that transit-dependent individuals are reliant on transit regardless of availability. Moreover, Statistics Canada only tracks mode choice for commuting trips, and successful transit depends on viable transit options for many different types of trip purposes.

Nevertheless, observing current mode share patterns, together with other demographic data such as car ownership and household income, can help explain where transit is most useful to residents, as well as where service can be expanded or reduced.

The overall transit mode share for commuting in 2016 was 0.99%; this is low at an aggregate level, but consistent with other municipalities across Canada of similar size. Transit mode share varies widely across the city (Figure 7), with the some of the highest mode share for residents living in the city centre, along Talbot Street and in neighbourhoods between Third and Fifth Avenue along Wellington Street. These neighbourhoods have transit mode shares above 2% — twice the city average.

The neighbourhoods at the southern end of St. Thomas also see a relatively high transit mode share, particularly in the neighbourhoods along Fairview Avenue. These areas, served by routes 3 and 4, contain lower income households and most likely rely on public transit due to the expense of owning a vehicle.

Most of the outlying areas on the north and south ends of the city have some of the lowest transit usage despite having good service coverage. This could be due to the fact that these neighbourhoods have some of the lowest population densities as well as the wealthiest households who would predominately tend to be auto-centric.

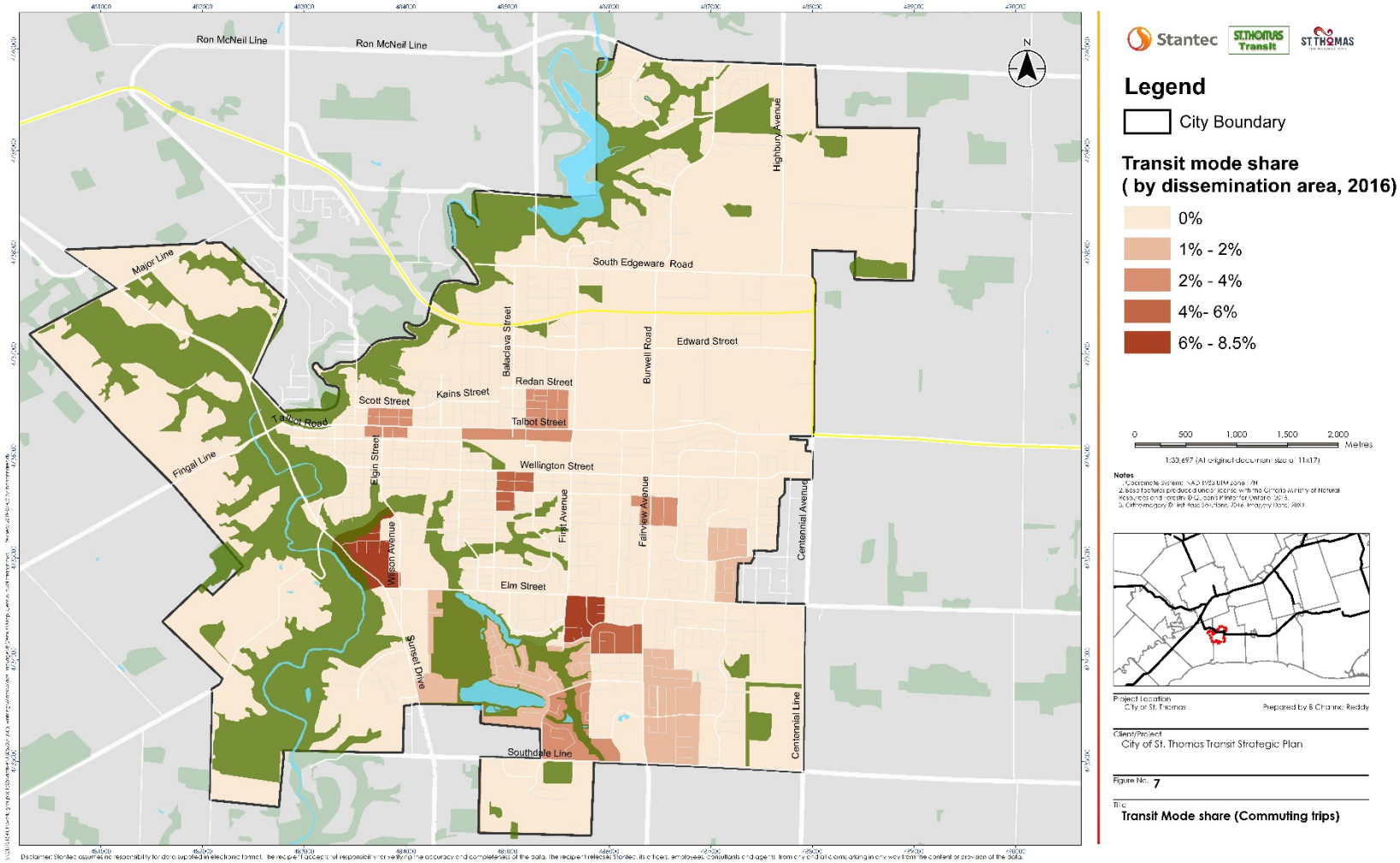


Figure 7: Transit mode share (commuting trips)

3.5 INCOME

One of the strongest predictors of transit use and ridership is car ownership. Unfortunately, Statistics Canada does not release car ownership data at the census tract or dissemination area levels.

As an imperfect proxy, we analyzed median household incomes, which can provide some clues as to car ownership, given that the Canadian Automobile Association (CAA) estimates that the cost of car ownership in Ontario is roughly $10,000 annually.[7] Households with low incomes would be less likely to own a car, and if they do own a vehicle, will likely devote a larger share of their income to car ownership. Moreover, low income vehicle owners may be sharing the vehicle with others in their household, so they would still need to rely on transit as a primary means of travel.

The median household income in St. Thomas in 2016 was $59,755. Figure 8 reveals that large portions of the city centre and surrounding neighbourhoods on both north and south sides have median household incomes below the city median. Further away from the city centre we find higher income neighbourhoods, in the north and the south ends.

By considering the transit mode share map in Figure 7 together with the income map in Figure 8, we can start to observe a similar but inverted relationship between income and transit use at the neighbourhood level. Neighbourhoods in the central part of the city are low-income (Figure 8) and display some of the highest transit use (Figure 7). Without actual car ownership data, it could be argued that areas with high transit use and low incomes likely have low car ownership or devote a substantial amount of income to transportation. As such, these areas are prime markets for transit, and are likely the transit-dependent, ‘captive’ riders that form a substantial ridership base of St. Thomas Transit.

[7] For a Honda Civic driven 10,000 km annually, the CAA estimates a cost of $3,884 for fuel, insurance, and license and registration, with the bulk of the cost, some $6,210, coming from depreciation and maintenance. Source: http://caa.ca/drivingcostscalculator.

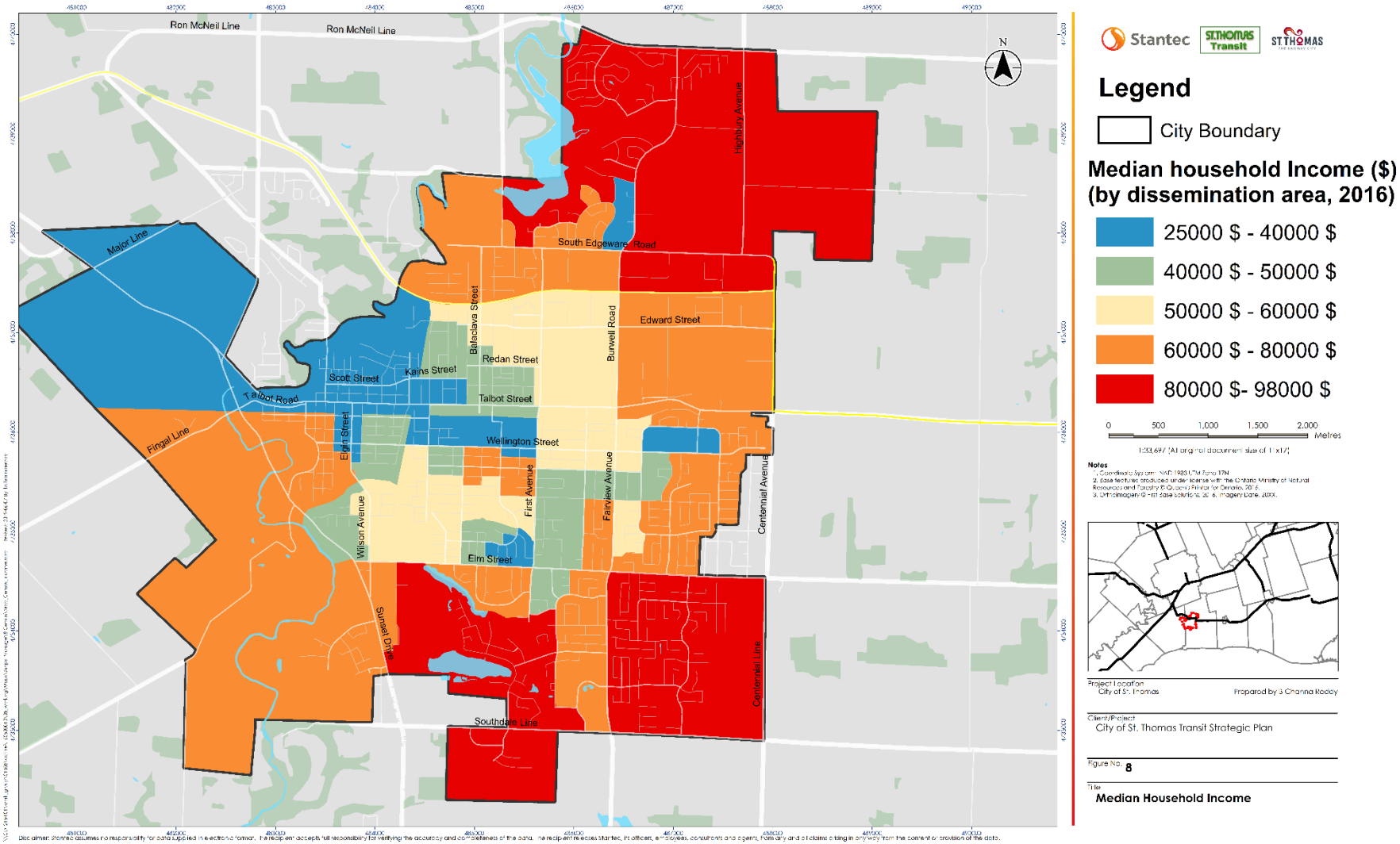


Figure 8: Median household income

3.6 FUTURE DEVELOPMENTS

One purpose of this plan is to proactively address the mobility needs of future residents of St. Thomas—by and large, much of the growth will go into the new neighbourhoods identified in the Urban Area Expansion Strategy, as well as into the developments already underway.

Figure 9 displays the developments, either active/approved or proposed, in the city. Many of these are currently beyond the service area of St. Thomas Transit but two notable ones include the condominium development on Princess Avenue and the development at the intersection of Elm Street and Parkside Drive. Also, the three proposed areas identified for urban expansion are not currently serviced by the existing transit routes.

Delivering effective and efficient public transit to new developments is challenging—typically, North American cities and towns develop new parcels of land in a way that prohibits transit use and service by:

- Developing at low residential densities, typically single detached homes on large lots
- Facilitating or encouraging driving by providing ample parking and separating land uses
- Discouraging walking by not providing sidewalks, developing dead-end streets, and separating land uses

All of the above stimulate driving and make it hard to run bus service in a cost-efficient manner. This is reflected in routes 1 and 2, which serve outlying areas that are low-density. Alternative service delivery methods might improve mobility in these types of developments – these concepts will be explored further in the Transit Strategic Plan.

As many of the factors impacting transit use and resulting ridership are beyond the control of most transit agencies, the City of St. Thomas plays a vital role in ensuring that transit is a viable travel option. Already, the Urban Area Expansion Strategy identifies a compact growth model, so that new expansion areas are denser and also new infill developments are encouraged closer to the city centre. The impact of this is that buses will need to spend less time deadheading while in service (driving long distances between stops).

Furthermore, the Urban Area Expansion Strategy also proposes that many of the developments, in particular the 'new neighbourhoods', be densely developed and have mixed land uses. Again, density and diversity are transit-supportive and providing high-quality transit service early after the first residents move in could steer some trips away from vehicles onto transit before the residents develop car-centric travel habits which are hard to break. The Position for Growth Study should be used to identify key development areas which will require transit service.

While density and diversity in new developments are important for transit, so is good urban form, i.e., connected and walkable streets, preferably in a grid layout like in downtown St. Thomas, rather than dead-end streets. This is important for transit for two reasons:

1. Gridded street networks improve the directness of travel and thus reduce travel time.

2. Connected streets, with the proper pedestrian infrastructure, allow people to walk to bus stops. Some of the biggest barriers to transit use surround poor access to bus stops. Moreover, a lack of sidewalks and accessibility features makes it difficult to reach a bus stop, especially for seniors, persons with reduced mobility, and parents with strollers.

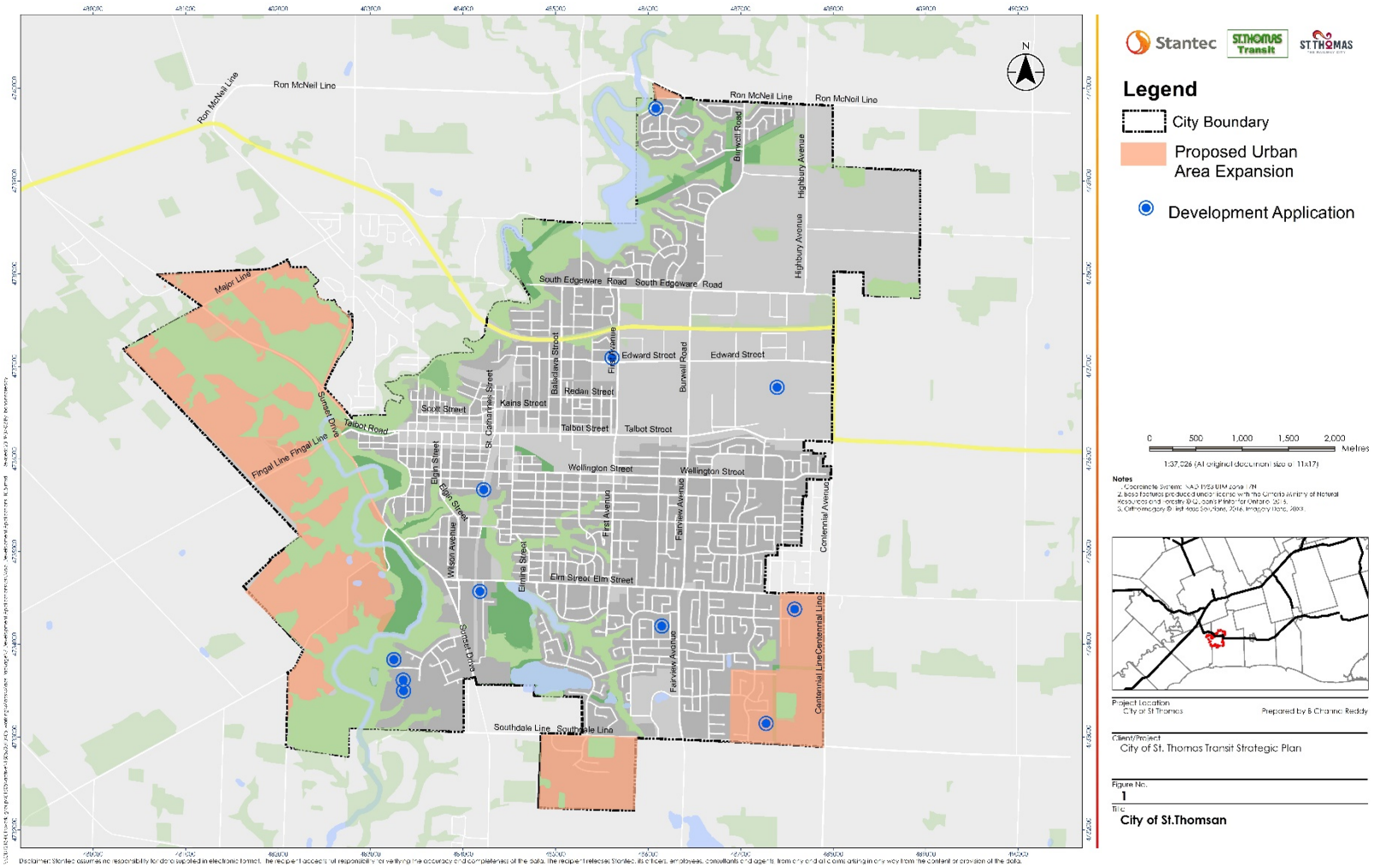


Figure 9: Future developments

3.7 MARKET CONDITIONS SUMMARY

The analysis presented in Section 3 demonstrates many of the necessary ingredients for transit, including:

- Density of population and jobs
- Mixed land uses
- Serving populations with little or no other travel options
- Connecting people with many useful destinations and opportunities

The areas with the greatest transit propensity, that is, areas that are likely to generate high transit ridership are the city centre, neighbourhoods around the city centre and neighbourhoods that have high population densities.[8] Furthermore, this discussion also highlights that many of these necessities are beyond the direct control of St. Thomas Transit and requires collaboration with municipal partners.

[8] These ingredients, however, do not account for how far buses need to drive to reach areas favourable for transit use. These areas could attract high ridership, but be relatively expensive to operate (per passenger) due to the distances travelled. In St. Thomas, most of the urbanized area is with 4 km of the city centre.

4.0 PEER ANALYSIS

By comparing St. Thomas Transit to similar-sized transit agencies or to agencies serving similar-sized cities, we can begin to understand areas where St. Thomas Transit is performing well and where opportunities for improvement might exist. Data between 2015 and 2017 was reviewed to get a sense of trends, and to provide a basis for gleaning strategies that have proven to be successful at peer agencies.Table 4 presents some basic information about St. Thomas Transit and its peers.

Table 4: Peer transit agencies

Agency	Municipality	Service Area Population (2015)	Service Area Population (2017)	Service Area Size (2017) (km^2)	Annual Ridership (2017)	Peak Vehicle Fleet (2017)	Specialized Transit Ridership (2017)	Specialized Transit Fleet (2017)	College/ University	Size of School
St. Thomas Transit	St. Thomas, ON	36000	38909	36	177056	9	17,417	3	Y	small
Woodstock Transit	Woodstock, ON	38,000	41,000	39	379,180	10	34,039	6	Y	small
CK Transit	Chatham-Kent, ON	45000	45000	44	213405	10	25,658	6	Y	medium
North Bay Transit	North Bay, ON	49,000	47,084	314.9	1,411,937	24	27,268	5	Y	large
Elliot Lake Transit	Elliot Lake, ON	11348	10498	16.0	99108	3	8,362	2	N	-
Cornwall Transit	Cornwall, ON	46,340	46,340	61.5	805,842	11	34,321	8	Y	small
Belleville	Belleville, ON	49,454	50,716	247.2	996,794	12	13,300	3	Y	medium
Stratford	Stratford, ON	32,000	32,000	28.0	600,728	13	20,009	5	Y	medium
Timmins Transit	Timmins, ON	38,622	38622	24.0	834,637	19	13,157	6	Y	medium
Welland	Welland, ON	48,000	48,000	86.0	1,025,622	28	12,843	5	Y	large
Owen Sound	Owen Sound, ON	22000	21341	23.7	200453	6	5,761	1	Y	medium

The peers were selected based on comparability with St Thomas Transit and through consultation with St Thomas Transit staff. All peers operate bus systems and have populations hovering around 40,000 residents (with the exception of Elliot Lake) and are cities with small, older urban cores and substantial suburban settlements, similar to St. Thomas. Of course, no two cities or agencies are similar, given demographic, historic, political and geographic differences. Notably, the annual ridership seen in North Bay, Belleville, and Welland is significant more than St Thomas Transit, this is related to a number of factors including larger populations as well as larger educational institutions (North Bay and Welland) where greater ridership is typically seen. The specialized transit ridership in St Thomas is just below the average of the peer group, however relative to the conventional ridership, St Thomas has a greater percentage of specialized transit ridership than its peers. In terms of dedicated resources, St Thomas is among the lower end of the peer group when considering designated specialized transit vehicles per capita.

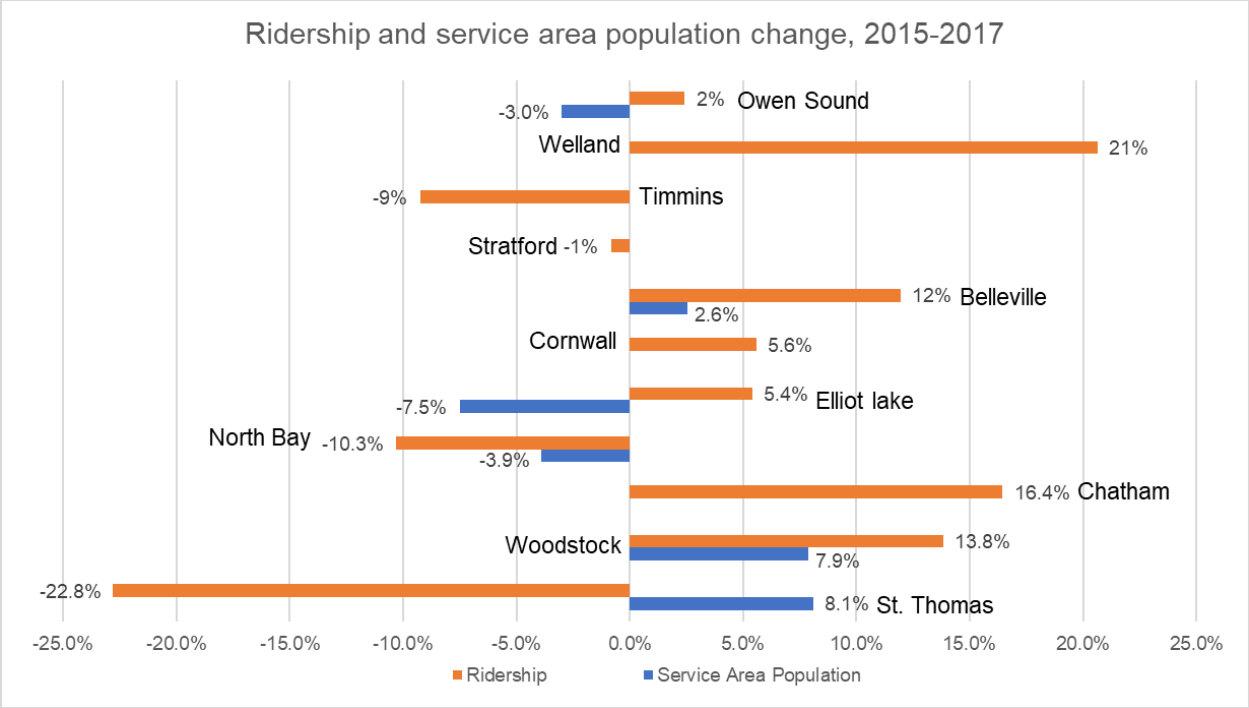
Moreover, transit agencies collect data and report statistics differently (such as ridership and boardings), despite best efforts for uniform reporting by the Canadian Urban Transit Association (CUTA). Thus, cautious comparisons are drawn. All data is sourced from CUTA Fact Books.

4.1 RIDERSHIP

Annual conventional ridership in 2017 ranged between 99 thousand trips for Elliot Lake Transit and 1.41 million trips for North Bay Transit. The same year St. Thomas Transit reported 177 thousand riders. Despite a growth of 8% in service area population from 2015 to 2017, St. Thomas Transit reported a 22% decrease in ridership over the same time period. It is noted, however, that the decline in St. Thomas Transit's ridership may simply be a consequence of implementing more accurate ridership reporting processes, correcting for ridership which was overstated in prior years. At the same time a portion of this ridership decline may be a "real" decline, considering that peers have experienced ridership declines as well, including North Bay Transit out of the agencies reviewed, which experienced a 10% decrease in ridership. The Transit Strategic Plan is therefore timely for St. Thomas Transit, as recommendations emerging from this plan can serve to grow ridership and make the system more effective and efficient.

An average growth in conventional ridership of 3% is seen among all peers. Welland, Chatham and Cornwall Transit's ridership grew by 21%,16.4% and 5.6% respectively though there was no change in the population served. Woodstock and Belleville Transit grew its ridership by 13.8% and 12%over the same period, and some of these gains likely resulted from the increased service area population being served. Figure 10 illustrates that St. Thomas Transit saw the largest decrease in conventional ridership despite having the largest increase in the service population which should be further investigated.

The specialized transit ridership among peers saw an average decline of 2.5%, however St. Thomas saw one of the largest increases of 13% which is slightly larger than the service area growth of 8%, indicating a growing percentage of individuals who use this service. Similarly, Woodstock saw a large increase of 25% in their specialized transit ridership, despite no service area changes.



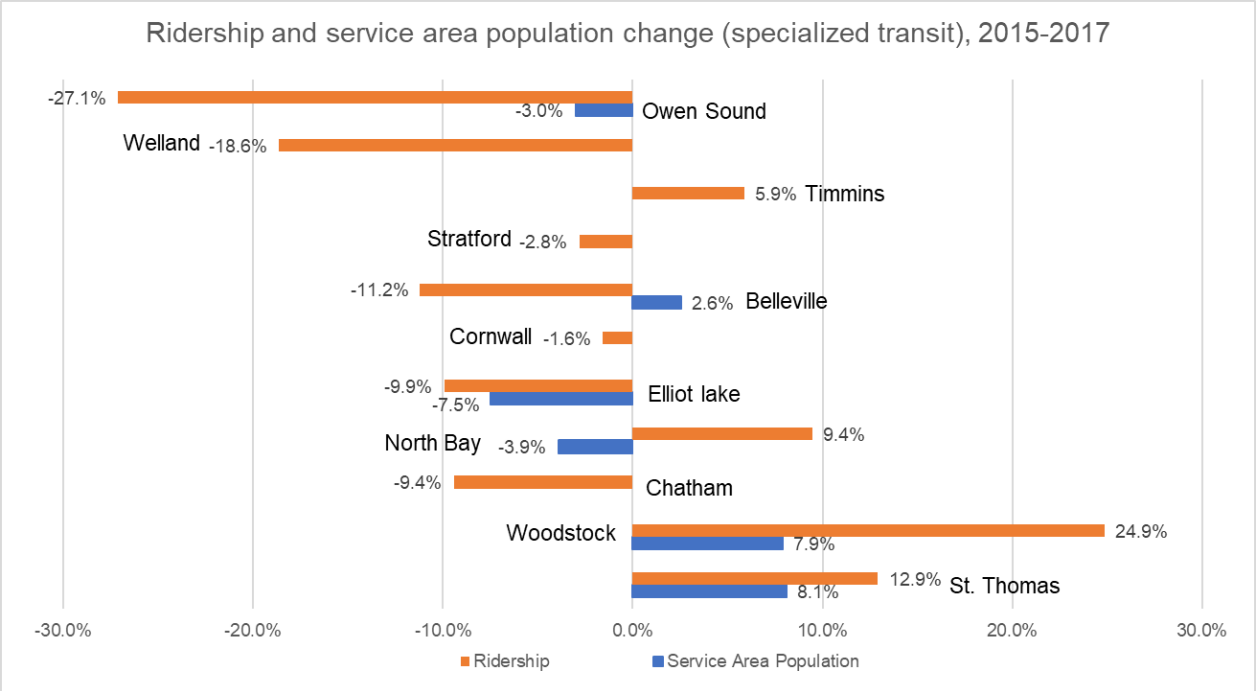


Figure 10: Ridership and population change, 2015 to 2017

One way of examining the popularity of transit, or its attractiveness, is by analyzing ridership on a per capita basis; this also helps account for population changes. Rides per capita provides an indication of how much transit is used in a municipality or region.

St. Thomas Transit has experienced a decrease in rides per capita from 6.37 in 2015 to 4.55 in 2017 and is less than half of the 2017 peer average of 15.1 rides per capita (Figure 11). All the other transit systems in comparison seem to provide around the same number of rides per capita over the period of 3 years. Though North Bay Transit experienced a slight decrease in 2017 it provides the highest number of transit trips at 30 trips per capita indicating that the transit system is highly used by its residents. A number of universities and colleges are located in North Bay which likely contribute to it's large ridership. The important takeaway from Figure 11 is that additional investment in St. Thomas Transit can be expected to pay dividends in the form of a more productive system that is more useful for St. Thomas residents.

Further evidence of this exists in Figure 13 which illustrates that St. Thomas Transit provides a relatively low number of revenue-hours of service on a per capita basis, suggesting there may be room to increase service levels. Similarities may be drawn between Figure 11 and Figure 13 in that the systems with higher revenue-hours per capita are the same as the systems with higher ridership per capita (and vice versa).

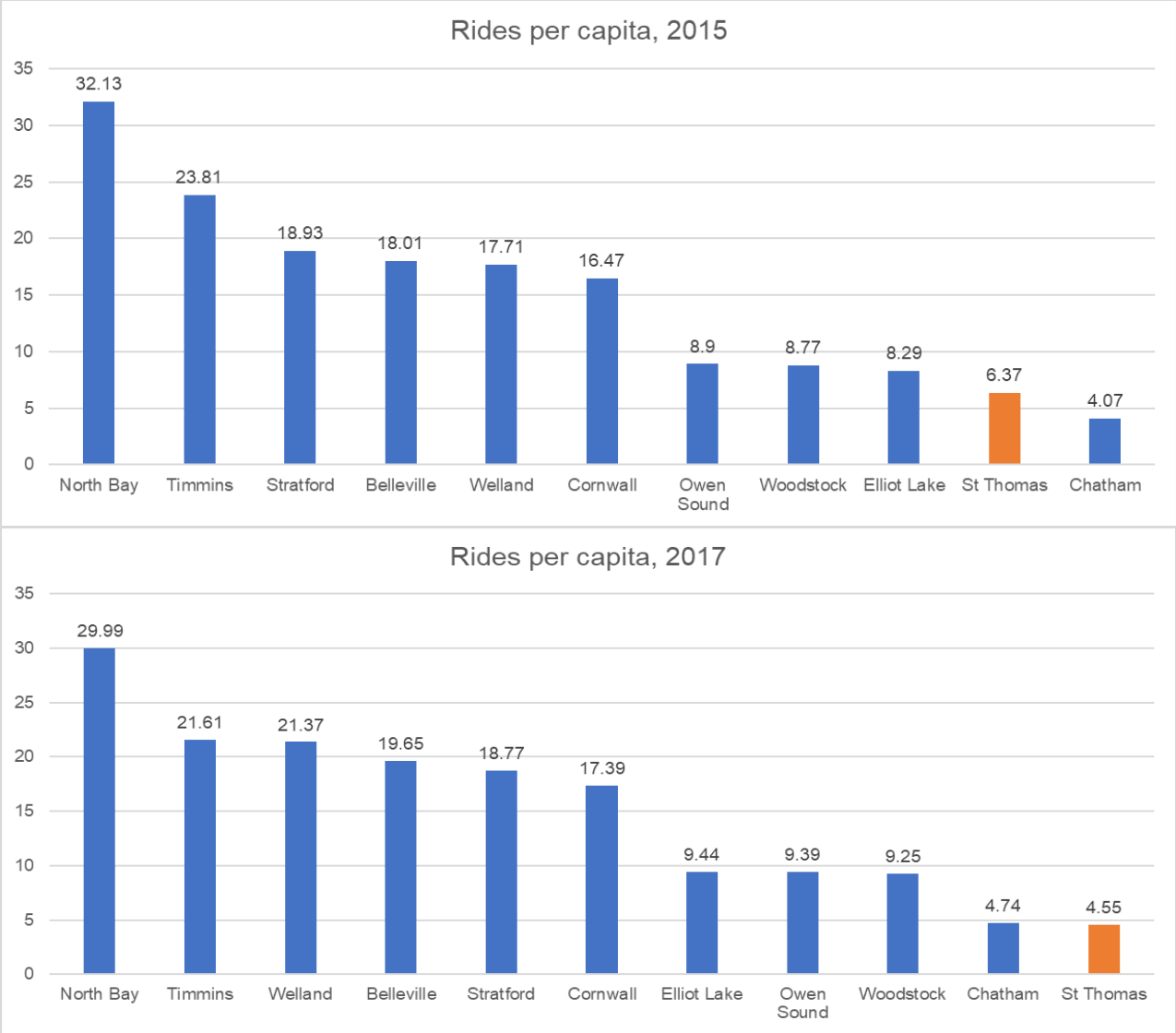
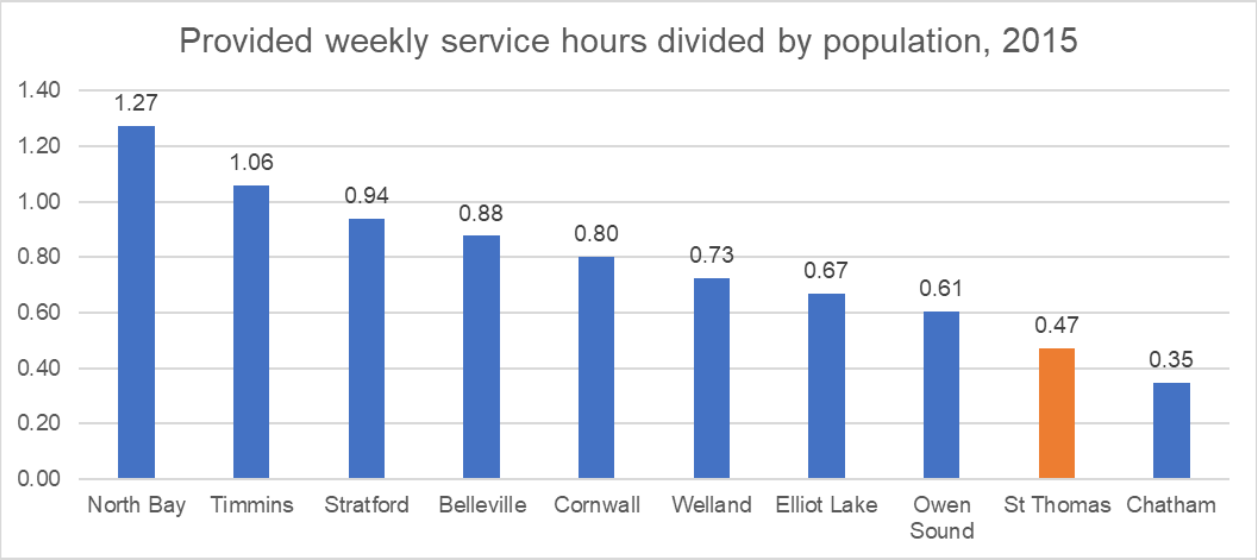


Figure 11: Rides per capita, 2015 to 2017



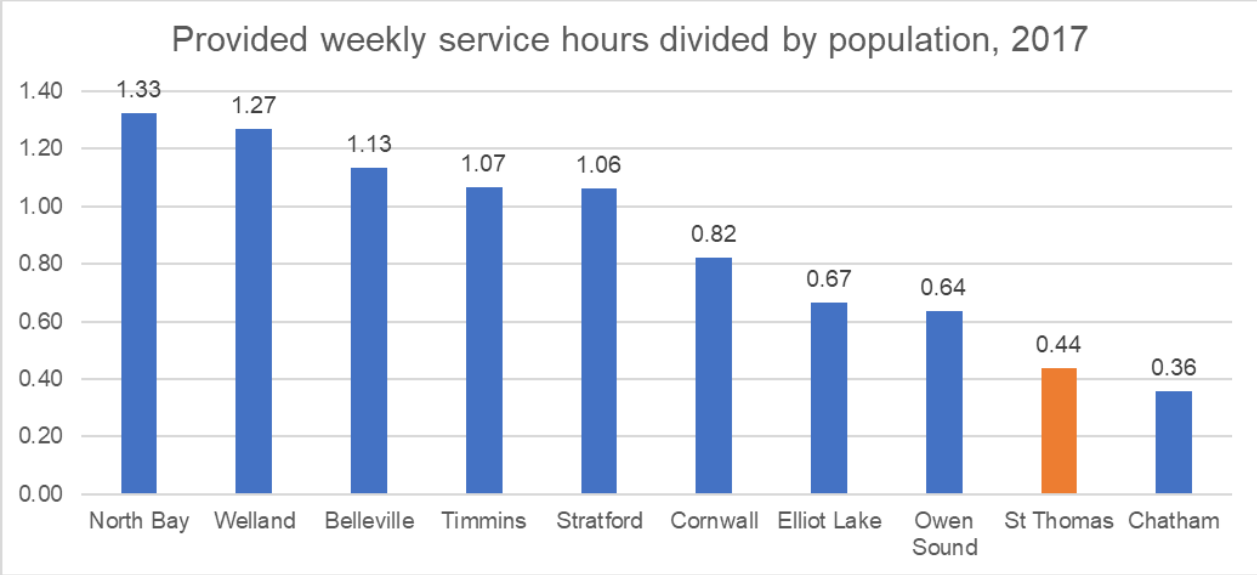


Figure 12: Revenue hours per capita, 2015 to 2017

4.2 SERVICE UTILIZATION (OR PRODUCTIVITY)

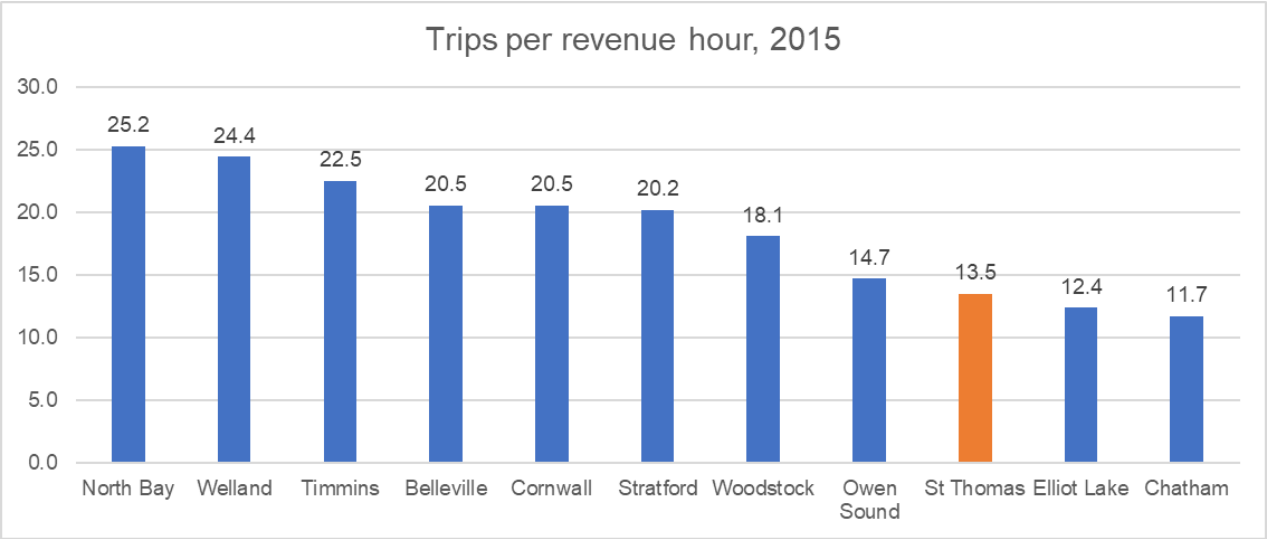
An industry measure of productivity of a public transit system results from the amount of service provided (revenue hours) and its utilization in the form of ridership/trips or boardings[9]. As such, trips per unit of service (revenue hours) provides a good understanding of the intensity of use of a transit system.

Figure 13 and Figure 14 illustrates the trips per revenue hour for the conventional and specialized transit services in the peer group for 2015 and 2017. In terms of conventional transit, in 2017 St. Thomas Transit provided around 10.5 trips per hour while North Bay Transit ranked the highest among the group providing around 22.6 trips per hour. A correlation may be observed in that the same systems with the highest service levels and ridership per capita are

[9] Boardings refers to all instances of a passenger boarding a vehicle, while ridership (or trips) refers to full journeys from origin to destination. The difference is the transfer rate. For example, somebody travelling from the north end of St. Thomas to the south end may board Route 1 and transfer to Route 2 at Walmart. This particular example refers to 1 trip but 2 boardings.

also the same systems with the highest productivity in terms of trips per revenue-hour. The reason for this is that as service quality increases, riders become willing to use the service more often rather than rely on it as a last resort. Industry practice suggests that increasing frequency on well-performing routes will nearly always generate more new ridership than extending service into a new area. Systems with lower revenue-hours per capita such as St. Thomas and Chatham have lower productivity likely because they are more coverage-driven in an effort to meet the politically-driven coverage mandates for the service. Systems with higher revenue-hours per capita such as North Bay and Cornwall, on the other hand, have higher productivity likely because they have additional resources to commit towards improving frequencies after meeting their minimum coverage mandates. The service populations and size of the systems contribute the level of service which can be offered, with larger systems such as North Bay or Welland being able to offer greater service.

An important takeaway in comparing conventional trips per revenue-hour from 2015 to 2017 across the peer group is that overall service productivity has declined slightly. This trend has been observed nationwide and across North America, as transit agencies are needing to find innovative ways to attract new ridership and enhance productivity. A similar decline in productivity can be seen in specialized transit ridership with the average trips per revenue hour declining from 3.9 in 2015 to 3.3 in 2017. This aligns with the slight decrease in specialized transit ridership between 2015 and 2017 as illustrated above in Figure 10.



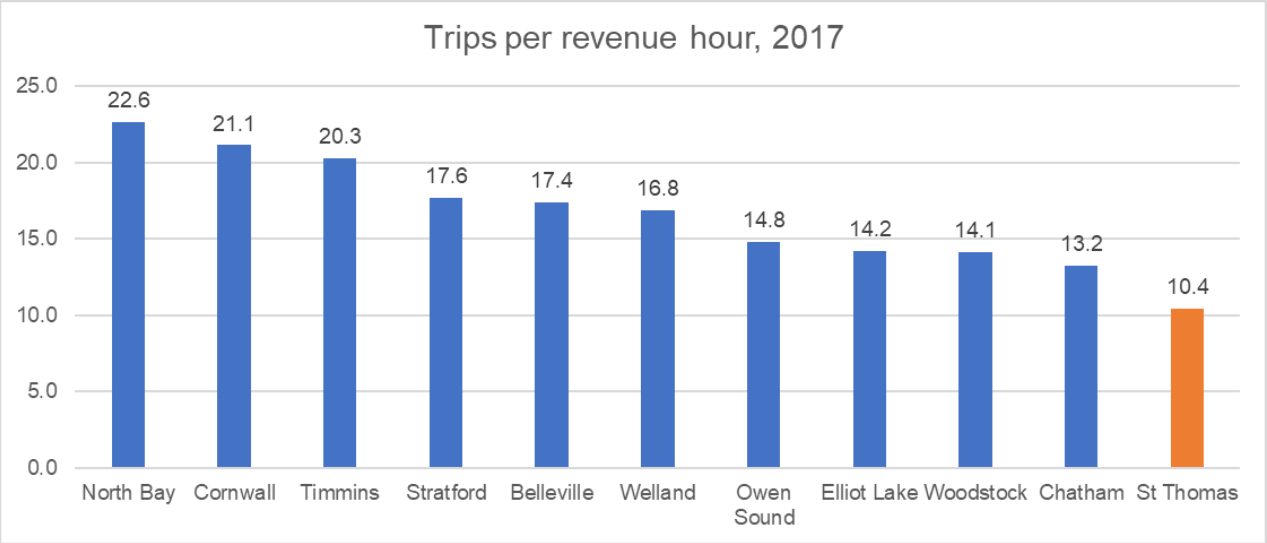
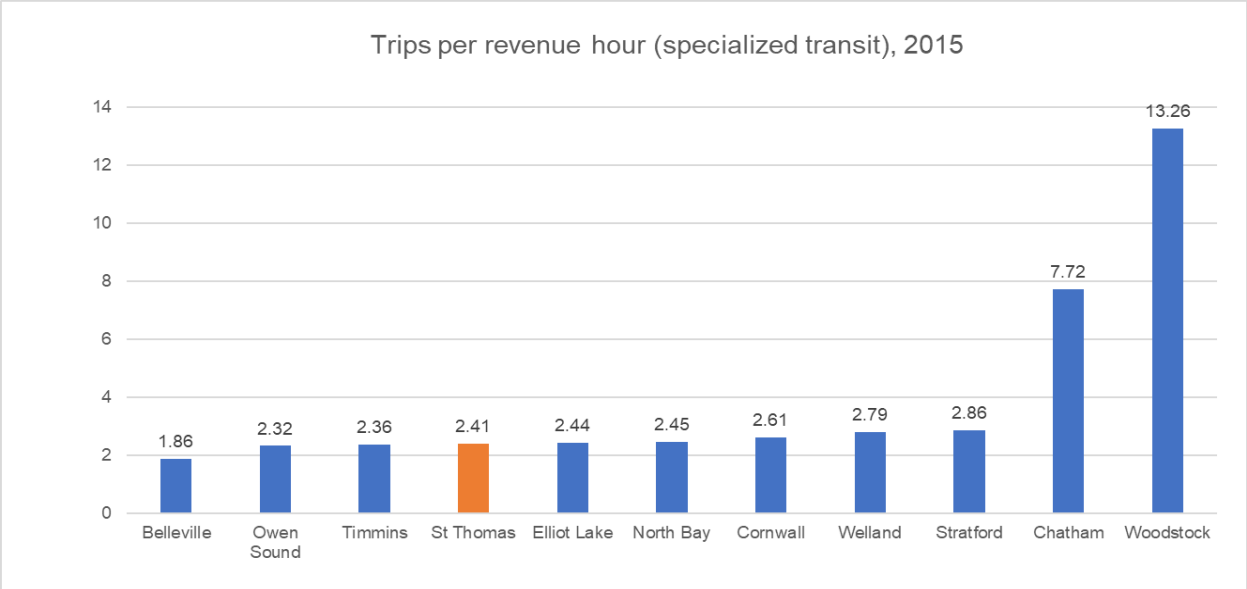


Figure 13: Trips per revenue hour (conventional service), 2015 to 2017



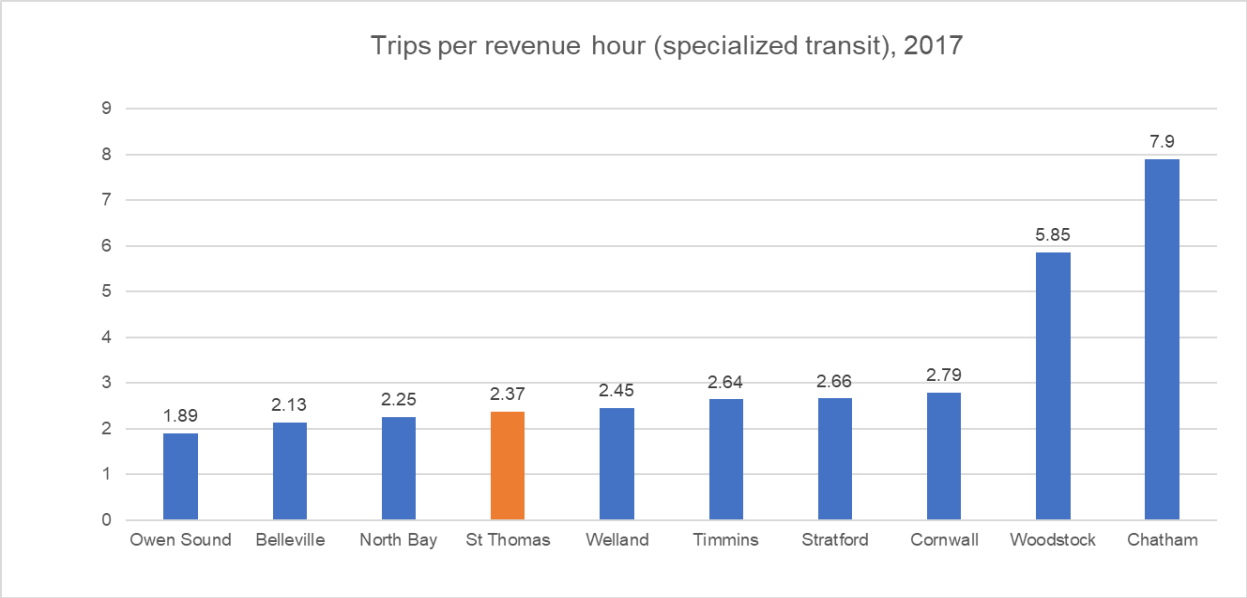


Figure 14: Trips per revenue hour (specialized service), 2015 to 2017

4.3 FINANCIAL PERFORMANCE

While ridership is a key measure of an agency's performance, another key area is financial investment and financial efficiency. St. Thomas Transit's operating cost for conventional transit slightly increased from around $1.06 million in 2015 to $1.16 million in 2017. Meanwhile operating revenue also slightly increased from $335 thousand in 2015 to $338 thousand in 2017. The slight increase in revenue, after taking into account the increase in monthly pass cost during this time, may provide a clearer indication of the "real" change in ridership over this period, which is likely close to stagnant, not the decline of 22% as suggested by the ridership figures reported to CUTA.

By examining the operating cost per revenue hour, we can also observe the cost efficiency of St. Thomas Transit and the peer agencies (Figure 15 and Figure 16). In comparison to its peers, St. Thomas Transit has one of the lowest operational costs per revenue hour for its conventional service, along with Elliot Lake in both 2015 and 2017. The operating costs per revenue hour for St. Thomas is around 23% lower than the peer group average, largely

attributable to Voyageur's comparatively low operator wages. The specialized transit operating expense per revenue hour for St. Thomas is around the average of the peer group, with an increase seen among all peers. This is anticipated as a number of costs increase annually.

In interpreting the data it should be appreciated that it may not be reflective of financial performance today, given that 2017 is the most recent year from which comparisons may be drawn between St. Thomas and peers. Various service changes since 2017 could be impacting the financial performance of both St. Thomas and the peers.

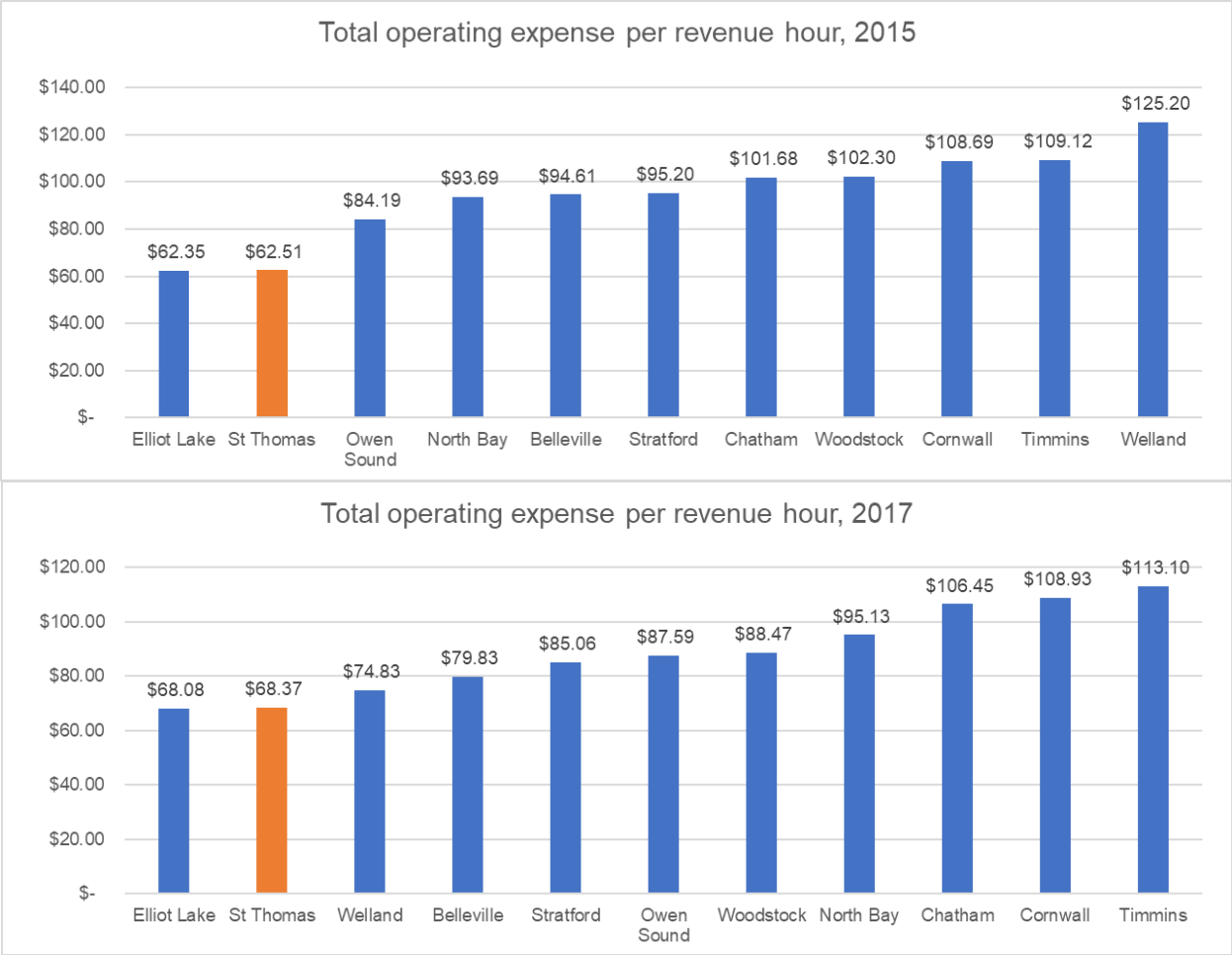
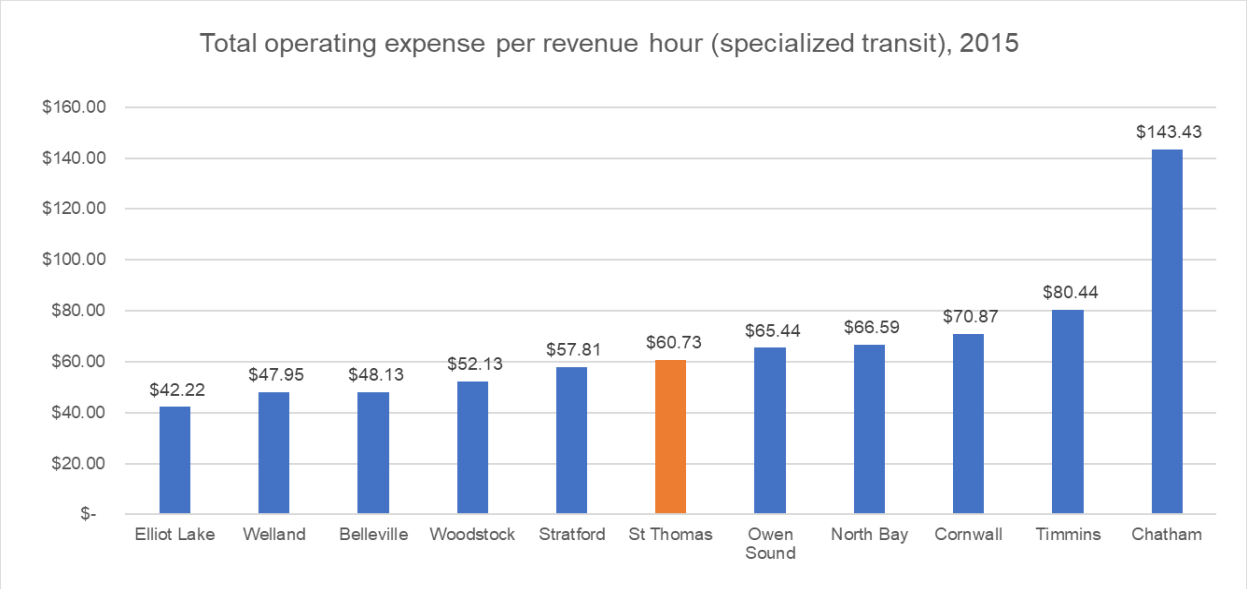


Figure 15: Operating cost per revenue hour (conventional service), 2015 to 2017



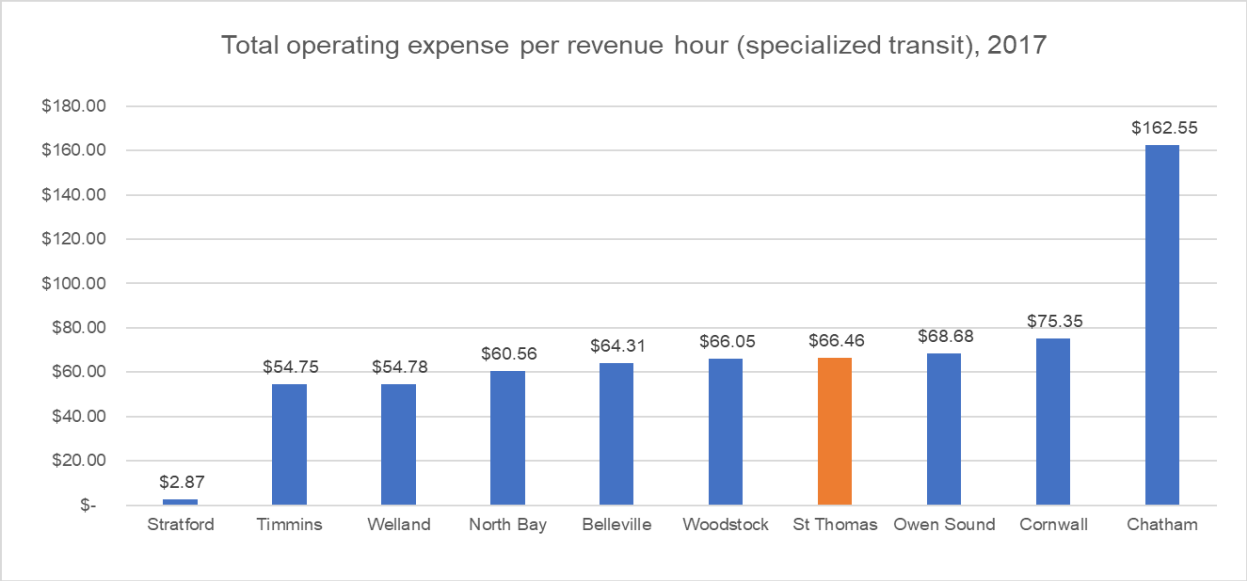


Figure 16: Operating cost per revenue hour (specialized service), 2015 to 2017

A measure of cost effectiveness of a transit agency is the cost per passenger-trip, where a lower cost per trip is preferable (Figure 17). St. Thomas' cost per trip was among the lowest in the peer group in 2015 at $4.64 per passenger-trip while in 2016, it increased by 41% to $6.57 per passenger-trip (peer average is $5.19).

The increased cost per trip is the direct effect of the decrease in ridership as reported. Although the fact that in percentage terms the increase in cost per trip is greater in magnitude than the decrease in ridership suggests that St. Thomas Transit should be mindful of increasing costs going forward and seek to identify cost management strategies.

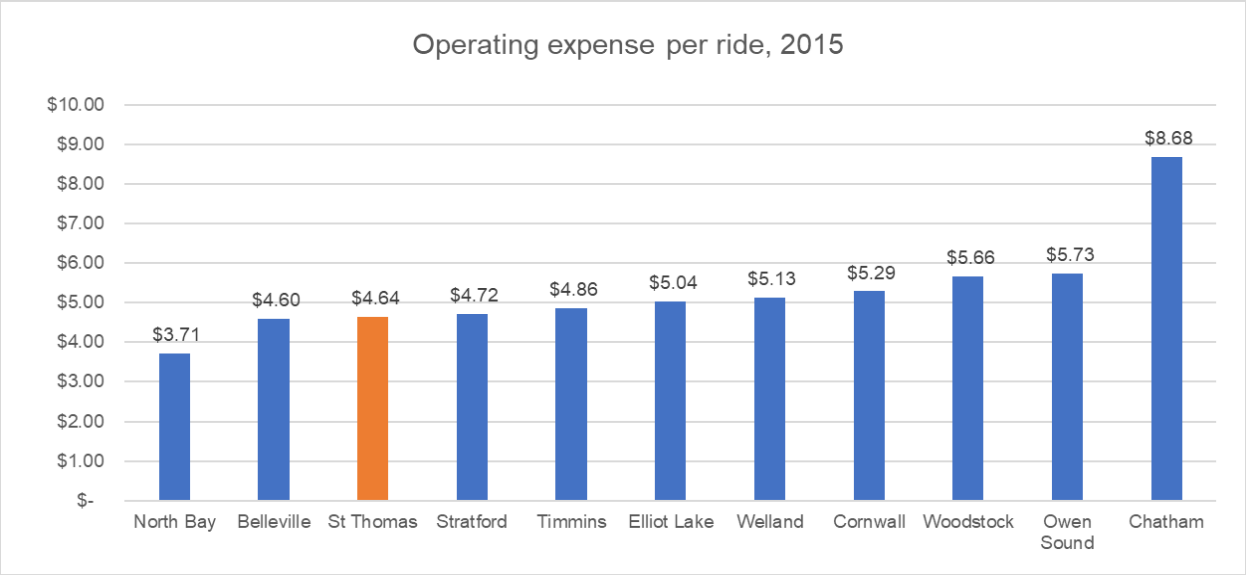
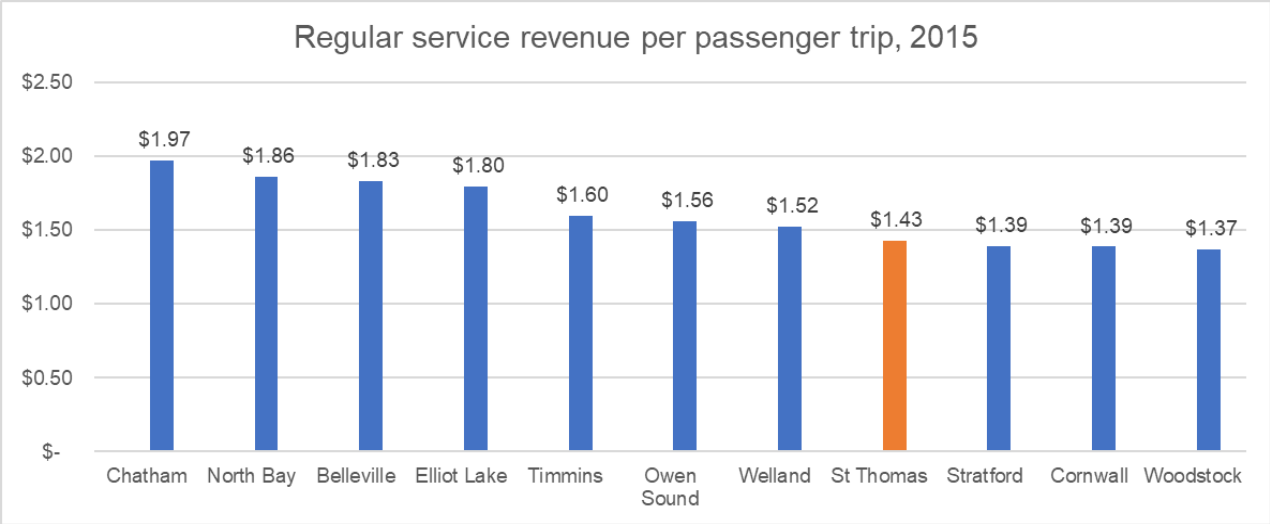


Figure 17: Operating cost per trip, 2015 to 2017

Another important measure of the financial health of a transit agency is the average or effective fare, that is, the total fare revenue divided by annual boardings or ridership. It's important to note that this average fare accounts for the fact that not all passengers pay the full cash fare, and use discounted monthly fares, for example, as well as concession fares such as for senior and student populations.

The average fare per rider collected by St. Thomas Transit increased by 38.3% from $1.43 in 2015 to $1.97 in 2017 (Figure 18). At the same time, the peer average increased by 5.8%, from $1.63 in 2015 to $1.67 in 2017. Over this period St. Thomas Transit increased the price of a monthly adult pass. Other explanations for the increase in revenue per passenger trip for St. Thomas Transit might include a shift in ridership by fare type and a decrease in fare evasion. The biggest driver of the change in revenue per passenger-trip, however, is likely the decrease in ridership resulting from the change in how ridership is reported. $1.97 per passenger-trip is more in line with what St. Thomas Transit should expect given the current fare structure (compared to $1.43), providing further evidence that St. Thomas Transit's updated ridership reporting processes have indeed helped to improve reporting accuracy.



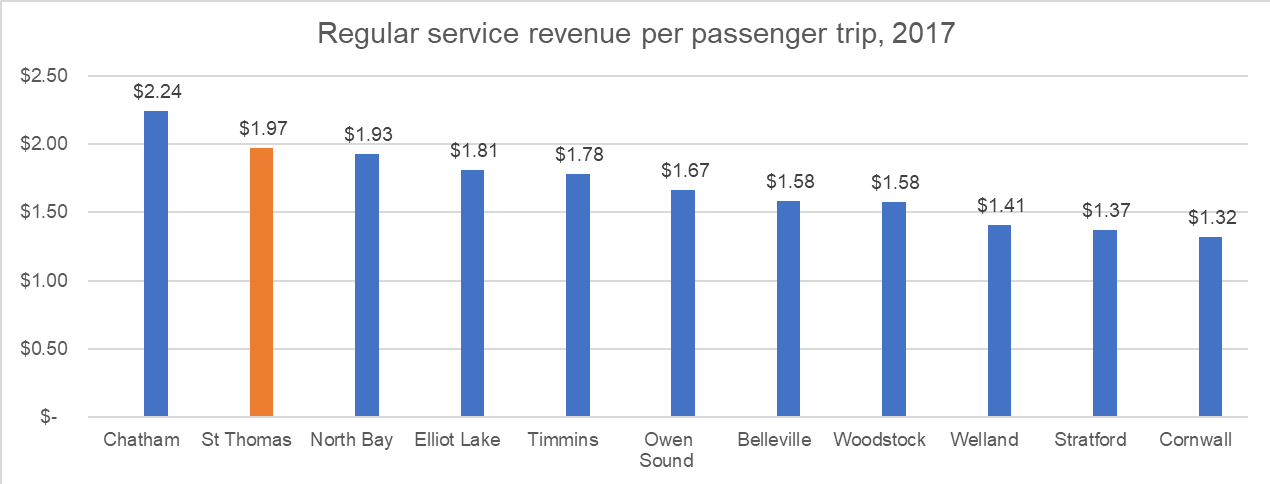
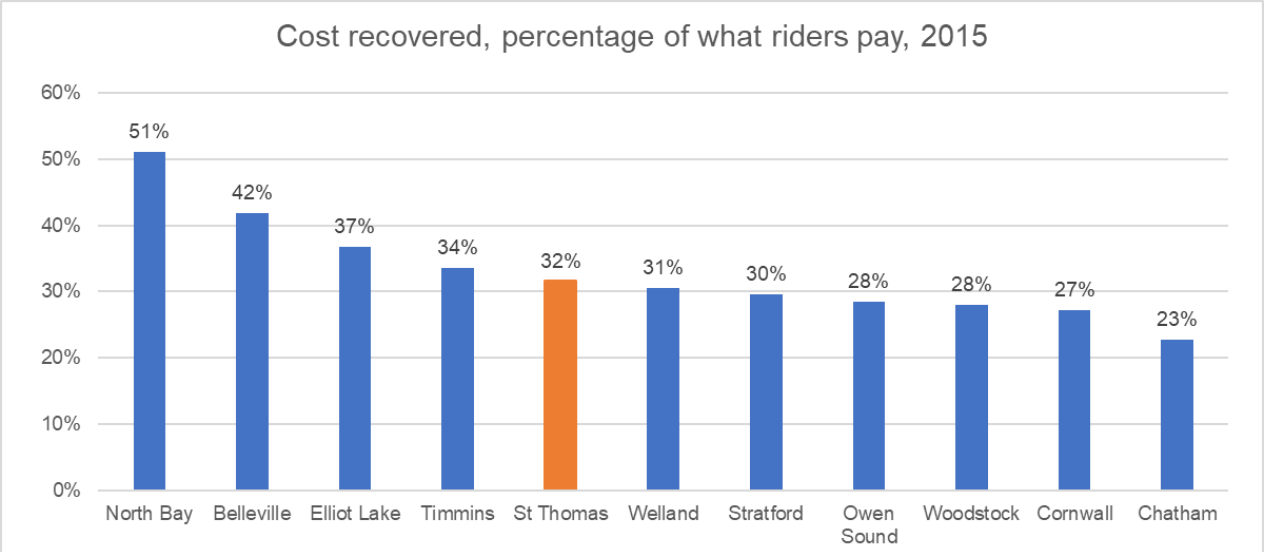


Figure 18: Fare revenue per rider, 2015 to 2017

Finally, by analyzing the amount of operating costs covered by revenue, that is, cost covered through fares and non-fare revenues (advertisements, parking, etc.), we can consider how reliant an agency is on the regional or municipal tax base. Indeed, in an effort to be respectful to both riders and non-riding taxpayers, most transit agencies strive to recover a substantial amount of operating cost through transit fares.

St. Thomas's cost recovery ratio has remained consistent, at 32% in 2015, and 31% in 2017 (Figure 19). This is a respectable cost recovery ratio for an agency of St. Thomas's size and well within North American industry norms. In both years, St. Thomas Transit performed similarly to the peer average, which remined constant at 33%, though this average is skewed by North Bay Transit which well outperforms all the other agencies in the peer group in both years. A major reason for North Bay's greater cost recovery is likely its fare structure; a monthly pass is $86 compared to $70 for St. Thomas.



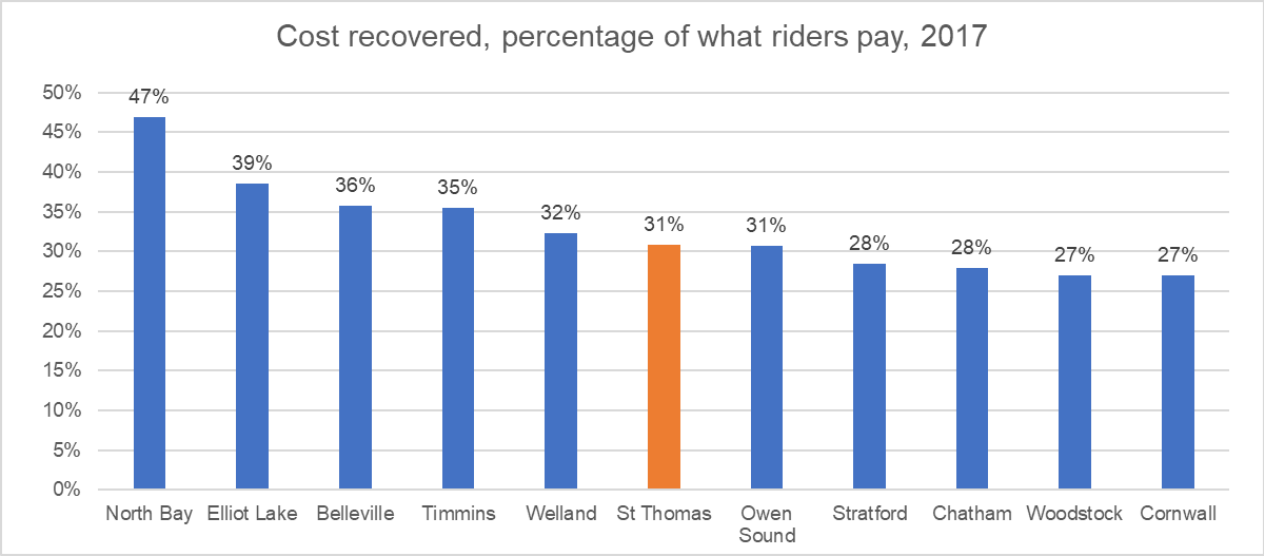


Figure 19: Cost recovery ratio, 2015 to 2017

5.0 ROUTE PERFORMANCE

Over the years (since 2003) St. Thomas Transit has seen a gradual decrease in ridership. In a span of 15 years St. Thomas Transit has seen a 43% decrease in annual ridership, though the service hours offered has remained constant over the last 7 years.[10]

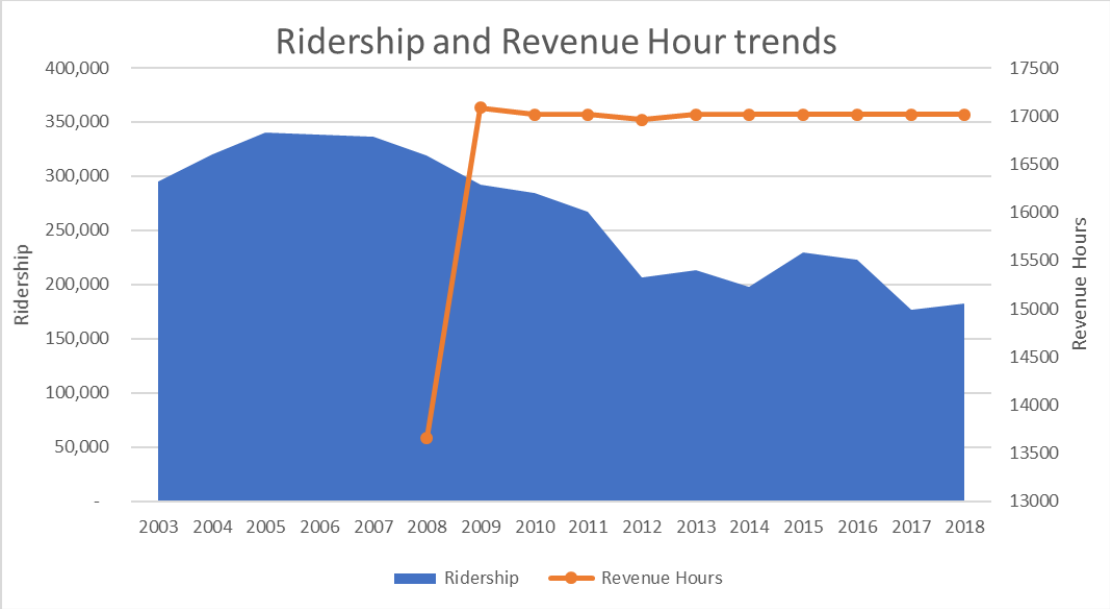
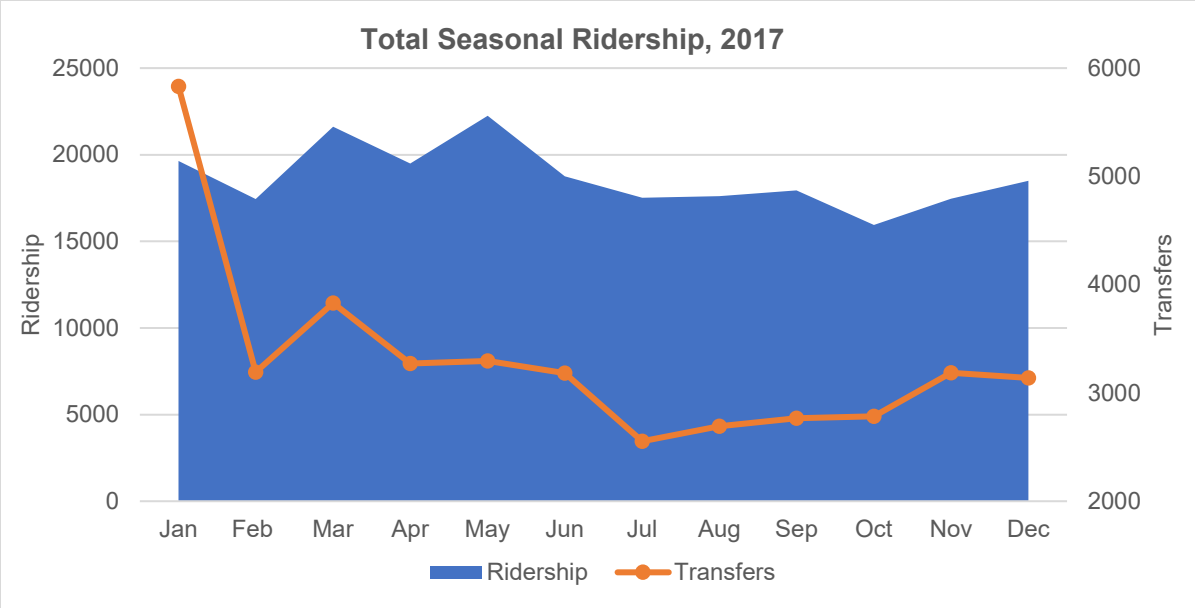


Figure 20: Ridership and revenue hour trends

The system experiences some of the highest ridership during the spring months between March and May, as well as during the winter months between November and March. The increased ridership during the winter months might be due to the mode shift from walking/biking to transit due to the adverse weather conditions. Over the years the seasonal variation of the ridership has remained the same despite the variation in total ridership.

[10] Only 7 years' worth of data was available.



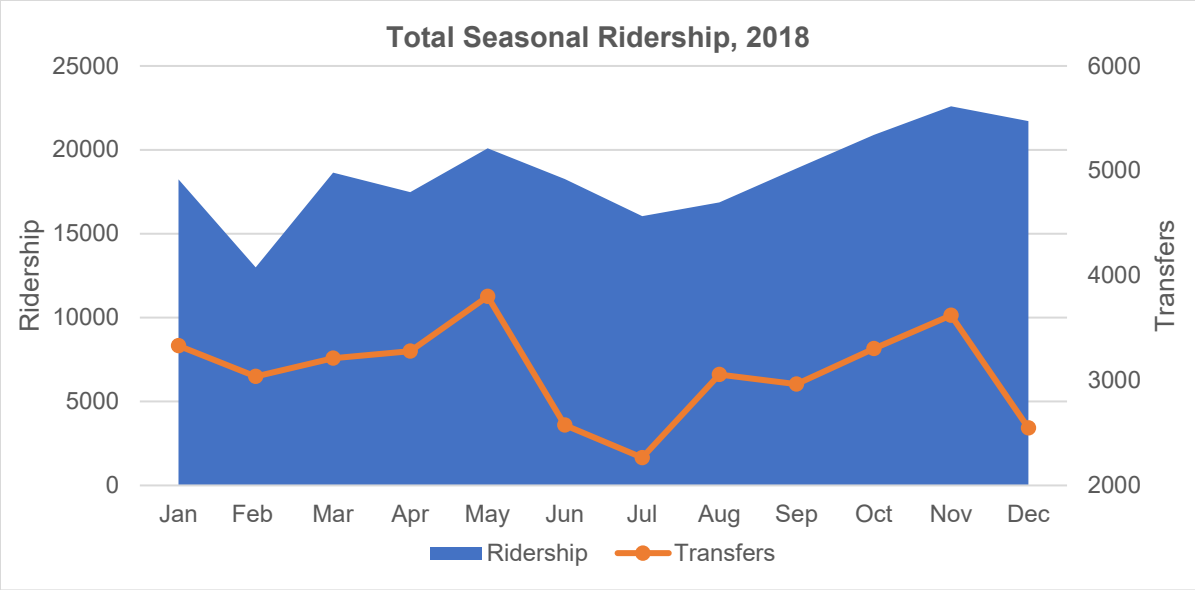


Figure 21: Seasonal Ridership trends 2017 and 2018

While some ridership has been recovered since 2017, the growth is small and is not consistent from route-to-route. The following section provides a brief description of each route and their relative performance within the network.

5.1 ROUTE 1 – NORTHSIDE

Route 1 has a running length of 12.3km and serves the neighbourhoods in the northern end of the city and connects them to the downtown core. With a 30-minute peak frequency and service hours from 7:15 am to 6:45 pm, the route has a yearly ridership of around 35,700. The route connects several schools in the north end of city and serves a large student base. Furthermore, the North Student Express route mimics the alignment of the Northside route and is operated during the morning and afternoon peaks to accommodate added demand mostly from students.

The neighbourhoods served by these routes are generally low-density residential and relatively higher income, and do not connect with major commercial centres outside of the transfer point, prompting a transfer to another route to travel to any of the major commercial centres. Though the route captures a large student base it only contributes 16% of the system's ridership.

Comparatively low ridership on Saturday suggests a frequent use of this route for work and school commuting during conventional work days, and perhaps a lower use of transit for non-commuting trips such as shopping, or leisure activities.

5.2 ROUTE 2 – ELGIN MALL

The Elgin Mall route serves neighbourhoods in the southern end of the city and connects them to the downtown core. A prime stop on the route is the Elgin Mall, housing several retail outlets and commercial services. The mall houses public services such as Service Ontario and also contains the only movie theatre in the city. The Elgin Mall acts as a prime trip generator attracting a large number of trips.

With the longest running length of 12.4 kilometres, the route attracts an annual ridership of around 41,000 passengers. Although the route serves a large shopping centre it still has a comparatively lower ridership on Saturdays.

5.3 ROUTE 3 – TALBOT

Route 3 is the highest performing route in St. Thomas Transit, with an average weekly ridership of over 1,000 passengers and a yearly ridership of 73,000 passengers. The route has the smallest running length of all the routes at 8.9km, and predominantly serves the downtown core and a few communities in the west end along Stanley Street and Wilson Avenue.

High ridership on this route is not surprising given that it serves a large extent of the commercial core along Talbot Street which has some of the highest employment densities in the city. It also serves some of the city's densest neighbourhoods in the west.

5.4 ROUTE 4 – HOSPITAL

The Hospital route connects several trip generators including the St. Thomas Community Centre, the St. Thomas Elgin General Hospital, and the Southwest Centre for Mental Health Care. It also connects a number of schools, educational institutions, parks and shopping centres. The route has an annual ridership of around 40,000 riders and contributes to 18% of the system's ridership.

Comparatively low ridership on Saturdays suggests a frequent use of this route for work and school commuting during conventional workdays, and a lower use of transit for non-commuting trips such as shopping, or leisure activities.

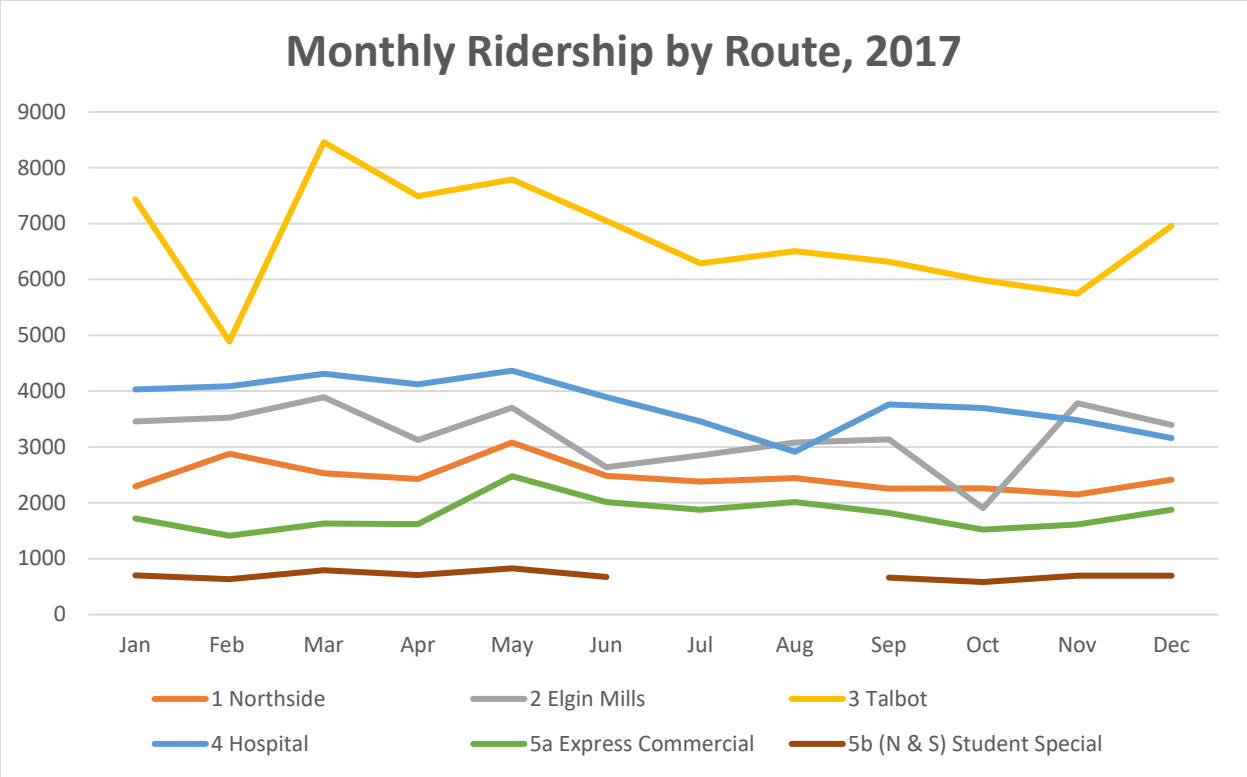
Also, the South Student Express Route mimics the alignment of Route 4 and is operated during the morning and afternoon peaks to accommodate added demand mostly from students.

5.5 ROUTE 5A – EXPRESS COMMERCIAL

Route 5A follows an east-west circuit predominantly along Wellington Street and Talbot Street. It serves the commercial uses along Talbot Street moving people that transfer from the north-south routes to their final destinations in the downtown core of the city. Ridership per revenue hour is comparable on weekdays and Saturdays, suggesting that service is well-aligned with lower Saturday demand and mostly used for shopping and other non-work-based trips.

5.6 ROUTE 5B – NORTH AND SOUTH STUDENT EXPRESS

The North and South Student Express Routes (both Route 5B) only operate during the morning and afternoon peaks during the school year to serve the additional demand from students. The routes predominantly mimic Routes 1 and 4 in the north and south directions respectively. Though the annual ridership numbers appear low in comparison to the others, these routes are productive, generating a considerable number of trips on a per revenue-hour basis.



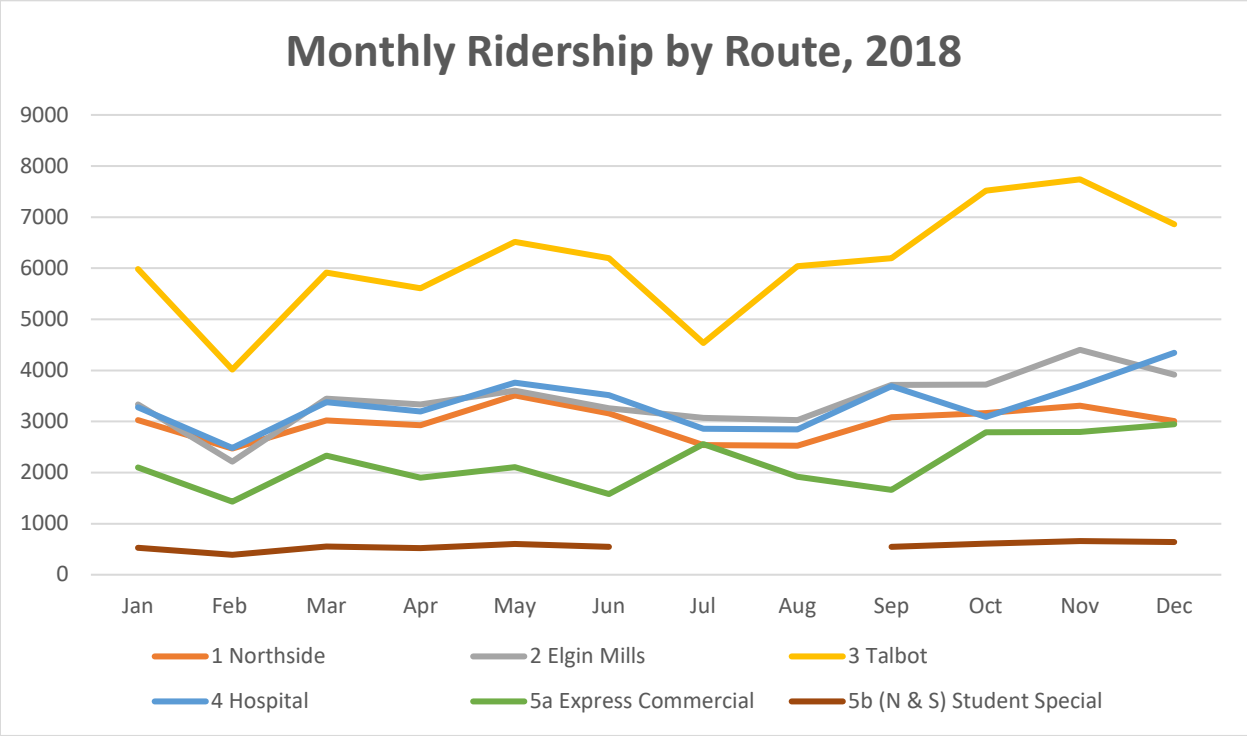


Figure 22: Monthly Ridership by Route 2017 and 2018

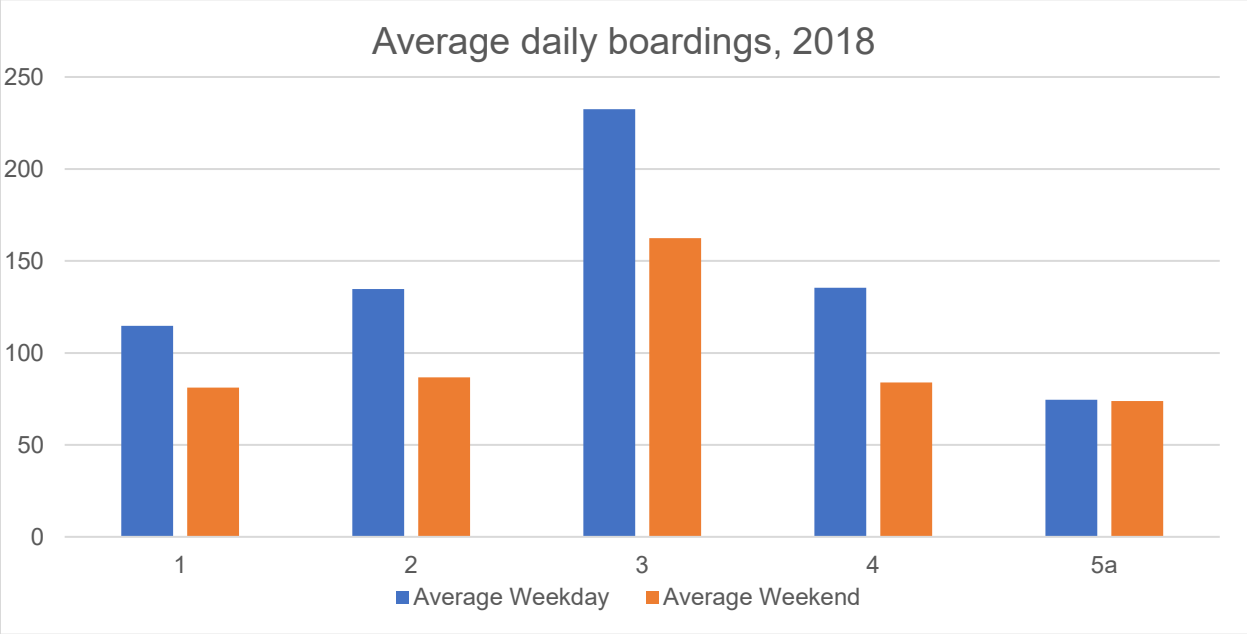


Figure 23: Average Daily Boardings - 2018

6.0 STAKEHOLDER ENGAGEMENT FINDINGS

Stakeholder outreach requires more than just informing stakeholders; meaningful engagement requires that all stakeholders are included in the decision-making process. Throughout the process, St. Thomas Transit engaged stakeholders with a broad spectrum of interests including riders, non-riders, operators, politicians, and special interest groups.

The purpose of this section is to highlight representative themes that emerged repeatedly through various meetings with different stakeholders across different media. This section is not intended to provide a comprehensive discussion or inventory of all topics or issues discussed, but rather provide highlights of common themes. In turn, the emergent themes from stakeholder engagement will help shape the recommendations of the Transit Strategic Plan.

Below, we provide a list of events held for consultation for the Transit Strategic Plan development and then discuss prevalent themes.

6.1 STAKEHOLDER ACTIVITIES

The following list provides key stakeholder events, their dates, and locations. These events were publicized with print advertisements, online on the City of St. Thomas' website and social media accounts, through media channels and through employer e-mail mailing lists.

- Home Show: Attendees at the annual Home Show were engaged for their feedback during the weekend of March 29-31. During this time, Stantec's online rider and non-rider survey was promoted.
- Ride-alongs and off-board engagement: Stantec staff rode every route during the weeks of April 1-5 and April 8-12 to talk with riders and operators, spread the message of the survey and the Transit Strategic Plan

process, gather feedback, and observe operations and transit service. Stantec staff also spent time engaging the public at and around the transfer location by Walmart. Riders and non-riders alike were encouraged to complete the online survey. Comments and prevalent themes recorded during the ride-alongs and off-board engagement were in alignment with the results from the online survey. Results of the survey are discussed in Section 6.3.

- One-on-one interviews with stakeholder groups: Stantec engaged with stakeholder groups including but not limited to Voyageur Transportation, the Health Unit, Central Elgin, Southwestern Student Transportation Services, Social Services, and the Downtown Development Board. The goal of these meetings was to understand the perception of transit services, the current issues, barriers to transit use, as well as to gather feedback and ideas while also informing about transit best practices and realities. Prevalent themes emerging from these meetings are discussed in Section 6.2.
- Operator workshop: Stantec engaged operators after evening pull-in to discuss with frontline employees major issues, ideas, ridership, and operations of St. Thomas Transit.
- Committee of Council presentation and meeting: St. Thomas Transit and Stantec met with Committee of Council on May 21 to present initial findings and discuss opportunities to be explored in the context of the Transit Strategic Plan.
- Municipal Accessibility Advisory Committee (MAAC) open house: Comments were provided at the committee open house held on September 27, 2018 related to transit service and operations in the city.

Figure 24: Stantec staff engaging with riders, non-riders, and operators at the transfer point

6.2 PREVALENT THEMES EMERGING FROM STAKEHOLDER INTERVIEWS

Service Provision

- The City of St. Thomas and Voyageur Transportation have a very good working relationship. Voyageur has the flexibility to adapt to varying service levels, should the City desire an increase in service.
- As noted by the Downtown Development Board, there is an opportunity to improve the marketing and visibility of the service, and alternatives to either improve the current transfer point by Walmart or potentially even relocate it entirely to a location more central (by Talbot St. and Moore St.) are worth considering.
- As noted from a student transportation group, there may be an opportunity for St. Thomas Transit to play a more active role in the provision of service to high school students. Currently, high school students need to live 3.2 kilometres away from their designated high school to qualify for school bus services.
- St. Thomas Transit might play a larger role in bolstering tourism throughout the city, for example through promotional free-fare days and/or through a branded bus that has the appearance of a rail car.
- Some users find the St. Thomas Transit vehicles to be uncomfortable to ride in, and certain vehicles are subject to frequent maintenance issues.

Demographics and Affordability

- As noted by the social service and health unit, transportation is a major barrier for individuals and families trying to enter the workforce. Many individuals are not able to afford transit passes, and it is a particular burden for families who need multiple passes (especially for children). Low income and/or family passes are worth exploring.
- There exist younger newcomers to the community who may only have one car and are willing to use transit but find it generally not convenient or user-friendly. There are many perceived opportunities to increase ridership.
- As noted by the health unit, lower income individuals tend to be dependent on transit, so service quality improvements should first focus on the neighbourhoods with high densities of lower income individuals.
- To address affordability concerns, there is currently a pilot project whereby transit passes are distributed to individuals on social assistance free of charge. St. Thomas Transit is reimbursed by Social Services.

Service Coverage

- Industrial areas are underserviced, and this is a significant barrier to those looking to access jobs. Not everyone has access to transportation through friends or family.
- There may be opportunities for partnerships with employers and organizations for improving access to transit. Employers such as North Star Windows may have used shuttles in the past, although it should also be appreciated that service provision to areas outside of the City's boundaries requires additional considerations. Concepts for extending service beyond the City boundaries will be explored further in the context of the Transit Strategic Plan.

- Coverage need not necessarily be equally spaced, rather it should focus on the areas where it is most needed. In general there seems to be minimal resistance with respect to restructuring the network if it is deemed appropriate to do so.

6.3 ONLINE SURVEY FINDINGS

As part of the St. Thomas Transit Strategic Plan an online survey was conducted to obtain stakeholder feedback. The survey was active for 37 days and resulted in 780 survey responses as visualized in Figure 23. The survey was available to fill out through an online portal, or through a physical survey that could be obtained from City Hall. Overall only 6 physical surveys were complete, with the remaining surveys all being completed online. This section summarizes the online survey findings and adds further insight into the existing transit system operations.

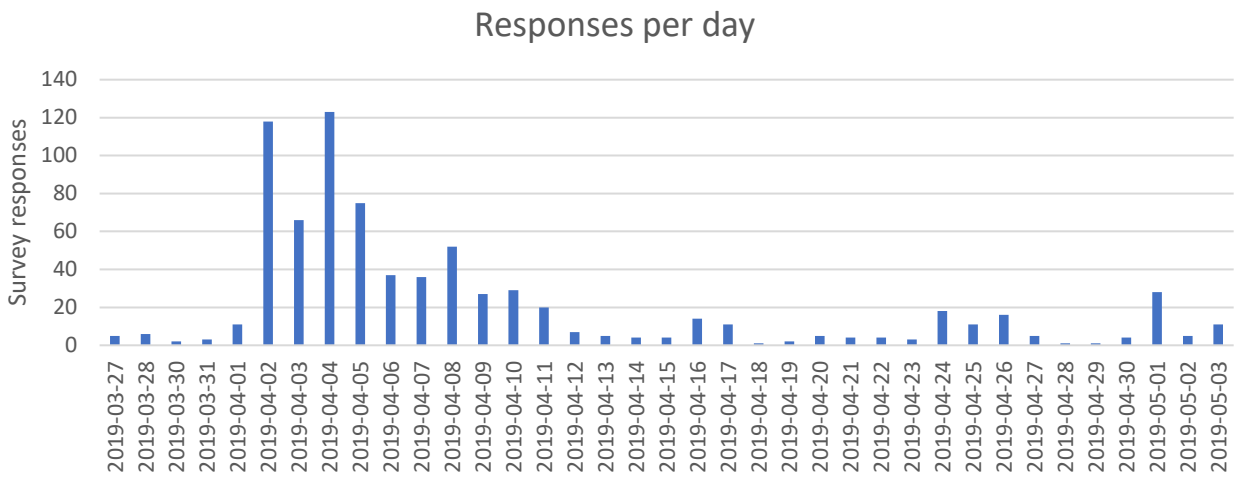


Figure 25: Online survey responses per day

The survey findings have been grouped into categories of information pertaining to:

- Demographics,
- Transit Usage;
- Gaps & Opportunities; and
- Trade-offs

Demographics

The survey response distribution by age-group followed a similar trend as census data for the City of St. Thomas with some differences in the distribution of young residents as visualized in Table 5. This is likely a result of few young children using transit.

Table 5: Online survey age distribution vs Census

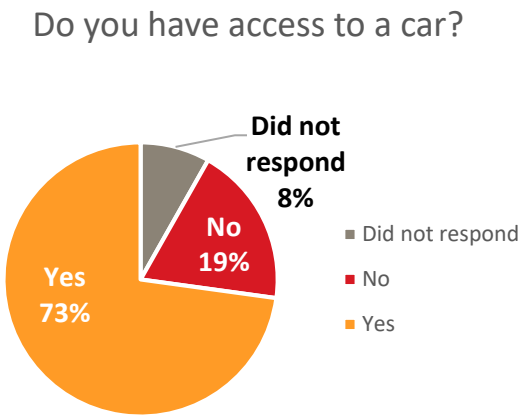
Age Group	Responses	Response %			Census %
		Total	Transit Users	Non-Transit Users	
14 years and under	1	0%	1%	0%	18%
15 to 19	36	5%	0%	0%	6%
20 to 24	31	4%	8%	2%	5%
25 to 34	154	20%	6%	2%	11%
35 to 44	169	22%	25%	18%	13%
45 to 54	155	20%	17%	25%	14%
55 to 64	146	19%	16%	20%	14%
65+	79	10%	17%	21%	19%
Did Not Respond	3	0%	9%	12%	n/a
Total	***774***	***100%***	***100%***	***100%***	***100%***

When accounting for respondent income distribution there was a higher proportion of responses from higher income groups as visualized in Table 6. This is surprising considering that the median household income in St. Thomas is $59,755 and that transit tends to have a higher uptake among lower income individuals. However, when we break-down the data between transit users and non-riders we see there is a larger proportion of lower-income transit riders, compared to higher-income respondents who were more likely to identify as a non-rider when filling out the survey. Despite these differences a fairly even distribution between income groups was obtained so that no single income group would have a significantly higher influence on survey responses. Furthermore, the results identified in the online survey are used for guidance and to add further insights into existing transit data but are not used as the sole data point for which improvements will be based upon.

Table 6: Online survey income distribution vs Census

Income Group	Responses	Response %			Census %
		Total	Transit Users	Non-Transit Users	
Less than $20,000	76	13%	26%	3%	30%
$20,000 - 40,000	109	18%	27%	11%	30%
$40,001 - 60,000	86	14%	16%	13%	21%
$60,001 - 80,000	101	17%	18%	18%	10%
$80,001 - 100,000	80	13%	7%	15%	5%
More than $100,000	153	25%	6%	39%	4%
Total	*605*	*100%*	*100%*	*100%*	*100%*
Don't know / Prefer not to say	167				

The majority of respondents identified as having access to a car (as shown in Figure 24), with transit riders having an average of 0.8 cars per household compared to non-transit riders that responded as having an average of 1.3 cars per household. This is likely a reflection of transit providing an opportunity to mitigate the need for additional vehicles within a household, as well as transit's fit within the multi-modal transportation network serving lower-income populations who may not be able to afford a private automobile (as summarized in Table 6).



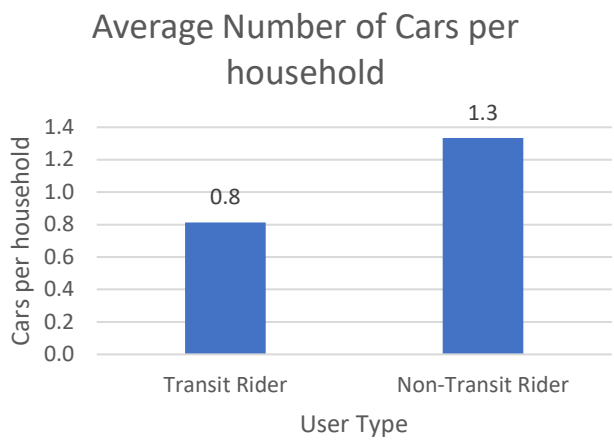


Figure 26: Survey respondents with access to a car

Transit Usage

The majority of respondents who identified as using transit were long-time users who have been using the system for more than one year as shown in Figure 27. Only 16% of respondents identified as using the system for less than a year indicating that many riders are long-term riders that rely on the system as an integral part of their life within St. Thomas.

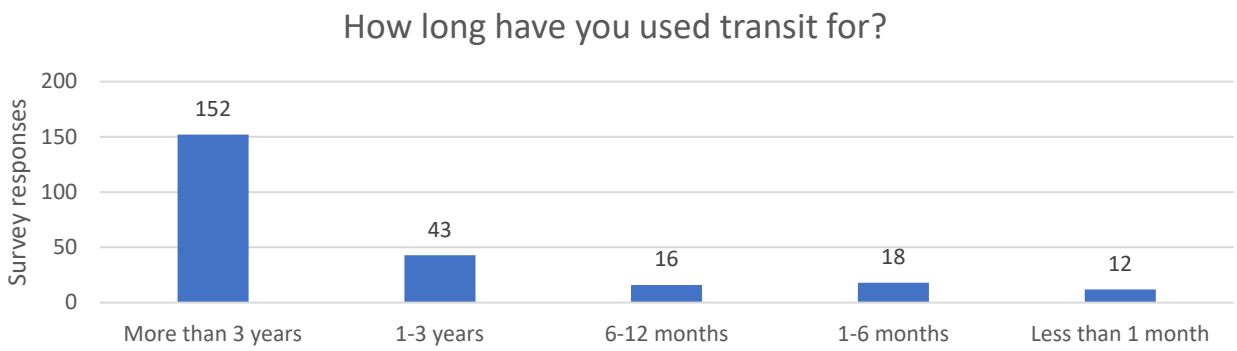


Figure 27: How long transit survey respondents have used the service for

The primary trip purpose for transit riders is commuting to/from work, which accounts for over 49% of responses. Shopping trips constitute the second highest trip purpose at 17% (as summarized in Figure 28). This emphasizes the

role that St. Thomas Transit plays within the community in providing a network that caters to regular users that use the service to access employment opportunities as well as conduct regular shopping trips.

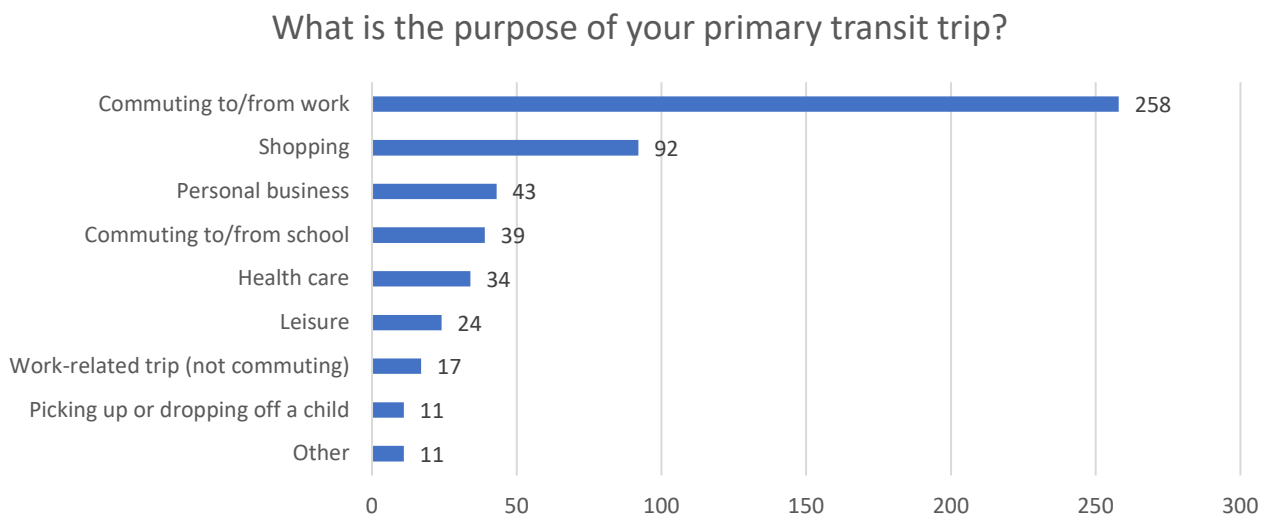


Figure 28: Purpose of respondents' primary transit trip

Gaps & Opportunities

<u>Service Satisfaction</u>

Overall transit riders identified being most satisfied with transit driver behaviour/attitudes as well as other qualitative components such as the ability to get a seat, cleanliness and safety. However, respondents were less satisfied with operational components such as directness of transit routes, time spent waiting for the bus and the cost for a trip as summarized in Figure 29.

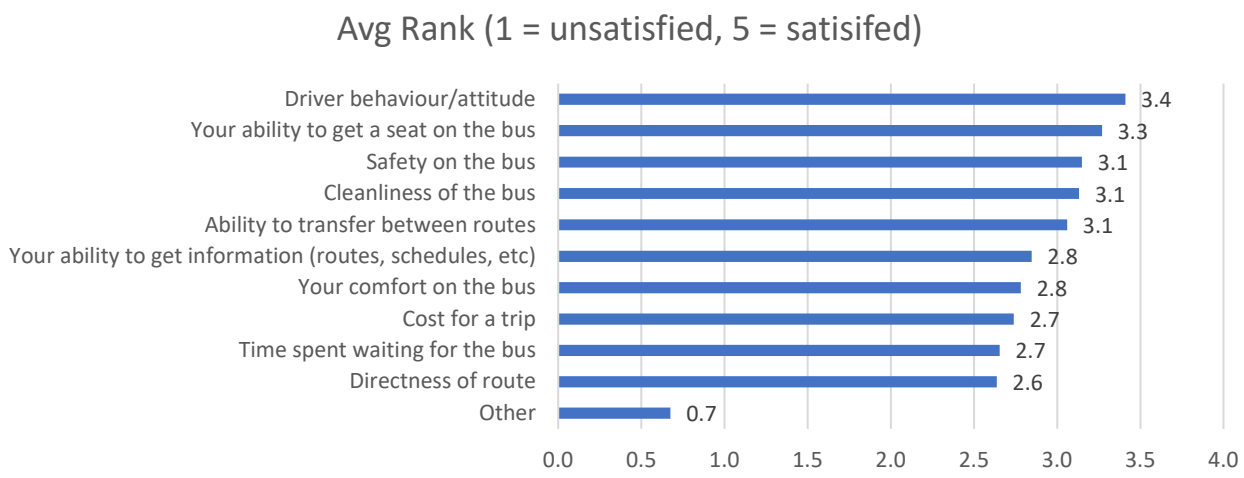


Figure 29: Average satisfaction by component of the transit system

Overall respondents did not have a positive impression of the transit service as shown in Figure 28. Many comments related to the quality and comfort of the existing transit fleet whereby many respondents identified the

small buses as uncomfortable and dated. This contrasts with service satisfaction where there were more satisfied than dissatisfied users (although the most common response was 'neither satisfied nor dissatisfied' with the service) as summarized in Figure 29.

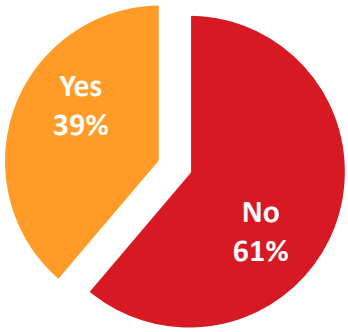


Figure 30: Proportion of respondents who has a positive impression of St. Thomas Transit

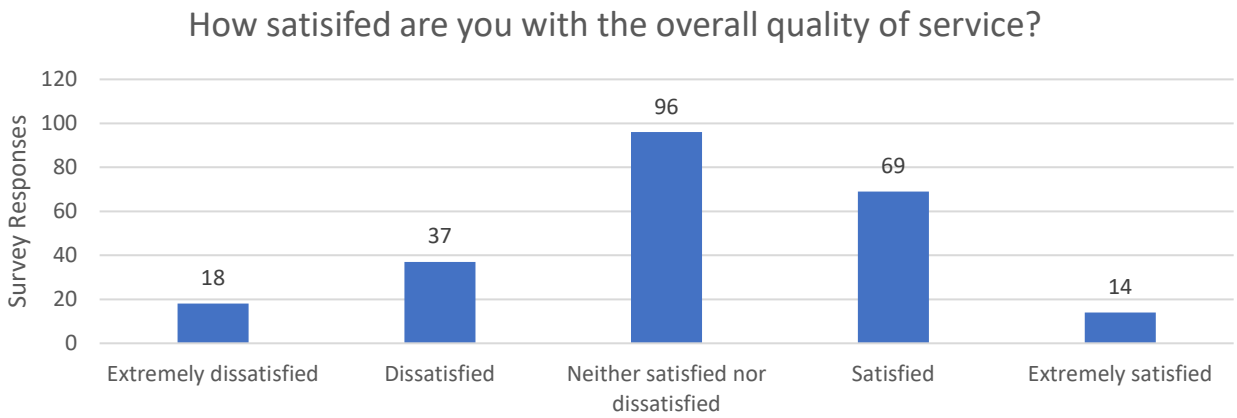


Figure 31: Respondent satisfaction with existing transit service

<u>Underserved Areas</u>

Survey respondents were able to identify under-served areas through an online mapping tool. Through this tool respondents identified areas that they perceived as underserved by the existing transit network by dropping points on a map. Section 7 contains heat maps, the first of which shows the areas that were identified as underserved, with dark shades representing areas that were perceived as underserved by multiple respondents.

The industrial lands in the northeast and the residential neighbourhoods in the southeast were identified as prime underserviced areas. The existing network just serves the exterior borders of these zones along Burwell Road and Fairview Avenue. The employment lands hold over 64% of the city's jobs but have minimal to no transit service. The neighbourhoods around the intersection of Wellington and First Avenues have also been flagged as underserved areas though they are serviced by multiple routes including the Hospital, Express Commercial and the South Student

Express routes. This could be a reflection of the fact that a number of transit user households are located around this interaction and perceive the 30-minute headways as a poor service standard. The Lynhurst neighbourhood outside the city boundary has been identified as an underserved area by several respondents living in that neighbourhood. The Country of Elgin's administrative building and the area surrounding it is another pocket outside the city's boundary that has been discerned as an underserved area.

Work Areas

Work location and employment density is an essential component of transit service and having the ability to commute by transit (i.e. having a bus stop near one's work) is a strong predictor of transit ridership. The second figure contained within Section 7 shows a heat map of work locations of transit users. A large number of commuters that use public transit mostly work in the downtown core on the east end of Talbot Street which is well serviced by the Talbot and Express Commercial routes. Several transit users also work in the northeast of the city but have limited last mile connectivity resulting in longer walk times to and from the closest transit stops. Also, the pocket in the southern end outside the city boundary provides considerable employment but is not serviced by transit.

Recreation Areas

All recreational locations identified by the respondents are serviced by the current transit network and within a 400 metre walking radius from a transit stop. These identified locations include the Doug Tarry complex, YMCA, Barnes Park, Pinafore Park and Waterworks Park. Although these locations are served by transit, the absence of transit service on Sundays might restrict public transit users from accessing these locations on Sundays and holidays when most needed. A heat map of recreational areas is included as the third figure within Section 7.

School Areas

Survey respondents also identified school locations that the members of their household studied at. The fourth figure contained within Section 7 shows a heatmap of schools that were frequently identified. All identified locations with the exception of Mitchell Hepburn Public School are directly serviced by the existing transit network. Mitchell Hepburn Public School is at a 600-meter walking distance from the closest transit stop. The 5B North and South Student Express routes serve John Wise Public School, Parkside Collegiate Institute, Central Elgin Collegiate Institute, June Rose Callwood Public School, Monsignor Morrison Catholic School and Arthur Voaden Secondary School.

Medical Areas

For health services to be effective, patients must be able to access the care offered—which can be a particular challenge for low-income households and those completely dependent on public transit. Lack of connectivity by public transit to health service can result in missed appointments, and poor illness management even though care is readily available. The existing transit network provides good connectivity to various health services around the city as illustrated in the fifth figure of Section 7.

External Connections

Survey respondents identified London and Port Stanley as the two most desirable external connections for regional transit links as shown in Figure 30. Census data identifies that the City of London is an area where a significant number of St. Thomas residents work, whereas Port Stanley represents more of a recreational destination based on comments received, particularly for the beach during the summer months.

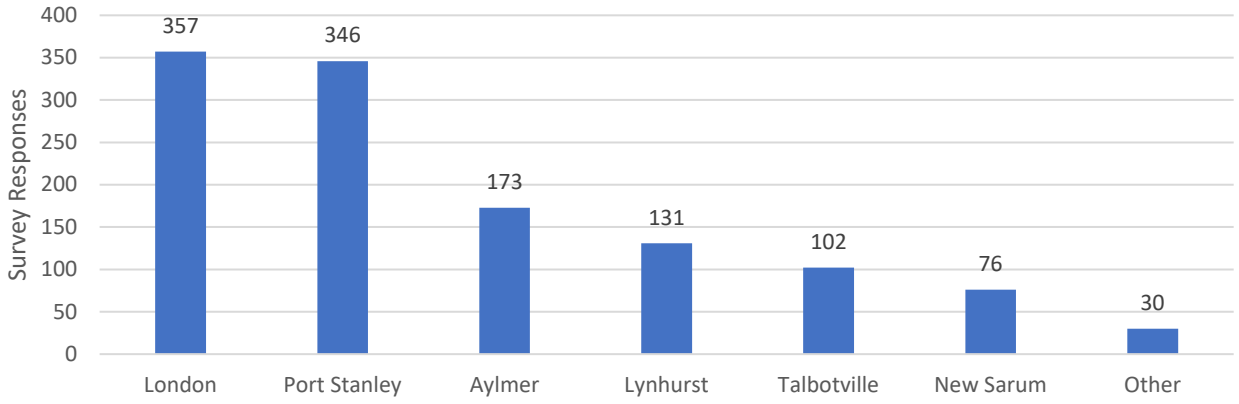


Figure 32: Preferred external community connection

Trade-Offs

Generally, respondents identified a desire for more frequent bus service even though it may require them to walk further to reach a bus stop as shown in Table 7. Conversely, it is important to note that although respondents would like to see service connecting to areas outside of St. Thomas, they would prefer not to see local service levels decline in order to accommodate it.

Table 7: Preference of Trade-Offs

Trade-Off	Avg Score <-Agree 1	2	3	4	Disagree-> 5
I would like the bus to take me to destinations outside St. Thomas (London, Lynhurst, etc), even though service levels within St. Thomas may be lower.					
I prefer bus service with longer service hours, even though my buses may come less frequently.					
I would like to bus to operate on Sunday, even though service levels on Monday-Saturday may be lower.					
Transit should get priority over vehicle traffic where it is feasible.					
I prefer shorter travel times, even though it may require me to transfer between bus routes.					
I prefer travelling on one bus (no transfer), even though my route may be indirect.					
I prefer frequent bus service, even though I may have to walk further to reach my bus route.					

Respondents identified a strong desire for later weekday and weekend transit service that extends beyond 6:45pm as shown in Figure 33. Several comments identified difficulties for riders that want to enjoy recreational activities within the City such as going to watch a movie or going out for dinner in the evening because the service ends early. This also presented challenges for riders who work retail or restaurant jobs that often end around 9pm or later.

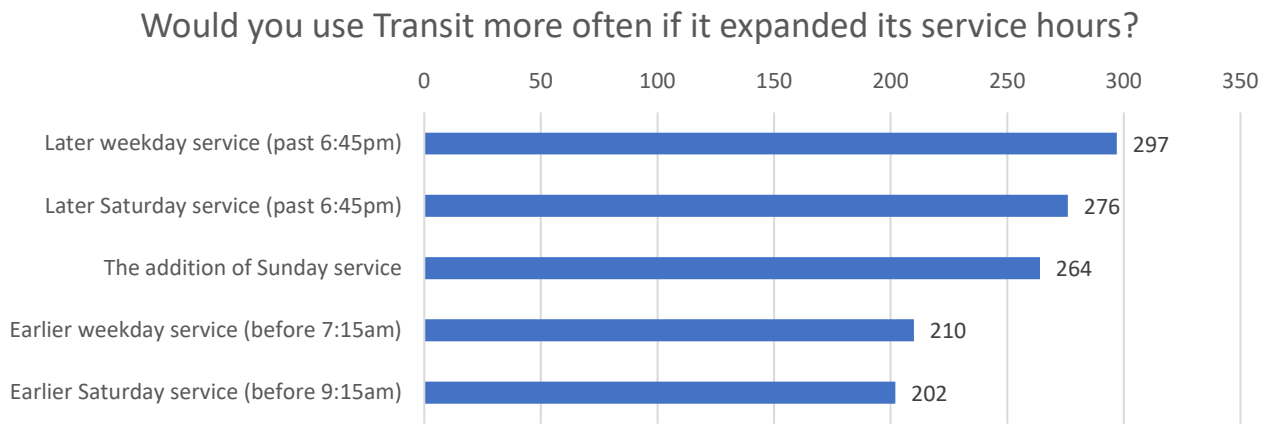
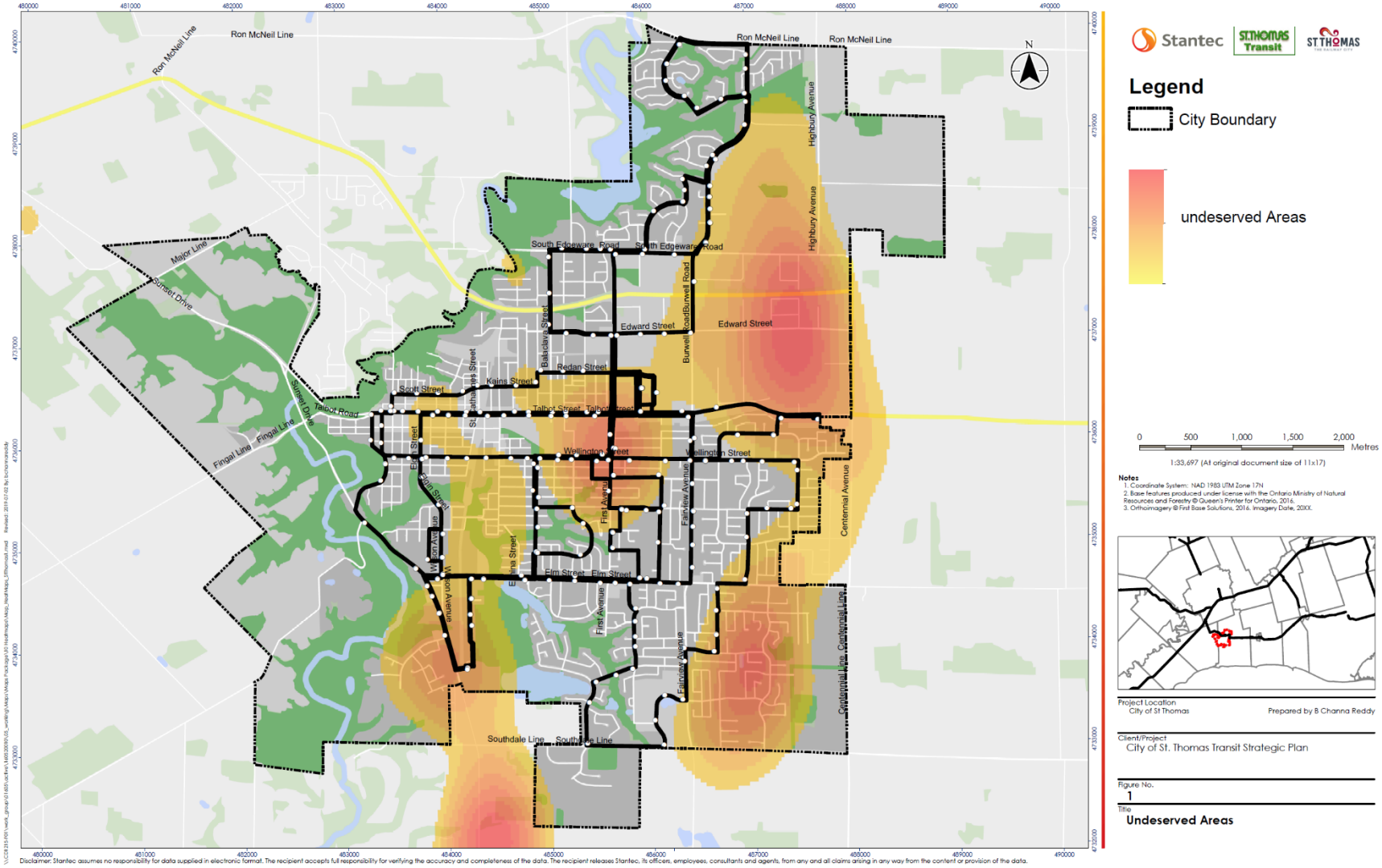
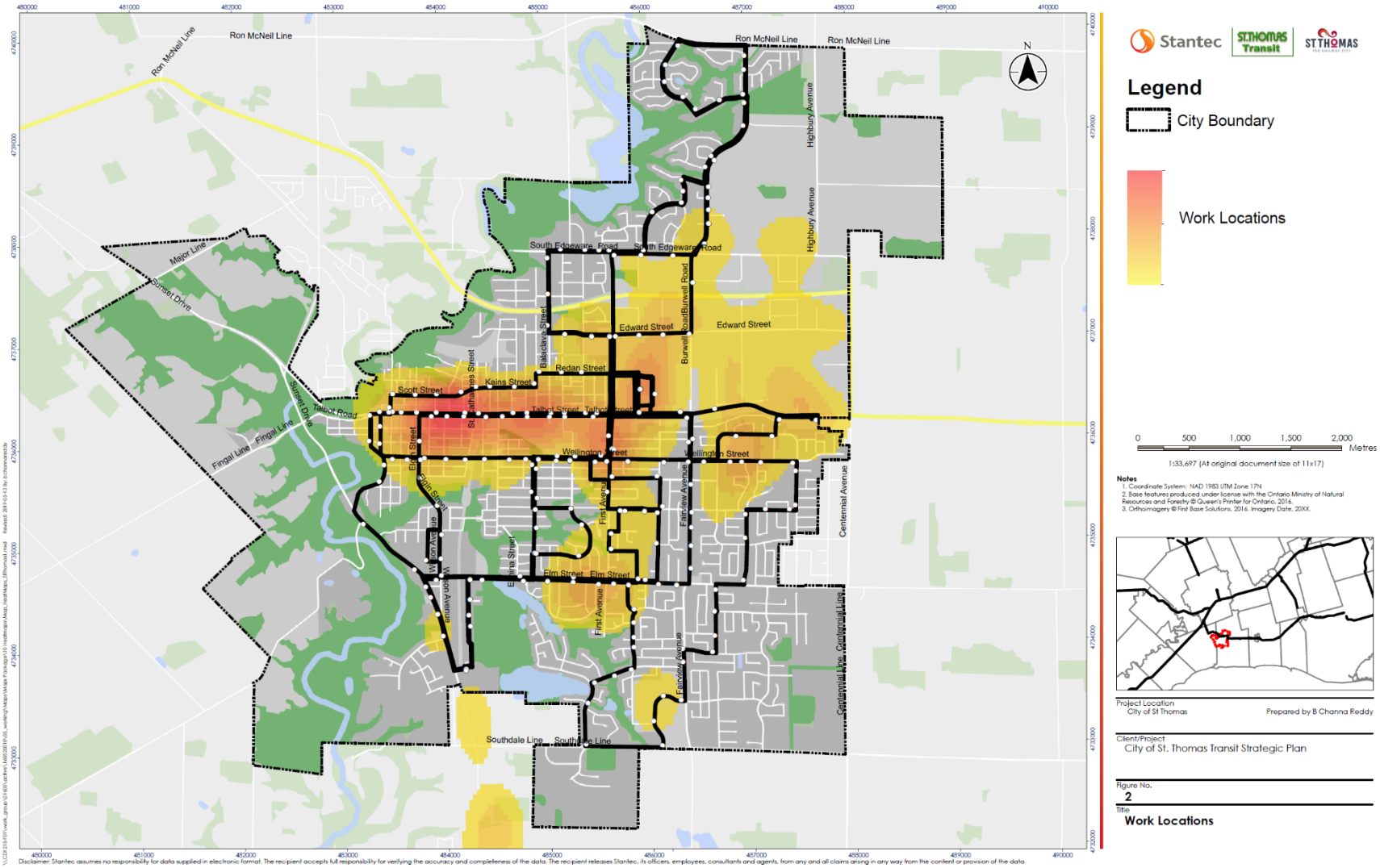


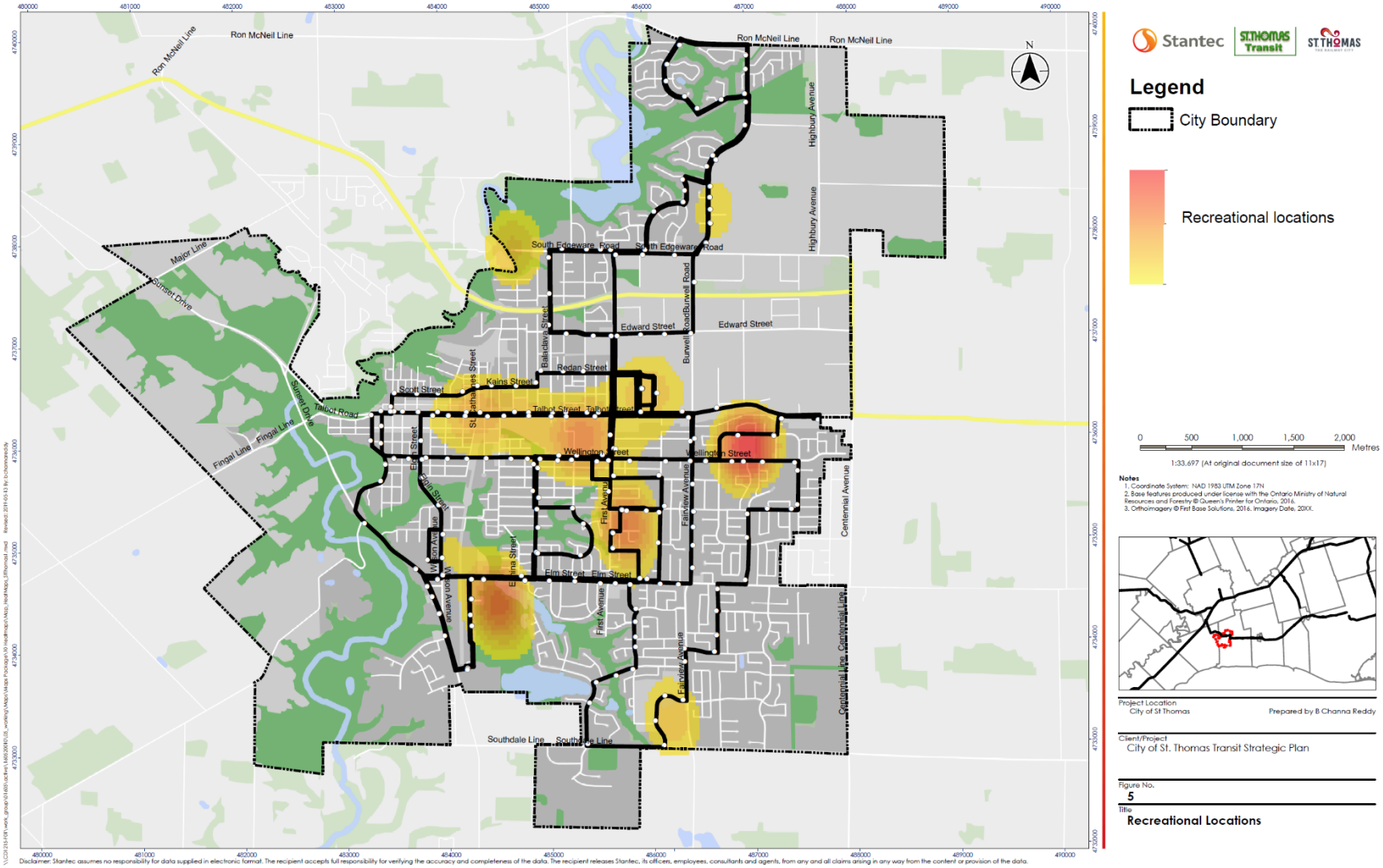
Figure 33: Preferred service expansion options

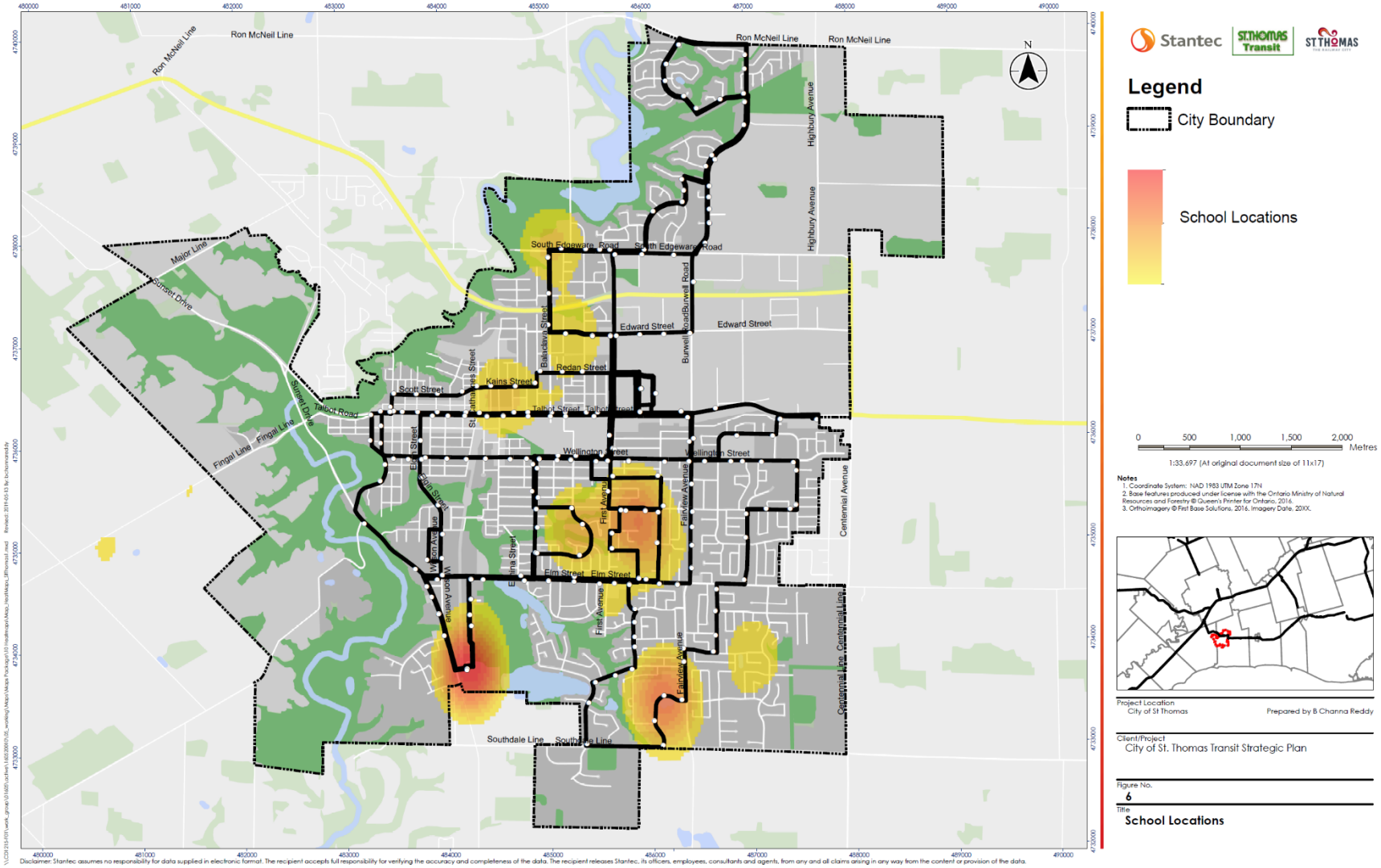
Reliability was the most important factor for survey respondents with several comments expressing frustration with regards to St. Thomas Transit's on-time performance. It is noted in Stantec's review of nextbus data that during the month of April 2019 when this survey was conducted, service was on time (defined as in between 0 and 5 minutes late) only 44% of the time, with service running early 24% of the time and late 32% of the time.

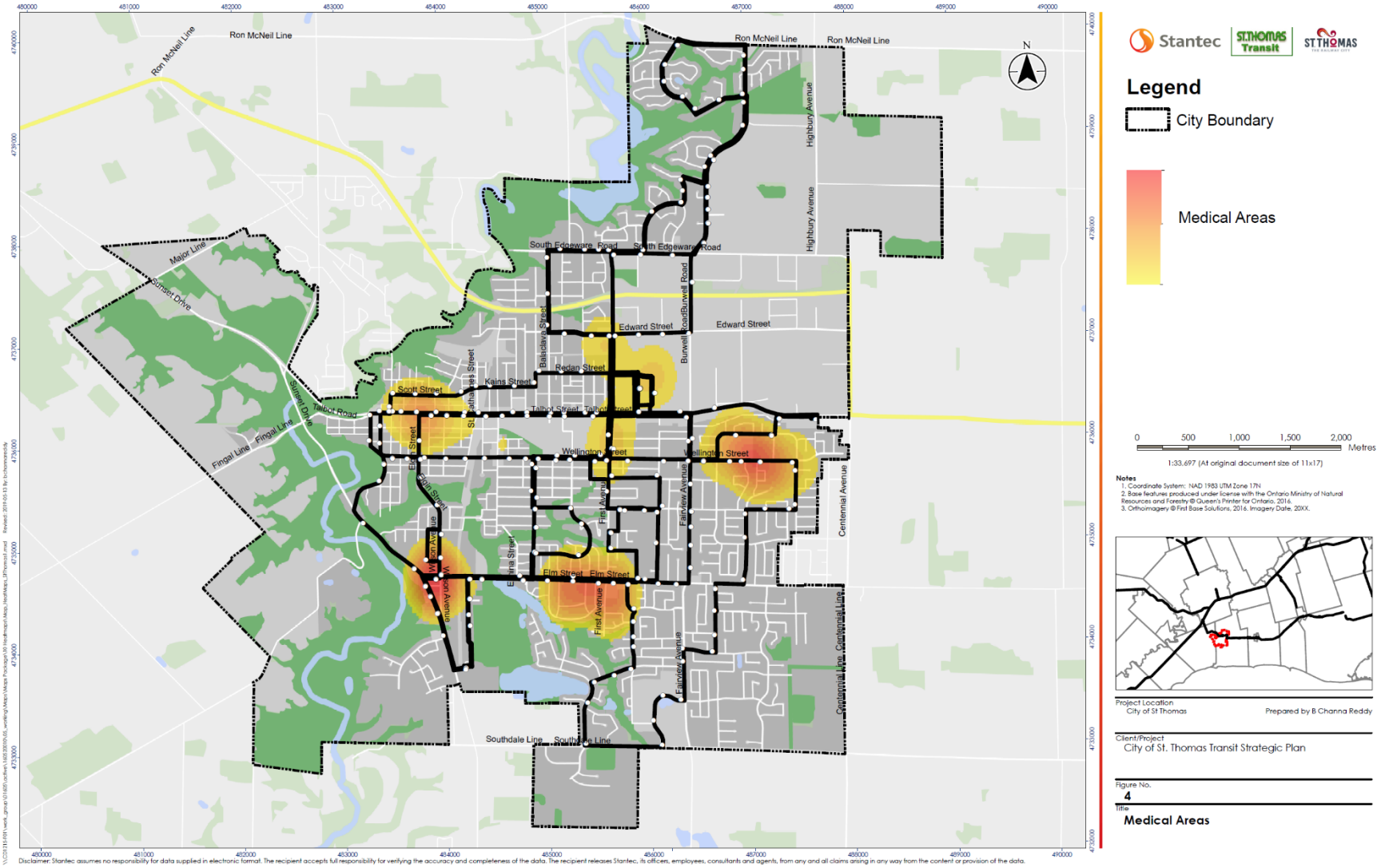
7.0 STAKEHOLDER ENGAGEMENT HEAT MAPS


Ron McNeil Line
Major Line
Sunset Drive
Fingal Line
Talbot Road
Scott Street
Kains Street
Redan Street
Balaclava Street
South Edgeware Road
Edward Street
Burwell Road
Highbury Avenue
Wellington Street
Elm Street
Elgin Street
Wilson Avenue
Elgin Street
First Avenue
Fairview Avenue
Centennial Avenue
Centennial Line
Southdale Line
N
Stantec
ST.THOMAS Transit
ST.THOMAS
Legend
City Boundary
undeserved Areas
0 500 1,000 1,500 2,000 Metres
1:33,697 (At original document size of 11x17)
Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 20XX.
Project Location
City of St Thomas
Prepared by B Channa Reddy
Client/Project
City of St. Thomas Transit Strategic Plan
Figure No.
1
Title
Undeserved Areas
Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

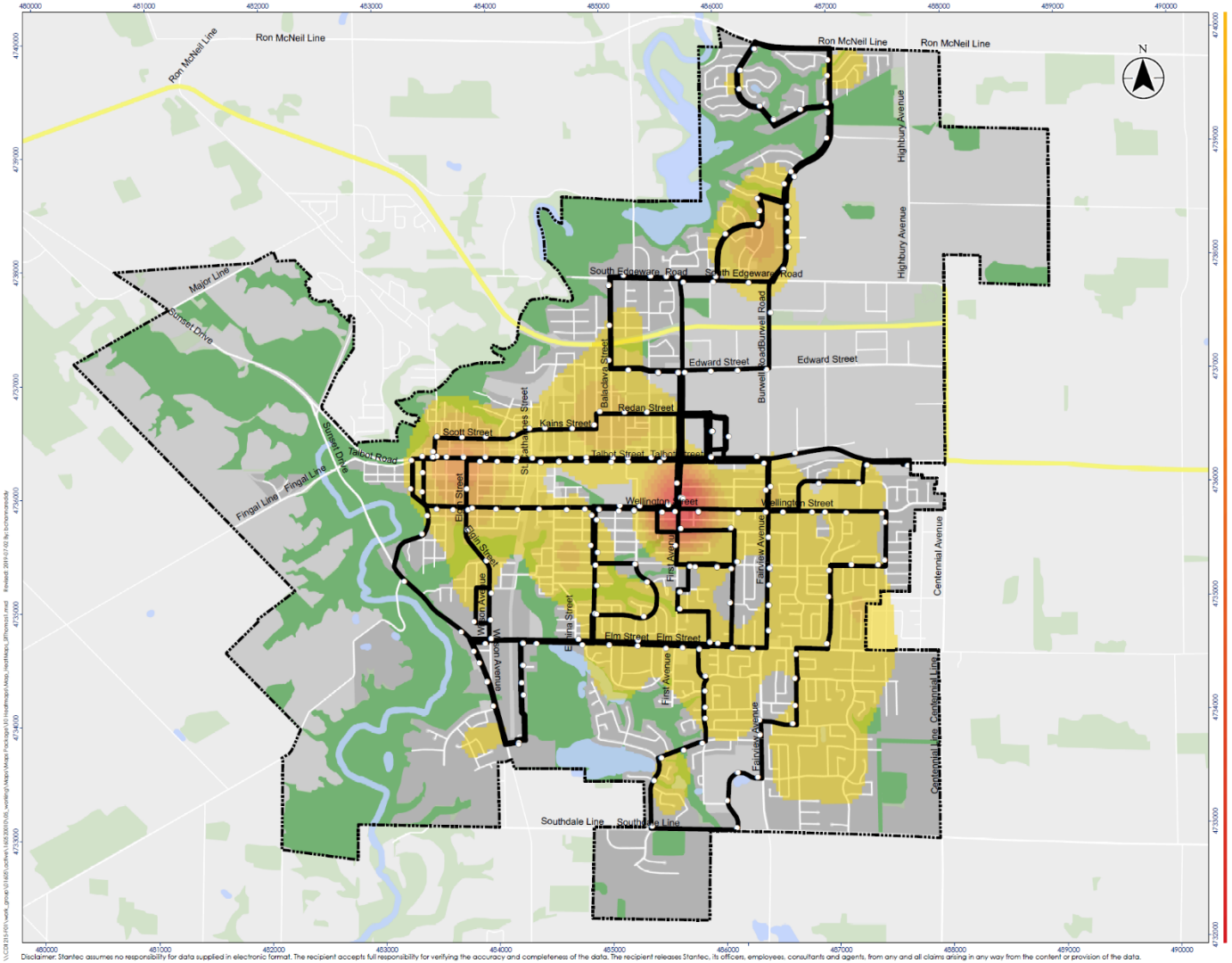

Ron McNeil Line
Major Line
Sunset Drive
Fingal Line
Talbot Road
South Edgeware Road
Edward Street
Burwell Road
Highbury Avenue
Redan Street
Scott Street
Kains Street
Talbot Street
Wellington Street
Elgin Street
First Avenue
Fairview Avenue
Centennial Avenue
Elm Street
Southdale Line
Legend
City Boundary
Work Locations
0 500 1,000 1,500 2,000 Metres
1:33,697 (At original document size of 11x17)
Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 20XX.
Project Location
City of St Thomas
Prepared by B Channa Reddy
Client/Project
City of St. Thomas Transit Strategic Plan
Figure No.
2
Title
Work Locations
Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.


Ron McNeil Line
Major Line
Sunset Drive
Fingal Line
Talbot Road
South Edgeware Road
Edward Street
Burwell Road
Highbury Avenue
Redan Street
Kains Street
Scott Street
Talbot Street
Wellington Street
Elgin Street
Elm Street
First Avenue
Fairview Avenue
Centennial Avenue
Centennial Line
Southdale Line
Stantec
ST.THOMAS Transit
ST.THOMAS
Legend
City Boundary
Recreational locations
0 500 1,000 1,500 2,000 Metres
1:33,697 (At original document size of 11x17)
Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 20XX.
Project Location
City of St Thomas
Prepared by B.Channa Reddy
Client/Project
City of St. Thomas Transit Strategic Plan
Figure No.
5
Title
Recreational Locations
Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.


Ron McNeil Line
Major Line
Sunset Drive
Fingal Line
Talbot Road
Scott Street
Kains Street
Redan Street
Edward Street
South Edgeware Road
Burwell Road
Highbury Avenue
Wellington Street
Elm Street
First Avenue
Fairview Avenue
Centennial Line
Southdale Line
Balaclava Street
Elgin Street
Wellington Avenue
Centennial Avenue
N
Legend
City Boundary
School Locations
0 500 1,000 1,500 2,000 Metres
1:33,697 (At original document size of 11x17)
Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date: 20XX.
Project Location
City of St Thomas
Prepared by B Channa Reddy
Client/Project
City of St. Thomas Transit Strategic Plan
Figure No.
6
Title
School Locations
Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



Stantec | ST.THOMAS Transit | ST.THOMAS

Legend

City Boundary

Household Areas

0 500 1,000 1,500 2,000 Metres

1:33,697 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 20XX.

Project Location
City of St Thomas

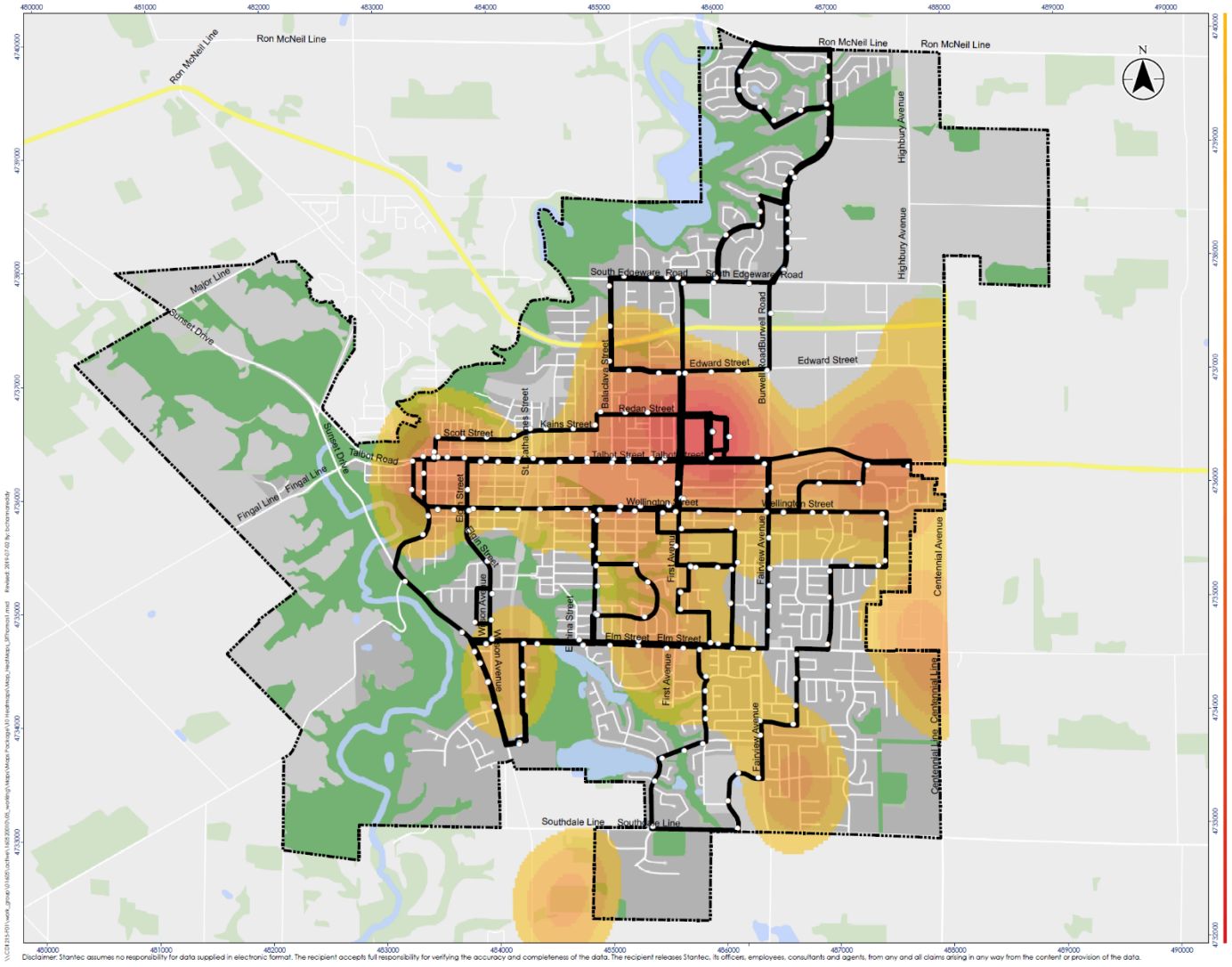
Prepared by B Channa Reddy

Client/Project
City of St. Thomas Transit Strategic Plan

Figure No.
7

Title
Household Areas

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



Stantec | ST.THOMAS Transit | ST.THOMAS

Legend

City Boundary

Problem Areas

0 500 1,000 1,500 2,000 Metres

1:33,697 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2016. Imagery Date, 20XX.

Project Location
City of St Thomas

Prepared by B Channa Reddy

Client/Project
City of St. Thomas Transit Strategic Plan

Figure No.
3

Title
Problem Areas

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.