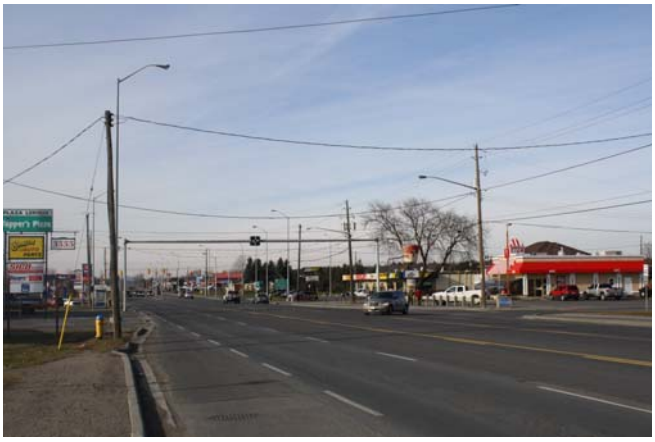

Sudbury

Revisit. Review. Revise.
Revisitez. Réexaminez. Révisez.
Official Plan Review • Révision du Plan officiel

Transportation Study Report

DRAFT
April 2015

MMM GROUP

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EXECUTIVE SUMMARY

Introduction

This Transportation Study Report is an update to the 2005 study. It proposes a sustainable transportation network for automobiles, pedestrians and cyclists that accommodates projected demands for the City of Greater Sudbury to the year 2031.

For the purposes of the Environmental Assessment process, this Transportation Study Report fulfils the requirements of a Transportation Master Plan (TMP). It covers Phases 1 and 2 of the Municipal Class EA process, which are:

- Phase 1 – Identify the problem (deficiency) or opportunity; and
- Phase 2 – Identify alternative solutions to address the problem or opportunity by considering the existing environment and establishing the preferred solution.

Two Public Information Centres (PICs) were conducted during the course of this study in order to obtain public feedback on existing conditions in Sudbury, future plans for the city and implementation of the Transportation Study Report.

This report highlights the proposed policy on "complete streets." 'Complete Streets' are accessible to all users, regardless of their chosen mode of transportation. The street network should be planned, designed, constructed and maintained to support transit, cyclists and pedestrians in addition to automobile and truck traffic. The elderly, adults, young and disabled should all be able to safely use the streets in a municipality. It is under the framework of "complete streets" that the analysis, supporting policies and recommendations have been developed.

Existing Transportation Conditions

The 2011 Census of Canada reported over 160,000 people and 67,000 households in Greater Sudbury, with an average household size of 2.4 persons. Historically, mining has played a major role in providing employment in Greater Sudbury. The sector continues to be an important source of jobs but has now been supplemented by service activities such as health care, education and public administration. Consultation was undertaken with industry representatives in January 2012 to understand current and projected truck flows associated with industry.

The main destinations for the travel flows out of the Sudbury city centre, in decreasing order of magnitude, are Nickel Centre, Valley East, Walden and Rayside-Balfour. The principal movements into the Sudbury city centre originate in Nickel Centre and Walden. Internal trips within the former City of Sudbury represent the majority of journeys in the Greater Sudbury area. Volumes associated with trips within Greater Sudbury but not starting or ending in the former City of Sudbury are relatively low. Please refer to **Section 2.2.2** for further details regarding these flows and how they relate to the road network.

Overall, desire lines within Greater Sudbury reflect that the former City of Sudbury constitutes the urban core of the municipality. Within that area, development has occurred along two major axes – north/south along Paris and Regent Streets, and east/west along the Kingsway and Lasalle Boulevard. Development of land use and the transportation network is constrained by the rugged topography, which includes rock outcrops.

Transit ridership data for the years 2003 through 2013 were examined to determine major transit passenger volumes in Greater Sudbury. Between 2003 and 2013, transit ridership has grown by 20%. The daily number of transit trips per capita increased by approximately 23%

between 2003 and the time of the last census in 2011. Over the same period, population in the City increased by only 3%. Transit ridership has increased significantly compared to population growth.

Traffic demand at multiple screenlines was determined using annual average daily traffic (AADT) and turning movement count data. During the a.m. and p.m. peak periods, all of the screenlines have an overall volume/capacity (v/c) ratio less than or around 0.8, which corresponds to the threshold of acceptable level of service. Individually, the westbound route of MR 24 at MR 55 and the southbound routes of Paris Street and Notre Dame Avenue have a volume to capacity (v/c) ratio of 0.97 (LOS E) at Walford Road and Elgin Street, respectively. The Kingsway was observed to be operating at capacity at Barry Downe Road, with at least one approach failing with a Level of Service F in the a.m. and p.m. peak periods.

Thirteen intersections were identified by the City of Greater Sudbury as being areas of concern. Capacity analysis was undertaken to evaluate the existing traffic operations and to determine the existing levels of service during the a.m. and p.m. peak hours. **Table 1** summarizes the critical movements (in terms of volume / capacity ratio and / or queue lengths) and gives recommendations that will improve the operation of the intersection for those movements. Please refer to **Section 2.2.6** for more details.

Table 1: Summary of Intersection Analyses

Intersection	Existing Critical Movements			Recommendations
	Movement (peak)	V/C Ratio	Percentile Queues 50th (95th)	
Main Street (M.R. 15) / M.R. 80	NB-L (p.m.)	1.08	~53 (#121)	• Optimize signal timings
Lasalle Boulevard / Barry Downe Road	EB-TT (p.m.)	0.89	91 (#135)	• Optimize signal timings
The Kingsway / Barry Downe Road	WB-TT (a.m.)	0.93	~108 (#187)	• Optimize signal timings
	SB-LL (p.m.)	0.86	53 (#85)	
	EB-LL (p.m.)	1.07	~127 (#180)	
The Kingsway / Silver Hills Drive	None	N/A	N/A	• N/A
The Kingsway / Bancroft Drive	EB-TT (p.m.)	0.90	173 (#282)	• Optimize signal timings
Bancroft Drive / Second Avenue	None	N/A	N/A	N/A
Lloyd Street / Brady Street	None	N/A	N/A	N/A
Lloyd Street / Elm Street / Notre Dame Avenue / Paris Street	None	N/A	N/A	N/A
Paris Street / Brady Street	WB-LL (a.m.)	1.04	~90 (#158)	• Optimize signal timings
	WB-LL (p.m.)	0.93	~73 (#131)	
Douglas Street / Regent Street	WB-LTR (p.m.)	1.08	-- (--)	• Introduce traffic signal control • Provide exclusive EB/WB left turn lanes
Ramsey Lake Road / Paris Street	NBR (a.m.)	1.01	~142 (#216)	• Optimize signal timings
	WB-R (p.m.)	1.07	~141 (#153)	
Regent Street / Paris Street (Four Corners)	None	N/A	N/A	N/A
M.R. 24 / M.R. 55	EB-L (a.m.)	0.91	31(#77)	• Provide new northbound right turn lane

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.
~: Volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

Transportation Planning Context

A number of documents provide the context for the Transportation Study Report. These include:

- Provincial Policy Statement;
- Growth Plan for Northern Ontario;
- Official Plan;
- Growth Outlook to 2036;
- Synthesis / Land Use and Settlement Report;
- Sustainable Mobility Plan;
- Bicycling Technical Master Plan;
- Economic Development Strategic Plan for Greater Sudbury 2020;
- Downtown Sudbury: A Plan for the Future;
- Pedestrian Crossing Policy Report; and
- Trails for Active Transportation.

These documents have been reviewed and considered in the development of this report. See **Sections 3** and **5.3** for more details.

Transportation Vision Statement, Principles, Objectives, and Process

The City's Official Plan casts a vision for Greater Sudbury as a modern and vibrant city that is healthy, sustainable and green. Greater Sudbury is open for business with the downtown core acting as the hub of this dynamic city. The vision for the Transportation Study Report is to support this city-wide vision through the development of a sustainable, multi-modal transportation system that provides mobility options to all residents and the necessary infrastructure to support economic activity and daily life.

There are three main principles guiding the development of the future transportation network:

- **Healthy communities** with on- and off-road networks that facilitate active transportation, such as cycling and walking, and that consist of 'Complete Streets' that are designed, constructed and maintained to support all users and all modes of transportation;
- **Sustainability** based on integrated transportation and land use planning that minimizes the use of private automobiles and, in particular, the number of single-occupant vehicle trips; and
- **Economic vitality** associated with reduced congestion on roads so that people and freight can access destinations with limited delay.

The objectives of this study are to develop a comprehensive plan that supports the transportation vision and principles through:

- Improvement of the existing road network;
- Enhancement and expansion of active transportation facilities; and
- Incorporation and development of additional transportation policies.

The purpose of the document is to present background information, policy changes and network improvements to be considered during the process of creating a new Official Plan. As part of the EA Master Plan process, the following problem/opportunity statement has been developed to encapsulate the Transportation Study Report:

Sudbury's current transportation system needs to be enhanced to address current deficiencies, and to accommodate growth in population, employment and commercial activity to the horizon of 2031. Developing a multi-modal system is a key component of that change; multi-modal mobility is also needed to address the directions set by the Province and by City Council, reflecting greater sustainability and intensification. Sustainability must encompass the goals of an active community, a healthy environment and economic vitality.

Key opportunities in Sudbury related to these needs include:

- *Creating transportation choices to better support biking, walking, and transit;*
- *Implementing short-term solutions for intersections and corridors of traffic congestion;*
- *In the longer term, creating a transportation network which offers more direct routings; and*
- *Providing the transportation network needed to support intensified land use in designated growth areas.*

This statement was reviewed with attendees of the first Public Information Centre.

Active Transportation: Cycling and Walking

Municipalities across Ontario are implementing initiatives to encourage active transportation (AT) as a viable alternative to the private automobile for short-distance trips and as a method of promoting a more active and healthy lifestyle. Active transportation brings health and fitness, mobility, environmental, economic and tourism benefits.

One of the key inputs into development of the recommended AT route network for the City of Greater Sudbury was a set of network planning guiding principles. These state that active transportation facilities should be visible, connected, integrated, attractive, varied, accessible, sustainable, context sensitive and cost effective. These principles were developed by the study team and reviewed with the public and key stakeholders. They guided the initial stages of the route selection process.

By adopting the Transportation Study Report and its active transportation mandate, the City of Greater Sudbury has the opportunity to create an environment that is supportive of all modes of transportation including walking and cycling. Infrastructure such as sidewalks, trails, bike lanes, benches and sign treatments all contribute to an improved active transportation system, but these alone will not produce a fully supportive system for the City. It is recommended that programs be put in place to support active transportation. These should focus on education, encouragement, enforcement, partnerships and support features. Please refer to **Section 5.4** for details.

Future Transportation Needs

The following steps were undertaken to determine future transportation needs and the preferred transportation alternative to address these needs:

- Forecasting population and employment for the ultimate horizon year (2031);
- Identifying strategic alternative road networks for testing;
- Producing a list of projects for each alternative;
- Running each alternative in the transportation model;
- Comparing system metric outputs computed by the model to evaluate the performance of the network for each alternative, such as: volume to capacity ratio; vehicle kilometres traveled; vehicle hours traveled, emissions and cost;

- Reviewing each alternative in light of the Transportation Principles: healthy communities, sustainability and economic vitality; and
- Select the preferred strategic alternative.

Transportation Planning Alternatives

As part of Phase 1 of the Municipal Class EA process, a transportation master plan must determine problems or deficiencies and then identify and test alternative solutions to address them. In Phase 2, the alternatives are evaluated and a preferred alternative selected.

In this case, three alternatives were considered:

- 'Do Nothing': existing transportation network + projects under construction;
- 'Auto Focused' approach: 'Do Nothing' + transportation projects that are primarily aimed at increasing roadway capacity for private motor vehicles, such as road widening or new road construction; and
- 'Sustainability Focused' approach: 'Do Nothing' + transportation projects that also promote other modes, such as transit, sustainability, active transportation and infill development.

In the 'Do Nothing' alternative, the main destinations for the travel flows out of the Sudbury city centre, in decreasing order of magnitude, are Nickel Centre, Valley East, Walden and Rayside-Balfour. As per the existing conditions analysis, the principal movements into the Sudbury city centre originate in Nickel Centre and Walden. Internal trips within the former City of Sudbury represent the vast majority of journeys in the Greater Sudbury area. Volumes associated with trips within Greater Sudbury but not starting or ending in the former City of Sudbury are relatively low. For significant flows, the greatest change in traffic volume relative to the existing conditions is approximately 10%, with the exception of the inbound movement from Walden into the Sudbury city centre which is expected to increase by around 30% due to forecast increases in employment along and to the north of the M.R. 55 corridor west of M.R. 24. Please refer to **Section 7.1.1** for further details regarding these flows and how they relate to the road network.

This 'Auto Focused' alternative includes projects identified in Schedule 6 of the Official Plan and the 2005 Transportation Study Report. The candidate proposals involve widening some existing roads to ease congestion on the following corridor sections:

- Notre Dame Avenue (MR 80) from Main Street to Kathleen Street;
- Maley Drive from Barry Downe Road to Falconbridge Highway;
- Falconbridge Highway from Maley Drive to Garson Coniston Road;
- Second Avenue from Donna Drive to Scarlett Road;
- Barry Downe Road from Westmount Avenue to the Kingsway;
- The Kingsway east of Lloyd Street;
- Howey Drive from Elgin Street to Bancroft Drive;
- Ramsey Lake Road from Health Sciences North Road to South Bay Road;
- Maley Drive from Lasalle Boulevard to MR 35; and
- MR 35 from MR 15 to Notre Dame Street East.

Some new roads are proposed for construction. Silver Hills Drive (from Bancroft Drive to Marcus Drive), Remington Road (from its current terminus to Gateway Drive), Montrose Avenue extension (north extension to Maley Drive extension and south extension to Hawthorne Drive and Notre Dame Avenue) and Martilla Drive (current terminus to Paris Street) are development-driven. City-driven projects include the creation of new bypasses as well as shorter links to offer more direct routings:

- Maley Drive extension from Lasalle Boulevard to Barry Downe Road;
- Ste. Anne Road extension to College Street;
- Larch Street extension between Elgin Street and Lorne Street;
- Garson connection proposed between Falconbridge Highway and Maley East Bypass;
- Big Nickel Drive connections to Southview Drive;
- Barry Downe Extension from Maley Drive to Main Street and Bodson Drive;
- South Bay Road Extension; and
- Maley East Bypass.

It is recommended that Environmental Assessments be conducted to determine the optimal corridor for the South Bay Road extension and the Maley East Bypass. In the latter case, the final alignment is to be determined in conjunction with the Ministry of Transportation of Ontario (MTO).

The modelling analysis indicates that these improvements will encourage residents to drive greater distances. This negates some of the capacity increases arising from the proposed projects and relocates capacity 'pinch points' to other parts of the network where physical constraints prevent the widening or construction of road links. Please refer to **Section 7.1.2** for the detailed network capacity analysis.

The third 'Sustainability Focused' alternative is a refinement of the 'Auto Focused' alternative that concentrates on improvements that can enhance the sustainability of the City's transportation network. To determine which projects to include in the 'Sustainability Focused' alternative, the candidate road improvements were considered individually through a Multiple Account Evaluation. This assessed whether the projects:

- Enhance network connectivity, by increasing the number of routing options available such that the average distance travelled between given points in the network is reduced;
- Relieve congestion and thus improve the relative ease of travel through the network and access to truck and commuter corridors;
- Have minimal impact on environmentally-sensitive areas or involve road construction on land that is designated for development; and
- Are cost effective relative to alternative options.

The aforementioned Accounts reflect the Project Principles. Following the evaluation, all projects in the 'Auto Focused' alternative were included, except for:

- South Bay Road extension;
- Garson connection proposed between Falconbridge Highway and Maley East Bypass;
- Big Nickel Drive connections to Southview Drive; and
- Barry Downe Extension from Maley Drive to Main Street and Bodson Drive.

By limiting the extent of new road projects and reallocating resources to create a balanced multi-modal system, the 'Sustainability Focused' alternative aims to provide the most beneficial solution to the Problem Statement and its related opportunities. It is also the alternative that most closely resembles the recommended option from the 2005 Transportation Study Report, which is to improve the transportation system through the betterment of both the road network and increased use of transit systems, ridesharing, bicycling and walking. Please refer to **Section 7.1.3** for the analysis of the road network performance, and to **Section 8** for details of the recommended active transportation network that will cater to biking and walking.

In addition to the network analysis, the evaluation of each alternative considered system metrics related to network performance, as shown in **Table 42** in **Section 7.3.2**. Relevant Project and Transportation Principles are identified.

While the 'Do Nothing' alternative shows fewer daily vehicle kilometres travelled (VKT) per capita than the 'Auto Focused' or 'Sustainability Focused' alternatives, the daily vehicle hours travelled (VHT) is much higher. This shows that in the absence of new road projects, congestion will increase and people will spend more time in traffic.

In the 'Sustainability Focused' alternative, the number of vehicle kilometres traveled and the vehicle hours traveled (both in per capita and absolute terms) is lower than for the 'Auto Focused' alternative, indicating that residents are commuting over shorter distances on average and are more likely to stay within their home area. They also are spending less time on the road. Although the absolute number of vehicle kilometers travelled is higher in the 'Sustainability Focused' alternative than in the 'Do Nothing' alternative, the total vehicle hours for the 'Sustainability Focused' alternative is lower than the 'Do Nothing' alternative.

Congested lane kilometres is greatest in the 'Sustainability Focused' alternative, however, the percentage of lane kilometres that is congested, 4.5%, is a very small percent of the overall road network.

The Sustainability Focused alternative balances road investments and achieves reasonable average travel times in the p.m. peak hour. This alternative exhibits the lowest number of vehicle hours traveled per capita of the three alternatives and exhibits fewer vehicle kilometres traveled and vehicle hours traveled than the Auto Focused alternative. Implementation of the Sustainability Focused alternative would be expected to result in the best overall network performance.

The 'Sustainability Focused' alternative was selected as the preferred transportation alternative. This is based on both the System Metrics Evaluation outlined in **Section 7.3.2** and the link-based network performance analysis in **Section 7.1.3**. When combined with the Active Transportation strategies detailed in **Section 8**, this alternative provides the best opportunity for satisfying the Problem Statement identified in **Section 4.4**.

There are multiple road projects recommended for construction by the year 2031, some of which have generated considerable public debate. These include Maley Drive, the South Bay Road extension, Municipal Road 80 and the Montrose Avenue extension. Each of these road projects is discussed in **Section 7.5** in order to present the pertinent issues and to better explain the rationale for the recommended action.

Even with the implementation of the projects in the recommended 'Sustainability Focused' alternative, some links are predicted to operate with a volume-to-capacity ratio over 0.8. This is generally due to the topographical constraints associated with Greater Sudbury's rugged terrain, which limits the number of available and potential entry points into the Sudbury city centre.

There are two ways to reduce volume/capacity ratios: if increasing capacity is not feasible, this may be achieved by reducing traffic volumes. Encouraging active transportation, as outlined in **Section 8**, will have an effect. However, it is not anticipated that the numbers of drivers transferring to cycling and walking modes will be sufficient on its own. Consequently, it is recommended that a Transit Master Plan be undertaken to build upon this Transportation Study Report and to investigate opportunities and quantify the potential benefits of improved public transit for the transportation network as a whole.

Cycling and Pedestrian Master Plan

One of the primary objectives of the City of Greater Sudbury Cycling and Pedestrian Master Plan is to develop a continuous and integrated cycling and pedestrian network of safe recreational and utilitarian routes. It builds upon, connects and supports existing and planned local regional routes and facilities such as the Rainbow Routes and Trans Canada Trail.

The recommended cycling and pedestrian network for the City of Greater Sudbury is illustrated in **Figure 67** through **Figure 71** in **Section 8**. It features multiple facility types, including bike lanes, cycle tracks, signed bike routes (with paved shoulders in rural areas and some urban areas) and multi-use trails. **Figure 72** through **Figure 76** illustrate the recommended cycling and pedestrian network by implementation phase. These phases, and their general durations, were identified as 'short term' (up to 5 years), 'medium term' (5-10 years) and 'long term' (11-15 or more years).

Policies to Support the Preferred Transportation Alternative

A number of policies have been developed as part of the Transportation Study Report to help facilitate the development of a more interconnected, multi-modal transportation network in the city. These policies support the preferred transportation alternative and include:

- Complete Streets;
- Road Classifications;
- Appropriate Implementation of Urban Cross Sections; and
- Sidewalk Priority.

Recommendations in the context of the planned road and active transportation improvements have been made for public transportation, Greater Sudbury Airport and rail. The policies and recommendations are described in more detail in **Section 9**.

Transportation Study Report Implementation

Based on the analysis of the three transportation planning strategies, the 'Sustainability Focused' alternative is preferred. The implementation of the projects will be phased over the following general horizons:

- Short term: generally within the next 5 years;
- Medium term: generally within 6 – 10 years; and
- Long term: generally within 11 – 15 or more years.

There also are a number of roads that are considered to be development-driven in that the roads are not needed unless development occurs. These roads have been included in the transportation model and are assumed to be constructed by the year 2031.

The recommended phasing of short, medium, long term and development-driven road improvements is outlined in **Table 48** through **Table 51** in **Section 10**. It is also displayed in **Figure 82** for the overall city and **Figure 83** through **Figure 86** for specific communities within the city.

Recommendations

The recommendations of the Transportation Study Report have been summarized and grouped into the following categories:

- Road improvements;
- Supporting active transportation;
- Active transportation implementation; and
- Transportation policies.

The recommendations will be incorporated into the ongoing Official Plan Review. The existing Official Plan language has been updated based on Transportation Study Report recommendations. Changes to the transportation chapter of the Official Plan have been included in **Appendix I**.

Road Improvements

Short Term (generally the next five years)

Construction for:

- Maley Drive extension and widening
- Ramsey Lake Road widening (pending results of Environmental Assessment)
- MR 35 widening
- Notre Dame Avenue (MR 80) widening
- The Kingsway widening
- Second Avenue widening

Intersection improvements for:

- Signalize the intersection of Douglas Street at Regent Street

Medium Term (generally the next six to ten years)

- Maley Drive widening
- Barry Downe Road widening
- Howey Drive widening

Larch Street extension

Monitor traffic volumes at the following intersections:

- Lloyd Street/Elm Street at Notre Dame Avenue/Paris Street
- Paris Street at Brady Street

Long Term (generally 11 or more years)

- Falconbridge Highway widening
- Maley Drive East By-pass construction
- Ste. Anne Road extension

Development-driven Roads (generally by 2031)

- Montrose Avenue North extension
- Montrose Avenue South extension
- Silver Hills Drive road construction
- Remington Road extension
- Martilla Drive extension
- John Street extension

Supporting Active Transportation

- The City should consider utilizing educational programming and materials to promote and inform people of the benefits of active transportation as it relates to community health and fitness, transportation, environment and sustainability, economy and tourism.
- Develop and distribute newsletters and educational materials to promote and educate the public on active transportation opportunities, recommendations for routes and destinations and updates on available routes.
- The City should consider the implementation of educational programs on walking and cycling and partner with interested other agencies, not-for-profit organizations and school boards.
- The City should explore community-based social marketing as a means of encouraging people to adopt more sustainable transportation habits, including walking and cycling. Tools such as those outlined in Table 29 can be used to develop a community-based social marketing program.
- The City and local organizations should develop a comprehensive approach to encouraging students and employees to walk or cycle to school or work and combine these modes with public transit for longer distance trips.
- The City should explore partnerships with local public and private organizations and integrate end-of-trip facilities into active transportation and trail promotional strategies and initiatives.
- The City should further promote active transportation and multimodal activities through the production of Active Transportation maps that also include transit information. City staff should work with local cycling and hiking groups and update the maps at least every two years to ensure new routes and connections are shown.
- Consider transportation operational measures in the future as part of the transportation system management to support safe and convenient AT movement and trail use. These measures may include:
    - Exempting cyclists from turn prohibitions at intersections, such as ‘No Right Turn on Red’;
    - Installing bicycle detection at intersections such that traffic signals recognize and react to cyclists on sideroads, particularly where motorized traffic is infrequent; and
    - Enforcing speed limits on roadways where observed speeds exceed acceptable levels.
- Enforcement activities from the Greater Sudbury Police should focus on issues related to the misuse of bicycle and pedestrian facilities, particularly sidewalk obstruction and the inappropriate use of trails.
- The City should work with the Greater Sudbury Police in the development and delivery of cycling and walking-related safety programs.

- The City should develop partnerships with outside agencies, volunteer groups, individuals as well as regional representatives to promote and educate residents on active transportation use throughout the City.
- The City and its respective partners should make the development of support facilities such as bicycle parking, showers and change rooms, rest areas, washrooms and waste receptacles a priority during the planning and implementation of active transportation facilities.

Active Transportation Implementation

Short Term (Generally the next five years)

- The City of Greater Sudbury should adopt the AT network implementation plan and use it to guide the implementation of the network over time.
- The City of Greater Sudbury should take the lead in establishing an Inter-Municipal Active Transportation Working Group including but not limited to staff representatives from the City, Sudbury District Public Health Unit and other key agencies as determined.
- The City of Greater Sudbury should continue to work with representatives from local advocacy groups, citizens-at-large, local businesses and other key groups as determined to further active transportation goals and objectives.
- The City of Greater Sudbury should coordinate the AT network implementation with the City's Roads and Transportation Services Department as well as the Community and Strategic Planning Department and other departments.
- The City of Greater Sudbury should explore the development of the role of an Active Transportation coordinator who would be responsible for the "championing" of AT related issues, initiatives and programming throughout the City. This role could be a new full-time position at the City.
  The Active Transportation Coordinator would be responsible for the implementation of the AT network and would provide updates on the progress of the study when necessary to stakeholders and interest groups.
- The AT Plan should be reviewed and given consideration when road improvements and other capital infrastructure projects are programmed.
- As part of demonstrating leadership, the City should provide bicycle parking facilities at public buildings under their ownership.
- The City, in partnership with local partners should investigate the potential to develop a bicycle parking program whereby bicycle racks would be installed in locations where there is a demonstrated need for bicycle parking facilities.
- The City should adopt the proposed network phasing strategy as the guide for implementing the AT network.
- In addition to capital funding, the City of Greater Sudbury should explore other outside partnerships, cost-sharing and funding opportunities for the implementation of the AT Network.

Medium Term (generally the next six to ten years)

- The City of Greater Sudbury should recognize that future refinement of the proposed AT network will be required. This is consistent with a goal of ensuring that the plan is flexible and can respond to changes and new opportunities.

Long Term (generally 11 or more years)

- As an interim solution in advance of future road improvements to install cycle tracks, the City of Greater Sudbury should modify current by-laws to continue to restrict cycling on sidewalks for adults but not prohibiting cycling on paved portions of boulevards where it is safe to do so.

Transportation Policies

Transportation policy recommendations are summarized in this section and described in more detail in Chapter 9. Transportation policies include:

- Complete Streets;
- Road classifications;
- Rural to urban conversion;
- Sidewalks;
- Public transportation;
- Greater Sudbury Airport; and
- Rail.

Complete Streets Policy

- Implement a "Complete Streets" policy so that the transportation network is designed, constructed, operated and maintained for all transportation users and all modes of transportation.

Road Classifications

- Revise the road classifications to include direction on transit, cycling and pedestrian provision, as detailed in Section 9.2.1.
- Adopt revised road cross sections as detailed in Section 9.2.2.

Rural to Urban Conversion

- Adopt the rural to urban conversion criteria outlined in Section 9.3.

Sidewalk Policy

- Finalize a Sidewalk Policy as detailed in Section 9.4.

Transit

- Develop a Transit Master Plan to leverage the road and active transportation plans recommended in the Transportation Study Report.

Greater Sudbury Airport

- Implement road improvements that will improve travel time and access to Greater Sudbury Airport.

Rail

- Should the rail companies consider the relocation of rail lines or rail yards, the City should work with them throughout the relocation process.

Roundabouts

- Develop roundabouts guidelines that could be used to help determine the appropriateness of installing roundabouts at new intersections in the city, or at existing intersections where the method of traffic control is being reconsidered.

1 INTRODUCTION

1.1 Purpose of the Study

The primary purpose of this study is to produce a Transportation Study Report that defines a sustainable transportation network for automobiles, pedestrians and cyclists that accommodates projected transportation demands to the year 2031 for the City of Greater Sudbury. The transportation system recommended in the report integrates the transportation infrastructure requirements of existing and future land use with the community planning vision and objectives of the City for healthy communities, sustainability and economic vitality. The recommendations from this report should be incorporated into the City's Official Plan Review process that is underway concurrent with the development of this Transportation Study Report.

The City's most recent Transportation Study was conducted in 2005. This included the larger City boundaries and anticipated the impacts of new retail "big box" developments, educational institutions and hospital expansion on the transportation network. Since 2005, Greater Sudbury has witnessed these and other changes; all are addressed in the report, which provides a vision of 'sustainable mobility' that can accommodate vehicles, cyclists and pedestrians in a healthy community. The report aligns with and will be included as part of the City's Official Plan. It accounts for the shift from transporting goods by rail to a focus on truck transportation and how this change will impact Greater Sudbury's streets. It also recognizes economic activity and travel demands associated with new mining activity in Greater Sudbury.

1.2 Conformance to Municipal Class Environmental Assessment Process

The *Municipal Class Environmental Assessment* (October 2000, amended in 2007 and 2011), provides a process in accordance with the EA Act for municipal infrastructure projects. For the purposes of the EA process, this Transportation Study Report fulfills the requirements of a Transportation Master Plan (TMP) and covers Phases 1 and 2 of the Municipal Class EA process, which are:

- Phase 1 – Identify the problem (deficiency) or opportunity; and
- Phase 2 – Identify alternative solutions to address the problem or opportunity by considering the existing environment and establishing the preferred solution.

Completion of Phases 1 and 2 will allow the City to move on to Phase 3 (Assessment of Design Alternatives) for projects which fall under Schedule 'C' of the Class EA Document. See **Section 1.5** for details of the consultation requirements associated with the EA Process.

1.3 Project Direction

The technical direction for the preparation of this report was provided by a Project Team with the following members:

- David Shelsted, MBA, P. Eng., City Project Manager, Director of Roads and Transportation Services;
- Dave Kivi, Coordinator of Transportation and Traffic Engineering Services;
- Mark H. Simeoni, MCIP, RPP, Acting Director of Planning Services;
- Chris Gore, Manager of Community Partnerships;
- David Kalvianien, P. Eng., Roads Engineer;

- Jim Gough, M.A.Sc., P. Eng., MMM Group, Project Management / Transportation Planning;
- Dave McLaughlin, MES, MCIP, RPP, MMM Group, Cycling and Pedestrian Network Planning;
- Jay Cranstone, OALA, MMM Group, Trails Planning;
- Brett Sears, MSP, MCIP, RPP, MMM Group, Project Coordination;
- Mausam Duggal, MCIP, RPP, MMM Group, Transportation Modelling; and
- Michael Parker, Transportation Alternatives Analysis.

Strategic direction was provided to the Project Team on development of the study from the Sustainable Mobility Advisory Panel, with the following representatives:

- Deb McIntosh, Rainbow Routes;
- Carol Craig, Public Health Nurse, Sudbury and District Health Unit;
- Daniel Eric Barrette;
- Samantha Jayne Baulch;
- Peter M. Clark;
- Donald Dennie;
- Nicole Good;
- Jessica Marie Perry;
- John-Wesley McGraw;
- Benjamin Timothy Reitzel;
- Steve F. Reitzel;
- Cortney J. St. Jean; and
- Selene T. Yan.

1.4 Best Practices in Sustainable Transportation Planning

In addition to the overall direction for sustainability-based planning, the best practice of "Complete Streets" is highlighted in this master plan. "Complete Streets" are defined as streets that are accessible to all users and to all modes of transportation. The street network should be planned, designed, constructed and maintained to support transit, cyclists and pedestrians in addition to vehicular traffic. The elderly, adults, young and disabled should all be able to use the streets in a municipality safely.

Implementing a "Complete Streets" policy will help the City achieve its principles of healthy communities, sustainability and economic vitality.

1.5 Consultation Process

The Class EA process requires a minimum of three points of contact with the public, stakeholders and government agencies during completion of the Study. The first point of contact is the Notification of Study Commencement. This Notification, which was posted on the City's website and printed in *Northern Life*, *Le Voyageur* and the *Sudbury Star* newspapers on January 4, 2012, introduces the study, supplies contact information and gives the public, stakeholders and government agencies the opportunity to provide input or ask to be included on a future contact list. In an effort to facilitate feedback, an online survey was posted in coordination with the Notice of Study Commencement. This survey was referenced in the Notice and was accessible via a hyperlink from the Notice published on the City's website.

For Phases 1 and 2, as outlined in **Section 1.2** above, there is a requirement for public consultation as part of the evaluation of alternative solutions. Two Public Information Centres (PICs) were conducted during the course of this study in order to obtain public feedback on existing conditions and future transportation plans. Two presentations were made to the City's Operations Committee, the first on June 17, 2013 and the second on March 23, 2015.

Further consultation will be required for any projects that fall under Schedule 'C' of the Class EA Document and are planned to progress to the implementation stage. At the end of the process, the report will be filed with the Ontario Ministry of Environment for the mandatory 30-day public comment period. Once this is over, a Notice of Study Completion will be placed on the City's website and advertised in the local newspapers.

1.6 Organization of the Report

The report is organized into eleven chapters, including this introduction. The chapters address:

- **Chapter 2 – Sudbury Today: Existing Transportation Conditions**: Analyzing the existing road conditions and identifying available bicycling and pedestrian amenities;
- **Chapter 3 – Transportation Planning Context:** Summarizing the planning documents that shape the Transportation Study Report;
- **Chapter 4 – Transportation Vision Statement, Principles and Objectives**: Outlining the transportation vision for Greater Sudbury, and the principles and objectives that support the vision;
- **Chapter 5 – Active Transportation: Cycling and Walking**: Describing the principles and process for identifying candidate routes for cycling and walking;
- **Chapter 6 – Future Transportation Needs**: Forecasting future population and employment growth conditions across the City to the year 2031;
- **Chapter 7 – Alternative Transportation Planning Strategies**: Presenting alternative strategies that could meet the vision statement and analyzing the road projects included in the preferred alternative;
- **Chapter 8 – Cycling and Pedestrian Master Plan**: Presenting the recommended cycling and pedestrian routes and an implementation strategy to bring the plan to fruition;
- **Chapter 9 – Policies to Support the Preferred Transportation Alternative**: Establishing the policy of 'Complete Streets' and providing related policies that support a multi-modal transportation network:
- **Chapter 10 – Transportation Study Report Implementation**: Outlining the phased implementation of the transportation improvement recommendations, identifying which projects should be incorporated into the short, medium and long term horizon years; and
- **Chapter 11 – Recommendations**: Summarizing the road improvements, active transportation improvements and transportation policies included in this report. These recommendations will be incorporated into the City's Official Plan as part of the City's Official Plan Review process, which is underway concurrent with the development of this Transportation Study Report.

2 SUDBURY TODAY: EXISTING TRANSPORTATION CONDITIONS

2.1 Socio-Economic Profile

The 2011 Census of Canada reported over 160,000 people in the City of Greater Sudbury, which is an increase of 1.6% from the 2006 census but is less than the City's peak population of almost 170,000 people in the year 1971. The population traditionally has increased and decreased in line with the demand for natural resources. The 2011 Census reported almost 67,000 households in Greater Sudbury, with an average household size of 2.4 persons. This has decreased from the 1971 average of 4 persons per household.

Historically, mining has played a major role in providing employment in Greater Sudbury. The sector continues to be an important source of jobs but has now been supplemented by service activities such as health care, education and public administration. Reviewing 2011 Census data, the median household income in Greater Sudbury is greater than that of Ontario as a whole as well as greater than the national median, as indicated in **Table 2**.

Table 2: Household Income

Area	2011 Median Total Income ($)
City of Greater Sudbury	82,220
Ontario	73,290
Canada	72,240

Source: 2011 Census of Canada.

2.2 Roadway Network and Travel Characteristics

This section has been subdivided to address:

- Roadway classification;
- Major travel flows – roads;
- Major travel flows – transit;
- Screenlines;
- Existing intersection levels of service (and potential short-term improvements); and
- Collision rates.

2.2.1 Roadway Classification

The existing road classifications are shown in Schedule 6 of the City's Official Plan, included in **Figure 1.** A description of each class of road, as reported in the Official Plan, is shown in **Table 3**.

Figure 1: Roadway Classification

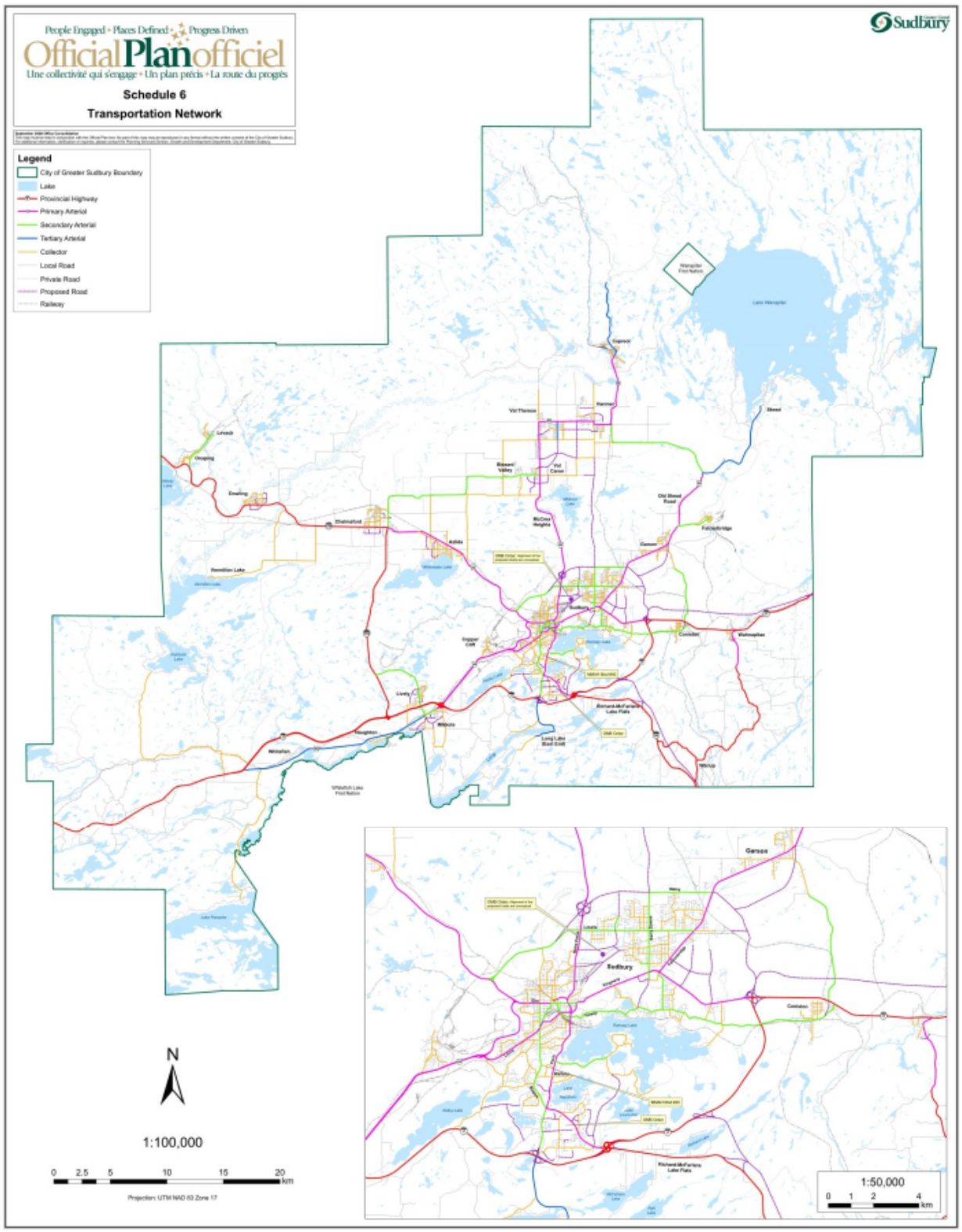


Table 3: Road Classification (as per the Official Plan for the City of Greater Sudbury)

Class of Road	Function	Access	Right-of-Way Width (metres)	Daily Traffic Volumes	Design Speed (km/h)	Minimum Intersection Spacing (metres)	Other Regulations
Primary Arterial (Major Highway)	• Connecting City with other major centres outside the City and/or interconnecting communities. • Long distance person or goods movement travel through the City or between major activity areas within the City. • Traffic movement primary consideration.	Intersections with other arterial roads or collector roads. Driveways to major regional activity centres.	35-45 in urban areas. 45-90 in rural areas.	10,000-50,000	60-100	400	No on-street parking Buffers between the roadway and adjacent uses
Secondary Arterial	• Connecting two or more communities or major activity centres; or • Connecting between two primary arterial roads; or • Connecting a community or activity centre with a primary arterial road. • Trip origin and/or destination along it, an intersecting tertiary arterial, intersecting collector or a local street intersecting with the collector. Traffic movement major consideration	Intersection with other roads. Access from adjacent property strictly regulated and kept to a minimum.	26-35 in urban areas. 30-45 in rural areas.	5,000-20,000	50-70	200	No on-street parking Buffers between the roadway and adjacent uses

Class of Road	Function	Access	Right-of-Way Width (metres)	Daily Traffic Volumes	Design Speed (km/h)	Minimum Intersection Spacing (metres)	Other Regulations
Tertiary Arterial	• Connecting small communities; or • Connecting communities to primary or secondary arterial leading to a recreational area. • Trip origin and/or destination along it, an intersecting collector or a local street intersecting with the collector. Traffic movement major consideration.	Intersections with other roads. Access from adjacent property strictly regulated and kept to a minimum.	26-35 in urban areas 30-45 in rural areas	5,000-20,000	50-70	200	No on-street parking Buffers between the roadway and adjacent uses
Collector	• Connecting neighbourhoods; or • Connecting a neighbourhood with an arterial road. • Trip origin and/or destination along it or an intersecting local street. • Traffic movement and land access of equal importance.	Intersections with other roads. Regulated access from adjacent property.	20-35 metres	1,000-12,000	50-80	60	On-street parking may be permitted Greater setbacks from roadway of adjacent uses
Local	• Connecting properties within a neighbourhood; • Trip origin and/or destination along its right-of-way; • Traffic movement secondary consideration, land access primary function.	Intersections with collectors or other local roads. Access from adjacent property permitted.	+/- 20	<1,000	30-50	60	On-street parking is generally permitted. Goods movement restricted except for that having origin or destination along the road

2.2.2 *Traffic Volumes and Network Capacity*

Existing traffic volumes between the key locations in the region in the p.m. peak period are shown in **Table 4**. They are based on the data for the existing daily travel demand from the 2005 study, to which a peak hour conversion factor of 0.0825, an auto occupancy factor of 1.178 and a modal split of 2% were applied. These revised volumes were input into the TransCAD model along with population and employment data from the 2011 census. The model outputs showed an increase of approximately 20% in total trips, with a reassignment across the network to reflect 2011 conditions.

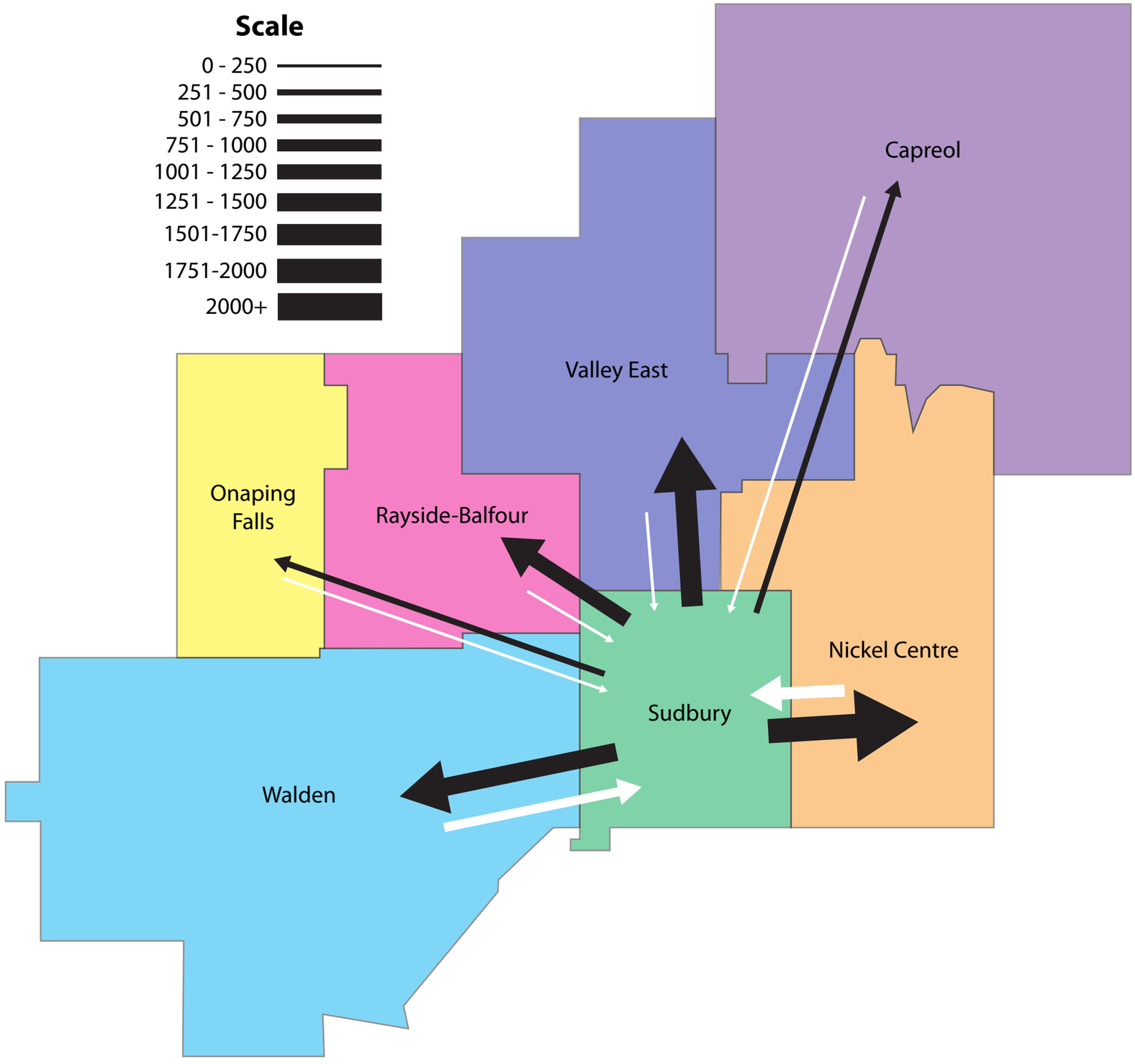
Table 4: Existing Traffic Volumes – P.M. Peak Period

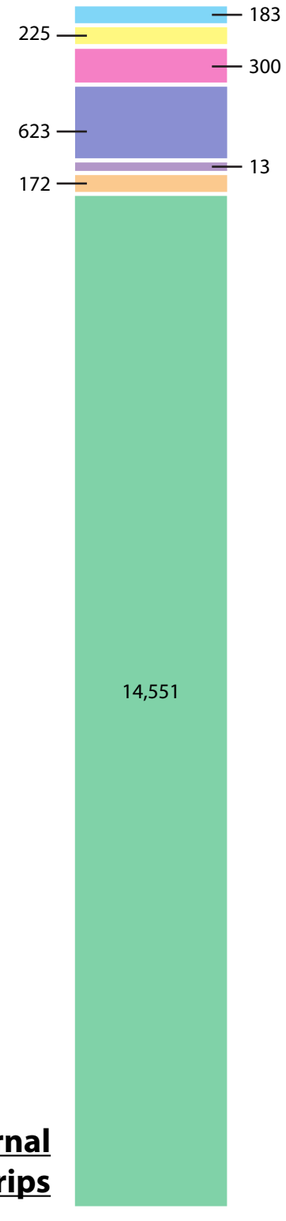
FROM \ TO	Sudbury	Nickel Centre	Capreol	Valley East	Rayside-Balfour	Onaping Falls	Walden
Sudbury	14,551	1,804	259	1,730	1,196	315	1,291
Nickel Centre	751	172	52	241	61	18	53
Capreol	23	13	13	147	30	8	6
Valley East	198	57	126	623	231	63	47
Rayside-Balfour	107	20	46	347	300	122	74
Onaping Falls	48	10	22	166	219	225	40
Walden	585	70	21	163	159	45	183

The map diagram in **Figure 2** shows trips to and from the former City of Sudbury. The thickness of the arrows is proportional to the traffic volumes into and out of the former City of Sudbury. Similarly, the bars to the right of the figure represent the internal trips within each area.

Scale

0 - 250
251 - 500
501 - 750
751 - 1000
1001 - 1250
1251 - 1500
1501-1750
1751-2000
2000+





Internal Trips

Legend

Direction of Trips

To Sudbury

From Sudbury

Figure 2

Key Traffic Flows - P.M. Peak Period

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It is important to understand the existing characteristics of the road network in the City of Greater Sudbury in order to plan the future transportation network. Volume to capacity plots have been created showing traffic volumes on each link within the network as well as an indication of the available spare capacity on that link.

In order to clearly show the traffic volumes for each link, three plots with different zoom levels were produced per alternative showing:

- Full study area (**Figure 3**);
- Area approximately bounded by Copper Cliff to the west, McCrea Heights to the north, Garson to the east and the Trans-Canada Highway to the south (**Figure 4**); and
- Downtown Sudbury and New Sudbury (**Figure 5**).

As indicated in the legend, the colour of each line corresponds to the volume/capacity ratio of that link, which in turn relates to the Level of Service of that link. **Table 5** below shows the relationship between the two variables, and the colour scheme matches that of the figures.

Table 5: Level of Service Designations

Level Of Service	V/C Ratio
A	≤ 0.26
B	>0.26 – 0.4
C	>0.4 - 0.6
D*	>0.6 - 0.8
E	>0.8 - 1.0
F	>1.0

* LOS D is the threshold for acceptable road performance

For each road in the transportation model, the model plots show the volume/capacity ratios for the peak travel direction. As this model represents the weekday p.m. commute, the peak direction typically is in the travel direction away from the city centre.

Figure 3: Volume to Capacity Plots - Existing (Overview)

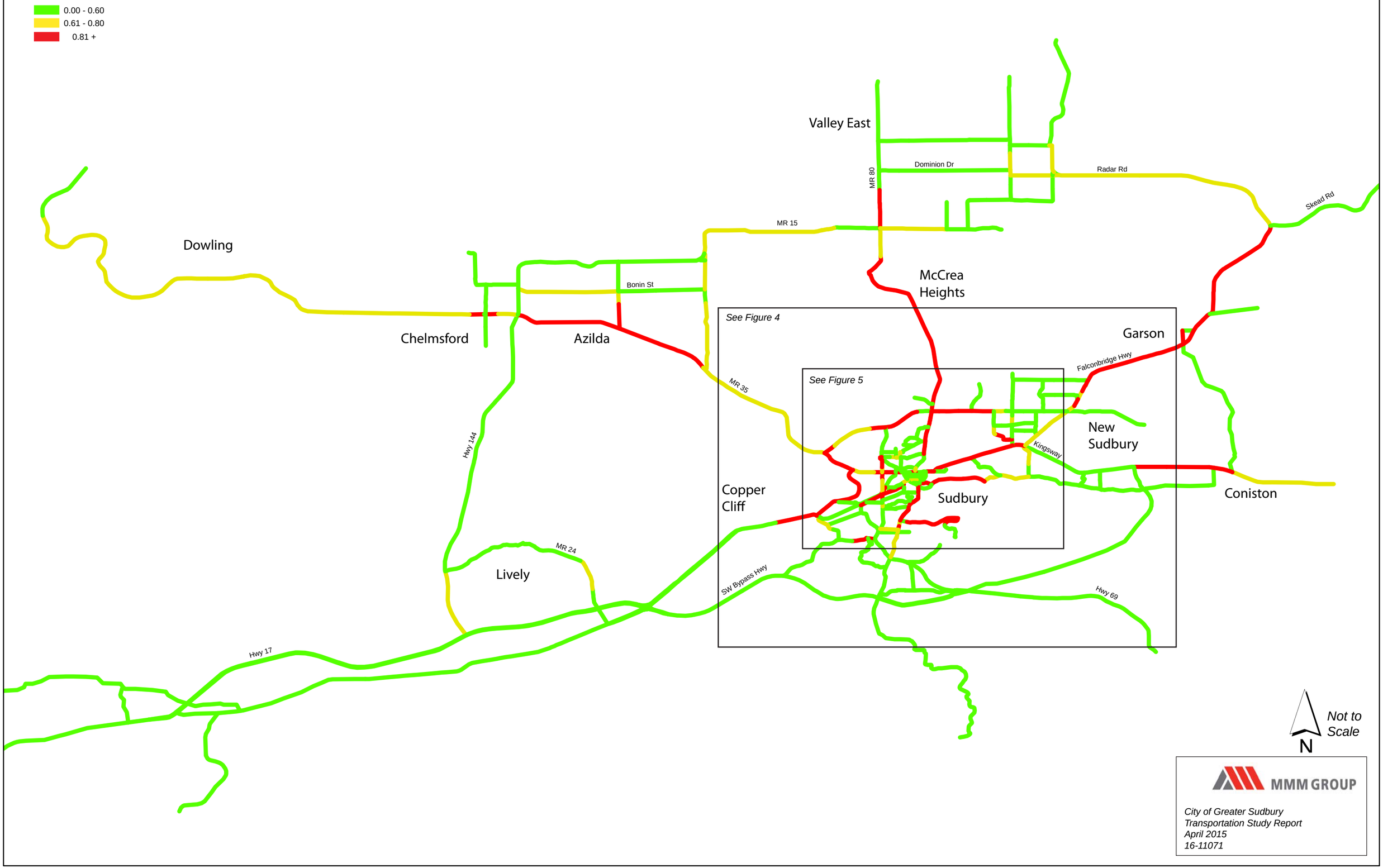

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Figure 4: Volume to Capacity Plots - Existing (Intermediate Zoom)

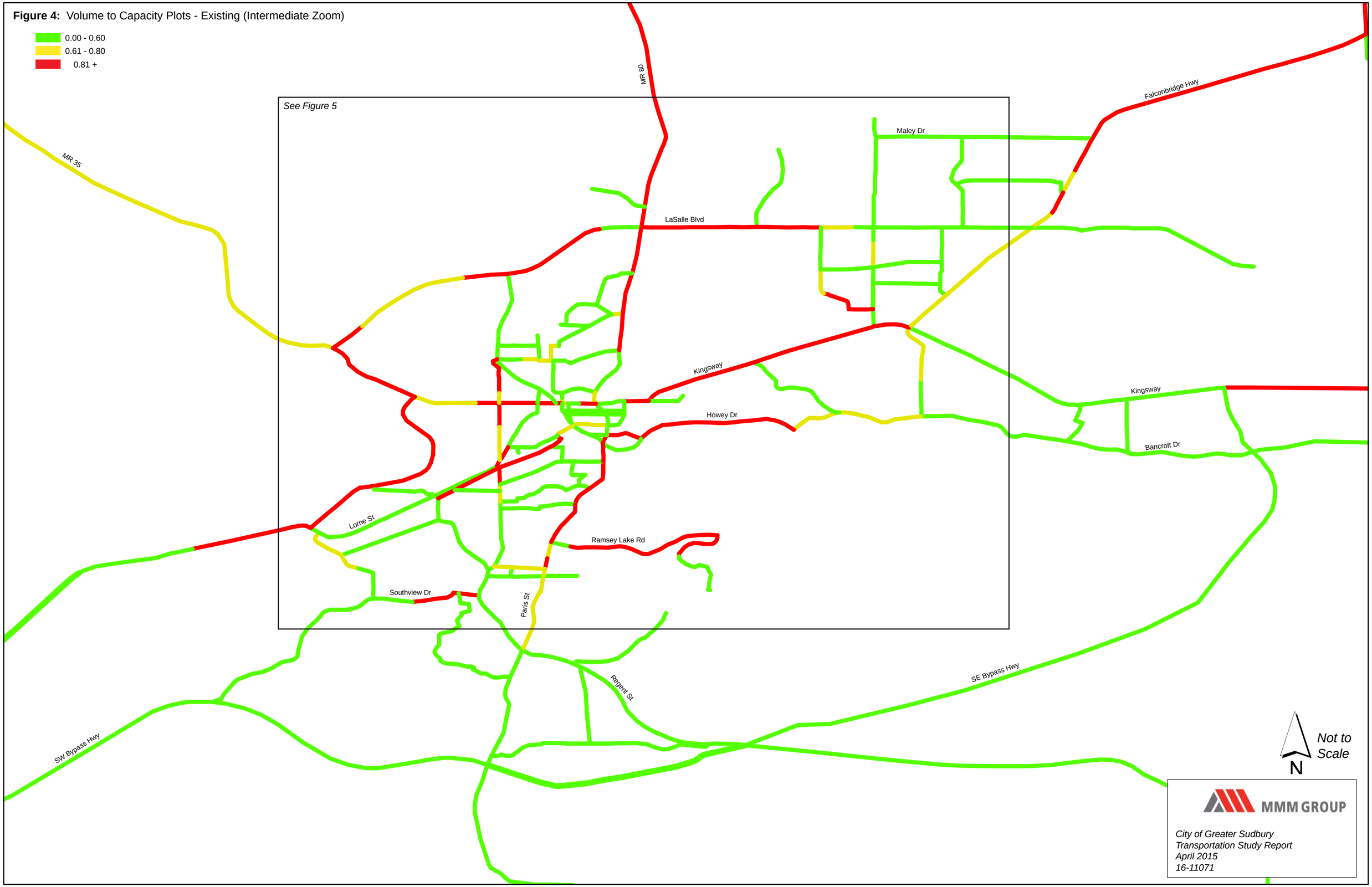
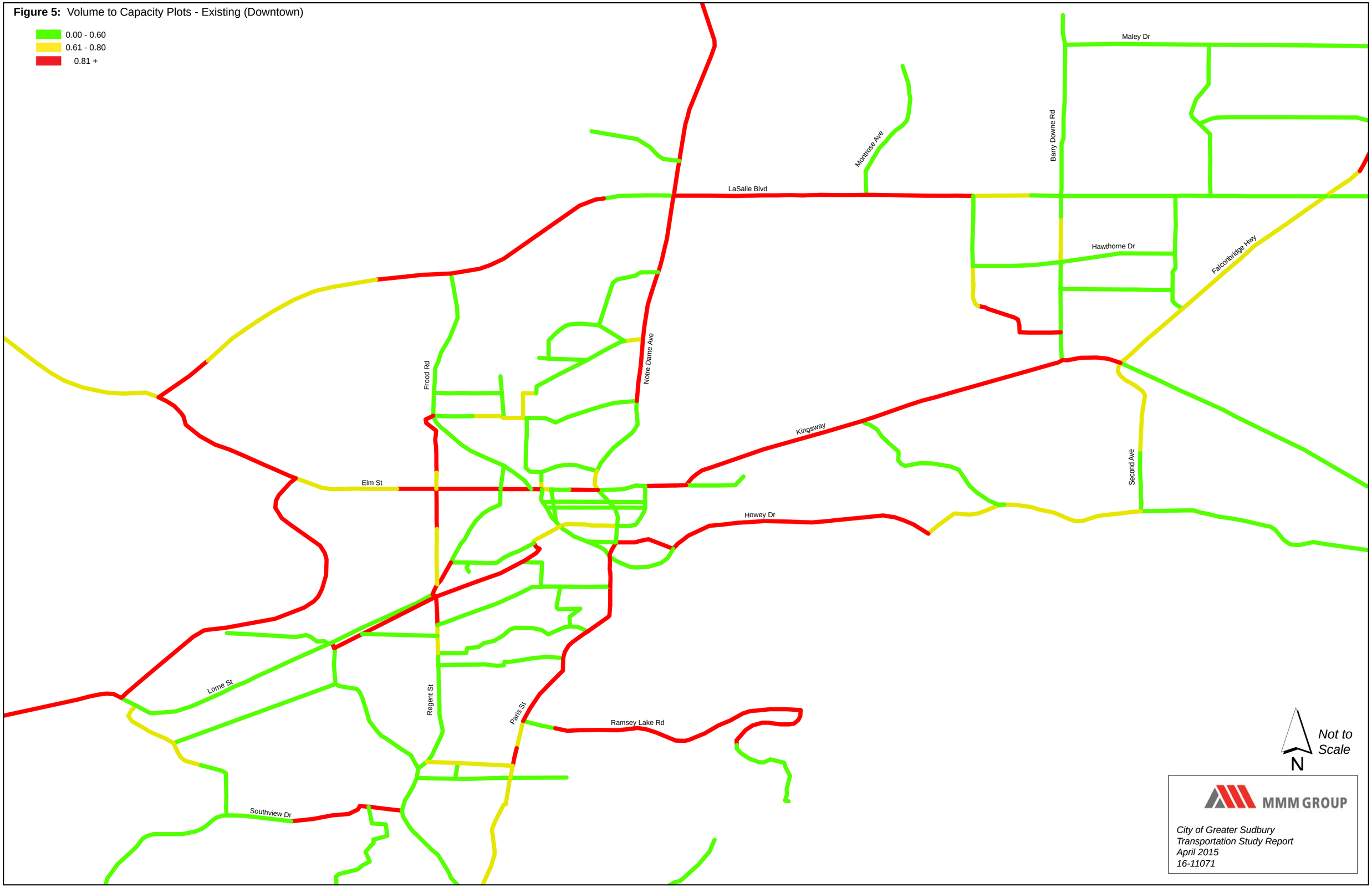


Figure 5: Volume to Capacity Plots - Existing (Downtown)



The following roadway sections have been identified as having a volume/capacity ratio of greater than 0.8 and are shown in red in **Figure 3, Figure 4** and **Figure 5**:

- Highway 144 between Isidore Street and Edward Avenue;
- M.R. 35 between M.R. 15 and Montee Rouleau;
- Montee Principale between M.R. 35 and Bonin Street;
- M.R. 80 / Notre Dame Avenue northbound between Kathleen Street and Valleyview Road, and between M.R. 15 and Campeau Street;
- Falconbridge Road / Falconbridge Highway / Skead Road northeastbound between Lasalle Boulevard and Radar Road;
- Trans-Canada Highway (17) east of the Kingsway to Garson Coniston Road;
- M.R. 55 between Balsam Street and Big Nickel Mine Drive;
- Big Nickel Drive between M.R. 55 and Elm Street;
- Elm Street between Lasalle Boulevard and Big Nickel Mine Drive, between Ethelbert Street and Elgin Street; and between Lisgar Street and Paris Street;
- Lasalle Boulevard on approach to M.R 35, between Crescent Park Road and west of Frood Road; and between Notre Dame Avenue and Attlee Avenue;
- The Kingsway / Lloyd Street between Brady Street and Falconbridge Road;
- Westmount Avenue / Attlee Avenue, between Beatrice Crescent and Barry Downe Road;
- Van Horne Street / Howey Drive, between Paris Street and Bellevue Avenue;
- Paris Street between Van Horne Street and Ramsey Lake Road, and between Paris Crescent / Centennial Drive and Walford Road;
- Regent Street between Lorne Street and Wembley Drive, on the approach to Elm Street,
- Beatty Street between Alder Street and Frood Road;
- Lorne Street between Regent Street and Douglas Street
- Riverside Drive / Ontario Street between Douglas Street / Edinburgh Street and Martindale Road;
- Southview Drive / Bouchard Street between Cranbrook Crescent and Regent Street; and
- Ramsey Lake Road between South Bay Road and Paris Crescent

The main travel flows out of Sudbury have the following destinations:

- **Nickel Centre:** This is the heaviest movement and causes eastbound congestion on the Kingsway and Howey Drive. This in turn affects the Falconbridge Road / Highway to Garson and, when commuters returning to Coniston are added to those on the Southeast Bypass, it also impacts the Trans-Canada Highway;
- **Valley East:** Almost all of these northbound vehicles use Notre Dame Avenue, which is consequently operating at close to its capacity;
- **Rayside-Balfour:** This northwestbound traffic is channelled along Municipal Road 35, which operates at an acceptable level of service between Lasalle Boulevard and Notre Dame Street East where there are two lanes westbound. However, capacity is constrained at Azilda west of Notre Dame Street East where this highway reduces to one lane in each direction; and

- **Walden:** Trips to this area to the southwest of Sudbury are distributed between M.R. 55 and the Trans-Canada Highway (17), both of which are operating at an acceptable level of service.

The principal movements into Sudbury originate in:

- **Nickel Centre:** There are three westbound routes into the centre of Sudbury, the Kingsway, Lasalle Boulevard and Howey Drive. The accumulation of internal Sudbury trips on top of those from Nickel Centre pushes both corridors over the 0.8 volume-to-capacity threshold; and
- **Walden:** As with the flow out of Sudbury, the distribution of trips between M.R. 55 and the Trans-Canada Highway (17) means that both are operating at an acceptable level of service. The exception is M.R. 55 east of Balsam Street, where traffic joining from Copper Cliff causes an increase in the volume-to-capacity ratio.

Internal trips within Sudbury represent the vast majority of journeys in the Greater Sudbury area. These include:

- Commuter and commercial trips between New Sudbury and the remainder of the City. These add to demand on the Kingsway, Lasalle Boulevard, and other links;
- Journeys along Paris Street to and from Laurentian University and Health Sciences North; and
- Commercial and retail trips to the Paris Street/Long Lake Road/Regent Street intersection, known locally as the Four Corners.

Volumes associated with trips within Greater Sudbury but not starting or ending in the City of Sudbury are relatively low. The only movements with volumes greater than 200 trips are between Valley East and Rayside-Balfour on M.R. 15, and heading into Valley East along the Radar Road / Skead Road corridor from Nickel Centre.

Overall, desire lines within Greater Sudbury reflect that the former City of Sudbury constitutes the urban core of the municipality. Within that area, development has occurred along two major axes – north/south, along Paris/Regent Streets, and east/west north of Ramsey Lake, along the Kingsway and Lasalle Boulevard. Development of land use and the transportation network is constrained by the rugged topography, which includes rock outcrops.

Most of the city's population is housed in this area. The outlying urban areas are home to significant industry as well as some housing. These areas are connected to the urban core by a very limited number of road links, which concentrate travel and funnel it through the urban core in many instances. Topography and distance will add to the cost and complexity of adding new connections or improving existing links.

2.2.3 Major Travel Flows – Truck Haulage

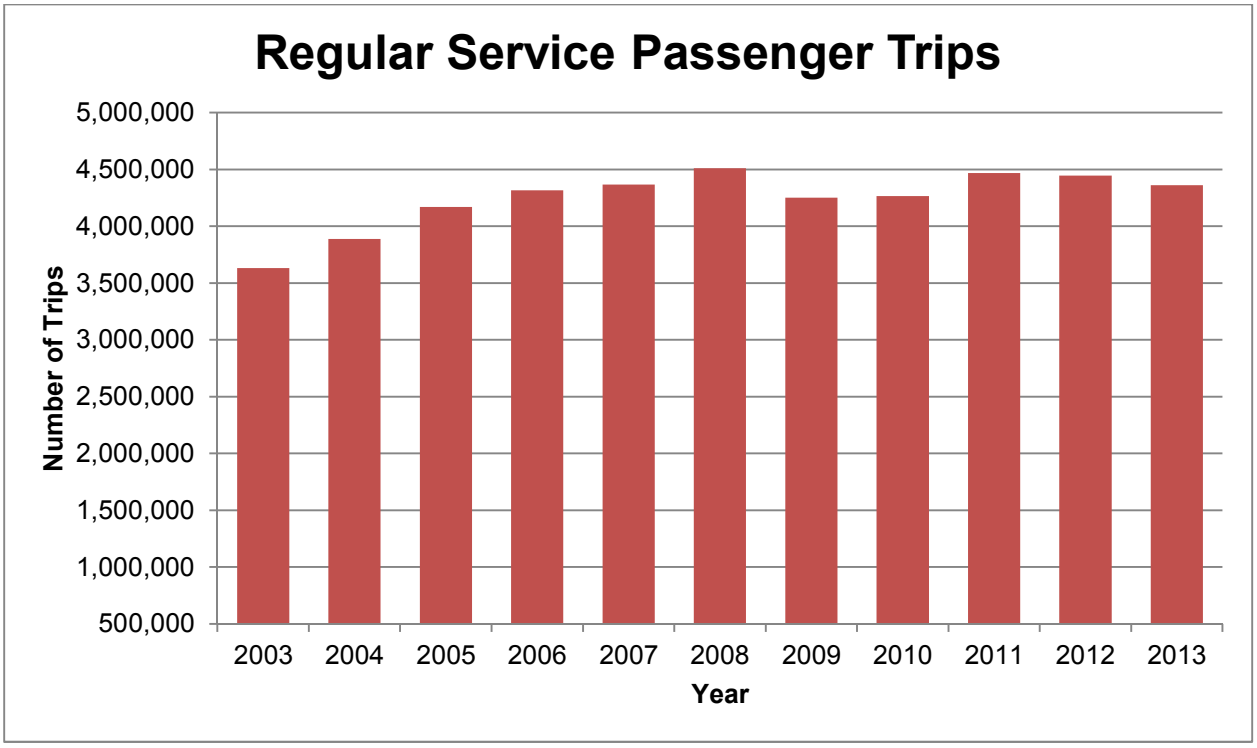
An important element of travel demand in Greater Sudbury is that associated with the mining and smelting industries. Consultation was begun with industry representatives in January 2012 to understand current and projected truck flows associated with industry. Truck flows are particularly important because of the travel characteristics of trucks (generally slower speeds with lower acceleration and deceleration rates) and because of their impact on the road structure.

A map of the current truck haulage routes is provided in **Appendix A.** The map also shows the typical volumes of mining related trucks on these routes. However, it is important to understand that there are numerous ancillary truck trips also associated with these uses, including contractor vehicles for construction and maintenance and employee trips. The future demands associated with industry are addressed in subsequent sections of the report.

2.2.4 Major Travel Flows – Transit

Transit ridership data for the years 2003 through 2013 were examined to determine major transit passenger volumes in Greater Sudbury. **Figure 6** below shows the number of passenger trips for all Greater Sudbury transit routes during that period. Compared to 2003, the annual transit ridership was approximately 25% higher in 2008 with around 4.5 million trips recorded. A decline of about 5% was registered in 2009, however this may be related to a background reduction in economic activity as ridership had almost recovered by 2011 and was near 2008 levels in 2013. From 2003 through 2013, transit ridership has grown about 20%.

Figure 6: Greater Sudbury Annual Transit Ridership, 2003 – 2013



The daily number of transit trips per capita increased by approximately 23% between 2003 and the time of the last census in 2011. Over the same period, population in the City increased by only 4,038 people, or 2.6%, as shown in **Table 6**. This indicates that there was a surge in transit ridership as an increasing proportion of the population views it as a viable travel mode. Part of the increase in ridership can be attributed to the introduction of the U-Pass, a transit pass that is part of the fees paid by all full-time undergraduate students at Laurentian University. The fee provides access to all transit services for the duration of the school year.

Table 6: Population of Greater Sudbury, 1971 - 2011

Year	Population
1971	169,580
1986	152,470
1996	164,049
2003	156,236
2006	157,857
2009	158,270
2011	160,274

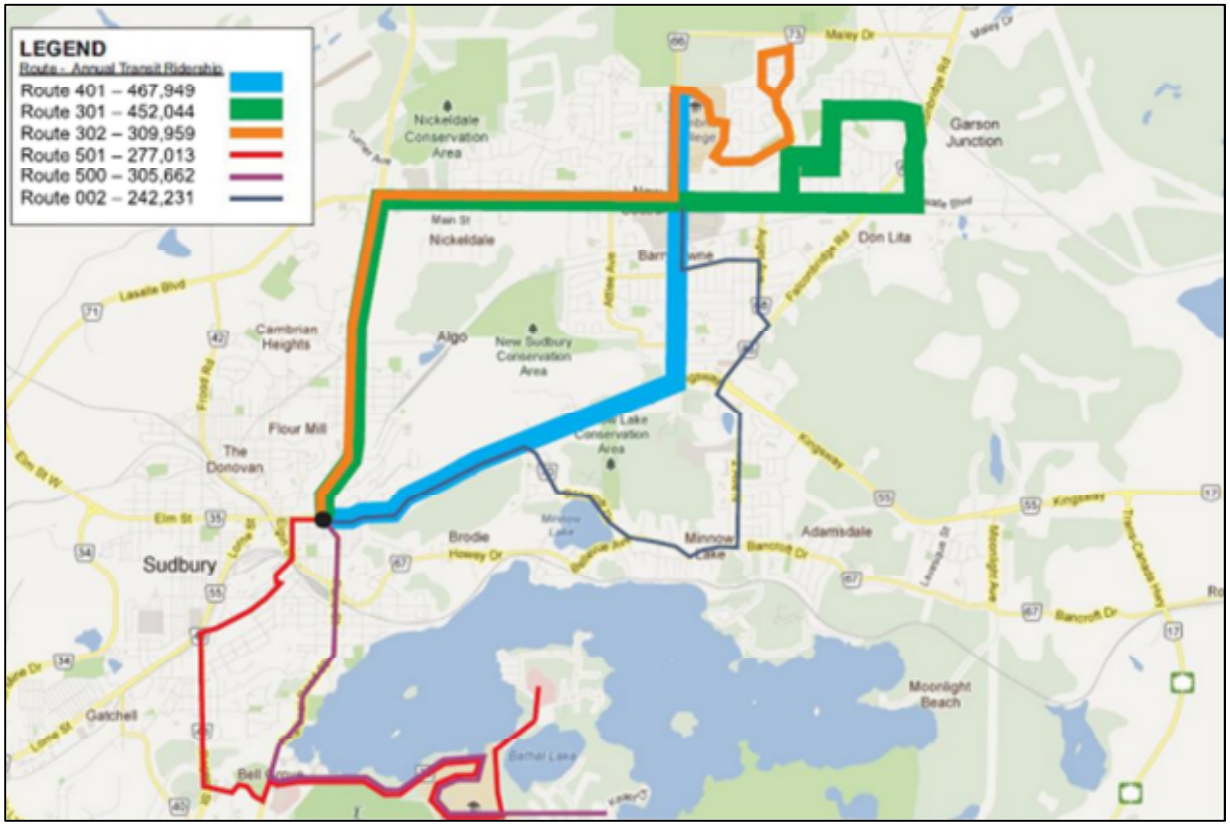
In **Table 7**, the six transit routes with ridership greater than 5% of the total system's ridership are listed and the corridors served by these routes are displayed in **Figure 8**.

Table 7: Transit Routes Accounting for 5% or More of Transit Trips in 2013

Route #	Route	Total Trips	% of Total
401	Barry Downe / Cambrian	467,949	11%
301	Lasalle / Madison	452,044	10%
302	Lasalle / Cambrian	309,959	7%
500	University via Paris	305,662	7%
501	Regent / University	277,013	6%
2	Second Avenue / Shopping Centre	242,231	6%

There are two routes that account for over 10% of the system's ridership: Route 401 (Barry Downe / Cambrian) and Route 301 (Lasalle / Madison). Four out of the six routes originate in the New Sudbury area and use either Notre Dame Avenue or the Kingsway to access Greater Sudbury's downtown transit terminal. The other two routes originate in the Laurentian University area and travel north along Regent Street and Paris Street to the downtown terminal. Overall, most transit-based trips are between New Sudbury or Laurentian University and the downtown core.

Figure 7: Most Traveled Transit Routes

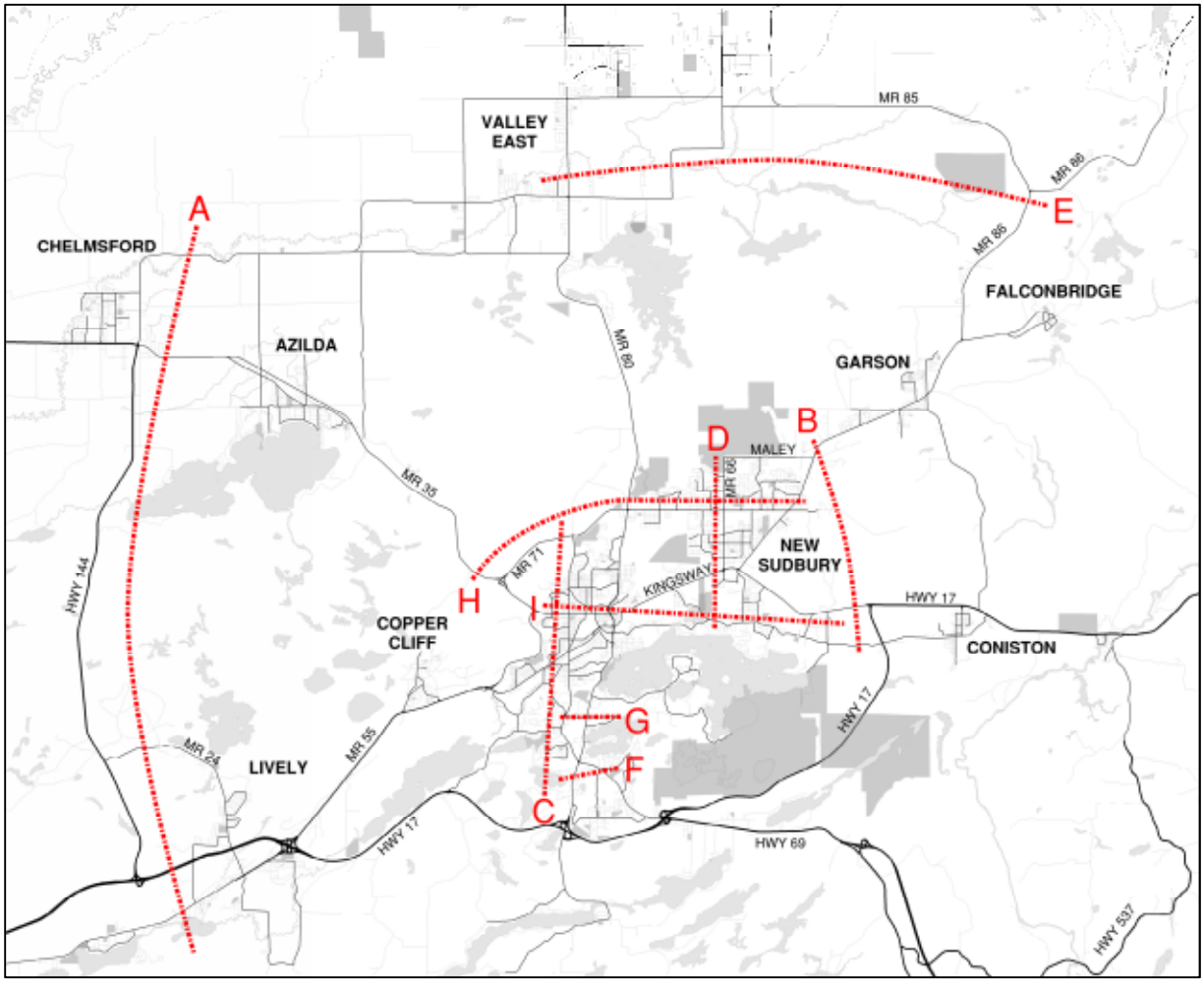


2.2.5 Screenlines

Screenlines are cordons drawn across a number of roads. They are often employed at 'pinch points' where the network is constrained by rivers, topography, freeways or railway corridors for example. All available traffic demand volume data for the points at which they intersect is aggregated and compared to the capacity of those roads.

The screenlines used in the 2005 Transportation Study were used as a starting point for the screenline analysis in this report. One screenline was added covering Regent and Paris Street to measure travel demands south of the Sudbury city centre. These two streets form an important travel corridor within the City, connecting a number of key employment, commercial and residential areas. The complete array of nine screenlines is shown in **Figure 8**.

Figure 8: Screenline Locations



Traffic demand at the screenlines was determined using annual average daily traffic (AADT), where available. In some other cases, volumes were extrapolated from turning movement count data. The calculated volumes and v/c ratios for each screenline and peak period are shown in **Table 8**.

It was found that during the a.m. peak period, all of the screenlines have an overall v/c ratio that is less than 0.8, with the highest v/c ratio being 0.71 (LOS C) across screenline E (trips from the Valley and Skead) in the southbound direction. Most of the screenlines during the p.m. peak have an overall v/c ratio less than 0.80, with the exception of screenline G (trips from the downtown south on Paris and Regent Streets) in the southbound direction which has a v/c ratio of 0.81 (LOS D). This indicates that the route exiting downtown Sudbury during the p.m. peak is approaching capacity. Individually, MR 24 westbound at Creighton and the southbound routes of Paris St at Walford Rd and Notre Dame Ave at Ste. Anne Road have a v/c ratio of 0.97 (LOS E).

The Kingsway was observed to be operating at capacity at Barry Downe Road, with at least one approach failing with a Level of Service F in the a.m. and p.m. peak periods. The existing operation of this and other key intersections is described in detail in **Section 2.2.6**.

Table 8: Existing Screenline Summary

Screenline	Screenline Name	A.M. Peak				
		Direction	Capacity	Volume	v/c ratio	LOS
A	External West Sudbury	Eastbound	6500	2282	0.35	B
		Westbound	6500	1683	0.26	B
B	Internal East Sudbury	Eastbound	3600	1441	0.40	B
		Westbound	3600	1861	0.52	C
C	Internal West Sudbury	Eastbound	4000	1974	0.49	C
		Westbound	4000	1926	0.48	C
D	Barry Downe Road	Eastbound	5100	2543	0.50	C
		Westbound	5100	3068	0.60	C
E	External North Sudbury	Northbound	2700	998	0.37	B
		Southbound	2700	1925	0.71	D
F	South Sudbury	Northbound	3600	2086	0.58	C
		Southbound	3600	1890	0.53	C
G	South of Downtown Sudbury	Northbound	4350	2962	0.68	D
		Southbound	4350	2655	0.61	D
H	Lasalle Boulevard	Northbound	6800	3087	0.45	C
		Southbound	6800	2771	0.41	C
I	Downtown Sudbury	Northbound	4500	2346	0.52	C
		Southbound	4500	1943	0.43	C
Screenline	**Screenline Name**	**P.M. Peak**				
		Direction	**Capacity**	**Volume**	**v/c ratio**	**LOS**
A	External West Sudbury	Eastbound	6500	2434	0.37	B
		Westbound	6500	2719	0.42	C
B	Internal East Sudbury	Eastbound	3600	1441	0.40	B
		Westbound	3600	1861	0.52	C
C	Internal West Sudbury	Eastbound	4000	1974	0.49	C
		Westbound	4000	1926	0.48	C
D	Barry Downe Road	Eastbound	5100	3872	0.76	D
		Westbound	5100	3676	0.72	D
E	External North Sudbury	Northbound	2700	2020	0.75	D
		Southbound	2700	1358	0.50	C
F	South Sudbury	Northbound	3600	2664	0.74	D
		Southbound	3600	2658	0.74	D
G	South of Downtown Sudbury	Northbound	4350	2695	0.62	D
		Southbound	4350	3516	0.81	E
H	Lasalle Boulevard	Northbound	6800	4137	0.61	D
		Southbound	6800	2777	0.41	C
I	Downtown Sudbury	Northbound	4500	2022	0.45	C
		Southbound	4500	2524	0.56	C

2.2.6 Existing Intersection Level of Service

One of the objectives of the Transportation Study is to assess the existing traffic conditions for the road corridors and intersections identified as areas of traffic congestion concern and make recommendations for immediate remedial improvements. The following thirteen intersections have been identified as areas of traffic congestion concern:

1. Main Street / M.R. 80;
2. Lasalle Boulevard / Barry Downe Road;
3. The Kingsway / Barry Downe Road;
4. The Kingsway / Silver Hills Drive;
5. The Kingsway / Bancroft Drive;
6. Bancroft Drive / Second Avenue;
7. Lloyd Street / Brady Street;
8. Lloyd Street / Elm Street / Notre Dame Avenue / Brady Street;
9. Paris Street / Brady Street;
10. Douglas Street / Regent Street;
11. Ramsey Lake Road / Paris Street;
12. Paris Street / Long Lake Road / Regent Street (locally known as the Four Corners); and
13. M.R. 24 / M.R. 55.

Findings presented in this report are based on the results of the intersection capacity analyses and site observations conducted on November 22 and 23, 2011. Intersection capacity analysis was undertaken using Synchro traffic analysis software in order to evaluate the existing traffic operations and to determine the existing levels of service during the a.m. and p.m. peak hours. The most recent turning movement counts and signal timing plans provided by the City were utilized in the analysis.

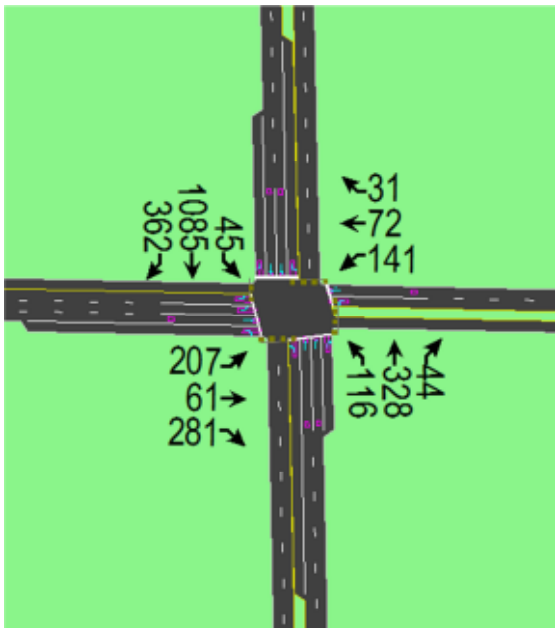
Main Street at M.R. 80 Intersection

The intersection of Main Street and M.R. 80 is a signalized four-legged intersection. Following reconstruction of the intersection in 2014, the lane configuration of each approach is as follows:

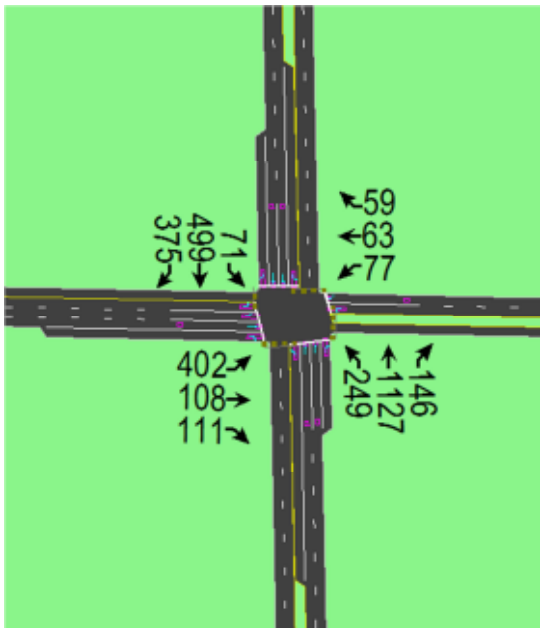
- Northbound: two through lanes, and exclusive left and right turn lanes;
- Southbound: two through lanes, an exclusive left turn lane, and an exclusive right turn lane;
- Eastbound: one through lane, two exclusive left turn lanes, and a right lane; and
- Westbound: one exclusive left turn lane and one shared through/right lane.

M.R. 80 primarily serves commuters travelling to and from work between Valley East and the former City of Sudbury. This is reflected in the existing turning movement counts which indicate a tidal pattern. Volumes in the southbound and northbound directions dominate in the a.m. and p.m. peak periods, respectively. The existing traffic volumes and lane configurations at this intersection are illustrated in **Figure 9** for the a.m. and p.m. peak hours.

Figure 9: Main Street at M.R. 80 Intersection Peak Hour Volumes and Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

Results of the capacity analysis indicate that this intersection operates at an overall acceptable level of service (LOS) during both the a.m. and p.m. peak hours. Almost all movements operate below the volume / capacity (v/c) ratio critical threshold of 0.85, including the eastbound left turn movement which has benefitted from the recent addition of a second left turn lane. The only exception is the northbound left turn in the PM peak with a modelled v/c of 1.08.

Theoretically, v/c ratios for existing conditions cannot be greater than 1.0 since the observed volumes used in the analysis represent 'supply' volumes that were served at the intersection and therefore must be at or below the capacity of the intersection. The high v/c ratios may be the result of the overly conservative parameters used in the Synchro analysis for the existing traffic conditions. In practice, northbound left-turning drivers may adjust their driving style and use an extra second of the intergreen period to perform their manoeuvre. If this is assumed, the v/c ratio for that movement is exactly 1.0.

Existing traffic conditions at this intersection are considered to be acceptable; however, given that population growth in Valley East is expected to continue, so too will the traffic demand at this intersection. The modelled timings in the a.m. peak hour were close to optimal; however, additional capacity and improved traffic operations at this intersection could be achieved by optimizing the green time split in the traffic signal timings for the p.m. peak hour. This reduces the v/c ratio for the aforementioned northbound left-turn to 0.74.

The results of the intersection capacity analysis based on the original timings (Scenario 1) and the optimized timings (Scenario 2) are summarized in **Table 9**.

Table 9: LOS Results – Main Street / M.R. 80 Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in seconds)	Movement	Volume to Capacity (V/C) Ratio	Percentile Queues 50th (95th)	LOS (Delay in seconds)	Movement	Volume to Capacity (V/C) Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (29)	NB-L	0.61	25 (#50)	C (34)	NB-L	**1.08**	~53 (#121)
		NB-TT	0.18	18 (32)		NB-TT	0.67	83 (115)
		NB-R	0.05	0 (0)		NB-R	0.19	8 (20)
		SB-L	0.43	10 (#26)		SB-L	0.65	13 (41)
		SB-TT	0.72	102 (142)		SB-TT	0.35	34 (50)
		SB-R	0.45	12 (40)		SB-R	0.46	0 (16)
		EB-LL	0.51	22 (37)		EB-LL	0.79	38 (#76)
		EB-T	0.22	12 (24)		EB-T	0.27	17 (35)
		EB-R	0.74	22 (51)		EB-R	0.25	0 (9)
		WB-L	0.67	30 (#65)		WB-L	0.71	15 (#45)
		WB-TR	0.37	17 (33)		WB-TR	0.50	15 (36)
Scenario 2 = Scenario 1 + Optimized Signal Timings	C (29)	NB-L	0.60	24 (#50)	C (29)	NB-L	0.74	50 (79)
		NB-TT	0.19	20 (34)		NB-TT	0.68	95 (132)
		NB-R	0.05	0 (0)		NB-R	0.19	2 (13)
		SB-L	0.35	10 (23)		SB-L	0.53	15 (#34)
		SB-TT	0.72	96 (143)		SB-TT	0.43	42 (66)
		SB-R	0.46	13 (41)		SB-R	0.51	0 (23)
		EB-LL	0.54	22 (38)		EB-LL	0.70	41 (61)
		EB-T	0.23	12 (24)		EB-T	0.26	20 (35)
		EB-R	0.73	20 (49)		EB-R	0.24	0 (9)
		WB-L	0.62	29 (#58)		WB-L	0.46	16 (32)
		WB-TR	0.35	17 (32)		WB-TR	0.51	17 (36)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.
~: Volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

Lasalle Boulevard at Barry Downe Road Intersection

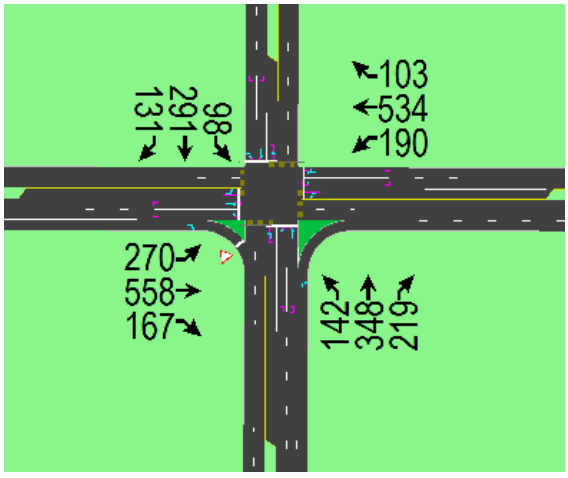
Lasalle Boulevard at Barry Downe Road is a signalized four-legged intersection. In 2014, the channelizing island on the northeast corner was removed and the channelizing island on southeast corner was reduced to allow for a second northbound through lane.

The lane configuration of each approach is as follows:

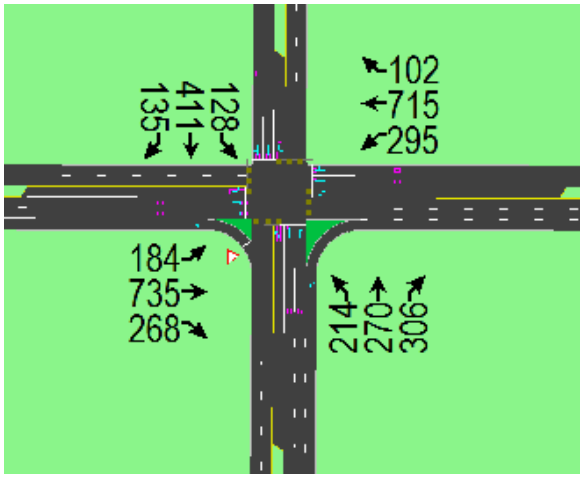
- Northbound: two through lanes, an exclusive left turn lane and an exclusive channelized right turn lane;
- Southbound: one through lane with a shared through/right lane and an exclusive left turn lane;
- Eastbound: two through lanes, an exclusive left turn lane, and an exclusive channelized right turn lane; and
- Westbound: two through lanes with a shared right turn movement, and an exclusive left turn lane.

The existing traffic volumes for the a.m. and p.m. peak hours and the lane configurations at this intersection are illustrated in **Figure 10**.

Figure 10: Lasalle Blvd at Barry Downe Road – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

The results of the capacity analysis for Scenario 1, with the existing timings, indicate that this intersection is currently operating at an acceptable LOS. The only movement with a volume/capacity ratio over 0.85 is the eastbound through movement, which registers a v/c ratio of 0.89 in the p.m. peak hour. By optimizing the signal timings, this can be reduced to 0.76, with the highest v/c ratio among the other movements being the westbound left turn (0.86) in the p.m. peak hour.

The results of the intersection capacity analysis are summarized in **Table 10**.

Table 10: LOS Results – Lasalle Boulevard / Barry Downe Road Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (35)	NB-L	0.71	28 (#52)	D (44)	NB-L	0.75	49 (75)
		NB-TT	0.47	33 (46)		NB-TT	0.32	27 (41)
		NB-R	0.15	0 (0)		NB-R	0.21	0 (0)
		SB-L	0.53	19 (35)		SB-L	0.60	29 (48)
		SB-TTR	0.66	35 (49)		SB-TTR	0.80	61 (84)
		EB-L	0.81	51 (#87)		EB-L	0.69	42 (64)
		EB-TT	0.48	47 (72)		EB-TT	**0.89**	91 (#135)
		EB-R	0.28	0 (16)		EB-R	0.49	0 (22)
		WB-L	0.69	37 (56)		WB-L	0.84	66 (#111)
		WB-TTR	0.62	59 (82)		WB-TTR	0.84	93 (#155)
Scenario 2 = Scenario 1 + Optimized Signal Timings	C (35)	NB-L	0.74	28 (#55)	D (43)	NB-L	0.83	51 (#90)
		NB-TT	0.47	33 (46)		NB-TT	0.34	29 (43)
		NB-R	0.15	0 (0)		NB-R	0.21	0 (0)
		SB-L	0.58	19 (36)		SB-L	0.65	30 (50)
		SB-TTR	0.68	35 (50)		SB-TTR	0.84	65 (#92)
		EB-L	0.81	51 (#84)		EB-L	0.80	44 (#78)
		EB-TT	0.46	46 (68)		EB-TT	0.76	87 (110)
		EB-R	0.27	0 (15)		EB-R	0.45	0 (20)
		WB-L	0.70	37 (57)		WB-L	**0.86**	70 (#115)
		WB-TTR	0.60	57 (80)		WB-TTR	0.71	89 (112)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.

The Kingsway at Barry Downe Road Intersection

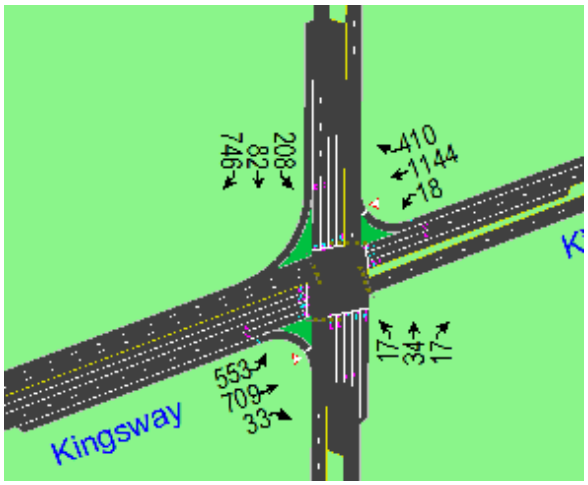
The Kingsway at Barry Downe Road is a signalized four-legged intersection northeast of the downtown core. The lane configuration of each approach is as follows:

- Northbound: dual left turn lanes, two through lanes and an exclusive right turn lane;
- Southbound: dual left turn lanes, dual through lanes and an exclusive channelized right turn lane;
- Eastbound: dual left turn lanes, dual through lanes and an exclusive channelized right turn lane; and
- Westbound: dual through lanes, an exclusive left turn lane and an exclusive channelized right turn lane.

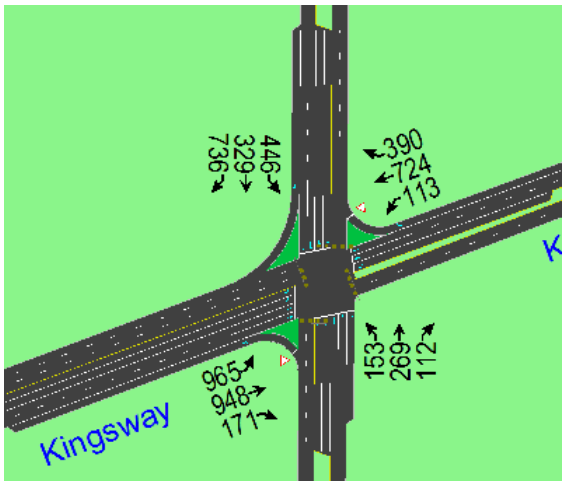
The southbound right turn movement operates under free flow conditions, while a 'no right turn on red' restriction is in place for the northbound right turn movement.

The existing traffic volumes and lane configurations at this intersection are illustrated in **Figure 11**.

Figure 11: The Kingsway at Barry Downe Road – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

The traffic counts indicate significant eastbound left turn and southbound right turn demands at this intersection. 746 and 736 southbound right turns were observed during the a.m. and p.m. peak hours, respectively, along with and 553 and 965 eastbound left turns. This intersection experiences a very low demand to and from the south leg during the a.m. peak hour due to the fact that Barry Downe Road terminates just to the south of this intersection. Also, the southern leg serves as an access to commercial developments whose peak activity times do not coincide with the road a.m. peak hour traffic conditions.

This intersection currently operates at an overall acceptable LOS during both the a.m. and p.m. peak hours. However, the westbound through movement has a volume to capacity (v/c) ratio of 0.93 during the a.m. peak hour. During the p.m. peak hour, the southbound and eastbound left turn movements operate with v/c ratios of 0.86 and 1.07, respectively. Theoretically, v/c ratios for existing conditions cannot be greater than 1.0 since the observed volumes used in the analysis represent 'supply' volumes that were served at the intersection and therefore must be at or below the capacity of the intersection. The high v/c ratios may be the result of the overly conservative parameters used in the Synchro analysis for the existing traffic conditions.

The operation of this intersection was improved by optimizing the green time splits for each phase; the phasing plan and intersection cycle length were not adjusted. With these adjustments, the overall operation of the intersection will be acceptable with only select movements which already have two dedicated lanes each, approaching capacity. The results of the intersection capacity analysis are summarized in **Table 11**.

Table 11: LOS Results – The Kingsway / Barry Downe Road Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (24)	NB-LL	0.07	2 (5)	D (44)	NB-LL	0.47	18 (29)
		NB-TT	0.10	3 (8)		NB-TT	0.55	31 (45)
		NB-R	0.12	3 (10)		NB-R	0.52	24 (43)
		SB-LL	0.46	18 (32)		SB-LL	**0.86**	53 (#85)
		SB-TT	0.14	6 (14)		SB-TT	0.47	36 (52)
		SB-R	0.49	0 (0)		SB-R	0.48	0 (0)
		EB-LL	0.69	48 (69)		EB-LL	**1.07**	~127 (#180)
		EB-TT	0.35	30 (64)		EB-TT	0.68	92 (135)
		EB-R	0.03	0 (0)		EB-R	0.23	0 (15)
		WB-L	0.13	3 (11)		WB-L	0.57	25 (44)
		WB-TT	**0.93**	~108 (#187)		WB-TT	0.81	83 (#115)
		WB-R	0.51	0 (22)		WB-R	0.60	8 (39)
Scenario 2 = Scenario 1 + Optimized Signal Timings	C (22)	NB-LL	0.09	2 (6)	D (41)	NB-LL	0.52	18 (30)
		NB-TT	0.12	4 (9)		NB-TT	0.55	31 (45)
		NB-R	0.14	4 (11)		NB-R	0.52	24 (43)
		SB-LL	0.66	23 (#38)		SB-LL	**0.93**	53 (#90)
		SB-TT	0.16	8 (16)		SB-TT	0.48	36 (50)
		SB-R	0.49	0 (0)		SB-R	0.48	0 (0)
		EB-LL	0.78	58 (79)		EB-LL	**0.96**	113 (#167)
		EB-TT	0.32	27 (52)		EB-TT	0.63	87 (120)
		EB-R	0.03	0 (0)		EB-R	0.22	0 (13)
		WB-L	0.19	4 (12)		WB-L	0.67	25 (#52)
		WB-TT	0.75	107 (138)		WB-TT	**0.87**	85 (#126)
		WB-R	0.45	0 (17)		WB-R	0.69	28 (67)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.
~: Volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

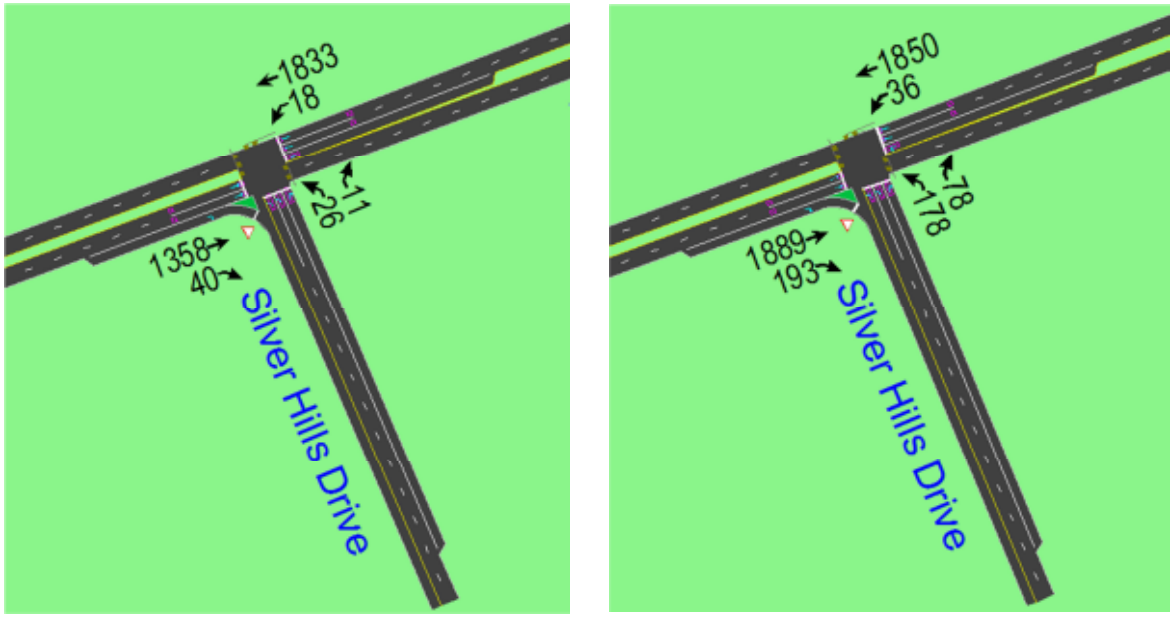
The Kingsway at Silver Hills Drive Intersection

The Kingsway at Silver Hills Drive is a signalized T-intersection that provides access to a commercial development to the south. The lane configuration of each approach is as follows:

- Northbound: two exclusive left turn lanes and an exclusive right turn lane;
- Westbound: two through lanes and an exclusive left turn lane; and
- Eastbound: two through lanes, and an exclusive channelized right turn lane;

There is no southbound approach. The existing a.m. and p.m. peak hour traffic volumes and the lane configurations at this intersection are illustrated in **Figure 12**.

Figure 12: The Kingsway at Silver Hills Drive – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes **Existing P.M. Peak Volumes**

The commercial development is not open for business during the a.m. peak hour, which is reflected in the very low turning traffic volumes reported. Significantly higher turning traffic volumes are observed during the p.m. peak hour with the majority of turning traffic going to and coming from the west.

Currently, this intersection operates at an acceptable LOS during both the a.m. and p.m. peak hours, although the results show significant queuing on the eastbound approach during the p.m. peak hour. In the traffic counts, 18 and 36 westbound left turn vehicles were observed at this intersection during the a.m. and p.m. peak hours, respectively. On their own, these volumes do not warrant retention of the existing protected westbound left turn phase, although this does facilitate the movement of northbound right-turners, who can exit at the same time. Its removal would result in improved operating conditions for eastbound traffic and would not be a safety concern as visibility is adequate.

It should be noted, however, that Silver Hills Drive may be extended to Bancroft Drive. This will likely result in a significant increase in the westbound left turn demand at this intersection, which may justify the protected westbound left turn phase. In the short term it is recommended to optimize the existing signal timing plans and keep the protected westbound left turn phase. However, if traffic conditions at the eastbound approach deteriorate, consideration should be given to eliminating the protected westbound left turn phase until the Silver Hills Drive extension is complete. By that time, it is likely that further optimization of the traffic signal plans at this intersection will be required anyway due to significant changes in traffic patterns. The results of the intersection capacity analysis are summarized in **Table 12**.

It should be noted that Saturday peak hour conditions were not analyzed, and that the protected westbound left turn phase could be warranted during this period.

Currently, no pedestrian crosswalk is present over the western leg of this intersection; however, curb cuts are provided and this might lead pedestrians to believe that it is an appropriate location to cross. The installation of signs instructing pedestrians to cross over to the eastern leg is recommended.

Table 12: LOS Results – The Kingsway at Silver Hills Drive Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	A (4)	NB-LL	0.10	3 (7)	B (11)	NB-LL	0.49	20 (30)
		NB-R	0.08	0 (6)		NB-R	0.33	0 (14)
		EB-TT	0.45	33 (72)		EB-TT	0.73	125 (175)
		EB-R	0.03	0 (3)		EB-R	0.16	4 (12)
		WB-L	0.05	0 (1)		WB-L	0.18	1 (3)
		WB-TT	0.59	58 (71)		WB-TT	0.67	75 (109)
Scenario 2 = Scenario 1 + Optimized Signal Timings	A (4)	NB-LL	0.10	3 (7)	B (11)	NB-LL	0.49	20 (30)
		NB-R	0.08	0 (6)		NB-R	0.33	1 (15)
		EB-TT	0.45	33 (72)		EB-TT	0.73	125 (175)
		EB-R	0.03	0 (3)		EB-R	0.16	2 (9)
		WB-L	0.05	0 (1)		WB-L	0.18	1 (3)
		WB-TT	0.59	58 (71)		WB-TT	0.67	75 (109)
Scenario 3 = Scenario 2 + Elimination of Protected WB LT Phase	A (3)	NB-LL	0.10	3 (7)	A (9)	NB-LL	0.49	20 (30)
		NB-R	0.08	0 (6)		NB-R	0.40	11 (25)
		EB-TT	0.44	33 (41)		EB-TT	0.68	78 (114)
		EB-R	0.03	0 (1)		EB-R	0.15	0 (4)
		WB-L	0.06	1 (2)		WB-L	0.30	2 (8)
		WB-TT	0.59	58 (71)		WB-TT	0.67	75 (109)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.

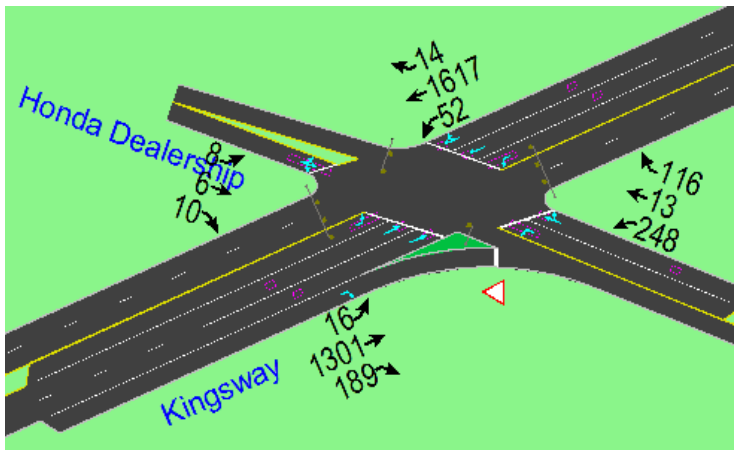
The Kingsway at Bancroft Drive Intersection

Site observations revealed extensive queuing on both of the Kingsway approaches to the Bancroft Drive intersection during both peak hours. In addition, City staff report long queues and long delays at this intersection. The lane configuration of the four approaches is as follows:

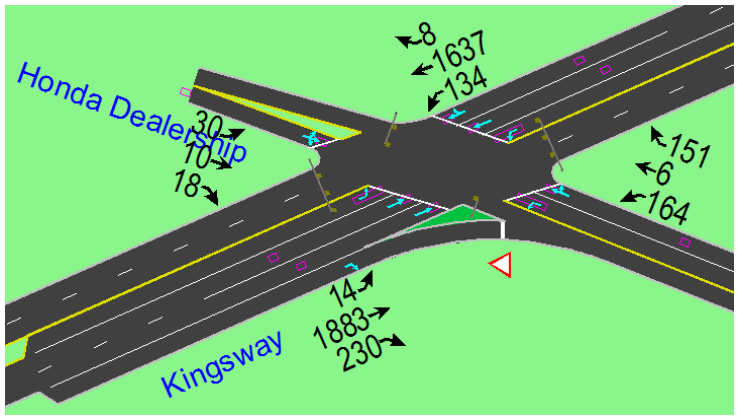
- Northbound: exclusive left turn lane and a shared through/right lane;
- Southbound: shared left/through/right lane;
- Eastbound: dual through lanes, an exclusive left turn lane, and an exclusive channelized right turn lane; and
- Westbound: dual through lanes with a shared right turn movement and an exclusive left turn lane.

The southbound approach serves as an access to a private car dealership and is not a public road. The existing a.m. and p.m. traffic volumes and the lane configurations at this intersection are illustrated in **Figure 13.**

Figure 13: The Kingsway at Bancroft Drive – Peak Hour Traffic Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

The modelling results for Scenario 1 suggest that under existing traffic conditions this intersection operates at acceptable levels of service. However, the theoretical analysis taken from the traffic analysis software only tells part of the story for this intersection. The eastbound through movement during the p.m. peak operates at a volume / capacity ratio of 0.90 and the 95th percentile queue length exceeds the storage length programmed into the analysis software. The queues, delays and associated levels of service are longer than those being reported and are likely longer than what is considered acceptable for urban conditions.

In the event that eastbound through traffic demand increases during the p.m. peak hour, additional capacity for this movement could be provided by optimizing the signal timings, thus shortening the green time allocated to the protected westbound left turn phase. The results for the optimized Scenario 2 show that the v/c ratio for the eastbound through movement would reduce to 0.87, while that for the westbound left turn would only increase to 0.67. The eastbound through queue lengths still would be expected to be long, at over 200 metres, but would be expected to show an improvement over existing conditions. No other short-term improvements are recommended at this intersection.

The results of the intersection capacity analysis are summarized in **Table 13**.

Table 13: LOS Results – The Kingsway/Bancroft Drive Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	B (19)	NB-L	0.74	39 (#98)	C (21)	NB-L	0.68	34 (57)
		NB-TR	0.27	2 (18)		NB-TR	0.41	4 (21)
		SB-LTR	0.06	2 (10)		SB-LTR	0.23	8 (19)
		EB-L	0.07	1 (3)		EB-L	0.06	1 (3)
		EB-TT	0.69	96 (121)		EB-TT	**0.90**	173 (#282)
		EB-R	0.13	0 (0)		EB-R	0.15	0 (0)
		WB-L	0.20	3 (7)		WB-L	0.58	12 (34)
		WB-TTR	0.79	106 (174)		WB-TTR	0.69	84 (175)
Scenario 2 = Scenario 1 + Optimized Signal Timings	B (19)	NB-L	0.71	39 (82)	B (19)	NB-L	0.70	36 (59)
		NB-TR	0.27	4 (20)		NB-TR	0.49	18 (39)
		SB-LTR	0.05	2 (9)		SB-LTR	0.24	8 (20)
		EB-L	0.09	1 (4)		EB-L	0.07	1 (2)
		EB-TT	0.69	90 (132)		EB-TT	**0.87**	167 (218)
		EB-R	0.13	0 (0)		EB-R	0.15	0 (0)
		WB-L	0.22	3 (8)		WB-L	0.67	13 (#43)
		WB-TTR	0.80	102 (190)		WB-TTR	0.68	87 (152)

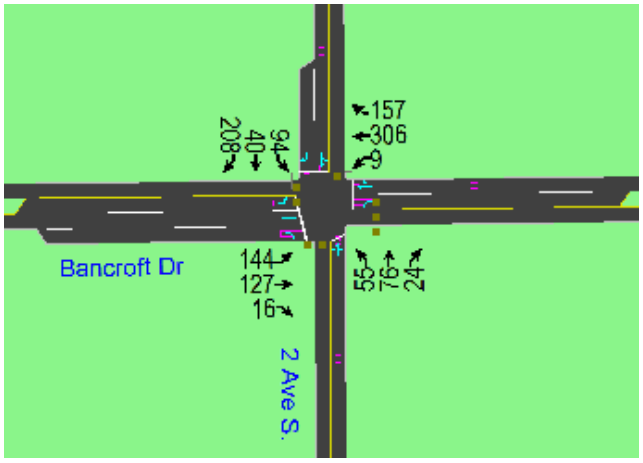
#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.

Bancroft Drive at Second Avenue Intersection

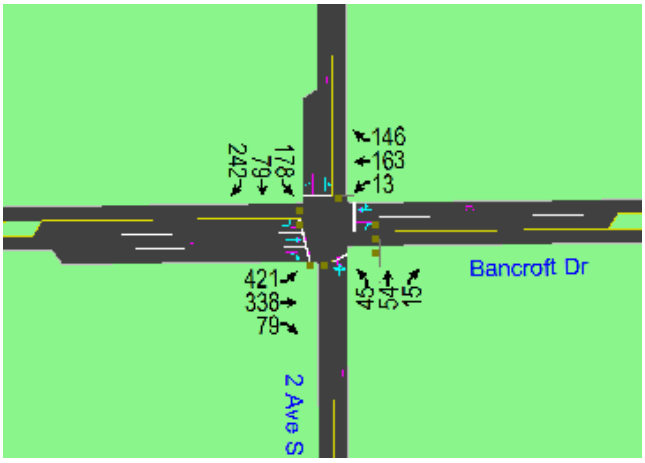
The existing peak hour traffic volumes and lane configurations for the signalized intersection of Bancroft Drive at Second Avenue are illustrated in **Figure 14**. The lane configuration of the four approaches is as follows:

- Northbound: shared left/through/right lane;
- Southbound: exclusive right turn lane, and a shared through/left lane;
- Eastbound: through lane, an exclusive left turn lane, and an exclusive right turn lane; and
- Westbound: shared through/right lane, and an exclusive left turn lane.

Figure 14: Bancroft Drive at Second Avenue – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

Under existing traffic conditions, this intersection operates at an acceptable level of service with no critical movements during either the a.m. or p.m. peak hours. The turning movement counts indicate a demand of 421 eastbound left turns during the p.m. peak hour. Although this movement operates with sufficient capacity, the results indicate that the 95th percentile queues extend beyond the available storage length. The operation of this intersection could be improved by optimizing the green time split for each signal phase. The phasing and the total cycle length for the intersection were not altered in the optimization process. The results of the intersection capacity analysis are summarized in **Table 14**.

Table 14: LOS Results – Bancroft Drive / Second Avenue Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	B (19)	NB-LTR	0.48	19 (43)	C (20)	NB-LTR	0.30	13 (30)
		SB-LT	0.51	18 (40)		SB-LT	0.69	37 (72)
		SB-R	0.43	0 (16)		SB-R	0.44	8 (27)
		EB-L	0.32	7 (19)		EB-L	0.79	38 (#90)
		EB-T	0.12	7 (18)		EB-T	0.36	30 (57)
		EB-R	0.02	0 (0)		EB-R	0.10	0 (6)
		WB-L	0.02	1 (4)		WB-L	0.05	2 (6)
		WB-TR	0.41	53 (113)		WB-TR	0.61	39 (71)
Scenario 2 = Scenario 1 + Optimized Signal Timings	B (17)	NB-LTR	0.47	17 (42)	C (22)	NB-LTR	0.34	17 (34)
		SB-LT	0.49	16 (40)		SB-LT	0.75	47 (81)
		SB-R	0.42	0 (15)		SB-R	0.46	10 (31)
		EB-L	0.34	7 (20)		EB-L	0.71	42 (76)
		EB-T	0.13	6 (18)		EB-T	0.34	33 (55)
		EB-R	0.02	0 (0)		EB-R	0.10	0 (6)
		WB-L	0.02	1 (3)		WB-L	0.05	2 (7)
		WB-TR	0.67	46 (95)		WB-TR	0.66	51(84)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.

Lloyd Street at Brady Street Intersection

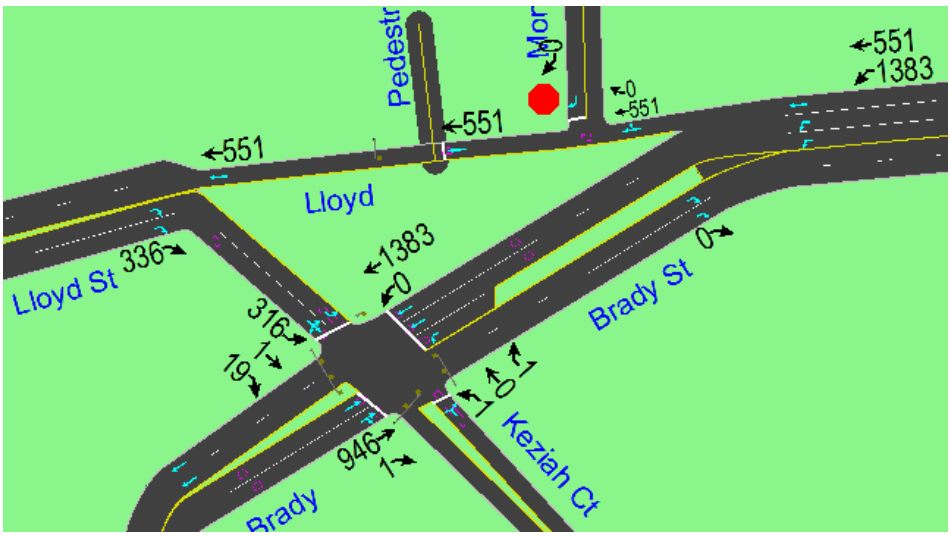
The intersection of Lloyd Street with Brady Street and Keziah Court has non-standard geometry and lane configurations, which are depicted in **Figure 15**.

At the Mathew Street intersection, the westbound lanes on Lloyd Street split into two lane groups. A westbound curb lane begins and continues as a single lane past the Brady Street intersection. The two southwest-bound lanes on the Kingsway become Lloyd Street at the Mathew Street intersection. At Mont Adam Street, they bend left and become Brady Street. Keziah Court is a cul-de-sac on the southeast corner of the intersection. The lane configurations at the Lloyd / Brady / Keziah intersection are as follows:

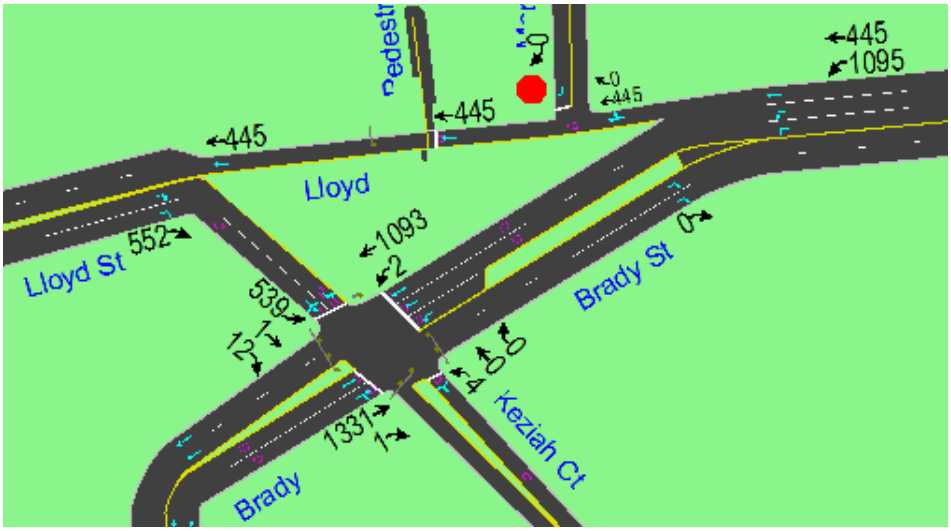
- Lloyd Street – Brady Street southwest-bound: dual through lanes and an exclusive left turn lane;
- Keziah Court: shared left/right lane;
- Brady Street northeast-bound: dual through lanes with a shared right turn movement; and
- Lloyd Street southeast-bound: shared left/through/right lane and an exclusive left turn lane.

A signalized pedestrian crossing is provided on the Lloyd Street single lane westbound ramp. Although connected to the same traffic signal controller, the pedestrian activated traffic signal located on the westbound ramp operates independently from traffic signals at this intersection. In addition to the lane configurations, existing traffic volumes are also shown in **Figure 15**.

Figure 15: Lloyd Street at Brady Street – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

Site observations revealed that there can be queuing in the p.m. peak hour. However, the results of the capacity analysis indicate that this intersection operates at an acceptable LOS under existing traffic conditions, and that short term improvements are not required. The results of the intersection capacity analysis are summarized in **Table 15**.

Table 15: LOS Results – Lloyd Street and Brady Street / Keziah Court Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	B (13)	NB-LTR	0.01	0 (0)	C (21)	NB-LTR	0.02	1 (3)
		SB-L	0.62	28 (49)		SB-L	0.75	51 (82)
		SB-LTR	0.63	28 (49)		SB-LTR	0.78	52 (83)
		EB-TTR	0.41	33 (60)		EB-TTR	0.64	82 (129)
		WB-L	0	0 (0)		WB-L	0.01	0 (1)
		WB-TT	0.60	59 (103)		WB-TT	0.52	61 (96)

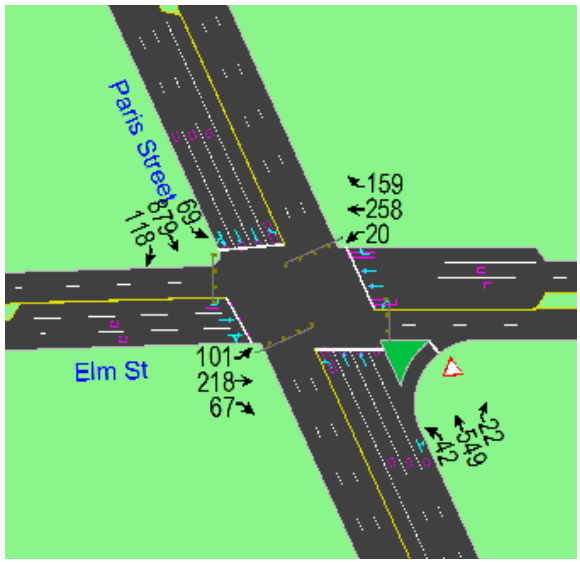
Lloyd Street / Elm Street at Notre Dame Avenue / Paris Street Intersection

The intersection of Lloyd Street / Elm Street and Notre Dame Avenue/Paris Street is signalized with four legs. The lane configuration of each approach is as follows:

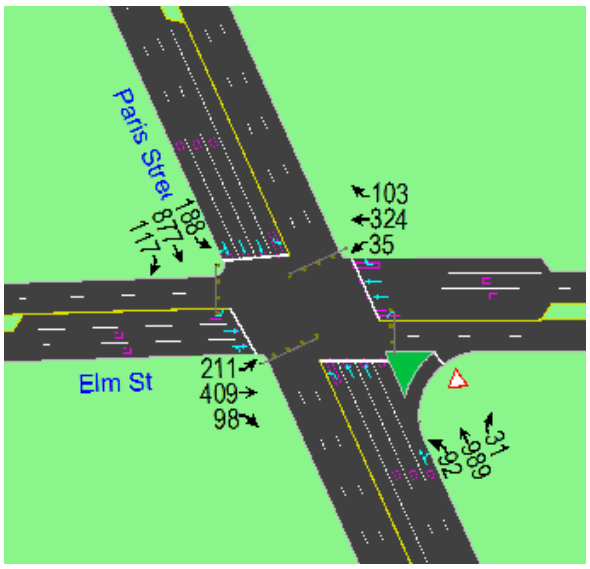
- Northbound and southbound: three through lanes with a shared right turn movement and an exclusive left turn lane;
- Eastbound: two through lanes with a shared right turn movement and an exclusive left turn lane; and
- Westbound: two through lanes and exclusive left and right turn lanes.

The existing traffic volumes and lane configurations at this intersection are illustrated in **Figure 16**.

Figure 16: Lloyd Street / Elm Street at Notre Dame Avenue / Paris Street – Peak Hour Volumes / Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

Results of the capacity analysis indicate that this intersection operates at an acceptable LOS and without critical movements in both the a.m. and p.m. peak hours. Moreover, the results suggest that the current lane configuration has sufficient capacity to accommodate considerable additional traffic demand, hence no improvements are currently required at this intersection.

The results of the intersection capacity analysis are summarized in **Table 16**.

Table 16: LOS Results – Lloyd Street / Elm Street and Notre Dame / Paris Street Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (27)	NB-L	0.20	8 (12)	C (32)	NB-L	0.44	17 (22)
		NB-TTTR	0.34	41 (53)		NB-TTTR	0.72	83 (106)
		SB-L	0.20	9 (17)		SB-L	0.72	25 (49)
		SB-TTTR	0.58	67 (82)		SB-TTTR	0.61	67 (82)
		EB-L	0.21	13 (23)		EB-L	0.48	29 (45)
		EB-TTR	0.21	17 (26)		EB-TTR	0.37	37 (51)
		WB-L	0.07	3 (9)		WB-L	0.15	6 (14)
		WB-TT	0.24	23 (33)		WB-TT	0.30	29 (41)
		WB-R	0.28	0 (14)		WB-R	0.18	0 (5)

Paris Street at Brady Street Intersection

Paris Street at Brady Street is a major downtown intersection, with Tom Davies Square located on the northwest corner. The lane configuration of each approach is as follows:

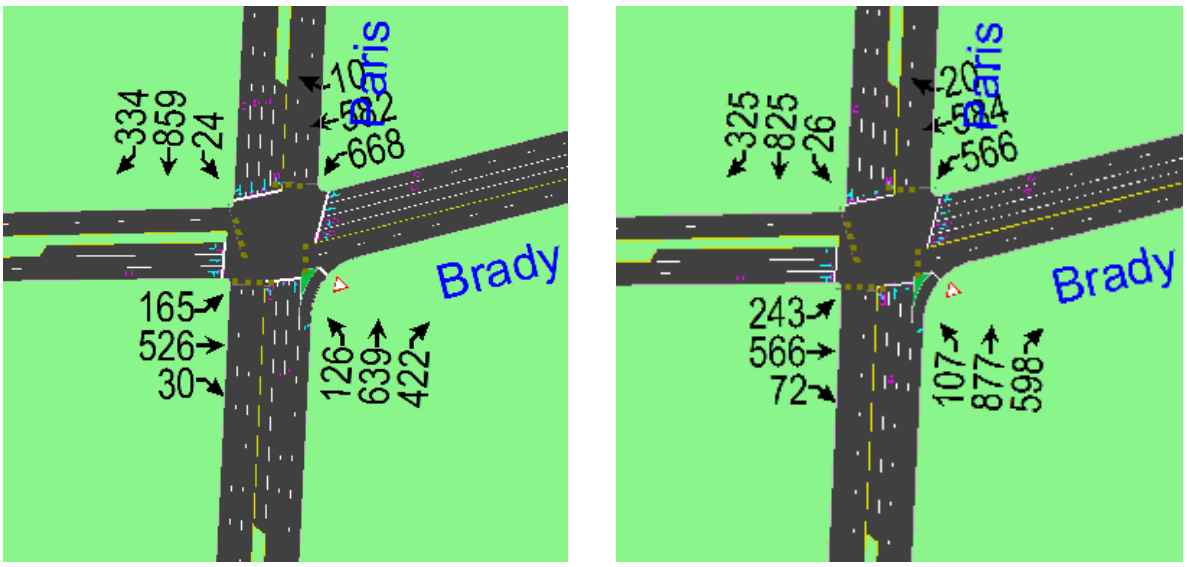
- Northbound and southbound: two through lanes plus a curbside lane that feeds into both a through lane and a channelized right turn lane, as well as an exclusive left turn lane;
- Westbound: two left turn lanes and two through lanes with a shared right turn movement; and
- Eastbound: two through lanes with a shared right through movement, and an exclusive left turn lane.

There are significant westbound left turn and northbound right turn demands at this intersection. Demands of 668 and 566 westbound left turns, and 422 and 598 northbound right turns were observed during the a.m. and p.m. peak hours, respectively.

The sum of the northbound through and right turn volumes is 1,061 and 1,475 in the a.m. and p.m. peak hours, respectively. When choosing a lane from multiple alternatives, drivers look for the lane that appears to be the least utilized, leading to an even distribution of volumes across the lanes. Based on this assumption, the expected volume for each of the three northbound lanes available to through traffic and right turners is 354 and 492 in the a.m. and p.m. peak hours, respectively.

The curbside lane is the only lane available to right turners, hence all vehicles making that movement use that lane. As the surveyed right turn volumes are in excess of the expected total volume (including through traffic) for the curbside lane, that lane operates as a de facto right turn only lane during both peak hours. In order to accurately represent the operation on the ground, the northbound movement has therefore been modelled with two through lanes and a channelized right turn lane. The existing traffic volumes and modelled lane configurations at this intersection are illustrated in **Figure 17**.

Figure 17: Paris Street at Brady Street – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes **Existing P.M. Peak Volumes**

Under current conditions, this intersection operates at an overall acceptable LOS during both the a.m. and p.m. peak hours. However, the westbound left turn movement experiences capacity constraints, operating with v/c ratios of 1.04 and 0.93 during the a.m. peak and p.m. peak hours, respectively.

Theoretically, v/c ratios for existing conditions cannot be greater than 1.0 since the observed volumes used in the analysis represent 'supply' volumes that were served at the intersection and therefore must be at or below the capacity of the intersection. The high v/c ratios may be the result of the overly conservative parameters used in the Synchro analysis for the existing traffic conditions. In practice, westbound left-turning drivers may adjust their driving style and use an extra second of the intergreen period to perform their manoeuvre. If this is assumed, the v/c ratio for that movement is 0.99.

The existing intersection capacity deficiencies could be mitigated by optimizing the amount of green time given to each phase in the existing signal timing plans. Following this optimization, all intersection movements will operate with a v/c ratio at or below 0.9. The results of the intersection capacity analysis are summarized in **Table 17**.

Table 17: LOS Results – Paris Street / Brady Street Intersection

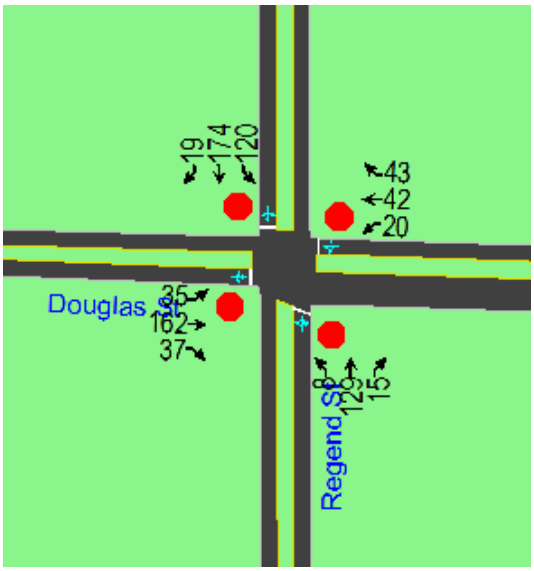
Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	D (43)	NB-L	0.58	27 (39)	D (37)	NB-L	0.51	16 (17)
		NB-TT	0.50	77 (77)		NB-TT	0.69	95 (95)
		NB-R	0.51	51 (55)		NB-R	0.69	43 (44)
		SB-L	0.08	1 (2)		SB-L	0.12	1 (2)
		SB-TTTR	0.79	89 (108)		SB-TTTR	0.76	86 (103)
		EB-L	0.71	35 (#80)		EB-L	0.79	55 (#124)
		EB-TTR	0.75	60 (77)		EB-TTR	0.82	70 (89)
		WB-LL	**1.04**	~90 (#158)		WB-LL	**0.93**	~73 (#131)
		WB-TTR	0.64	65 (83)		WB-TTR	0.76	66 (84)
Scenario 2 = Scenario 1 + Optimized Signal Timings	C (33)	NB-L	0.70	17 (#39)	D (38)	NB-L	0.59	14 (17)
		NB-TT	0.59	71 (94)		NB-TT	0.79	81 (98)
		NB-R	0.55	50 (86)		NB-R	0.76	24 (32)
		SB-L	0.10	1 (2)		SB-L	0.15	3 (7)
		SB-TTTR	**0.90**	91 (#117)		SB-TTTR	**0.85**	89 (105)
		EB-L	0.71	36 (57)		EB-L	**0.85**	53 (#92)
		EB-TTR	0.68	59 (77)		EB-TTR	0.70	69 (88)
		WB-LL	**0.89**	75 (#103)		WB-LL	0.88	64 (#91)
		WB-TTR	0.52	56 (74)		WB-TTR	0.60	64 (81)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.
~: Volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

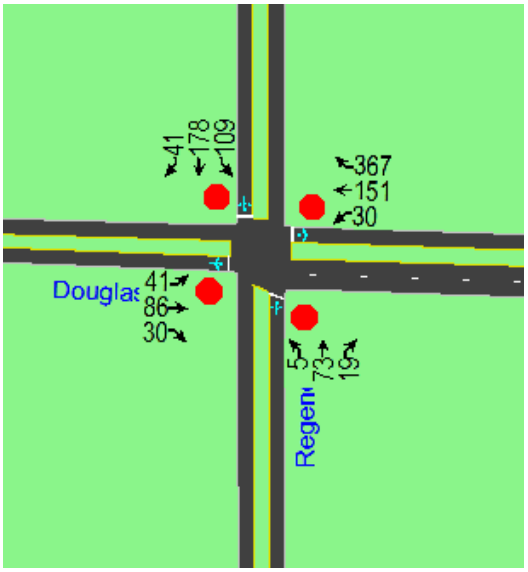
Douglas Street at Regent Street Intersection

The Douglas Street / Regent Street intersection is the only all-way stop controlled intersection in the list of those identified for inclusion in this analysis of existing conditions. One consideration is whether or not traffic signals are warranted. A single shared left/through/right lane is present on each of the approaches to this intersection. This is illustrated in **Figure 18,** along with the existing traffic volumes.

Figure 18: Douglas Street at Regent Street – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

The capacity analysis results indicate that this intersection is over capacity during the p.m. peak hour, with a LOS of F. This is caused by the heavy westbound demand, particularly vehicles turning out of Douglas Street to head north on Regent Street. On this approach, the volume / capacity ratio is shown as 1.00. The high v/c ratios are the result of the overly conservative parameters used in the Synchro analysis for the existing traffic conditions.

A traffic signal warrant analysis was conducted based on the methodology from Book 12 of the Ontario Traffic Manual. This analysis indicated that signalization of this intersection is appropriate; the detailed results are provided in **Appendix B**. It should be noted that, according to OTM Book 12, the turning movement count data used in the warrant analysis should cover 8 hours.

On the westbound approach, there is less than 105 metres of storage length available to accommodate vehicle queues without compromising the operation of the neighbouring Douglas Street / Lorne Street intersection. In order to minimize the risk of this occurring, utilization of a signal timing plan with a short cycle length is recommended. The results of the capacity analysis based on the existing lane configurations and a cycle length of 60 seconds indicate that traffic conditions would be acceptable during both the a.m. and p.m. peak hours.

It is our understanding that, if feasible, exclusive left turn lanes will be provided at all approaches of this intersection; these are typically provided to prevent blockage of through movements by a left turn vehicle waiting for a suitable gap in the opposing traffic. Adequate space is available to accommodate a left turn lane on the eastbound and westbound approaches, however the northbound and southbound approaches are constrained. Consequently, capacity analysis was undertaken for a third scenario assuming that, in addition to the signalization, a left turn lane will be provided on the eastbound and westbound approaches.

The results of the intersection capacity analysis are summarized in **Table 18**.

Table 18: LOS Results – Douglas Street / Regent Street Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	**Movement**	**V/C Ratio**	**Percentile Queues 50th (95th)**	**LOS (Delay in Seconds)**	**Movement**	**V/C Ratio**	**Percentile Queues 50th (95th)**
Scenario 1 = Existing Conditions	C (16)	NB-LTR	0.30	-- (--)	F (85)	NB-LTR	0.24	-- (--)
		SB-LTR	0.58	-- (--)		SB-LTR	0.73	-- (--)
		EB-L	0.08	-- (--)		EB-L	0.11	-- (--)
		EB-TR	0.42	-- (--)		EB-TR	0.29	-- (--)
		WB-L	0.05	-- (--)		WB-L	0.07	-- (--)
		WB-TR	0.18	-- (--)		WB-TR	**1.00**	-- (--)
Scenario 2 = Scenario 1 + Signalization	B (14)	NB-LTR	0.26	8 (16)	B (16)	NB-LTR	0.16	6 (15)
		SB-LTR	0.65	22 (38)		SB-LTR	0.64	29 (57)
		EB-LTR	0.55	17 (36)		EB-LTR	0.32	9 (17)
		WB-LTR	0.25	4 (13)		WB-LTR	0.81	31 (51)
Scenario 3 = Scenario 2 + Exclusive EB and WB LT lanes	B (13)	NB-LTR	0.26	7 (16)	B (16)	NB-LTR	0.15	5 (14)
		SB-LTR	0.65	19 (38)		SB-LTR	0.57	27 (52)
		EB-L	0.12	2 (8)		EB-L	0.35	3 (9)
		EB-TR	0.45	13 (29)		EB-TR	0.20	6 (13)
		WB-L	0.08	1 (5)		WB-L	0.08	2 (6)
		WB-TR	0.20	3 (10)		WB-TR	0.80	28 (49)

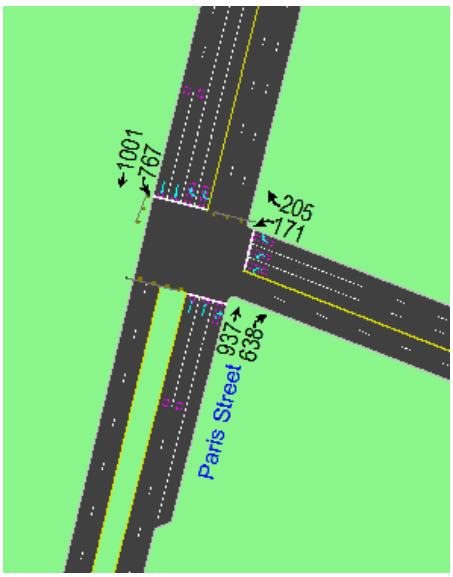
Ramsey Lake Road at Paris Street Intersection

The signalized intersection of Ramsey Lake Road and Paris Street provides access to Health Sciences North and Laurentian University. The lane configuration of each approach is as follows:

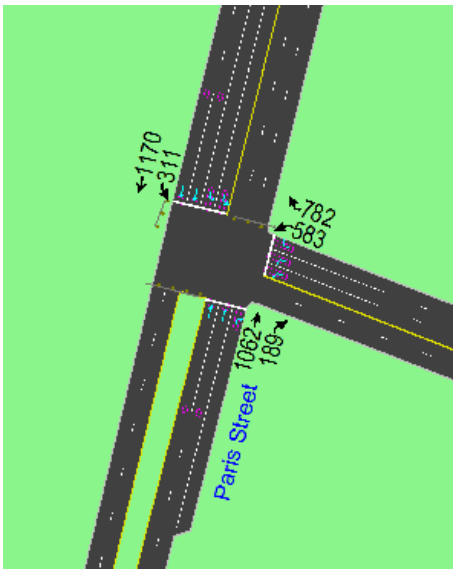
- Northbound: two through lanes and an exclusive right turn lane;
- Southbound: dual left turn lanes and two through lanes;
- Westbound: dual left turn lanes and an exclusive right turn lane; and
- There is no eastbound approach.

The traffic patterns observed at this intersection reflect its function providing access to the hospital and the university. There is a significant inbound traffic demand during the a.m. peak hour with the opposite occurring during the p.m. peak hour. The traffic counts indicate a demand of 767 southbound left turns and 638 northbound right turns during the a.m. peak hour; 583 left turns and 782 right turns were counted on the westbound approach during the p.m. peak hour. The existing traffic volumes and lane configurations are illustrated in **Figure 19**.

Figure 19: Ramsey Lake Road at Paris Street – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes



Existing P.M. Peak Volumes

While this intersection operates at an overall acceptable LOS during both the a.m. and p.m. peak hours, some individual movements experience capacity constraints. The northbound right turn movement operates with a v/c ratio of 1.01 during the a.m. peak hour, and the westbound right turn movement operates with a v/c ratio of 1.07 during the p.m. peak hour. Theoretically, v/c ratios for existing conditions cannot be greater than 1.0 since the observed volumes used in the analysis represent 'supply' volumes that were observed at the intersection and therefore must be at or below the capacity of the intersection. The high v/c ratios are the result of the overly conservative parameters used in the Synchro analysis for the existing traffic conditions.

Optimization of the existing traffic signal plans results in no significant improvements during the a.m. and p.m. peak hours. The results of the intersection capacity analysis are summarized in **Table 19**.

Table 19: LOS Results – Ramsey Lake Road / Paris Street Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (29)	NB-TT	0.41	87 (109)	C (34)	NB-TT	0.80	106 (12)
		NB-R	**1.01**	~142 (#216)		NB-R	0.32	28 (45)
		SB-LL	0.66	56 (74)		SB-LL	0.71	35 (39)
		SB-TT	0.37	3 (7)		SB-TT	0.62	81 (90)
		WB-LL	0.42	18 (27)		WB-LL	0.48	53 (70)
		WB-R	0.28	19 (27)		WB-R	**1.07**	~177 (#213)
Scenario 2 = Scenario 1 + Optimized Signal Timings	C (32)	NB-TT	0.68	84 (117)	C (33)	NB-TT	**0.89**	115 (#145)
		NB-R	**1.03**	134 (#230)		NB-R	0.35	31 (50)
		SB-LL	0.65	91 (106)		SB-LL	**0.94**	32 (#49)
		SB-TT	0.37	48 (83)		SB-TT	0.70	30 (43)
		WB-LL	0.42	18 (27)		WB-LL	0.40	45 (60)
		WB-R	0.27	18 (32)		WB-R	**0.97**	142 (#211)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.
~: Volume exceeds capacity, queue is theoretically infinite. Queue shown is the maximum after two cycles.

Looking toward the long term accessibility of this area, a possible southern access to the University to better distribute traffic demand is shown in the City's Official Plan. That potential initiative is discussed in the analysis of future travel demands, provided in subsequent sections of the report.

Laurentian University prepared a Campus Plan in the fall of 2013, which identified future development levels and uses and planned for future growth in the student population. Additionally, 400 students from the Faculty of Architecture are now being housed in a building downtown, so improved linkages are required between that facility and the main campus.

Alternatives to the South Bay Road extension include a focus on improving transit and high occupancy vehicle access to this area in order to reduce growth in auto demand. Possible ways to accomplish this include: transit priority signals at the Ramsey Lake Road intersection, transit-only queue jump lanes; an increase in transit service frequency; and parking policies at the University and Hospital which support higher occupancy vehicle use and other travel demand management measures. A joint City/University/Hospital travel management committee should be considered to assist in managing demands to this area.

Cycling could also be part of the long term accessibility solution. The existing two-way cycle path along the northbound lanes of Paris Street should be connected to the multiuse path along the eastbound lanes of Ramsey Lake Road. Eliminating or minimizing this discontinuity should be considered in the planning of future improvements to this intersection.

The potential for a new road parallel to Ramsey Lake Road should also be considered. It is recommended that an Environmental Assessment be undertaken to review potential alignments and compare the costs and benefits those associated with the widening of Ramsey Lake Road and other measures. Modifications to the geometry, lane allocations and signal operation of the Ramsey Lake Road / Paris Street intersection, along with connections to Paris Crescent and Walford Road associated with the potential alignments, should be evaluated as part of this holistic review.

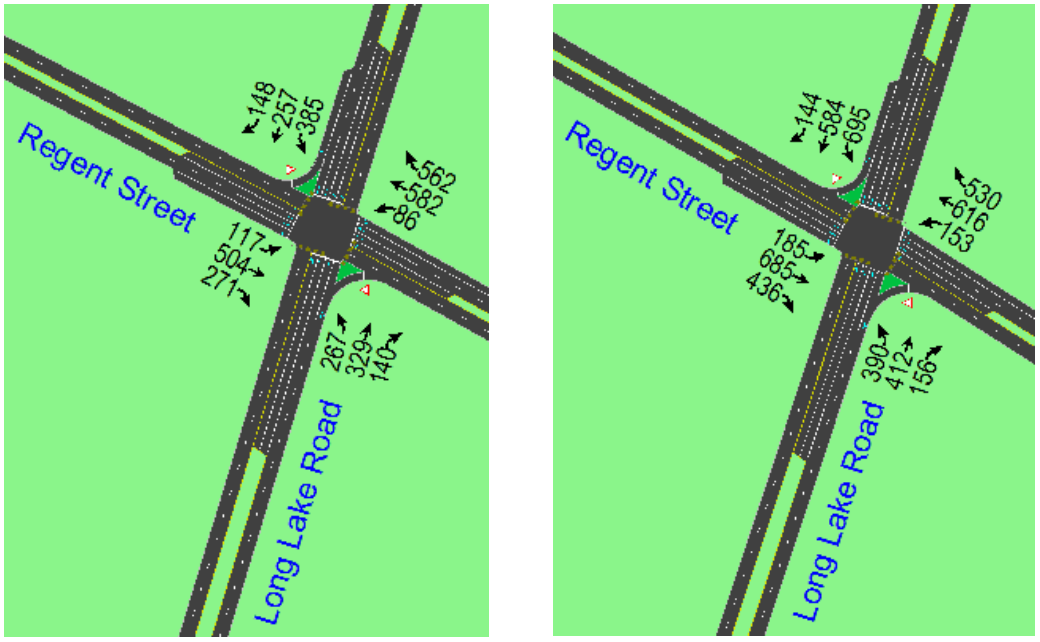
Regent Street at Paris Street / Long Lake Road Intersection (Four Corners)

The intersection of Regent Street and Paris Street / Long Lake Road, known locally as the Four Corners, is a major signalized intersection in the southern portion of the city with heavy traffic volumes in the a.m. and p.m. peak hours. The lane configuration of each approach is as follows:

- Northbound: dual left turn lanes, two through lanes with a shared right turn movement;
- Southbound: dual left turn lanes, two through lanes and a channelized right turn lane; and
- Westbound and eastbound: two through lanes, an exclusive left turn lane, and an exclusive right turn lane.

The existing traffic volumes and lane configurations at this intersection are illustrated in **Figure 20**.

Figure 20: Regent Street at Paris Street / Long Lake Road – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes **Existing P.M. Peak Volumes**

Results of the capacity analysis indicate that that this intersection operates with an acceptable LOS and without critical movements during both the a.m. and p.m. peak hours. Moreover, it was confirmed that the existing traffic signal plans are currently adequate and that optimization will only result in nominal improvements to the levels of service, hence no short term improvements are required at this intersection. The results of the intersection capacity analysis are summarized in **Table 20**.

Table 20: LOS Results – Regent Street / Paris Street Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	Volume to Capacity (V/C) Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (28)	NB-LL	0.37	26 (42)	D (38)	NB-LL	0.50	45 (61)
		NB-TTR	0.64	45 (69)		NB-TTR	0.73	67 (87)
		SB-LL	0.58	41 (60)		SB-LL	0.82	89 112)
		SB-TT	0.37	26 (41)		SB-TT	0.66	73 (93)
		SB-R	0.10	0 (0)		SB-R	0.10	0 (0)
		EB-L	0.38	15 (33)		EB-L	0.75	33 (#52)
		EB-TT	0.45	47 (79)		EB-TT	0.73	87 (109)
		EB-R	0.41	0 (21)		EB-R	0.63	7 (39)
		WB-L	0.24	11 (26)		WB-L	0.72	27 (#45)
		WB-TT	0.55	55 (90)		WB-TT	0.68	77 (97)
		WB-R	0.70	2 (39)		WB-R	0.71	3 (38)
Scenario 2 = Scenario 1 + Optimized Signal Timings	C (27)	NB-LL	0.37	26 (42)	D (38)	NB-LL	0.50	45 (61)
		NB-TTR	0.64	45 (69)		NB-TTR	0.73	67 (87)
		SB-LL	0.58	41 (60)		SB-LL	0.82	89 (112)
		SB-TT	0.37	26 (41)		SB-TT	0.66	73 (93)
		SB-R	0.10	0 (0)		SB-R	0.10	0 (0)
		EB-L	0.40	15 (33)		EB-L	0.75	33 (#52)
		EB-TT	0.42	44 (74)		EB-TT	0.73	87 (109)
		EB-R	0.39	0 (19)		EB-R	0.63	7 (39)
		WB-L	0.26	11 (26)		WB-L	0.72	27 (#45)
		WB-TT	0.53	53 (87)		WB-TT	0.68	77 (97)
		WB-R	0.69	1 (35)		WB-R	0.71	3 (38)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.

This intersection is built out and the scope for further expansion is constrained by existing properties and topography. However, substantial commercial development is proposed in the vicinity of this intersection, including the Southridge Mall Expansion, Long Lake Retail Centre and First Nickel Shopping Centre. This area was the subject of the *South End Traffic Studies Peer Review* completed by AECOM in December 2008, which indicated that the forecast traffic from the proposed commercial developments could not be accommodated at this intersection. In addition, the planned road improvements shown in the City's transportation master plan at the time of the 2008 report are not expected to alleviate traffic congestion at the intersection to a level that would support all proposed developments. In order to accommodate the forecast traffic, the 2008 report recommends that the intersection be reconstructed as an interchange, acknowledging that such a measure would involve acquisitions, controlled access to private property, significant utility relocations and considerable construction costs. This would also require an assessment to be undertaken in line with the Municipal Class EA Guideline for Schedule C road projects.

The report also suggested that the City consider the socio-economic needs of the community and long-term sustainable mobility solutions in this part of the city. Creating an interchange at this location would represent an erosion of the urban fabric of the City and could have a negative effect on the growth and development of the area. It is recommended that the City conduct an integrated urban design, land use and transportation study engaging developers and the local community to form a unified vision for the area. This would leverage the current dynamic activity to create a node for intensification with a focus on accommodating growth through non-auto modes to provide a more sustainable solution than the creation of a new interchange. The study would need to address opportunities for new road links as well as changes in density and urban form in the area.

Creating this multi-modal node would be a medium term solution for this intersection. In the short term, a traffic management association should be set up involving landowners, business operators, Greater Sudbury Transit and the city to explore ways to manage demand. For example, employees could park off-site and be shuttled to work; where possible, shift changes could be staggered to move traffic demand away from the network peak hours.

M.R. 24 at M.R. 55 Intersection

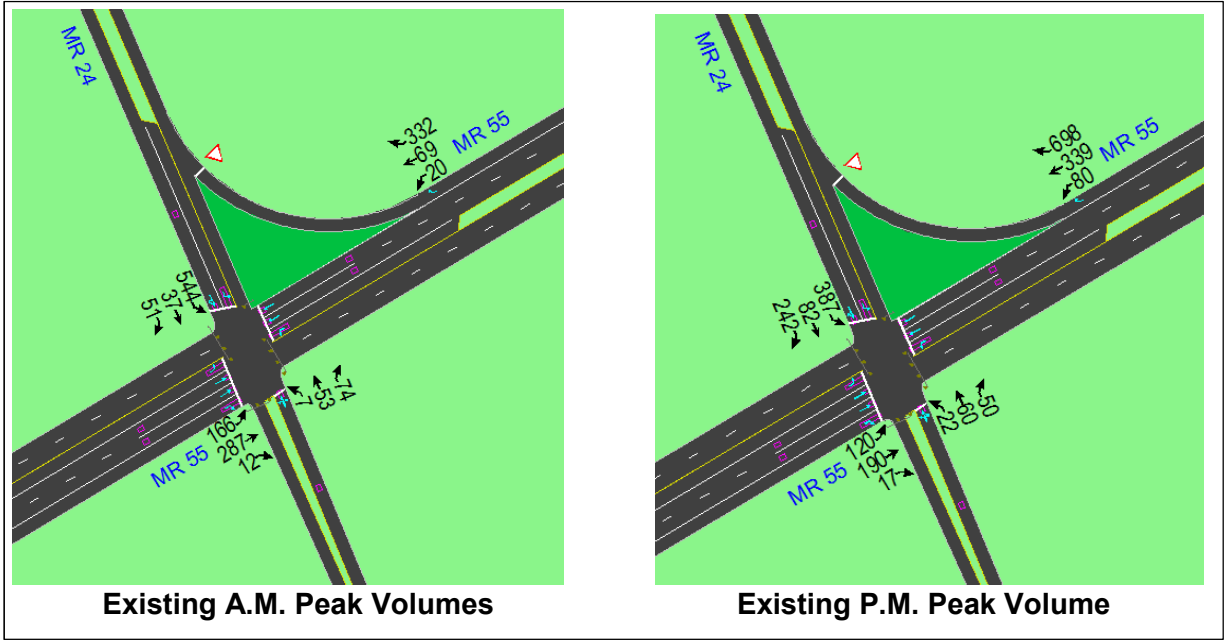
The signalized intersection of M.R. 24 and M.R. 55 has four legs and lies in the community of Lively, in the southwestern portion of Greater Sudbury. The lane configuration of each approach is as follows:

- Northbound: a single shared left/though/right lane;
- Eastbound: two through lanes, and exclusive left and right turn lanes;
- Westbound: two through lanes, an exclusive left turn lane, and a channelized right turn lane; and
- Southbound: an exclusive left turn lane and a shared through/right lane.

There is a two-stage signalized pedestrian crosswalk over the western leg; a crosswalk is marked over the southern leg, however no pedestrian signals are present.

The traffic counts indicate a demand of 544 and 387 southbound left turns during the a.m. and p.m. peak hours, respectively; the volume of westbound right turns observed was 332 and 698 in those periods. The existing traffic volumes and lane configurations at this intersection are illustrated in **Figure 21**.

Figure 21: M.R. 24 at M.R. 55 – Peak Hour Volumes / Lane Configuration



Existing A.M. Peak Volumes **Existing P.M. Peak Volume**

Currently, split phasing is provided for the northbound and southbound movements. Results of the capacity analysis indicate that the southbound movement experiences capacity constraints and long vehicle queues during the a.m. peak hour, which is consistent with traffic conditions observed during the site visit. This intersection operates at an acceptable LOS during the p.m. peak hour.

Approximately 90 metres north of this interaction along M.R. 24 there is a railway crossing. For a prolonged period of time during the a.m. peak hour, southbound vehicle queues were observed to extend beyond and block the railway crossing, as illustrated in **Figure 22**. A sign warning motorists not to do this is installed upstream of the crossing but compliance was observed to be very low. If a driver sitting on the crossing were not to notice the railway signals activating, or were blocked in and unable to exit the queue of traffic, a passing train may collide with that vehicle.

Figure 22: M.R. 24 at M.R. 55 – Southbound Queues Extending Beyond Railway Crossing

A safety review should be undertaken on the design of the crossing and the operation of the M.R. 24 / M.R. 55 intersection. The latter could be modified to minimize the risk of vehicle queues on the southbound approach stretching back as far as the railway crossing. Of the improvements considered, elimination of the existing split phasing arrangement and construction of a short exclusive northbound right turn lane were preferred. The greatest effect is likely to be attributable to the change in phasing. This cannot be combined with the potential conversion of the southbound curb lane to a shared left-through-right lane, for safety reasons and due to the likelihood of left-turners from that lane blocking other movements while waiting for a gap in opposing traffic. Results of the capacity analysis indicate that the available storage space between the intersection and the railway crossing would be sufficient to accommodate the projected 50th percentile queues. The results of the intersection capacity analysis are summarized in **Table 21**.

Table 21: LOS Results – M.R. 24 at M.R. 55 Intersection

Scenario	A.M. Peak Hour				P.M. Peak Hour			
	LOS (Delay in Seconds)	Movement	Volume to Capacity (V/C) Ratio	Percentile Queues 50th (95th)	LOS (Delay in Seconds)	Movement	V/C Ratio	Percentile Queues 50th (95th)
Scenario 1 = Existing Conditions	C (27)	NB-LT	0.32	10 (23)	C (21)	NB-LT	0.59	22 (47)
		NB-R	0.23	0 (0)		NB-R	0.59	22 (47)
		SB-L	0.76	62 (95)		SB-L	0.74	70 (108)
		SB-TR	0.11	3 (10)		SB-TR	0.56	30 (59)
		EB-L	**0.91**	31 (#77)		EB-L	0.62	20 (#55)
		EB-TT	0.28	20 (39)		EB-TT	0.20	14 (28)
		EB-R	0.02	0 (0)		EB-R	0.03	0 (0)
		WB-L	0.15	4 (11)		WB-L	0.55	13 (#40)
		WB-TT	0.10	6 (12)		WB-TT	0.46	26 (48)
		WB-R	0.58	0 (24)		WB-R	0.79	0 (#44)
Scenario 2 = Scenario 1 + Split Phasing + New Northbound Right Turn Lane	C (27)	NB-LT	0.32	10(23)	C (21)	NB-LT	0.44	13 (30)
		NB-R	0.23	0 (0)		NB-R	0.14	0 (0)
		SB-L	0.76	62 (95)		SB-L	0.61	40 (60)
		SB-TR	0.11	3 (10)		SB-TR	0.38	7 (19)
		EB-L	**0.91**	31 (#77)		EB-L	0.78	20 (#62)
		EB-TT	0.27	20 (39)		EB-TT	0.20	14 (28)
		EB-R	0.02	0 (0)		EB-R	0.03	0 (0)
		WB-L	0.17	4 (11)		WB-L	0.54	13 (#40)
		WB-TT	0.10	6 (12)		WB-TT	0.42	25 (47)
		WB-R	0.58	0 (24)		WB-R	0.77	0 (38)

#: 95th percentile volume exceeds capacity: queue may be longer. Queue shown is the maximum after two cycles.

Site observations suggested that the railway and traffic signals at this intersection operate completely independently without any type of coordination. When the signals at the railway crossing were in operation, the northbound and southbound traffic signal phases were still available even though northbound traffic had to stop at the railway crossing. This resulted in vehicle queues spilling back into the intersection, as illustrated in **Figure 23**. This could result in significant operational safety and operational concerns, especially when the railway crossing is closed for an extended period of time due to the passing of very long trains. It is recommended that the operation of the railway crossing and intersection traffic signals be coordinated using readily available pre-emptive signal technology. Only the eastbound and westbound through movements, which do not conflict with the railway crossing, should receive a green traffic signal indication while the railway crossing is in operation. For the same reason, the fully protected eastbound left turn should not coincide with the operation of the railway crossing. Consideration should be given to increasing the storage length for that movement to reduce the risk of the left-turn queue extending into the through lane and the potential occurrence of rear-end collisions with fast-moving through vehicles.

Figure 23: M.R. 24 at M.R. 55 – Northbound Queues Spilling Back into the Intersection

2.3 Existing Active Transportation Network

2.3.1 Existing Cycling and Pedestrian Networks

The first step in developing a successful Active Transportation (AT) network for the City of Greater Sudbury was to assemble and assess key background information, including existing and previously proposed pedestrian and cycling facilities. This was a crucial step, as it provided a detailed understanding of active transportation facilities currently on the ground or proposed for consideration by the City. This was the basis for identifying key missing links, spine connections and routes to key community destinations as part of an overall AT network.

City staff provided the study team with a Geographical Information System (GIS) database and digital aerial photography for the entire municipality. The information included:

- Existing and proposed roads;
- Posted speed limits;
- Existing sidewalks and walkways;
- Points of interest and attractions (including recreational facilities and schools);
- Existing and proposed on-road cycling routes;
- Existing and proposed trails; and
- Parks, lakes and watercourses.

In addition, a significant number of background materials, such as policies and plans, were reviewed to further inform the development of the inventory of existing conditions. The sources, that were considered when preparing the inventory mapping include:

- Ontario Provincial Policy Statement;
- Growth Plan for Northern Ontario;
- City of Greater Sudbury Official Plan;
- Sustainable Mobility Plan and Bicycling Technical Master Plan, prepared by volunteer groups and received by City Council but not formally adopted;
- Rainbow Routes Mapping;
- Trails for Active Transportation: City of Greater Sudbury Report;
- Downtown Sudbury: A Plan for the Future; and
- Pedestrian Crossing Policy Report.

For a more detailed description of these policies and plans, as well as a review of how they influence the development of active transportation facilities in Greater Sudbury please refer to **Section 3**. The AT related information presented in these documents was used to prepare context maps and served as the framework to guide the development of the AT Plan as a component of the City of Greater Sudbury's Transportation Master Plan.

Major Destinations and Attractions

When developing the AT Plan, major active recreation attractions and destinations were identified based on input from the Sustainable Mobility Advisory Panel, local agencies and stakeholders. Key attractions and destinations included but were not limited to:

- Major commercial and employment centres;
- Educational institutions;
- Municipal buildings and civic centres;
- Parks and trail areas;
- Public lands;

- Natural heritage areas; and
- Environmentally sensitive lands.

Responses from stakeholder consultation indicated that some key existing or future attractions and destinations in the City of Greater Sudbury include:

- Laurentian University;
- Cambrian College;
- Downtown Sudbury; and
- Science North.

Barriers

Another key element in assessing the existing AT conditions for the City of Greater Sudbury was the identification of real or perceived barriers. These can be defined as those things which could potentially interfere with the development of a well-connected and continuous network of AT facilities. Major barriers to walking and cycling in the City of Greater Sudbury include:

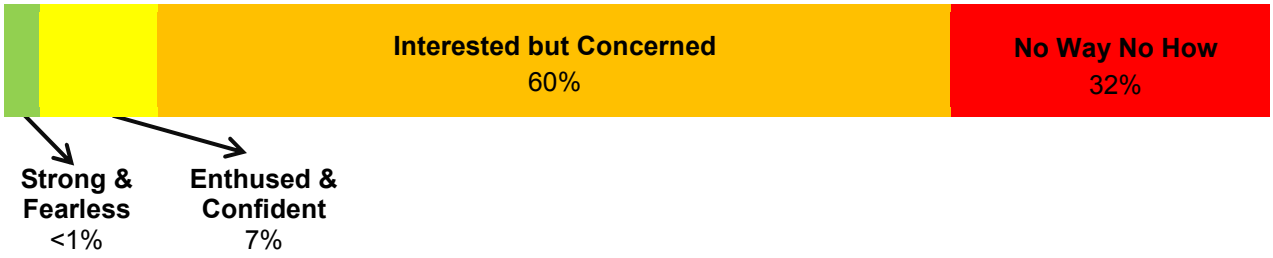
- Gaps in the sidewalk network;
- Physical barriers such as railways, hill topography, lakes and rivers;
- Lack of a "grid" road network in many areas;
- Large and complex intersections;
- Truck traffic;
- Accommodating the needs of a range of skill levels among users including experienced and casual cyclists; and
- Maintenance, including winter snow clearing and storage.

2.3.2 Pedestrian and Cycling Network User Groups

Cyclists

When developing a network of cycling facilities it is important to note that it is not a "one size fits all" approach. Cyclists come in all ages, shapes, sizes and skill levels and they have different reasons for cycling. The driving factors behind a person's reason to cycle can be utilitarian, such as commuting, recreational or for touring.

According to Book 18 of the Ontario Traffic Manual, the population can generally be divided into four groups with the following approximate relative sizes and characteristics:



Group 1: "Strong and Fearless" (<1% of the population)

- Tend to ride more frequently;
- Will typically cycle for both utilitarian and recreational purposes;
- Have advanced cycling skills and are comfortable riding alongside motorized traffic; and
- Will cycle regardless of roadway conditions, although users in this group may prefer to use on-street bike lanes.

Group 2: "Enthused and Confident" (7% of the population)

- May share the roadway with vehicular traffic; but
- Prefer to have their own designated area.

Group 3: "Interested but Concerned" (60% of the population)

- Avoid cycling in areas with medium to high volumes of motor vehicle traffic;
- Become discouraged by high-speed traffic, extreme topographic conditions and inconsistent bicycle facilities;
- Ride infrequently, typically around their immediate neighbourhood but are curious about cycling and would like to ride more;
- Do not have their own car, for example children or teenagers who would like to cycle to school or other activities but they (or their parents) are concerned for their safety; and
- May be attracted to cycling by the implementation of designated facilities, particularly separated and in-boulevard bicycle facilities which provide more space between cyclists and motorists.

Group 4: "No Way, No How" (32% of the population)

- Are not, and may never be, interested in cycling;
- May live in an area whose topography is not suited to cycling;
- May lack the skills or capability to cycle; and
- Have not and would not consider cycling as a mode of transportation.

The 'Interested but Concerned' and the 'Enthused and Confident' groups are the ones containing those who may be encouraged to cycle more if better infrastructure were in place; together, these represent around two-thirds of the population. As such, the provision of a comprehensive network of cycling facilities has strong potential to lead to greater level of participation within the City of Greater Sudbury. A network of active transportation and trail facilities accommodating all potential cyclists is needed: one which overcomes barriers and creates key links within the City, thus facilitating community connectivity and continuity.

Pedestrians

Improving conditions for pedestrians requires more than the development of a network of connected sidewalks and trails. It is essential to create a system that "engages" pedestrians, makes them comfortable and allows them to feel as though they are a priority. As the City of Greater Sudbury continues to grow, this approach should be considered at all stages of development.

The concept that “every street should be viewed as a pedestrian street” is a notion that was adopted in the York Region Pedestrian and Cycling Master Plan and should be incorporated into the City’s Active Transportation Master Plan (ATMP). The ATMP’s primary goals include: improving the environment for pedestrians of all ages and fitness levels; creating a system that is accessible for all types of users; and encouraging more people to walk more often.

2.3.3 Identification of Missing Links in the Active Transportation Network

The sidewalk network is fairly well developed in the downtown core of the City Greater Sudbury; however, outside of this area pedestrian facilities are discontinuous with a number of significant gaps and missing links. A key step in improving conditions for walking in the City is the identification of missing links in the existing sidewalk system, particularly on local roads. These can act as barriers discouraging walking, an issue that is especially critical in the urban areas of Greater Sudbury.

The development of a comprehensive and connected sidewalk system is also necessary to promote other forms of active transportation and the use of public transit. Since passengers begin and end each trip as pedestrians, these two travel modes should be viewed as being mutually dependent upon one another and their networks should be planned on that basis.

Currently the cycling network within the City is limited, including some off-road trails but limited on-road facilities such as bike lanes or signed routes. The existing cycling network and development of future cycling infrastructure may be further limited by the presence of barriers. These highlight deficiencies in the cycling network, they adversely affect the ability of active transportation users to travel effectively from their origins to their destinations and they will dissuade others against transferring their trips from other modes.

The existing cycling priority network in the City is shown in **Figure 24.**

FIGURE 24
Existing Active Transportation Conditions

Revisit. Review. Revise.
Revisitez. Reexaminez. Revisez.
Official Plan Review • Révision du Plan officiel

Legend

Existing On-Road Facilities
- Existing Bike Lane
- Existing Paved Shoulder
- Existing Signed Bike Route

Existing Off-Road Facilities
- Existing Multi-Use Trail

Existing Road Network
- Existing Provincial Road / Highway
- Existing Roads

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions

Other
- Lakes and Rivers
- Parks and Conservation Areas
- Active Railway
- Abandoned Railway

CHELMSFORD
AZILDA
LIVELY
VALLEY EAST
COPPER CLIFF
NEW SUDBURY
FALCONBRIDGE
GARSON
CONISTON
WAHNAPITAE

GARSON FOREST CONSERVATION AREA
MALEY CONSERVATION AREA
NICKELDALE CONSERVATION AREA
LAKE LAURENTIAN CONSERVATION AREA

DRAFT - APRIL 2015

N W E S

0 2 4 8 Kilometres

2.4 Public Consultation Regarding Existing Conditions

Public consultation was conducted with identified stakeholders and the general public in order to obtain a better understanding of existing conditions, current concerns and views on the future transportation network of Greater Sudbury.

Numerous methods were used to engage residents of Greater Sudbury and solicit feedback on the transportation network. In addition to face-to-face meetings, an online survey was developed and notices were distributed in newspapers, via the City's website and via City Facebook and Twitter accounts. The online survey, which requested feedback regarding residents' concerns on existing mobility and future improvements, is included in **Appendix C**.

This section summarizes public consultation with the Sustainable Mobility Advisory Panel, the Trucking Association and the general public, as engaged in Public Information Centre #1.

2.4.1 Meetings with Sustainable Mobility Advisory Panel

The Sustainable Mobility Advisory Panel (SMAP) has been engaged as a key stakeholder in helping to create a transportation master plan that supports the guiding principles of healthy communities, sustainability and economic vitality. Meetings with the SMAP were held in 2011 on August 18, November 23; in 2012 on January 12 and May 3; and on June 17, 2013. The purpose of these meetings was to obtain feedback from the SMAP on the direction of the study, to understand the completed and ongoing work of the SMAP and to gather feedback on the proposed active transportation routes.

2.4.2 Meeting with Mining and Trucking Industry Representatives

A consultation meeting was held with representatives of the mining and trucking industries on January 11, 2012 to introduce the purpose and schedule of the study and to obtain information and feedback on items of concern for industry. The participants predicted several areas of future growth in truck volumes and road corridors of concern. The route from Chelmsford to downtown Sudbury was identified as critical for the mining industry. Future mining activity projected north of Capreol and Victoria Mine will result in increased truck movements. Growth in the mining industry from Whitefish to Copper Cliff is expected to increase truck traffic in this area.

Attendees also discussed existing conflicts between trucks, pedestrians and cyclists. The consensus among the trucking representatives was for the provision of separate pathways away from motor vehicle traffic for these vulnerable users. Where a separate pathway is not available, they suggested wider partially or fully paved shoulders.

2.4.3 Public Information Centre #1

Public Information Centre (PIC) #1 was held on January 11, 2012, from 4 p.m. to 7 p.m. in Room C12 of the City Hall building at Tom Davies Square. The combined Notice of Study Commencement and announcement of PIC#1 is included in **Appendix D**. The PIC was structured as a drop-in meeting with presentation boards, which are included in **Appendix E**. The presentation boards addressed the process, schedule, and existing conditions for roads, cycling and pedestrian infrastructure. They also included interactive boards on which participants were asked to rank their choices and provide direct feedback on the proposed transportation solutions.

Extensive outreach was conducted leading up to the meeting to inform the general public. Prior to the PIC, an online survey was developed in English and French to solicit feedback from the public. Newspaper advertisements to promote the PIC and launch the online survey were run in the following newspapers on January 4, 2012:

- *Northern Life*;
- *Le Voyageur*; and
- *Sudbury Star*.

Newspaper advertisements to promote the online survey were run in the following newspapers during the week of January 9, 2012:

- *Valley Meteor*; and
- *Walden Today*.

Public service announcements in English and French to promote the January 11 PIC and online survey were distributed to the following groups on January 4, 2012:

- Local news media;
- Laurentian University, Cambrian College and College Boreal newspapers;
- Boards of Education;
- Community Action Networks;
- Rainbow Routes;
- Sudbury Trail Plan; and
- Advisory Panels (via Clerk's Office).

Additional outreach measures to promote the PIC and online survey included:

- Advertising on Facebook during the five days prior to the Transportation Study PIC (January 6 to 10);
- Twitter announcements about the PIC;
- Introductory web content for the Official Plan has been posted on the City of Greater Sudbury web site at the following URLs:
    - www.greatersudbury.ca/officialplan (English);
    - www.greatersudbury.ca/planofficiel (French);
    - The online survey was accessible from both the English and French Official Plan websites;
- Transportation Study updates were posted in CGS News, which is distributed via e-mail to all City of Greater Sudbury employees on Mondays; and
- A message to City of Greater Sudbury employees was posted on the Chief Administrative Officer's blog. The message informed employees about the Transportation Study and its importance, and encouraged them to participate in the consultation process and talk about it with their families and friends.

The PIC was conducted as a drop-in open house and over 100 people attended throughout the evening. Attendees were given the opportunity to read about the study through a series of 20 poster boards, visual displays and discussions with representatives from the City and MMM Group. Attendees were encouraged to actively participate in the development of the study through comment sheets, poster board polls and an online survey. Several maps on poster boards were displayed for the purpose of having attendees post their comments about a specific location. The online survey was made available during the PIC.

There were a number interactive poster boards at the PIC on which attendees could cast votes in a poll or write comments on a map about concerns or ideas regarding specific locations. The

first poll-related question asked participants to identify what should be focused on in the evaluation of the study. The feedback received is illustrated in **Table 22**.

Table 22: Focus of the Transportation Study Report

Ranking of Most Important Considerations		Potential Considerations	Potential Changes/Effects suggested for Assessment
33	19%	Reduction in the amount of auto travel per person in Sudbury, to increase sustainability and community health	• Changes to land use allocations • Network improvements for walking, cycling and transit
29	17%	Enhancements to the bike network (See Active Transportation Facility Matrix for descriptions)	• On-road bike lanes • On-road cycle paths • Shared auto / bike routes • Off-road trails
23	13%	Transit Service Levels	• Increased transit frequencies (considered at a strategic level)
19	11%	Natural Environment	• Amount of natural area affected (wetlands, areas of natural and scientific interest, watercourses)
16	9%	Enhancements to the sidewalk network	• New sidewalk links • Widening of sidewalks •Addition of pedestrian signals at signalized intersections
10	6%	Improved road access to outlying areas including Val Caron, Hanmer, Chelmsford, Lively, Coniston, and Garson	• Road widening • New road links
9	5%	Intersection improvements	• Optimize signal timings • Increase intersection capacity • Address safety concerns
9	5%	Improved Access into downtown	• Road improvements • Bike access enhancements • Transit service improvements • Sidewalk enhancements
9	5%	Air quality effects	• Network improvements for walking, cycling and transit • Road network changes to reduce congestion
6	3%	Improved access to Laurentian University / College Boreal / Cambrian College	• Road improvements • Bike access enhancements • Transit service improvements • Sidewalk enhancements
5	3%	Improved road connections that can provide opportunities for better service	• Widening roads to 4-lane cross-section where appropriate • Queue jump lanes and priority traffic signals for transit at intersections
3	2%	Accommodation of freight movements by truck	• Expanding or improving the truck route network • Improving key intersections used by trucks
3	2%	Cost	• Capital and operating cost

The next poll-related question asked participants to identify which active transportation options they find the most comfortable, on a scale from 1 (most comfortable) to 3 (least comfortable). The number and proportion of respondents answering 1, 2 or 3 for each facility type is shown in **Table 23** below. The rows have been listed to show the most comfortable facility types, based on respondent answers.

Table 23: Preferred Active Transportation Options

Potential Active Transportation Facility Types	My Level of Comfort					
	1 (Most Comfortable)		2 (Comfortable)		3 (Least Comfortable)	
	#	%	#	%	#	%
Separated Bike Lanes and Cycle Tracks	30	91%	2	6%	1	3%
Multi-use Trails (off-road)	21	81%	2	8%	3	12%
Sidewalks	15	68%	3	14%	4	18%
Other (Transit)	6	67%	3	33%	0	0%
Signed Only Bike Route	8	44%	3	17%	7	39%
Bike Lanes and Shoulder Bikeways	10	37%	8	30%	9	33%

A map of the active transportation routes being considered in the study was provided at the PIC. Attendees were encouraged to post comments about specific locations. Below is a list of responses that relate to specific locations:

- The bike route on Grandview Boulevard is unappealing to some cyclists due to its hilly nature;
- Bike routes that access New Sudbury shopping areas need to be shown;
- Lasalle Boulevard is a major route that has limited bicycle access;
- The neighbourhood located south of Lasalle Boulevard and east of Regional Road 80 should be connected to the trail route in the New Sudbury Conservation Area;
- There is no bus that goes to Dynamic Earth;
- Pedestrian and cycling facilities on Kelly Lake Road should be upgraded to improve access to Junction Creek Waterway Park and Copper Cliff Trail;
- There is a section of Junction Creek Waterway Park missing;
- Ramsey Lake Road is a flat road which avoids a portion of Paris;
- The Class II bike route on Notre Dame Street should be upgraded to a Class I bike route;
- Relating to the Kingsway in New Sudbury: all arterials should include an option for commuter cyclists;
- Transit needs priority at Copper Street and Kelly Lake Road in Copper Cliff;
- The two-way transit corridor on Regional Road 80 between Valleyview Road and Dominion Drive in Valley East needs more places to cross safely;
- If a road is to be built between Capreol and Maley Conservation Area, a bike lane or off-road trail is needed;
- The multi-use trail on Municipal Road 80 between Lasalle Boulevard and Cambrian Heights Drive is a good idea;

- There should be washroom and public facilities east of Whitson Lake and north of Maley Conservation Area;
- There is very little population to warrant the Maley Extension. Who will pay for it?;
- There is concern about future developments (in wetland) that would lead to more traffic on Lasalle Boulevard, endangering school children and pollution;
- There should be bike facilities on the Kingsway. There are businesses and restaurants that cyclists want to get to;
- The trails east of Municipal Road 80, south of Lasalle Boulevard and north of the New Sudbury Conservation Area are incomplete;
- The Maley Drive Extension should be completed;
- Need a safer rail crossing behind Sudbury Place;
- Regarding bike lanes along Falconbridge: the centre turning lane should be removed to slow vehicular traffic and increase safety for pedestrians and cyclists;
- Bike lanes are needed all along Lasalle Boulevard for improved connectivity ;
- There should be better facilities and connections on Ramsey Lake Road between South Bay Road and Laurentian University and the route to hospital (Algoma). There are no sidewalks in the area. There is a speeding issue around the main hospital, necessitating measures to protect pedestrians and children in playground;
- A path connection between Caswell Drive and Paris Street is required;
- On-road bike lanes are needed on Lorne Street to provide a connection to downtown and the new school of architecture; and
- A connection between Brennan Road and Delki Dozzi Track is desired.

2.4.4 Online Survey

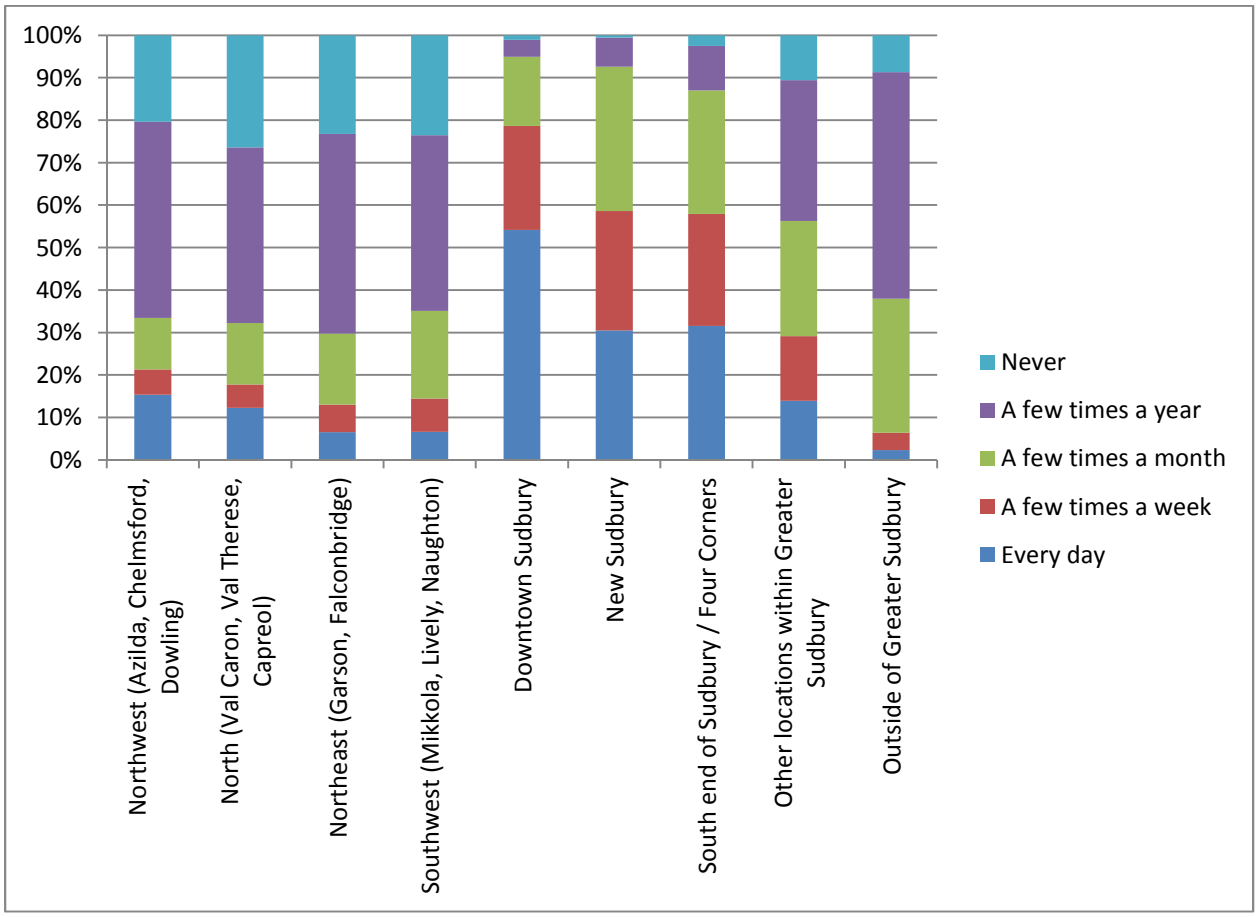
The online survey was launched on January 4, 2012 and more than 500 surveys were received over the duration of this study. Survey responses were compiled and are summarized in this section. The survey had five questions, in which participants ranked several criteria, including:

- Travel destinations;
- Transportation modes;
- Views on alternative transportation;
- Their desired objectives for the study; and
- Barriers to providing alternative transportation.

The survey also allowed participants to expand on their thoughts about the top three issues of concern regarding transportation, the top three transportation improvements they would like to see, and the top three biggest challenges or constraints to providing greater transportation choices.

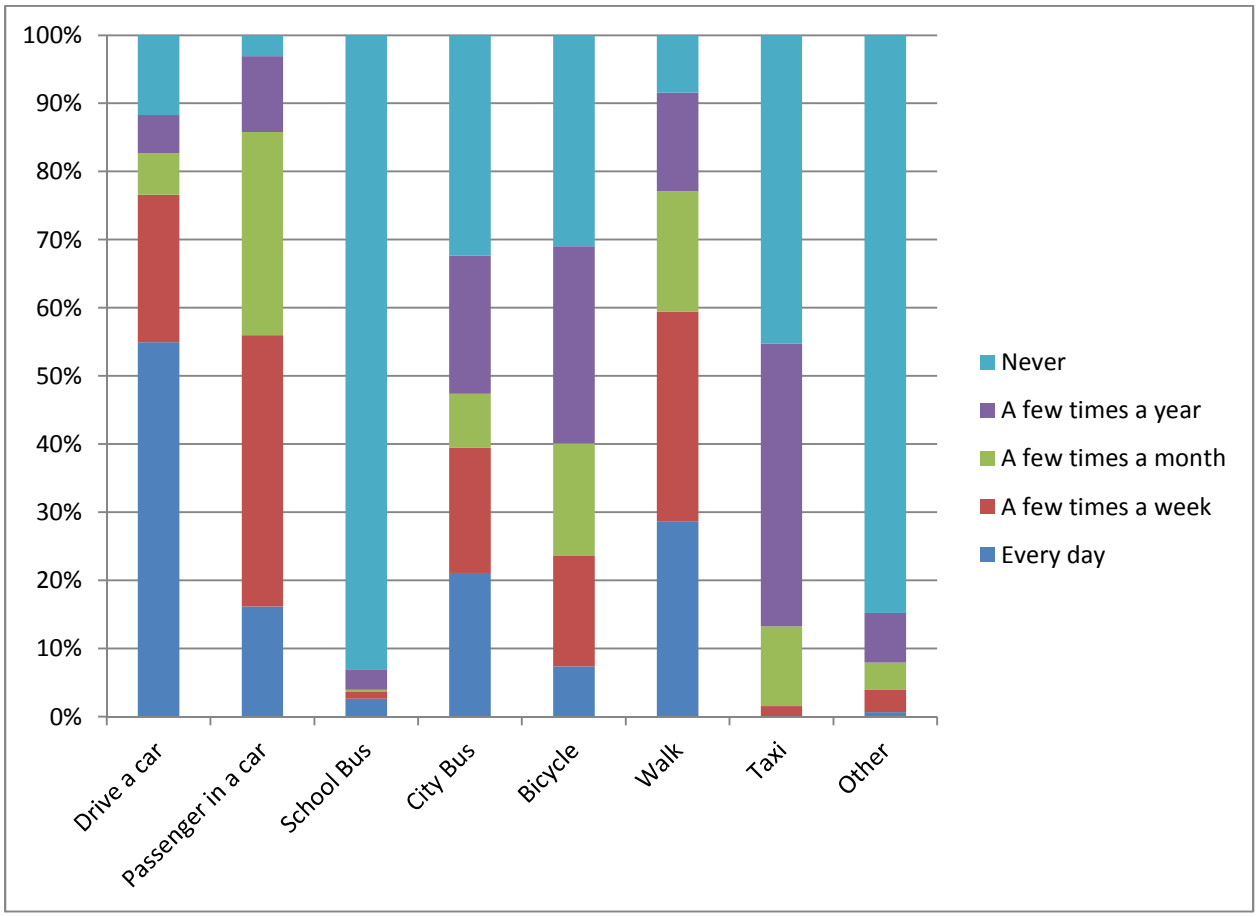
The most popular destinations are downtown Sudbury, New Sudbury and the South End (Four Corners) as illustrated in **Figure 25**.

Figure 25: Proportion of Trips Made within Greater Sudbury



The majority of daily trips are made in an automobile, followed by city buses and walking as illustrated in **Figure 26**.

Figure 26: Modes of Transportation Used in Greater Sudbury



The next question asked participants to rank on a five-point scale ranging from most important to least important, several improvements that might encourage them to use alternative modes of transportation. The detailed responses are ranked from high to low in order of the proportion of respondents that rated each item as the 'most important'. Please refer to **Table 24** below. Responses relating to active transportation (walking and cycling) are fairly evenly spread in terms of priority, however it can be seen that three of the top four responses relate to transit.

Table 24: Survey Results: Potential Improvements to Sudbury's Transportation System

Answer Options	Most Important	Important	Somewhat Important	Least Important	Not Important At All
Improve bike, walk or transit connections to key destinations (schools, work, shopping, community centres)	17%	9%	4%	2%	2%
Improved and expanded bus routes	16%	7%	7%	6%	5%
Bike lanes or paved shoulders on roads	15%	10%	6%	4%	5%
Improvements to bus stops - shelters, benches, route information	10%	10%	10%	9%	5%
More multi-use hiking and cycling trails	9%	10%	12%	9%	7%
Snow removal	9%	11%	10%	8%	4%
More sidewalks	6%	13%	12%	8%	4%
Maps identifying cycling, trail and pedestrian routes	6%	11%	14%	11%	7%
Secure bicycle parking	6%	12%	12%	11%	10%
Other	3%	1%	1%	1%	29%
Shower/change facilities at schools/places of employment	2%	6%	12%	33%	23%

The following question asked participants to rank several objectives they would like to see the study focus on. Participants ranked improving the quality of life and health of Greater Sudbury residents, improving walking and cycling as transportation options, and enhancing the sustainability of the transportation system as the most important objectives with each receiving over 20% of the "most important" votes. The results of the survey are illustrated in **Table 25**.

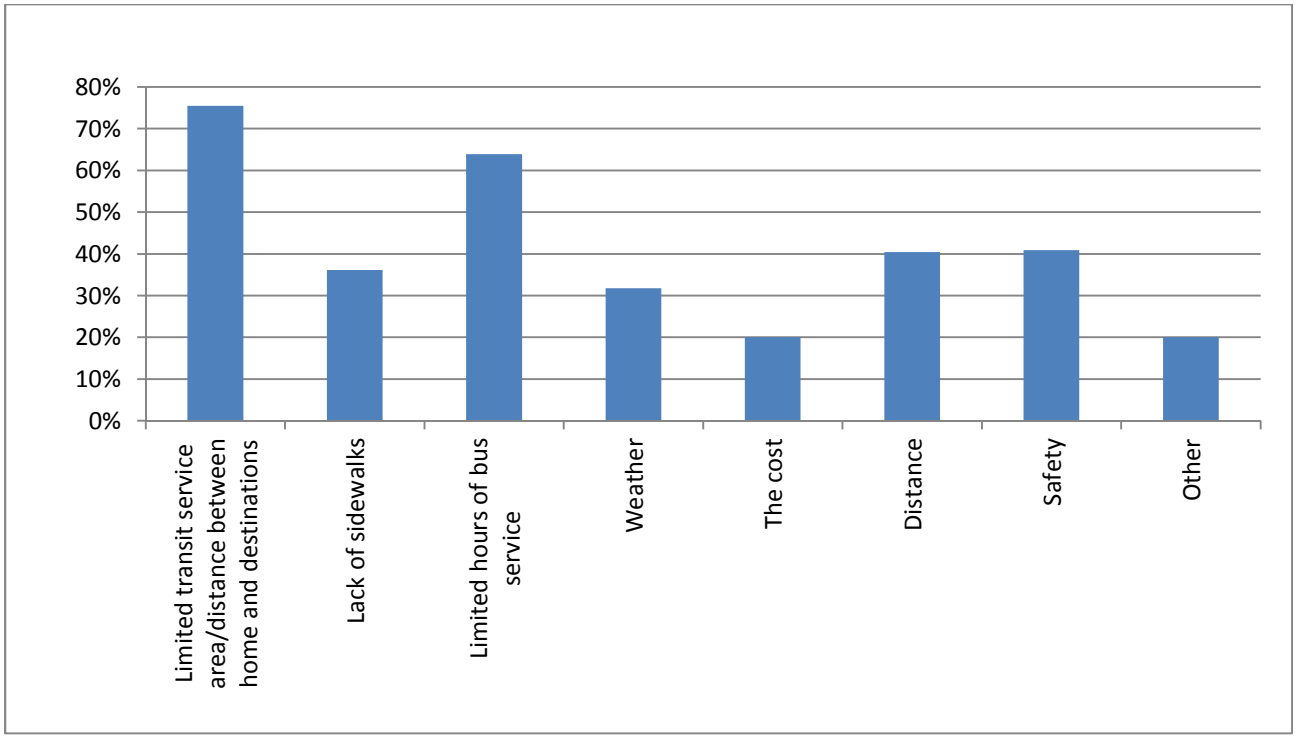
Table 25: Survey Results: Desired Objectives for the study

Answer Options	Most Important	Important	Somewhat Important	Least Important	Not Important at All
Improve the quality of life and health of Sudbury residents	24%	16%	8%	3%	0%
Improve walking and cycling as transportation options	22%	14%	10%	13%	9%
Enhance the sustainability of the transportation system	21%	18%	9%	5%	6%
Improve connections between the communities in Greater Sudbury	17%	19%	17%	9%	12%
Provide better access to commercial areas (e.g. retail shopping areas)	9%	17%	28%	37%	24%

Answer Options	Most Important	Important	Somewhat Important	Least Important	Not Important at All
Support employment activity, including mining	8%	16%	29%	34%	48%

Several barriers discouraging residents from choosing alternative transportation modes were identified in the next question and participants were asked to select which barriers they believed were the most relevant. The majority of participants thought that having limited transit service areas/distances between homes and limited hours of bus service were the dominant barriers to use of alternative modes of transportation. The detailed results of this question are illustrated in **Figure 27**.

Figure 27: Survey Results: Barriers to Alternative Modes of Transportation



In the first opinion question of the survey, participants were asked the top three issues of concern regarding transportation. Below is a summary of the recurring concerns:

- Transit Service
  - Lack of connecting routes to outer areas of the City
  - Lack of transfer stations aside from the downtown terminal. Riders are forced to go long distances because they must transfer at the downtown terminal;
  - The hours of operation are unreasonable, especially after 10 p.m. when the buses become very infrequent;
  - The safety of using the downtown bus terminal is a concern especially at night; and

  - The bus fare is perceived to be too high when compared to the cost of using an automobile.
- Bicycle Infrastructure
  - Lack of bike lanes;
  - Safety is compromised for cyclists in current conditions; and
  - There are limited multi-use trails for cyclists to reach nearby communities.

- Official Plan
  - Several roads have an improper road class designation;
  - There are trucks using roads that are not suitable for them, including some that carry hazardous waste; and
  - The proposed Laurentian University Link should be dropped.

- Car-centred Mentality
  - Expanding and widening roads is not the solution;
  - Lack of education among residents about sustainable transportation; and
  - There are no incentives to use public transportation.

- Lack of New Roads
  - There is a need for a secondary exit from the university grounds
    (NB: this contradicts a previous comment stating the link should be dropped; residents had mixed opinions about this issue)

- Unmaintained Roads
  - Roads are in bad condition; and
  - Sidewalks are not cleared of snow in a timely manner.

- Congestion
  - Traffic lights needs to be coordinated better; and
  - Roads are not adequately planned for new developments.

Almost every respondent discussed issues with the transit system in Greater Sudbury as well as the bicycle infrastructure.

The second opinion question asked participants to list the top three transportation improvements they would like to see. Respondents expanded on their concerns that they listed in the previous questions. The following is a list of the top three responses from all of the participants in order of the most frequent:

- Increase transit service coverage by offering more routes;
- Improve bus schedules by increasing frequency and extending the hours of operation; and
- Improve the bicycle infrastructure and pedestrian trails.

The last opinion question asked participants to list the top three challenges or constraints to providing greater transportation choices. Again, many respondents expanded on their previous opinion-related questions. Topics included:

- A perceived lack of initiative from City Hall in terms of vision for the future of Greater Sudbury's transportation system, leadership, long-term planning and accountability.
- The car-centred mentality of many residents;
- Corporate influence over government policy;
- High traffic volumes;
- Enforcements issues;
- Not enough cycling infrastructure;
- Budgetary constraints;
- Insufficient bus routes and confusing schedules;
- The large geographical area covered by the city, with long trips, distances and low population density;
- The climate;
- Existing road conditions; and
- The aging population and the limited choice of transportation modes available to seniors, especially in outer lying communities.

2.4.5 Consultation Summary

The meetings with the SMAP and industry representatives, the attendance at PIC #1 and the large number of online surveys completed show a high level of engagement among Greater Sudbury residents in the transportation planning process. The majority of the participants in the public outreach activities desire a multi-modal transportation network whose focus is on transit and active transportation, such as cycling and pedestrian facilities, and less focus on automobile-oriented facilities. However, it is recognized that industry is an important economic driver in the City and its needs, particularly in terms of freight, must be accommodated and balanced with those of the travelling public.

3 TRANSPORTATION PLANNING CONTEXT

A number of documents provide the context for the Transportation Plan. These include:

- Provincial Policy Statement;
- Growth Plan for Northern Ontario;
- Official Plan;
- Growth Outlook to 2036;
- Growth and Settlement Report;
- Sustainable Mobility Plan;
- Bicycling Technical Master Plan;
- Economic Development Strategic Plan for Greater Sudbury 2020;
- Downtown Sudbury: A Plan for the Future;
- Pedestrian Crossing Policy Report; and
- Trails for Active Transportation: City of Greater Sudbury.

These documents have been reviewed and considered in the development of this Transportation Plan. The relevance of each document to the Transportation Plan is described in this chapter.

3.1 Provincial Policy Statement

All municipal Official Plans (OPs) in Ontario are required to be consistent with the policies set out in the Provincial Policy Statement (PPS) that came into effect April 30, 2014. The PPS provides policy direction on matters of provincial interest related to land use planning and development. It also gives specific direction on infrastructure and transportation facilities in Sections 1.6.7 and 1.6.8, which provide policies for municipalities to plan for transportation systems that are safe, efficient and that facilitate movement of people and goods. In order to meet the objectives of these policies, municipalities must make efficient use of existing and planned infrastructure. This requires a high level of connectivity and a land use pattern that promotes a multi-modal system. Several other sections within the PPS also influence transportation systems and should be considered by authorities while making land use planning decisions.

3.2 Growth Plan for Northern Ontario

The Growth Plan for Northern Ontario was released in 2011. The Plan recognizes the need for an integrated system based on efficient and sustainable modes of transportation that “responds to open markets, seamless borders, and just-in-time delivery to markets around the world”. The policies state that an integrated and efficient transportation network will require expansion, maintenance and preservation of current highways, roads, bridges, ports, railway networks, and airport facilities in the near future. A shift to a more coordinated planning strategy will leverage funding for these projects from all levels of government. The Plan speaks to Strategic Core areas, of which Greater Sudbury is one, and focusing on intensification and transportation investment in these areas.

3.3 City of Greater Sudbury Official Plan

An Official Plan is a statutory planning document that provincial legislation requires most municipalities in Ontario to develop, adopt and abide by. Official Plans are high-level policy documents that set out the planning policy vision for the municipality; they guide land use

decisions that determine where and how growth and development will occur. Authorities can use their Official Plans to establish policies that make the connection between transportation and land use.

The City of Greater Sudbury Official Plan, adopted by City Council on June 14, 2006, establishes goals, objectives and policies to manage and direct physical change and its effects on the social, economic and natural environment. The four key principles of the plan are:

- A healthy community;
- Economic development;
- Sustainable development; and
- Focus on opportunities.

The City presently is reviewing and revising its Official Plan concurrent with the development of this Transportation Study Report. The recommendations of the Transportation Study Report will be incorporated into the Official Plan Review.

3.4 Growth Outlook to 2036

The City prepared a growth outlook to forecast population and employment growth to the year 2036. From the base year of 2011, the Reference Scenario indicated a population growth of 10,500 and an employment growth of 2,200 by the year 2036. The High Scenario indicated a population growth of 22,000 and an employment growth of 8,600 by the year 2036. This Transportation Study has assumed population and employment growth in line with the Reference Scenario.

3.5 Growth and Settlement Report

The City prepared a Growth and Settlement Report in June 2013 to review requests for changes to settlement boundaries in the city. This report analyzes these requests in the context of the current urban structure framework of the Official Plan and the Provincial requirements. The report addresses population, housing and employment needs, land supply for residential development and residential intensification.

The report draws the following conclusions on the current growth and settlement policies of the Official Plan:

1. There is currently an ample supply of both draft approved and designated and available lands in the City to meet the projected household and employment demand over the 20 year planning period. There is also ample supply to meet the minimum requirements of the PPS for draft approved, registered and designated lands. As a result of the current land supply, requests to expand the settlement boundaries to accommodate new residential and industrial development cannot be justified at this time;
2. There is currently an ample supply of vacant rural lots and rural lots with the ability to be severed under the current policy framework to meet the projected demand over the 20 year planning period. As a result, modifications to the existing rural lot creation policies are not necessary at this time;
3. The Water and Waste Water Master Plan currently underway will provide a better understanding of the servicing and economic issues associated with the existing vacant land supply and will be a key assessment tool in future comprehensive reviews;
4. The current Living Area and Intensification policies are achieving their desired effect by allowing for a wide range of choice in terms of location and housing type in the City. This is reflected in the current market shift away from predominantly single detached housing

to more multi-unit buildings. As a result of this, changes to the existing Living Area polices are not recommended at this time;
5. New provincial legislation and policy documents will require the City to develop policies to allow second units as of right in the City and to focus residential and employment intensification in strategic core areas and along intensification corridors, and
6. Improvement in GIS capabilities have allowed for an analysis of the residential infill potential in the City.

3.6 Sustainable Mobility Plan

The *Sustainable Mobility Plan*, prepared in June 2010, is focused on transportation modes other than the private automobile. In developing the Plan, public input was sought and best practices were reviewed from cities in Ontario and other parts of North America. The resulting Plan is tailored to the unique mobility challenges of Sudbury and contains a series of recommendations to help the City encourage walking, cycling and transit use. The Plan is viewed as a tool to help develop a multi-modal transportation system, and was received by council but not adopted.

3.7 Bicycling Technical Master Plan

The Bicycling Technical Master Plan was prepared by the Bicycling Advisory Panel in 2011 but was not formally adopted by City Council. The Plan provided a summary of existing bicycling infrastructure and identified bicycling routes for implementation in the short, medium and long term.

3.8 Economic Development Strategic Plan for Greater Sudbury 2020

Digging Deeper – Coming of Age in the 21st Century: An Economic Development Strategic Plan for Greater Sudbury 2020 was prepared in June 2009 as an update to an original document first written in 2003. The Strategic Plan developed guiding principles and growth drivers to address challenges and opportunities for economic development. The approach to the economic development strategy was outlined and performance indicators were developed to measure progress. This report currently is under review. Any changes stemming from the review will be incorporated, as appropriate, through the Official Plan review process.

3.9 Downtown Sudbury: A Plan for the Future

In January 2012, the City of Greater Sudbury prepared a downtown master plan entitled *Downtown Sudbury: A Plan for the Future*. The plan was created with extensive input from stakeholders. The plan recommends improvements for implementation immediately, over the short term (1-5 years) and over the longer term (6-10 years). These proposed projects are aimed at supporting three complementary objectives:

1. Activity and growth;
2. Access and connectivity; and
3. Beauty and pride.

The types of transportation projects recommended in the plan include improvements to roads, cycling and pedestrian infrastructure. Connections are proposed within the downtown area and also between the downtown area and other parts of the city.

3.10 Pedestrian Crossing Policy Report

The *Pedestrian Crossing Policy Report* prepared by the City of Greater Sudbury in February 2012 recommends a policy for protected pedestrian crossings, including:

- Traffic control signals at intersections;
- Traffic control signals mid-block;
- Intersection pedestrian signals; and
- Adult crossing guards.

The recommendations in the report are based on existing conditions, consideration of alternative crossing facilities and a review of best practices.

3.11 Trails for Active Transportation: City of Greater Sudbury

In 2009, *Trails for Active Transportation* was prepared by *Walk and Bike for Life* to develop a plan to provide communities with tools that encourage cycling, walking and other forms of active transportation. The report was informed by public opinion gathered at several public information centres and workshops undertaken in the City of Greater Sudbury. The document outlines initiatives and goals to facilitate the creation of an active transportation network, connecting residential areas to employment and commercial areas as well as public parks, schools and other community facilities for residents and visitors. *Trails for Active Transportation* further recommends the development of a Sustainable Mobility Plan to improve cycling and pedestrian facilities for residents and visitors of all ages and abilities.

4 TRANSPORTATION VISION STATEMENT, PRINCIPLES, OBJECTIVES, AND PROCESS

4.1 Transportation Vision

The City's Official Plan's casts a vision for Greater Sudbury as a modern and vibrant city that is healthy, sustainable and green. Greater Sudbury is open for business with the downtown core acting as the vibrant hub of this dynamic city.

The vision for the Transportation Study Report is to support this city-wide vision through the development of a sustainable, multi-modal transportation system that provides mobility options to all residents and the necessary infrastructure to support economic activity and daily life.

To remain an effective document, the Transportation Study Report must be regularly updated and modified in order to respond to changes in the economy, social goals, and the external environment.

Several major changes have occurred following the approval of the 1992 Transportation Plan and were included in the 2005 Transportation Study Report:

- The expanded boundaries of the City of Greater Sudbury;
- The development of the City of Greater Sudbury as the major retail 'big box' market destination within Northeastern Ontario;
- The new College Boreal Campus;
- The centralization of hospital services to the former Laurentian Hospital campus (now called Health Sciences North);
- The completion of the Highway 17 by-pass; and
- The completion of the Brady Street extension.

As part of the Official Plan Update, this 2015 Transportation Study Report must take into account not only the evolving character of the area but also the changes in the external components of the various transportation networks. Intra-municipal rail links are being removed with more goods being delivered by truck. The role of air traffic has also changed; with airports now being free of many federal constraints, there is a new opportunity to build activity as commercial hubs.

This Transportation Study Report builds upon the 2005 Transportation Study by:

- Reviewing and repositioning transportation priorities given current conditions, forecasts and extensive consultation with the general public and interest groups; and
- Setting forth a vision for a sustainable, multi-modal transportation network for 2031.

4.2 Transportation Principles

There are three main principles guiding the development of the future transportation network:

- **Healthy communities** with on- and off-road networks that facilitate active transportation, such as cycling and walking, and that consist of 'Complete Streets' that are designed, constructed and maintained to support all users and all modes of transportation;
- **Sustainability** based on integrated transportation and land use planning that minimizes the use of private automobiles and, in particular, the number of single-occupant vehicle trips; and

- **Economic vitality** associated with reduced congestion on roads so that people and freight can access destinations with limited delay.

4.3 Transportation Objectives

The objectives of this study are to develop a comprehensive plan that supports the transportation vision and principles through:

- Improvement of the existing road network;
- Enhancement and expansion of active transportation facilities; and
- Incorporation and development of additional transportation policies.

The purpose of the document is to present background information, policy changes and network improvements to be considered during the process of creating a new Official Plan.

4.4 Problem Statement

As part of the EA Master Plan process, the following problem/opportunity statement has been developed to encapsulate the thrust of the Transportation Study Report:

> *Sudbury's current transportation system needs to be enhanced to address current deficiencies, and to accommodate growth in population, employment and commercial activity to the horizon of 2031. Developing a multi-modal system is a key component of that change; multi-modal mobility is also needed to address the directions set by the Province and by City Council, reflecting greater sustainability and intensification. Sustainability must encompass the goals of an active community, a healthy environment and economic vitality.*
>
> *Key opportunities in Sudbury related to these needs include:*
>
> - *Creating transportation choices to better support biking, walking, and transit;*
> - *Implementing short-term solutions for intersections and corridors of traffic congestion;*
> - *In the longer term, creating a transportation network which offers more direct routings; and*
> - *Providing the transportation network needed to support intensified land use in designated growth areas.*

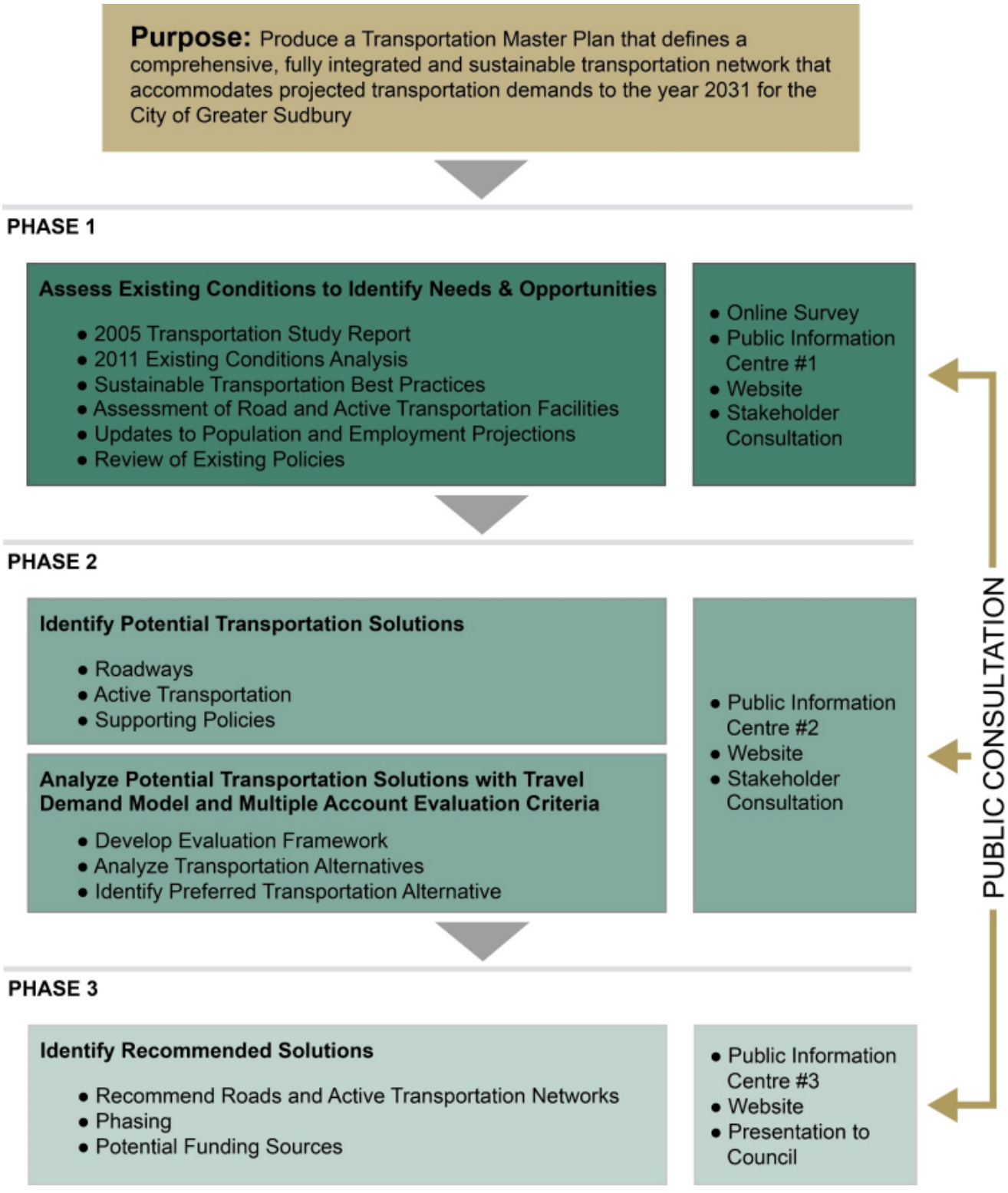
This statement was reviewed with attendees of the first Public Information Centre.

4.5 City of Greater Sudbury Transportation Study Report Process

The study process used to develop the Transportation Study Report is shown in **Figure 28**. Specific to the City of Greater Sudbury, the study process was unique and innovative in that it was:

- Integrated and coordinated with the active transportation master plan completed as part of this assignment;
- Based on a set of principles to guide the selection of the preferred solution that has been evaluated against a quantifiable and qualitative framework;
- Built around a 'Complete Transportation' approach to address capacity deficiency to meet growth demands; and
- Focused on engaging residents and stakeholders throughout the study.

Figure 28: Transportation Master Plan Process



5 ACTIVE TRANSPORTATION: CYCLING AND WALKING

5.1 General Objectives and Goal of Active Transportation

Municipalities across Ontario are implementing initiatives to encourage active transportation as a viable alternative to private automobile for short-distance trips and as a method of promoting a more active and healthy lifestyle. The following section discusses some of the key health and fitness, transportation, environmental, economic and tourism benefits associated with active transportation.

5.1.1 Health and Fitness

Walking and cycling provide an enjoyable, convenient and affordable means of exercise and recreation. Research suggests that the most effective fitness routines are moderate in intensity, individualized and form part of our daily activities. Studies such as the one undertaken by the National Collaborating Centre for Environmental Health (NCCEH) in 2010 have shown that people who use active transportation are, on average, more physically fit, less obese and have a reduced risk of cardiovascular disease. Some key facts and information about the health and fitness benefits of active transportation include:

- In 2001, approximately $2.8 billion was spent on health care due to physical inactivity in Canada. This could be reduced by $280 million if physical activity were increased by 10% (Business Case for AT, Go for Green, 2004).
- Improved cycling facilities lead to increased bicycle use. Increased physical activity such as walking, cycling and other trail-related activities can help reduce the risk of coronary heart disease, premature death, high blood pressure, obesity, adult-onset diabetes, depression and various types of cancer.
- The most visible effect of physical inactivity is obesity, and there has been a sharp rise in cases across Canada in recent years. Almost half of Canadians aged 12 and over report being physically inactive and 26% of youth between the ages of 2 and 17 years old are overweight or obese (Statistics Canada 2005).
- The proportion of overweight and obese adolescents aged 12-17 doubled from 14% to 29% between 1979 and 2004, and today only 12% of children and youth get adequate levels of physical activity.
- Exploring different modes of active transportation can enhance one's mental outlook and well-being, improve self-image, social relationships and increase self-reliance by instilling a sense of independence and freedom.
- A recent report from the World Health Organization (WHO) concluded that a significant shift from private motorized vehicles to walking, cycling and public transit could also reduce:
    - Cardiovascular and respiratory disease caused by air pollution;
    - Traffic-related injuries;
    - Noise and noise-related stress; and
    - Chronic diseases such as type 2 diabetes, heart disease and cancers that are associated with physical inactivity.

These benefits may be achieved by making strategic investments in both infrastructure and outreach initiatives. The City of Greater Sudbury can support the incorporation of active transportation into people's daily commuting habits, fitness and recreational routines by:

- Providing educational information and promotion in schools, businesses, and community centres;
- Implementing pedestrian and bicycle facilities that offer feasible transportation alternatives to automobile use;
- Creating a pleasant and safe environment with less noise and air pollution; and
- Including health and equity impacts in cost-benefit assessments that are directed at transportation projects and planning.

5.1.2 Transportation

Aside from being popular recreational activities, walking and cycling are also efficient, affordable, environmentally-friendly and accessible means of transportation. The wider benefits of walking, cycling and other active transportation modes include: reduced road congestion and greenhouse gas emissions; cheaper infrastructure, including lower maintenance costs; road safety improvements; and lower user costs compared to motorized vehicles (NCCEH, 2010). In many cases, for distances up to 10 km in urban areas, cycling can be the fastest of all modes from door to door.

Canadians make an average of 2,000 car trips per year over distances of less than 3 kilometres. Surveys show that 66% of Canadians would like to cycle more than they presently do. A 2005 survey by the Ministry of Health Promotion of Ontario indicated that seven in ten Ontarians would cycle to work if there "were a dedicated lane which would take me to my workplace in less than 30 minutes at a comfortable pace". These facts clearly demonstrate the potential for increasing the number of bicycle trips in the City of Greater Sudbury.

Typical roadway funding requirements include maintenance, safety and enhancement costs plus the addition of roadway capacity through lane widening or additions. These are usually paid for by road users through property and gas taxes. An emphasis on walking, cycling and other active transportation modes can result in a reduction in roadway costs. Bicycles are lightweight vehicles that take up little space and cause minimal wear and tear on a road surface.

A roadway could carry 7 to 12 times as many people per lane per hour if they were travelling by bicycle as opposed to motor vehicle in urban areas operating at similar speeds. It is also much less costly to provide paved shoulders on a road for cyclists than to provide additional motor vehicle travel lanes. A small portion of a municipality's transportation budget, if well targeted, can have a significant impact on facilitating bicycle use.

It is important to develop integrated active transportation networks. The greater the connectivity and reach of a network, the more potential it has to encourage cyclists and pedestrians to use it. While it may be convenient or cost-efficient to implement facilities in sections, their effectiveness will be compromised if potential cyclists feel that the provisions are not adequate or safe along the entirety of their route. The period over which the links in a network are implemented should therefore be as short as possible.

5.1.3 Environment

Active Transportation modes of travel are clean and energy-efficient. Motor vehicle trips over a short distance are the least fuel efficient and generate the most pollution per kilometre. These trips have the greatest potential of being undertaken by walking or cycling alone, or integrated with transit.

Reducing the number of motor vehicles on the road decreases the quantity of pollutants released into the atmosphere by motor vehicles. The effects of climate change can be reduced by encouraging drivers to use other modes. Motor vehicles, roads and parking facilities are major sources of water pollution and hydrologic disruptions due to such factors as road de-icing, air pollution settlement, roadside herbicides, road construction along shorelines, and increased impervious surfaces.

Motor vehicles generate various types of unwanted noise that cause disturbance and discomfort to residents. These include engine acceleration, contact between tires and the road, braking, the use of horns and vehicle theft alarms. Bicycles make little noise and are not disruptive to local residents. Automobile-dependent communities require more land for road rights-of-way and parking than those that are more sustainable. Reducing car dependence by providing infrastructure for alternative transportation modes, such as walking, cycling and public transit, results in more compact subdivisions that make more efficient use of available land.

5.1.4 Economic

A study published by Go for Green in March of 2004 establishes a convincing Business Case for Active Transportation in the report entitled 'The Economic Benefits of Walking and Cycling' (BEST, 2004). These benefits include reductions in:

- Road construction, repair and maintenance costs;
- Costs due to air pollutants and greenhouse gas emissions;
- Long-term health care costs;
- Fuel, repair and maintenance costs to users;
- Collision-related expenses; and
- Lost productivity due to traffic congestion.

There is ample evidence that on and off-road active transportation facilities provide significant economic benefits for adjacent landowners and local businesses. The wider economy also benefits, during both construction and operation, in the form of demand for materials and jobs associated with their installation. Following construction, commercial and retail outlets connected to the active transportation network will benefit from expenditure related to pass-by pedestrian and cycling trips.

Reduced car use may also decrease the number of parking spaces required for residential and retail complexes as well as places of employment. For new developments, less space may need to be dedicated to parking in areas where bicycle usage is high. In existing buildings, bicycle parking facilities may be provided in a surface or underground parking lot at minimal cost.

In addition, bicycle manufacturers, sales and repairs, as well as bicycle tourism, recreation and delivery services contribute to the economy with little to no public investment or subsidy.

Finally, trail systems can attract tourists, either as travel destinations in themselves, or as recreational facilities that will encourage visitors to stay in the area longer. This will result in additional nights' lodging and meals, a direct benefit to local businesses.

5.1.5 Tourism

It has been shown that there is a growing demand for cycling and eco-tourism throughout Ontario and North America. The demand stems from an increasing desire to explore new areas through an active mode of transportation and experience one's natural surroundings. In all cases the increase in cycling and active tourism has a direct impact on the economy of a Municipality, County or Region.

When looking at pedestrian, cycling and trail related tourism, one must consider all expenditures associated with these trips, including hospitality-related costs which may accrue over time. Though tourism-related benefits from Active Transportation facilities provide an injection into the local economy, there are also a wide range of social, environmental and health benefits associated with AT and trail tourism. As people become increasingly more aware of the benefits of trail use and other pedestrian and cycling activities, there tends to be a continuous increase in the number of cycling tourists.

Over the last ten years, the concept of active transportation and the development of pedestrian and cycling networks has been gaining popularity because the health, social, environmental, economic and tourism benefits are so substantial. There is clear evidence of benefits associated with active transportation, cycling and pedestrian friendly communities and encouraging people to be more active by walking and biking more often for both recreational and utilitarian purposes. Promoting active transportation through the development of an integrated on and off-road system can encourage people to reduce their use of the personal automobile and create sustainable, livable, safe and active communities.

5.2 Network Planning Guiding Principles for Active Transportation

One of the key inputs into development of the recommended AT route network for the City of Greater Sudbury was the following set of network planning guiding principles. These were developed by the study team and reviewed with the public as well as key stakeholders in the initial stages of the study. The principles guided the initial stages of the route selection process. They should be reviewed in the future as part of the detailed feasibility assessment on a route by route basis, and also when any future network changes are being contemplated.

Table 26: Network Planning Principles

VISIBLE	Active transportation routes should be a visible component of the transportation system.
CONNECTED / LINKED	The Active Transportation network should link important destinations throughout the City such as commercial, employment and residential areas, community centres, leisure, recreation and tourist destinations, parks and schools. The City-wide network should link existing and planned Active Transportation and trail facilities and should be seamlessly connected to neighbouring municipalities. Active Transportation routes should cross major barriers such as railways, highways, major arterial roads, valleys and rivers.
INTEGRATED	The network should be integrated with other modes of transportation, particularly public transit. Routes will provide access to existing and planned future transit stations and hubs.
ATTRACTIVE & INTERESTING	Routes should take advantage of attractive, scenic areas and vistas. They should provide users with the opportunity to experience and appreciate the natural and cultural heritage of the Greater Sudbury area.
FACILITY TYPE VARIATION	The bicycle facility network should appeal to the full range of user abilities and interests by including an equally wide variety of facility types.
ACCESSIBLE	Off-road routes should be accessible at as many points as is practical. Routes should be appropriately signed to communicate the level of accessibility so that users can make their own decision about use based on their personal level of mobility. Routes should be easily accessible from local neighbourhoods within Greater Sudbury.
SUSTAINABLE	Sustainability should be a key consideration in the alignment, design and selection of materials for on and off-road Active Transportation facilities.
CONTEXT SENSITIVE	Facility design for individual routes should follow widely accepted guidelines but may also be modified to respond to the immediate surroundings. For example, off-road routes should be appropriately located when associated with natural heritage features; each site's characteristics should be carefully considered when the alignment and design details are being developed for routes in natural heritage areas.
COST EFFECTIVE	Proposed facilities should be affordable and appropriate in scale for the City. The cost to implement and maintain the facilities and supporting amenities should be phased over time. User safety must not be compromised in the interest of minimizing initial construction or ongoing operational costs. Opportunities for partnerships with other levels of government and outside organizations should be pursued wherever possible.

5.3 Existing Active Transportation Policies and Initiatives

This section identifies and discusses key Federal, Provincial and Local policies that directly influence active transportation in Greater Sudbury. This provides an understanding of the current policy framework and establishes a base for the active transportation component of the City of Greater Sudbury Transportation Study Report.

Federal

In 2005, Transport Canada released a report entitled 'Strategies for Sustainable Transportation Planning: A Review of Practices and Options'. The purpose of this report is to provide a foundation on which to build a set of guidelines for incorporating sustainable transportation principles into municipal transportation plans. Some of these principles include the creation of policies related to walking and cycling that can be used to develop effective, realistic transportation plans that promote sustainable transportation on a federal level. Some of the key objectives are listed below:

Integration with Land Use Planning

- Encourage desirable land use form and design (e.g. compact, mixed-use, pedestrian/bike-friendly) through transportation plan policies.

Environmental Health

- Identify strategies to mitigate the air impacts of transportation activities;
- Identify strategies to mitigate the noise impacts of transportation activities;
- Identify ways that transportation systems influence the achievement of the community's economic and social objectives. Provide support in the plan's strategic directions;
- Recognize the importance of ensuring access to opportunity for disabled and low-income persons, recent immigrants, youth and the elderly. Set goals and objectives for reducing the need to travel, improving transit mobility, and preserving minimum levels of service on roadways. Identify related strategies;
- Address the transportation needs of persons with disabilities, notably with regard to public transit service and barrier-free design in public rights-of way;
- Recognize the public health impacts of transportation activity arising through road safety, pollution and physical activity levels. Identify effective strategies to strengthen positive impacts and lessen negative ones;
- Recognize the impact of transportation related death and injury on quality of life and the economy. Set goals and objectives for multimodal road safety; and
- Identify effective road safety strategies.

Modal Sustainability

- Identify strategies, policies, facilities and services to increase walking, cycling, other active transportation modes, transit, ridesharing and teleworking;

- Recognize synergies and tensions among different modes (e.g. potential for multimodal cycling-transit trips, potential for modal shift from transit to ridesharing). Address possible implications for transportation objectives; and
- Include objectives, strategies, policies, facilities and services to make transit operations more sustainable.

The publication of this document and the recommended policies and strategies identified within it illustrate the federal initiatives currently being undertaken to develop national standards and practices to improve conditions for walking and cycling across Canada.

Provincial

There are a wide range of provincial policies that influence Active Transportation in Ontario. The following summary highlights the most relevant provincial policies.

Bill 51 – Planning Reform, 2006

Bill 51 includes reforms to the Planning Act, which provides the legislative framework for land use planning in Ontario. Bill 51 includes changes to the planning process that are intended to support intensification, sustainable development and protection of green space by giving municipalities greater powers, flexibility and tools to use land, resources and infrastructure more efficiently.

Bill 51 is in line with Ontario's recent policy shift towards sustainable land use development and planning. For instance, Bill 51 permits municipalities to require that individual buildings and entire neighbourhoods be designed to be environmentally sustainable. It also adds sustainable development as a provincial interest in the Provincial Policy Statement.

Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) sets the foundation for regulating land use and development within the Province and supports Provincial goals. The PPS provides for appropriate development and protects resources of provincial interest.

The PPS promotes transportation choices that facilitate pedestrian and cycling mobility and other modes of travel. The term "transportation systems" under the PPS means a system consisting of corridors and rights-of-way for the movement of people and goods and the associated transportation facilities, which include cycling lanes and Park 'n' Ride lots. Policies pertaining to transportation, such as cycling, pedestrians and transit are dispersed throughout the PPS.

Municipal Act, 2001

The Municipal Act, 2001 provides municipalities with broad flexibility to deal with local circumstances and to react quickly to local, economic, environmental or social changes. It recognizes municipalities as responsible, accountable governments with respect to matters within their jurisdiction. The Act provides policies relating to a municipality's jurisdiction over municipal highways and the maintenance of those highways, which has an impact on cycling.

Highway Traffic Act, 1990

Bicycles are recognized to be vehicles as defined in the Highway Traffic Act (HTA). This means that bicycles can operate on public roadways with the same rights and responsibilities as motor vehicles. However, bicycles are not permitted on controlled access highways such as the 400 series highways or on any roadway where they are prohibited by a municipal bylaw.

The Highway Traffic Act contains a number of policies relating to bicycles, including bicycle lanes on municipal roadways, vehicles interacting with bicycles, bicycles being overtaken and the regulation or prohibition of bicycles on highways.

Accessibility for Ontarians with Disabilities Act, 2005

The Accessibility for Ontarians with Disabilities Act was passed on June 13, 2005. It is a provincially legislated policy which calls on the business community, public sector, not-for-profit sector and people with disabilities or their representatives to develop, implement and enforce mandatory standards. Ontario is the first jurisdiction in Canada to develop, implement and enforce accessibility standards, which apply to both private and public sectors.

These accessibility standards are the rules that business in Ontario should follow to identify, remove and prevent barriers to accessibility. The Accessibility Standards for Customer Service were the first to come into effect; however, Ontario is also developing requirements related to the built environment, employment, information and communications and transportation.

Planning By Design – Healthy Communities, 2009

In 2009, the Ontario Ministry of Municipal Affairs and Housing, in conjunction with the Ontario Professional Planners Institute, developed 'Planning by Design: A Healthy Communities Handbook' to promote sustainable development across the province. The handbook explores the connections between sustainable community building and health; it highlights the critical role that the built environment can play in shaping the health of individuals and communities throughout Canada. The handbook also outlines ways in which the current state of the built environment is detrimental to individuals and communities; it details changes that, if implemented, could result in noticeable improvements. Promoting safe and healthy mobility throughout communities is paramount to improving the overall health of Canadians. In order to reduce the incidence of disease, injuries and fatalities, the handbook recommends that municipalities should:

- Create streets, paths and trails that are well-connected, properly maintained and able to safely accommodate different modes of transportation;
- Produce neighbourhoods that are safe, accessible, aesthetically pleasing, well-serviced and inclusive; and
- Develop natural environments that are resilient, provide ecosystem services, support wildlife and their habitats and are better connected to where people live.

The Ontario Trails Strategy, 2005

The Government of Ontario has developed the Ontario Trails Strategy in response to the popularity of trail infrastructure and related activities, the desire of trail organizations for government leadership, the need to protect provincial investment in trails and the significant challenges that confront them. The Ontario Trails Strategy is a long-term plan that will establish a strategic direction for government and stakeholders on the planning, management, promotion and use of trails for a healthier and more prosperous Ontario. Developed in collaboration with other ministries and a wide range of stakeholders in the community, the strategy supports continued cooperation between governments, not-for-profit organizations and the private sector. There are five strategic directions that comprise the Ontario Trails Strategy:

- Improving collaboration among stakeholders;
- Enhancing the sustainability of Ontario's trails;
- Enhancing the trail experience;
- Educating Ontarians about trails; and
- Fostering better health and a strong economy through trails.

A number of goals and strategies have also been identified to support each of the five strategic directions. The Ontario Trails Strategy recommends that trail organizations should formulate common standards to guide the development and use of trails. This will help the trail system evolve to meet the particular needs of new users. Trail organizations also need more effective tools and better ways of distributing information which allow them to reach a greater number of Ontarians. As these challenges require coordination between all stakeholders, there should continue to be collaboration regarding priorities, roles and responsibilities, timeframes, and methods to strengthen and enhance existing and future trails in Ontario.

#CycleON: Ontario's Cycling Strategy

In November 2012 the Ministry of Transportation Ontario (MTO) published the Draft Cycling Strategy. The strategy acknowledges the importance of developing cycling infrastructure to help reduce GHG emissions, ease gridlock, enhance the economy, increase tourism and increase quality of life for Ontario residents. The strategy was developed based on increasing demand from local municipalities for direction from the province on the development of cycling facilities and responds to recommendations in the Coroner's report published in 2012.

The province's vision is to ultimately "develop a safe cycling network that connects the province, for collision rates and injuries to continue to drop, and for everyone from the occasional user to the daily commuter to feel safe when they get on a bicycle in Ontario". The strategy outlines recommended cycling infrastructure, legislation changes and enhancements including a set of proposed changes to The Highway Traffic Act.

In August 2013 the final version of the Ontario Cycling Strategy – #CycleON was released by the MTO. #CycleON Action Plan 1.0 has since been released and includes a set of actions divided into the following five theme areas:

- Design healthy active and prosperous communities;
- Improve cycling infrastructure;
- Make highways and streets safer;
- Promote cycling awareness and behavioural shifts; and
- Increase cycling tourism opportunities.

A key part of the first action plan is the launch of a three-year cycling infrastructure funding program that will commence in the fall of 2014 and requires projects receiving provincial funding to be completed by March 2017. One of the eligibility requirements for this program is that a municipality have a council approved active transportation master plan that identifies a specific project for which funding is sought.

Local

The active transportation component of the City of Greater Sudbury Transportation Study builds upon three main local policy documents: The City of Greater Sudbury Official Plan (2006), the Sustainable Mobility Plan 2010 and the most recent Bicycle Technical Master Plan for the City of Greater Sudbury 2011. The following text provides an overview of the AT and cycling policies, programs and potential initiatives outlined in each of these policy documents.

The City of Greater Sudbury Official Plan (2006)

Table 27 below highlights policies and programs from The City of Greater Sudbury Official Plan (2006) that consider active transportation and area trail systems. Please refer to Section 9 for more information on how these can support the preferred transportation alternative.

Table 27: City of Greater Sudbury Official Plan (2006) AT policies and programs

PRESERVE ASPECTS OF THE DOWNTOWN	"It is policy of the City of Greater Sudbury Official Plan to preserve those aspects of the Downtown that contribute to the image, character and quality of life in the City, including natural features, landmarks, design attributes, heritage resources, linkages to existing trails, pedestrian walkways and other desirable elements of the built environment." (Section 4.2.1.2, Policy 1)
REZONING APPLICATIONS	"When considering rezoning applications for new or expanded employment uses in Regional Centres…pedestrian walkways will be included, with linkages to transit stops and other modes of active transportation including sidewalks and trails." (Section 4.2.2, Policy 2d)
PARKS AND OPEN SPACE	"It is the objective of the Parks and Open Space policies to…provide parks, trails and leisure facilities that are aesthetically pleasing, multipurpose, multi-season and appeal to all ages and skill levels in order to attract and retain residents, especially young adults and families, and to enhance local tourism development." (Section 7.1e) "Publicly owned lands designated Parks and Open Space include a variety of lands used for active and passive recreational uses." (Section 7.2.1) "A comprehensive multi-use trail system that is linked to major civic facilities, educational institutions, employment areas, water bodies and tourist attractions will be developed, utilizing the development approval process with a view to developing these linkages for passive and active recreational uses as appropriate." (Section 7.2.1, Program 1) "Private lands designated Parks and Open Space are not necessarily accessible to the public; however, the municipality will continue to seek arrangements with landowners to provide public access to privately-held lands in order to expand the open space network including the trail system." (Section 7.2.2, Program 1)
TRANSPORTATION NETWORK & INTEGRATION	"Sidewalks, bike lanes, bike paths and walking trails need to be fully integrated components of the overall transportation system, providing safe access for pedestrians and cyclists supported by good urban design principles. Opportunities to engage in recreational and leisure activities are also tied to the transportation network." (Section 11.0) "It is the objective of the transportation network policies to… promote all travel modes, including public transit, walking and cycling." (Section 11.1e) "Pedestrian walkways, intersections of major roads, and pedestrian access systems are to be integrated with transit stops, and wherever possible, connected to trail systems." (Section 11.3.2, Policy 6).
NON-RAIL USES OF RAIL LANDS	"When reviewing proposed non-rail uses of railway lands, Council will…maintain railway corridors in public ownership and encourage linear uses such as trail linkages and transit corridors." (Section 11.6.1, Policy 1a)
PEDESTRIAN AND BICYCLE NETWORK	"Protecting and expanding the existing pedestrian and bicycle network in the City is essential to creating quality of place. Trails promote healthy lifestyles and provide an alternative transportation network. Existing and proposed components of the trail network, including the Trans-Canada Trail and Rainbow Routes are indicated on Schedule 5, Trail Route Map." (Section 11.7)

PEDESTRIAN AND BICYCLE NETWORK *(continued)*	"The existing pedestrian and bicycle network will be maintained and expanded through the creation of additional pedestrian walkways, trails and bikeways with adequate signage throughout the City." (Section 11.7, Policy 1) "Development proposals will be reviewed to ensure that there is adequate pedestrian access in new developments. The City may acquire lands to provide pedestrian facilities or cycling as a condition of approval. Wherever possible, the provision of adequate bicycle facilities will be encouraged." (Section 11.7, Policy 2) "Bicycle facilities for all new road links and road widening projects will be considered based on an assessment of safety, potential usage, cost, and linkages to major employment, educational, or recreational centres." (Section 11.7, Policy 3) "The maximum level of separation of pedestrians and bicyclists from motor vehicle traffic will be achieved through good road design practices." (Section 11.7, Policy 4) "Sidewalks facilitate active living and are an essential component of good neighbourhood design, providing a safe pedestrian environment and access to other transportation linkages such as transit stops and trails. Curbs and sidewalks in neighbourhoods also encourage walking and provide safety for children. It is policy of this Plan to provide the following on new and reconstructed roads, when feasible: a. Sidewalks on both sides of urban Arterial, Collector and Local Roads; b. High quality pedestrian connections to transit; c. Pedestrian connections between neighbourhoods; and d. Pedestrian linkages to major attractions/generators." (Section 11.7, Policy 5) œ□□dewalks are to be built and maintained to a standard that facilitates the mobility of persons with disabilities." (Section 11.7, Policy 6) "Barrier-free design of pedestrian facilities will be required through site plans." (Section 11.7, Policy 7) "The City will update the Bicycle Advisory Committee Reference Manual and undertake a bicycle network plan." (Section 11.7, Program 1) "The existing bicycle and pedestrian network will be expanded, with special emphasis on major generators such as community centres and educational institutions, as well as enhanced linkages between communities, neighbourhoods and schools." (Section 11.7, Program 2) "Pedestrian and bicycle safety programs within the City will be supported and coordinated." (Section 11.7, Program 3) "Appropriate bicycle storage facilities will be provided at City-owned buildings and parks. Other public and private sector development will be encouraged to provide such facilities, especially in areas adjacent to transit corridors, institutional uses, mixed use areas and other Employment Areas." (Section 11.7, Program 4) "Public awareness of the convenience, health and economic benefits of commuter

	cycling and walking will be promoted." (Section 11.7, Program 5)

Sustainable Mobility Plan, 2010

In 2010, the City of Greater Sudbury completed a Sustainable Mobility Plan with a vision to move the community forward in terms of active transportation strategies and initiatives. The Plan recognizes that developing a sustainable transportation system means building a city where people have the option to walk, cycle or use public transit as their preferred means of moving from place to place. One of the objectives set out in this plan is "to create a safe, cycle-friendly community." Recommendations shown in **Table 28** were outlined in the Sustainable Mobility Plan in terms of policy development, investment, public awareness & education, as well as future considerations and potential initiatives.

Table 28: Sustainable Mobility Plan Recommendations

POLICY DEVELOPMENT	(1) As part of the next Official Plan review process, give equitable consideration to the needs of cyclists in the Transportation section of the Official Plan. This could include, among other matters, a set of indices, which would help set priorities for cyclists and other forms of transportation improvements. (2) Amend the Official Plan (Transportation Schedule) to include a Bicycle Route Network & Classification System using the draft Bicycle Route Network and Classifications System developed through public consultation and in conjunction with the Bicycle Advisory Panel for all existing roads as a starting point. (3) Create a Priority Indexing System for cycling to create a system that will set priorities for cyclist infrastructure improvements, installations, traffic calming and maintenance. Adopt this Indexing System into the Official Plan Review process. (4) Incorporate into the Official Plan review appropriate cycling infrastructure on all new road development. (5) Incorporate into the Official Plan Review, the mandatory requirement for commercial, retail and institutional buildings to provide bicycle parking and storage, as per a Bicycle Parking By-Law. (6) Adopt the draft Bicycle Parking Zoning By-Law which would require a minimum number of bicycle parking spaces at retail, institutional, employment, educational and residential centers. (7) Draft and adopt a by-law which prohibits the operation of motor vehicles within designated bicycle lanes or paths. (8) Ensure that the practice of incorporating wide, paved shoulders along major arterials connecting outlying communities is continued. These paved shoulders often provide optimal infrastructure for distance "Group A" cyclists.

INVEST IN CYCLING INFRASTRUCTURE	(9) Implement the Action Plan developed for the Bicycle Route Network following the Official Plan amendment process. (10) Pave shoulders along major arterial roads connecting outlying communities to the urban core to provide a safe area for Class A cyclists to commute.
INVEST IN CYCLING INFRASTRUCTURE *(continued)*	(11) Using the Priority Index System for cycling, install complimentary traffic calming measures on residential and local roads to create the safe conditions necessary to encourage individuals to choose cycling. (12) Expand and promote the City of Greater Sudbury Transit "Rack and Roll" program to all transit busses by 2015. (13) Ensure that adequate, accessible and secure bicycle parking facilities are available at all major employment, retail and educational centers, in addition to all city-owned facilities and buildings through the enforcement of a new Bicycle Parking By-Law. (14) Complete the Junction Creek Waterway Park as an Active Transportation Corridor in Greater Sudbury by 2015.
PUBLIC AWARENESS & EDUCATION	(15) Develop a "Cycling in Greater Sudbury" wayfinding map outlining designated routes and information. (16) Develop and promote educational programs for both cyclists and motorists. (17) Develop a user-friendly "Transportation" page on the City website to include links to all forms of transportation information. (18) Conduct educational blitzes at high-profile intersections in the City of Greater Sudbury.
CONSIDERATIONS AND POTENTIAL CYCLING INITIATIVES	(19) Develop a partnership in order to facilitate the movement of the Bicycle portion of the Police Auction into the Downtown Core to improve access to inexpensive bicycles for individuals earning a low income. (20) Develop private partnerships to establish Mobility Hubs in predetermined activity centres in order to encourage mixed-use transportation by easing the transition between modes (walk or cycle then ride public transit). Potential Mobility Hubs: Valley East Shopping Centre, Downtown, Southridge Mall, New Sudbury Shopping Centre. (21) Examine the feasibility and effectiveness of painting bicycle lanes a solid colour, through a pilot project on Howey Drive or Bancroft Drive. (22) As part of the pilot project above, implement "bike box" infrastructure at the intersections of Bancroft/Bellevue and Bancroft/Second to increase visibility of cyclists to motorists by providing a staggered stop. (23) Form a local partnership to facilitate the development of a bicycle library, rental system or co-operative. (24) Partner with a local employer to install proper end-of-trip facilities in order to determine the success and feasibility of such a project on a larger scale.

	(25) "Crossrides" for cyclists, "Crosswalks" for pedestrians. (26) Form a partnership with a local organization or retail outlet to provide bicycle locks either at a reduced cost or no cost to agencies that provide services for low income individuals.

The Bicycling Technical Master Plan was prepared by the Bicycling Advisory Panel in 2011. It provided a summary of existing bicycling infrastructure and improvements necessary for cycling to be a safe and practical alternative means of transportation in the City. This identifies bicycling routes for implementation in the short, medium and long term which have been considered in the development of the active transportation component of the City of Greater Sudbury Transportation Study.

The Bicycle Technical Master Plan is a blueprint for a cycle-friendly community intended to build upon the Sustainable Mobility Plan's cycling component and implemented in conjunction with its pedestrian and transit components. It fulfills the recommendations of the Mobility Plan to amend the City of Greater Sudbury Official Plan using a Bicycle Route Network and Classification system. It also introduces a priority indexing system for important bicycling corridors, based on the potential benefit of each one in terms of cycling safety and practicability, as well as the relative ease of implementation.

5.4 Supporting AT in Greater Sudbury – Programming, Outreach & Support Features

By adopting the Transportation Study Report and its active transportation mandate, the City of Greater Sudbury has the opportunity to create an environment that is supportive of all modes of transportation including walking and cycling. Infrastructure such as sidewalks, trails, bike lanes, benches and sign treatments all contribute to an improved active transportation system, but these alone will not produce a fully supportive system for the City.

The City of Greater Sudbury should continue to explore opportunities to expand upon its leadership role; it should develop, implement and promote outreach programs with local partners to help educate residents about the public health, financial and environmental benefits that participating in active transportation and trails initiatives provide.

A well-developed, properly maintained and comprehensive network of on-road and off-road active transportation facilities will not automatically achieve its potential utilization. The network has to be promoted and users need to feel comfortable and safe using it. Amenities such as parking and end-of-trip facilities should also be available at strategic locations.

5.4.1 Education

Education is one of the most important components of this plan. Active transportation facility and trail users need to understand and practice both on and off-road operating procedures to engender a safe, connected and inviting environment. The public also needs to be educated on the many health benefits of active transportation.

Making information easily available is a core element of any educational strategy. The Greater Sudbury Area should support the implementation of active transportation-related educational programs and partner with other groups and agencies where appropriate. The Greater Sudbury Area could follow the examples of other municipalities and organizations in developing a variety

of educational materials for a nominal cost. Many of these publications have a host of contributing partners including: Healthy Living; the Ontario Ministry of Transportation; Ministry of Health Promotion; Transport Canada; Health Canada; the Canadian Safety Council; and private sector sponsors. This underscores the importance of cooperation and the need to share expertise and resources.

Paper or digital newsletters could focus on active transportation with information about existing and planned facilities, statistics, recommended routes and destinations, safety and training information, benefits of healthy active lifestyles and tips for pedestrians and cyclists. These could also include information about initiatives by others, for example walking and cycling events, bike racks on buses, bicycle parking at key destination points and the benefits of walking and cycling.

In addition, guide brochures could be adapted or developed for active transportation to address specific concerns related to:

- Implementation of the Active Transportation components of the Transportation Master Plan;
- Pedestrian and cyclist safety;
- Walking or cycling to school or work;
- Active transportation in winter/inclement weather conditions;
- Particular age groups, such as elderly persons or young children;
- The rules and regulations for pedestrians and cyclists, plus walking/cycling etiquette for on- and off-road routes;
- The benefits of active transportation, for example in terms of health, finances and the environment; and
- Intermodal connections, for example between cycling and transit, or walking and carpooling.

Educational information should be developed in a language and style appropriate for the group being targeted, such as children, seniors or individuals for whom English is not their primary language. Adaptation of both the content and the presentation of the information should be considered to ensure effective communication with the intended audience.

Materials could be provided to residents, employees and visitors through various methods such as:

- The City's website (http://www.greatersudbury.ca), ideally via specific web pages dedicated exclusively to active transportation. These should include news updates, downloadable files and links to other relevant walking and cycling-related websites.
- The production of paper pamphlets and brochures on safe operating procedures for pedestrians, cyclists and other road and trail users. These could be made available at local facilities such as libraries, community centres, arenas and City Hall, delivered as part of mailing initiatives, distributed at events and circulated through community partners.

- The implementation of education programs through partnerships between the City and other local groups looking to educate Greater Sudbury residents on active transportation and trails in general.

5.4.2 Encouragement

Residents can be encouraged to walk and cycle through various methods including community-based social marketing, leading by example, availability of active transportation maps and school programming.

Community-Based Social Marketing

People can be encouraged to adopt more sustainable transportation habits, including walking and cycling more often, through community-based social marketing such as Transport Canada's Urban Transportation Showcase Program. Community-based social marketing is a practical approach that stresses direct contact among community members and focuses on removing structural barriers that prevent people from changing their behaviour. The program involves five steps:

1. Identification of desired behaviour change;
2. Identification of barriers;
3. Program design;
4. Pilot program with a small segment of the community; and
5. Evaluation and program improvement during implementation (ongoing).

A number of community-based social marketing programs have been shown to be effective at influencing public attitudes and behaviours. Some "tools" utilized by such programs are described in **Table 29**.

Leading by Example

Expanding the utilitarian walking and cycling population will be essential to reaching future mode share targets. To achieve this, employers should be motivated to encourage and support walking and cycling among their employees. The City of Greater Sudbury can set an example for others to follow. A comprehensive approach could be put in place to encourage municipal employees to walk or cycle to work, and to combine these modes with transit for longer distance trips.

Active Transportation Maps

The Bicycling Technical Master Plan for the City of Greater Sudbury was developed by the Bicycle Advisory Panel in 2010. This plan provided a summary of existing bicycling infrastructure and improvements necessary for cycling to be a safe and practical alternative means of transportation in the City. It identified bicycling routes for implementation in the short, medium and long term; this led to the development of the Sustainable Mobility Plan in 2011, including a bicycle route classification system and five bicycle route network maps.

The Bicycling Technical Master Plan, the Sustainable Mobility plan and additional background information have been used to develop the Existing and Proposed Active Transportation Network maps presented in **Sections 2.3 and 8.4**, respectively.

Table 29: Community-Based Social Marketing Tools

TOOL	DESCRIPTION	EXAMPLE
OBTAINING A COMMITMENT	People are asked to pledge or agree to carry out a specific action.	City of Mississauga's "Towards an Idle-Free Zone" anti-idling campaign asked drivers to commit to reducing the frequency and duration of engine idling and to declare their commitment by placing a decal on their vehicle's windshield.
PROMPTS	Prompts are used to remind people to perform a particular action.	City of Ottawa's 'Walk the Talk' program provided participants with a bright yellow card and memo holder to remind them to track their walking, cycling and transit trips.
PERSONALIZED COMMUNICATION	Information is tailored to a target audience's specific needs, with particular information and images.	City of Vancouver's 'TravelSmart' program provides a forum to interested households with which they can request specific materials on select topics that suit their travel needs such as transit maps, cycling guides, trail maps and bike shop discount coupons.
NORM APPEALS	Making group standards, or the behaviour and attitudes that people observe around them, more apparent to encourage the desired behaviour.	The national 'Commuter Challenge' encourages the senior staff of participating workplaces to lead by example in adopting more sustainable transportation choices for their commute.
WORD-OF-MOUTH	Information that people hear from family, friends or colleagues. Such recommendations are highly influential as they come from a trusted source.	City of Seattle's 'In Motion' initiative provided lawn signs to participants who received information about travel options, stimulating conversation within their neighbourhoods about the program.
OVERCOMING SPECIFIC BARRIERS	Information or initiatives targeted at specific issues or groups that have been identified as significant.	British Columbia's 'Bike Smarts' program provided children with specific information about bicycle safety since this was identified as the primary concern for parents.
INCENTIVES AND DISINCENTIVES	Rewards for desired behaviour or punitive measures for the behaviour being discouraged.	The Government of Canada's change to the Canadian Income Tax Act to make the cost of monthly transit passes deductible in order to encourage regular transit use.
FEEDBACK	Demonstrating the outcomes, particularly the positive impacts or behavioural changes.	The successful elements of the City of Boulder's 'Go Boulder' program were publicized in local newspapers and on the community television channel. They shared the results of the program's initiatives aimed at encouraging residents to shift to more sustainable travel modes.

The City of Greater Sudbury should develop maps which clearly and legibly combine all existing walking, cycling and transit facilities as well as recreational opportunities. The maps should be updated every one to two years, especially after significant additions or changes are made. The information could be made available to the public at a nominal fee to generate revenue which can be reinvested into the development of future map editions or used to fund educational initiatives. Alternatively, the maps could be provided at no cost to residents and visitors at key locations throughout the City such as community centres, local rinks, at trailheads, municipal offices and via the 'Maps Online' page of the City's webpage.

5.4.3 Enforcement

In addition to education and encouragement, enforcement is important to pedestrian and cycling safety. Its principal objective is the prevention of incidents that may cause property damage, injury and death. Enforcement should be applied to on- and off-road segments of the proposed active transportation network.

A bicycle is a vehicle under the Ontario Highway Traffic Act (HTA). This means that cyclists have the same rights and responsibilities to obey all traffic laws as other road users. Cyclists charged for disobeying traffic laws will be subject to a minimum set fine and a Victim Surcharge fine of $20.00 for most offences. Currently the HTA is being reviewed and changes are being proposed to clarify the rules of the road for cyclists. This will address inconsistencies within the HTA as it relates to enhanced bicycle facility types which may encourage motorists and cyclists to use the road in ways that may contravene current HTA rules.

The following are not considered bicycles and are subject to different rules for use:

- Limited-speed motorcycles;
- Motor-assisted bicycles (mopeds);
- Low-speed vehicles (LSVs);
- Electric and motorized scooters (go-peds); and
- Segway Human/Personal Transporter.

For more information on the rules of use for these types of vehicles please visit http://www.mto.gov.on.ca/english/dandv/vehicle/emerging.

The responsibility for enforcement rests primarily on the Greater Sudbury Police. They are already educating the public on pedestrian and cycling safety via the following pages of their website:

- Bicycle Helmet Safety Standards (http://www.gsps.ca/en/specializedservices/bicyclesafety.asp)
- E-bikes (http://www.gsps.ca/en/specializedservices/ebikes.asp)
- Pedestrian Safety (http://www.gsps.ca/en/specializedservices/pedsafety.asp)

- Recreational Vehicles (http://www.gsps.ca/en/specializedservices/recreationalvehicles.asp)

To strengthen the effectiveness of enforcement the City, in association with Greater Sudbury Police Service, should consider the following:

- Cycling patrols and safety blitzes along walking and cycling routes to enforce safe operating procedures for all users;

- The collection of accurate data on all collisions involving cyclists, including those where cyclists hit open vehicle doors. This will help identify any potential problem areas as well as safety and enforcement priorities; and

- The development of materials to inform pedestrians and cyclists about the steps they should take if they are involved in a collision.

5.4.4 Partnerships

The City of Greater Sudbury will need the cooperation of outside agencies, volunteer groups and individuals to increase in the number of cycling and pedestrian trips being undertaken. The City should work with partners that have similar mandates to ensure that communication with the public is consistent and to avoid the duplication of efforts.

5.4.5 Support Features

The use of the pedestrian and cycling network can be encouraged by increasing user convenience through the provision of end-of-trip facilities. These meet the practical needs of users, such as locking up their bike and showering themselves after their ride. In many cases, such as office buildings where commuters must park their bicycles during the day and prepare themselves for work, these are essential to presenting walking and cycling as a feasible alternative mode of transportation and should be incorporated into building design. Support features in public spaces should be considered during the planning, design and implementation of the AT network.

Bicycle Parking Facilities

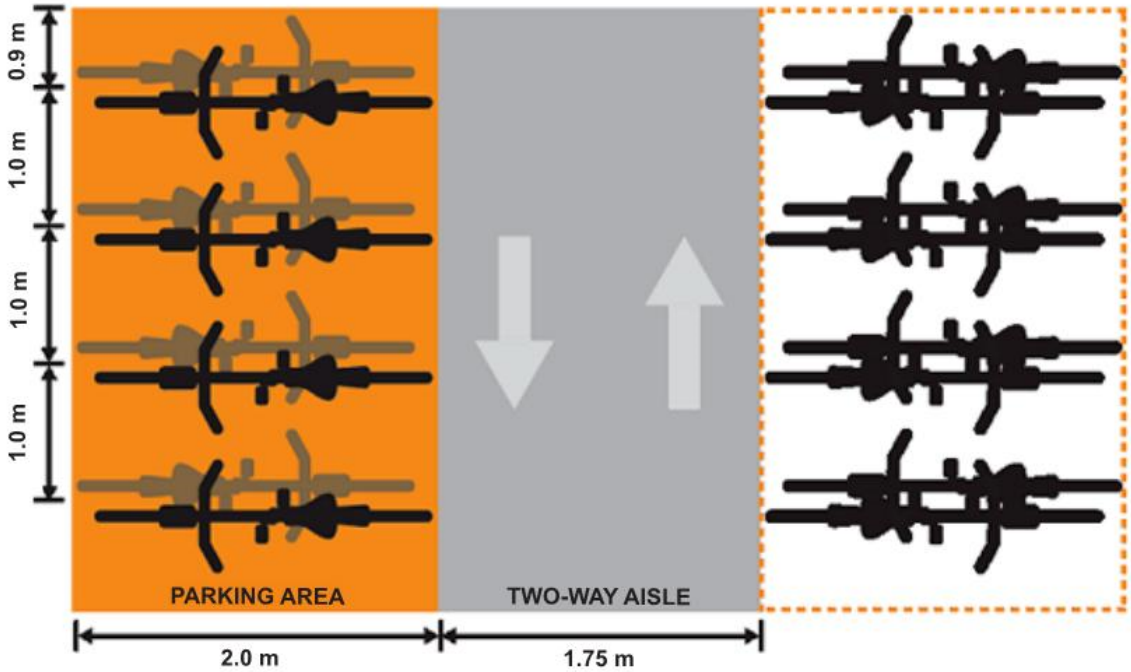
Providing bicycle parking facilities is an essential component of a multi-modal transportation system and necessary for encouraging more bicycle use. A lack of adequate bicycle parking supply can deter individuals from considering cycling as their basic mode of transportation.

Adequately designed bicycle parking facilities located in strategic areas allow cyclists to securely lock their bicycles and can contribute to more orderly sidewalks and parking areas in terms of appearance and flow. Bike racks can be provided for short term use, while bike lockers or a bike cage may be considered for longer-term storage. In any case, convenient and secure bicycle parking is a necessity for most cyclists.

Bike racks can vary from a simple post and ring stand for two bicycles to larger, more elaborate systems for multiple bikes where the current or potential demand is high. The purpose of a bike rack is to allow cyclists to securely and efficiently lock up their bicycle in a convenient location and to provide support for the bicycle frame itself. Easy and independent bike access should be provided to the bicycle rack. Inverted ‘U’ rack elements should be mounted in a row and placed

1 metre apart to allow enough room for two bicycles to be secured to each element. Racks should be arranged such that it is quick, easy and convenient to lock or unlock a bicycle.

Figure 29: Basic Dimensions for the Two Bicycles per Stand Perpendicular Configuration



Source: Ontario Traffic Manual Book 18, based on a Transport Canada specification

Bike lockers differ from bike racks in that they are individual storage units. They are enclosed, weather-protected and operated by a controlled access system. Access may be gained through the use of a key, swipe card or an electronic key pad located on the locker door. Locker systems set up for multiple users are often coin operated or secured with personal locks. Bike lockers require more space than bike racks to implement.

The rack area is essentially the 'bicycle parking lot' and refers to the space where more than one bicycle rack is installed. Bicycle racks are separated by aisles, much like a typical motor vehicle parking lot. The minimum acceptable aisle width is 1.2 metres, which provides enough space for one person to walk with a bicycle. Aisle widths of 1.75 metres are recommended in high traffic areas where many users may wish to retrieve their bicycle at the same time, such as after a school class.

Large bicycle rack areas with a high turnover rate of arriving and departing cyclists should have more than one access point, ideally with separate entrances and exits. The rack area should be sheltered to protect the bicycles from the elements by placing awnings and overhangs above the rack area.

Bicycle racks should be placed as close as possible to the building entrance they serve, but not in a location where they would inhibit pedestrian flow in and out of the building. Rack areas should be no more than 15 metres from an entrance and should be clearly visible along a major building approach line. Bicycle rack areas that are hard to find or that are located far from a building entrance are generally perceived as vulnerable to vandalism and therefore may be underutilized. To counter this, the rack site should be clearly visible and well lit.

Bicycle racks should not be placed within bus loading areas, taxi zones, goods delivery zones and emergency vehicle zones. They should be placed at least 4.0 metres away from a fire hydrant, 2.5 metres from a driveway or access lane and 10.0 metres from an intersection so as not to cause an obstruction.

Showers and Change Facilities

Showers and change facilities at workplaces help to promote walking and cycling for utilitarian purposes and are particularly important for individuals who commute to work or school. They should be located adjacent to bicycle parking facilities or in close proximity to the building entrance for easy access by users. They may contain lockers which can be used to store personal belongings such as cycling accessories, in-line skates or a change of clothing. Businesses or institutions with more than 20 employees or students commuting by foot, bicycle or in-line skates should be particularly encouraged to offer these facilities; however, all employment and educational buildings should consider providing them to increase the catchment area from which active transportation is a realistic commuting alternative.

Rest Areas

Rest areas should be provided at strategic locations along rural and urban facilities where users are expected to stop, such as at lookouts, restaurants, access points to trails and along waterfront routes. In general, rest areas should be provided at least every five kilometres on popular rural recreational routes, or at major intersections and gathering places near bicycle facilities. In urban centres, rest areas should be provided more frequently. In areas where demand is high, particularly among seniors or other users with mobility challenges, locations for sitting and resting should be more tightly spaced, typically at intervals of 100 to 250 metres.

Rest areas may contain a variety of amenities such as tables, washrooms, waste receptacles, parking for automobiles and bicycles as well as bicycle route signage. The purpose, size and location of the rest area govern the amenities that are provided.

Washrooms and Waste Receptacles

Washrooms must be provided along longer trail networks. Typically, they are located in parks and at major trailheads; they may also be located within facilities such as community centres. Washrooms should be placed where they can be easily accessed for maintenance and security purposes.

Waste receptacles are an absolute necessity throughout a trail network. Generally, they should be located at regular intervals and in locations where they can be easily serviced. Ideal locations include mid-block crossing points, staging areas and trail nodes; they may also be placed close to amenities that attract trail users such as benches and interpretive signs. They must be monitored and emptied on a regular basis to prevent unsightly overflow.

Table 30: Recommendations for Supporting Active Transportation in Greater Sudbury

EDUCATION	The City should consider utilizing educational programming and materials to promote and inform people of the benefits of active transportation as it relates to community health and fitness, transportation, environment and sustainability, economy and tourism.
	Develop and distribute newsletters and educational materials to promote and educate the public on active transportation opportunities, recommendations for routes and destinations and updates on available routes.
	The City should consider the implementation of educational programs on walking and cycling and partner with interested other agencies, not-for-profit organizations and school boards.
ENCOURAGEMENT	The City should explore community-based social marketing as a means of encouraging people to adopt more sustainable transportation habits, including walking and cycling. Tools such as those outlined in Table 29 can be used to develop a community-based social marketing program.
	The City and local organizations should develop a comprehensive approach to encouraging students and employees to walk or cycle to school or work and combine these modes with public transit for longer distance trips.
	The City should explore partnerships with local public and private organizations and integrate end-of-trip facilities into active transportation and trail promotional strategies and initiatives.
	The City should further promote active transportation and multimodal activities through the production of Active Transportation maps that also include transit information. City staff should work with local cycling and hiking groups and update the maps at least every two years to ensure new routes and connections are shown.
ENFORCEMENT	Consider transportation operational measures in the future as part of the transportation system management to support safe and convenient AT movement and trail use. These measures may include: • Exempting cyclists from turn prohibitions at intersections, such as 'No Right Turn on Red'; • Installing bicycle detection at intersections such that traffic signals recognize and react to cyclists on sideroads, particularly where motorized traffic is infrequent; and • Enforcing speed limits on roadways where observed speeds exceed acceptable levels.
	Enforcement activities from the Greater Sudbury Police should focus on issues related to the misuse of bicycle and pedestrian facilities, particularly sidewalk obstruction and the inappropriate use of trails.
	The City should work with the Greater Sudbury Police in the development and delivery of cycling and walking-related safety programs.
PARTNERSHIPS	The City should develop partnerships with outside agencies, volunteer groups, individuals as well as regional representatives to promote and educate residents on active transportation use throughout the City.
SUPPORT FEATURES	The City and its respective partners should make the development of support facilities such as bicycle parking, showers and change rooms, rest areas, washrooms and waste receptacles a priority during the planning and implementation of active transportation facilities.

6 FUTURE TRANSPORTATION NEEDS

6.1 Steps to Determine the Preferred Transportation Alternative

There are multiple steps in the process of determining future transportation needs and the preferred transportation alternative to address these needs:

- Forecasting population and employment for the ultimate horizon year (2031);
- Preparing the travel demand model for forecasting;
- Identifying strategic alternative road networks for testing;
- Producing a list of projects for each alternative;
- Running each alternative in the transportation model;
- Comparing system metric outputs computed by the model to evaluate the performance of the network for each alternative, such as: volume to capacity ratio; vehicle kilometres traveled; vehicle hours traveled, emissions and cost;
- Reviewing each alternative in light of the Transportation Principles identified for Greater Sudbury in **Section 4.2**: healthy communities, sustainability and economic vitality; and
- Selecting the preferred strategic alternative.

Forecasting population and employment and preparing the travel demand model are covered in this chapter. The other steps are addressed in **Chapter 7**.

6.2 Population and Employment Projections for the Year 2031

The first step in identifying the preferred transportation alternative is to project the population and employment for the city in the ultimate 2031 horizon year. Population and employment data are the key inputs to the travel demand model and fundamentally influence the anticipated travel demands. **Figure 30** shows the population levels in the City of Greater Sudbury in 2006. The population has been divided into Transportation Analysis Zones (TAZs) for use in the travel demand model. Working with the City's Planning Department, projections of the employment and population levels in the year 2031 were made for each TAZ. The 2031 population projection is shown in **Figure 31**.

Figure 30: Map of 2006 Sudbury Population

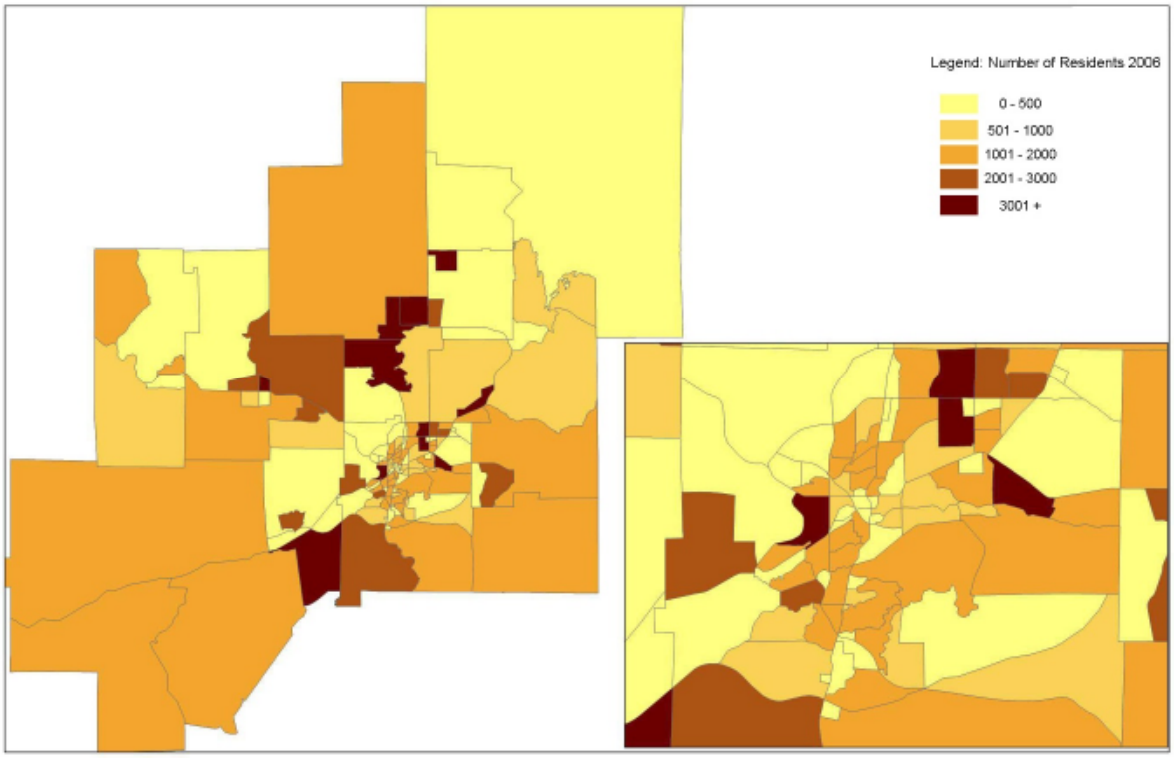
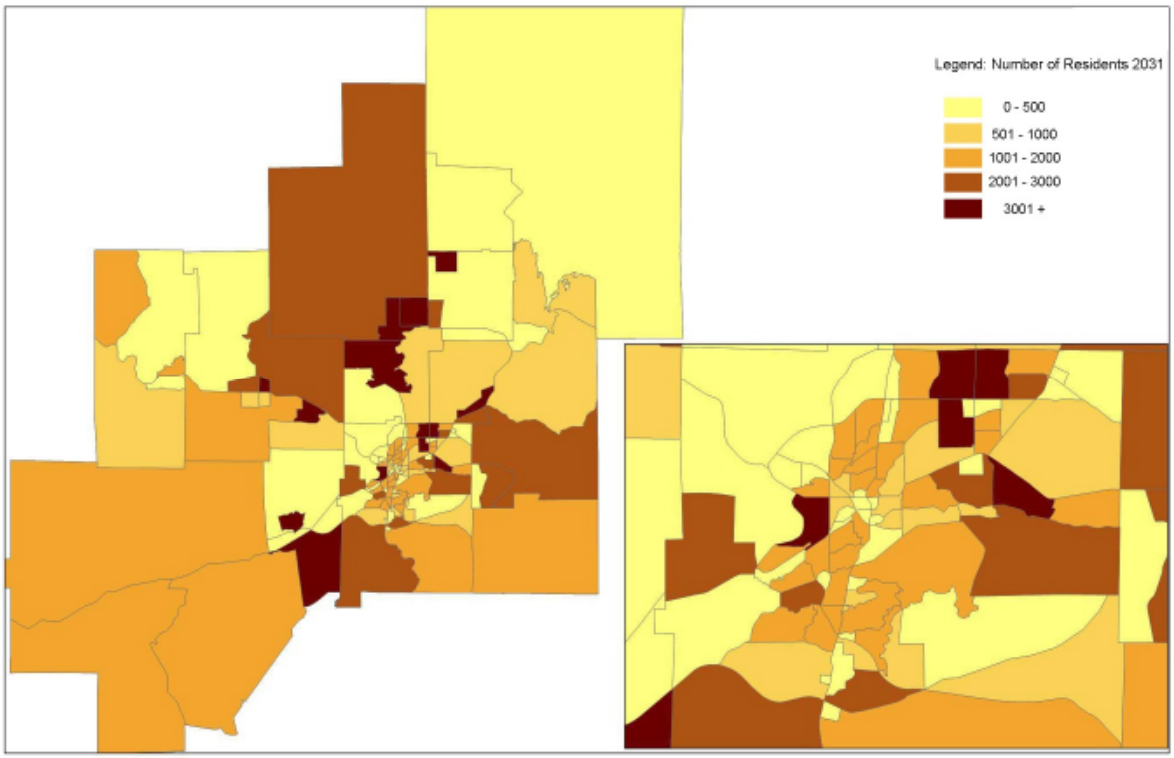


Figure 31: Map of Forecast 2031 Sudbury Population



The overall change in population between 2006 and 2031 is portrayed in **Figure 32**. Based on these projections, it can be determined that the areas of New Sudbury, Valley East, and Sudbury South are anticipated to experience the greatest proportion of the forecast population growth.

Figure 32: Forecast Change in Sudbury Population between 2006 and 2031

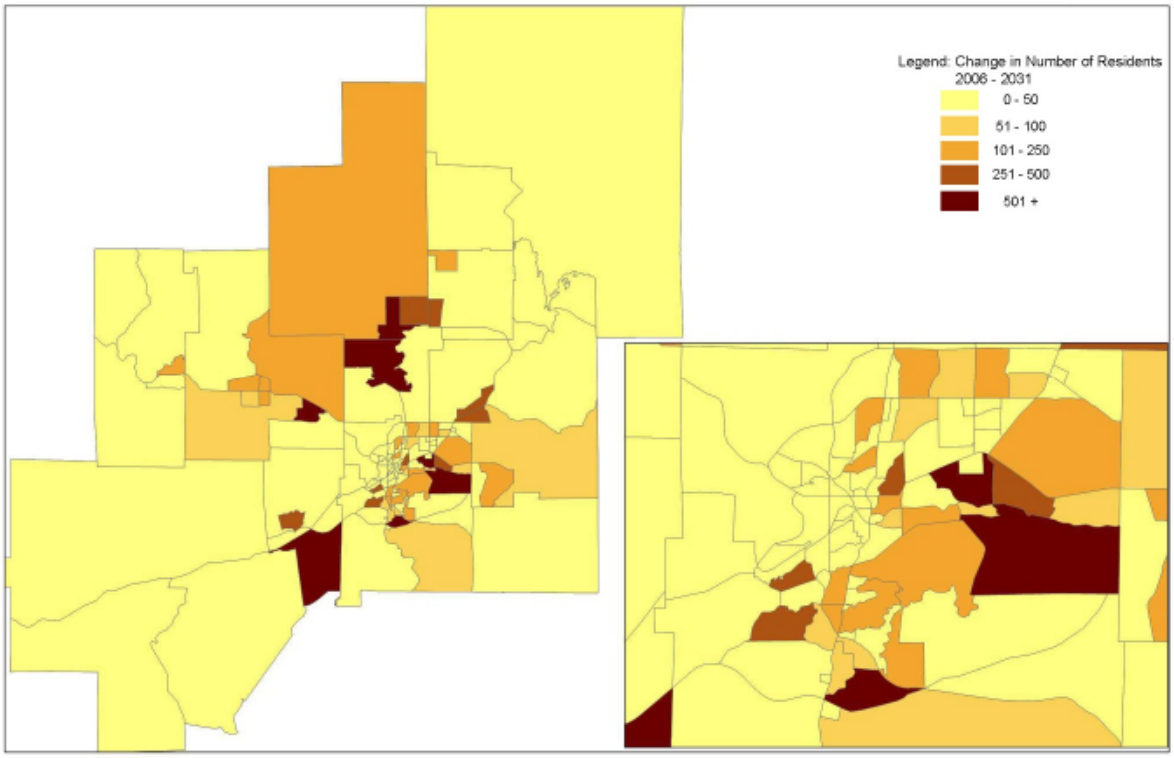


Figure 33 shows the level of employment in various areas of Sudbury in 2006. A 2031 projection for employment is shown in **Figure 34**. The overall change in employment between 2006 and 2031 is portrayed in **Figure 35**. Based on the projected change, it can be determined that the areas of Copper Cliff, Lively, and Chelmsford are expected to experience the greatest proportion of employment growth by the year 2031.

Figure 33: Map of 2006 Sudbury Employment

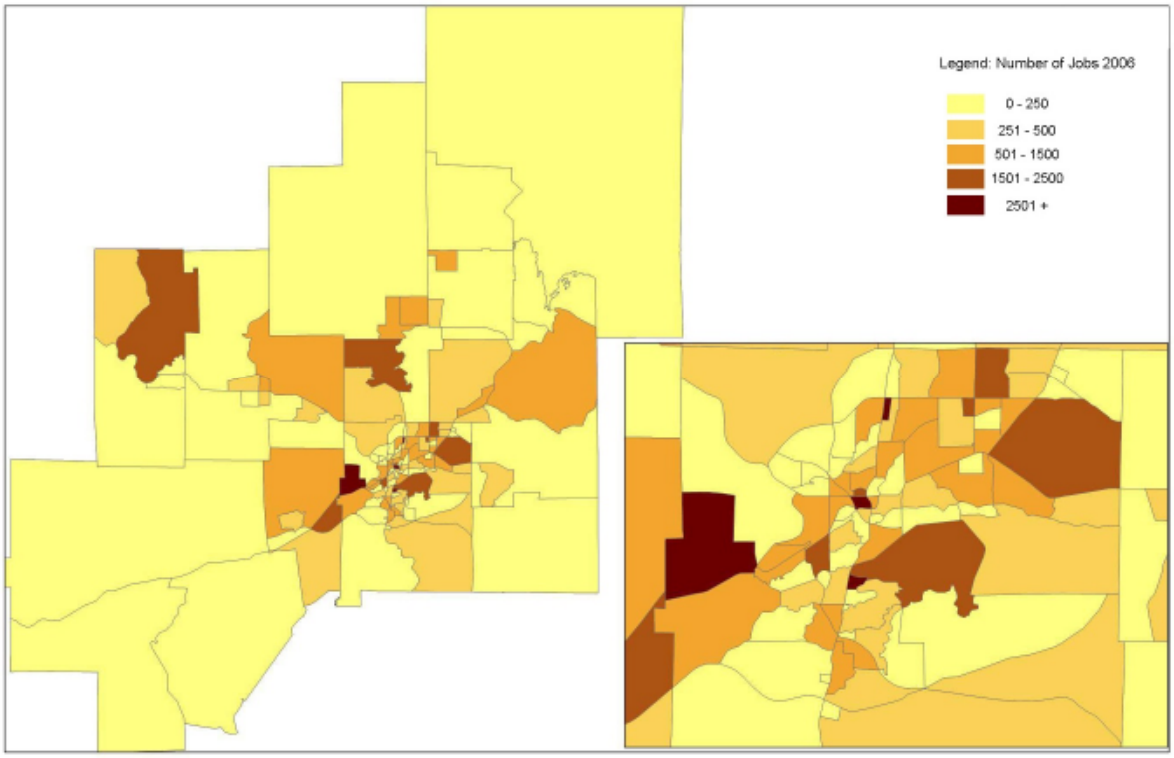


Figure 34: Map of Forecast 2031 Sudbury Employment

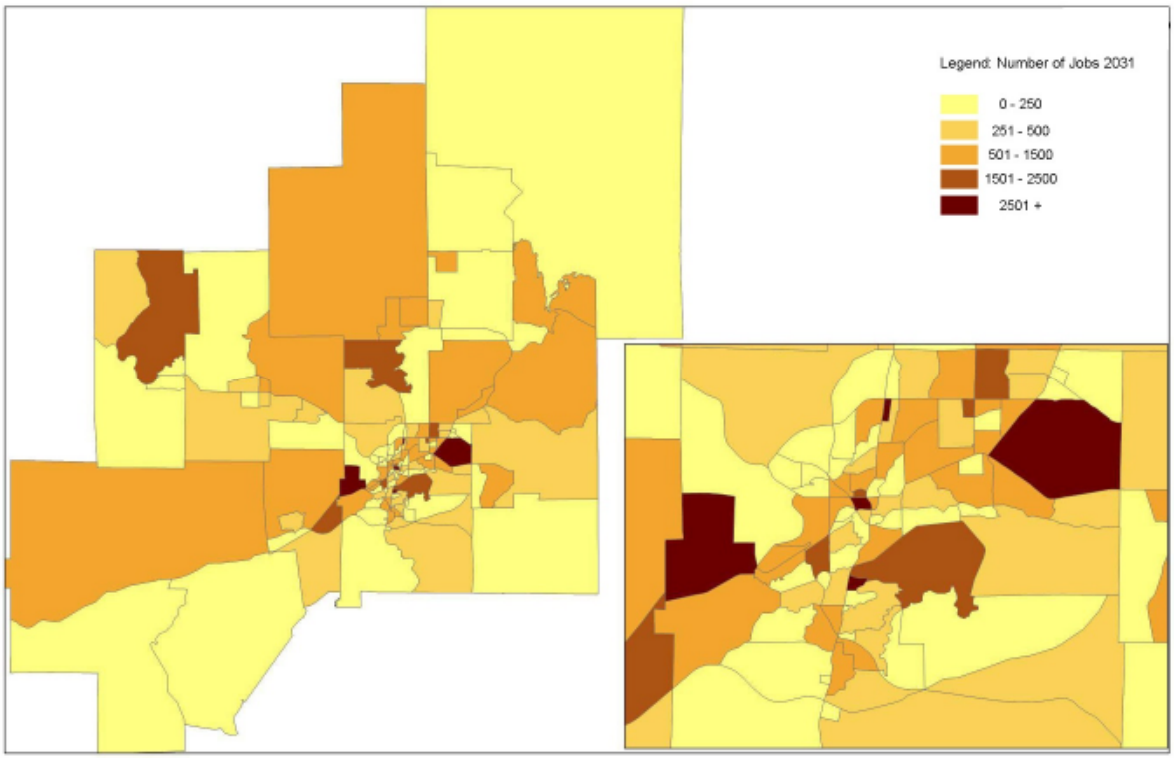
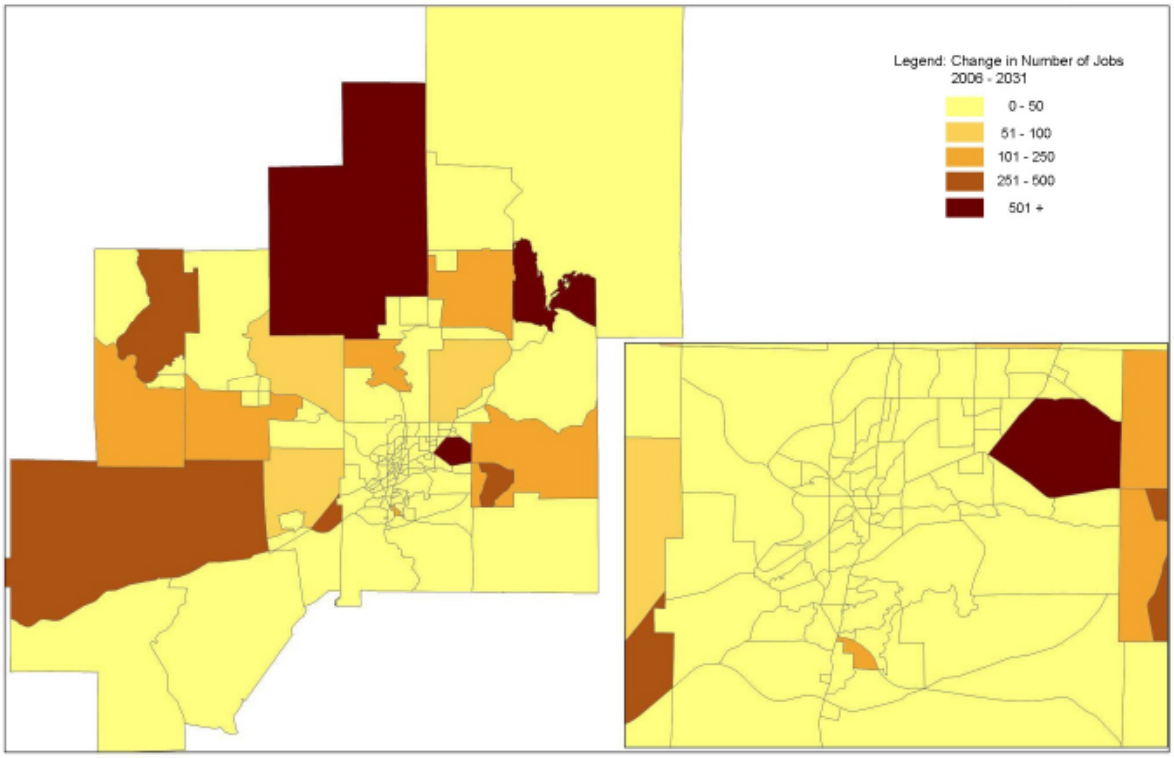


Figure 35: Forecast Change in Sudbury Employment between 2006 and 2031



6.3 Travel Demand Forecasting Model

The modelling of general travel demand involves four stages of analysis incorporating Trip Generation, Trip Distribution, Mode Split, and Trip Assignment. Household survey data collected for the 2005 Transportation Study was utilized again as the basis for the first three steps of the model. It was deemed that travel patterns in the city had not changed significantly in the years since the household survey was undertaken and that the survey results reported in the 2005 Transportation Study were still representative of existing conditions in the city.

The 2005 Transportation Study included a travel demand model prepared using TransCAD software, so this was used again to perform trip assignment for this report. Changes in travel patterns were predicted by the model and several iterations were necessary to take into account the resulting travel times on various routes. The overall model outputs were validated by considering projected volumes at several screenlines and road links, and these were found to be reasonable.

TransCAD is limited in that it does not consider driver behaviour, intersection delays, or the impact of opposing traffic. This results in the model not being able to predict intersection turning movements with a great deal of accuracy. However, the model does show general travel patterns and provides forecasts for link volumes. When combined with data on the capacity of road links, volume / capacity ratios can be determined and links approaching capacity can be highlighted. The model helps to identify where improvements are needed and allows for the testing of multiple alternatives to determine the most appropriate improvements to implement.

7 TRANSPORTATION PLANNING ALTERNATIVES

As part of Phase 1 of the Municipal Class EA process, a transportation master plan must determine problems or deficiencies and then identify and test alternative solutions to address them. In Phase 2, the alternatives are evaluated and a preferred alternative selected.

For the Greater Sudbury Transportation Study Report, three alternative networks were considered for the 2031 horizon year:

- 'Do Nothing': existing transportation network + projects planned for construction;
- 'Auto Focused' approach: existing transportation network + projects planned for
- construction + transportation projects that continue road widening or new road construction; and
- 'Sustainability Focused' approach: existing transportation network + transportation projects that result in a focus more on sustainability, active transportation and infill development.

All alternatives were modelled for the 2031 horizon based on forecast population and employment data as outlined in **Section 6.2**.

7.1 Do Nothing Alternative

In order to meet the requirements of the EA process, one of the alternative strategies that must be analyzed is the 'Do Nothing' alternative. This considers the existing transportation network and municipal projects that are planned for construction. Analysis of the 'Do Nothing' alternative identifies where the deficiencies in the transportation network would be located throughout the city if no further transportation improvements were to be made.

For the 'Do Nothing' alternative, traffic volumes within and between each of the key areas of Greater Sudbury in the p.m. peak period (3:30 – 6:30p.m.) are shown in **Table 31** below.

Table 31: 'Do Nothing' Traffic Volumes – P.M. Peak Period (2031)

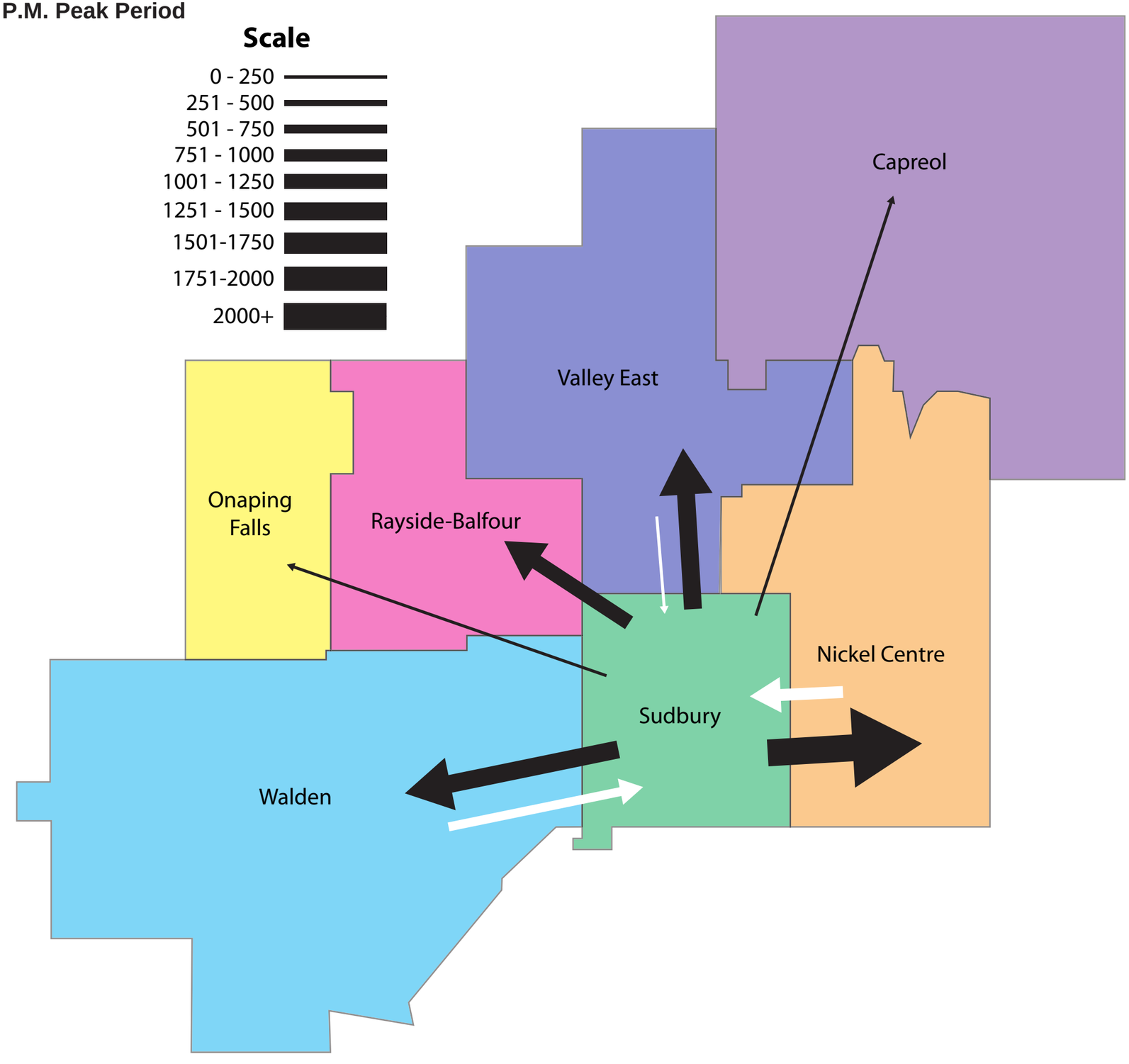
TO / FROM	Sudbury	Nickel Centre	Capreol	Valley East	Rayside-Balfour	Onaping Falls	Walden
Sudbury	16,279	2,058	198	1,443	1,017	143	1,365
Nickel Centre	784	268	91	460	110	18	59
Capreol	1	2	16	183	41	5	7
Valley East	52	16	175	966	375	44	71
Rayside-Balfour	8	3	50	451	442	100	103
Onaping Falls	1	1	12	104	206	484	25
Walden	702	68	21	189	219	22	311

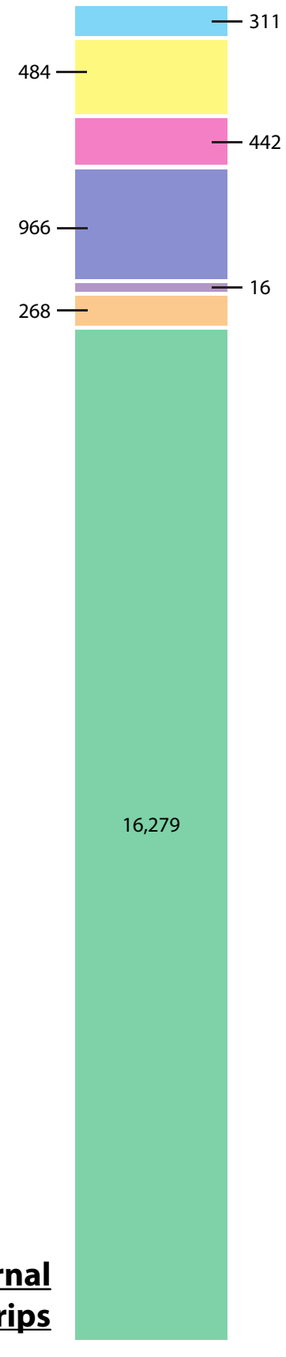
The map diagram in **Figure 36** shows trips to and from the core area traditionally known as the City of Sudbury. The thickness of the arrows is proportional to the traffic volumes into and out of the City of Sudbury. Similarly, the bars to the right of the figure represent the internal trips within each area.

P.M. Peak Period

Scale

0 - 250
251 - 500
501 - 750
751 - 1000
1001 - 1250
1251 - 1500
1501-1750
1751-2000
2000+





Internal Trips

Legend

Direction of Trips

To Sudbury

From Sudbury

Figure 36

Key Traffic Flows -
'Do Nothing' Alternative

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City of Greater Sudbury
Transportation Study Report
April 2015
16-11071

Major travel flows out of the Sudbury city centre have the following destinations:

- **Nickel Centre:** This is still the heaviest movement and its volume is projected to increase by more than 10% between 2011 and 2031. This will compound the existing eastbound congestion on the Kingsway, Lasalle Boulevard and Howey Drive, which in turn will affect the Falconbridge Road / Highway to Garson. When commuters returning to Coniston are added to those on the Southeast Bypass, the Trans-Canada Highway will also be impacted.
- **Valley East:** The projected increase in employment in Valley East is expected to result in a drop of more than 10% in the number of trips from Sudbury as Valley East residents work closer to home. However, the fact that Notre Dame Avenue is the only direct north-south route will result in it continuing to operate at close to capacity.
- **Walden:** Trips to this area to the southwest of Sudbury are distributed between M.R. 55 and the Trans-Canada Highway (17). Despite a marginal increase in the predicted trips from Sudbury, both these routes will continue operating at an acceptable level of service. The exception is M.R. 55 east of Balsam Street, where traffic joining from Copper Cliff and Gatchell will cause an increase in the volume/capacity ratio.
- **Rayside-Balfour:** Northwestbound traffic is channelled along M.R. 35, which operates at an acceptable level of service between Lasalle Boulevard and Notre Dame Street East, where there are two lanes westbound. However, capacity is constrained at Azilda west of where the highway reduces to one lane in each direction. The projected change in the volume of this movement between 2011 and 2031 is negligible, so this will continue to be a pinch point.

Major travel flows into the Sudbury city centre have the following origins:

- **Nickel Centre:** There are three westbound routes into the centre of Sudbury: the Kingsway, Lasalle Boulevard and Howey Drive. Between them they will have to manage an anticipated increase in traffic from Nickel Centre of over 5% by 2031. West of Bancroft Drive the accumulation of internal Sudbury trips on top of those from Nickel Centre will push the Kingsway, and also Howey Drive, over the 0.8 volume/capacity threshold;
- **Walden:** As with the flow out of Sudbury, the distribution of trips between M.R. 55 and the Trans-Canada Highway (17) means that both will operate at an acceptable level of service. This is despite an anticipated 30% increase in trips from Walden into Sudbury associated with forecast increases in employment along and to the north of the M.R. 55 corridor west of M.R. 24. The exception is M.R. 55 east of Balsam Street, where traffic joining from Copper Cliff and Gatchell will cause an increase in the volume/capacity ratio.

Major travel flows within the Sudbury city centre include:

- Commuter and commercial trips between New Sudbury and the remainder of the City. These add to demand on the Kingsway, Lasalle Boulevard, and other links;
- Traffic on Paris Street to and from Laurentian University and Health Sciences North; and
- Commercial and retail trips to the Paris Street/Long Lake Road/Regent Street intersection, known locally as the Four Corners.

Some movements within Greater Sudbury but not starting or ending in the former City of Sudbury are expected to see significant percentage increases, however the volumes are still relatively low. The same movements dominate as in the existing conditions: between Valley East and Rayside-Balfour on M.R. 15, and heading into Valley East along the Radar Road / Skead Road corridor from Nickel Centre.

Volume/capacity plots have been created showing traffic volumes on each link within the network as well as an indication of the available spare capacity on that link in the 'Do Nothing' alternative.

In order to clearly show the traffic volumes for each link, three plots with different zoom levels were produced per alternative showing:

- Full study area (**Figure 37**);
- Area approximately bounded by Copper Cliff to the west, McCrea Heights to the north, Garson to the east and the Trans-Canada Highway to the south (**Figure 38**); and
- Downtown Sudbury and New Sudbury (**Figure 39**).

As indicated in the legend, the colour of each line corresponds to the volume/capacity ratio of that link, which in turn relates to the Level of Service of that link. **Table 32** below shows the relationship between the two variables, and the colour scheme matches that of the figures.

Table 32: Level of Service Designations

Level Of Service	V/C Ratio
A	≤ 0.26
B	>0.26 – 0.4
C	>0.4 - 0.6
D*	>0.6 - 0.8
E	>0.8 - 1.0
F	>1.0

* LOS D is the threshold for acceptable road performance

For each road, the model plots show the volume to capacity ratios in the peak travel direction.

The following roadway sections have been identified as having a volume/capacity ratio of greater than 0.8 in the p.m. peak hour and are shown in red in **Figure 37, Figure 38** and **Figure 39**:

- Highway 144 between Isidore Street and Edward Avenue;
- M.R. 35 between M.R. 15 and Montee Rouleau;
- Montee Principale between M.R. 35 and Bonin Street;
- Notre Dame Avenue / M.R. 80 between Kathleen Street and Dell Street, and the approach to Lasalle Boulevard to Valleyview Road;
- M.R. 80 northbound between Main Street / M.R. 15 and Campeau Street;
- Falconbridge Road / Falconbridge Highway / Skead Road between Lasalle Boulevard and Sunderland Road;
- Trans-Canada Highway (17) east of the Kingsway;
- M.R. 55 between Balsam Street and Big Nickel Drive;
- Big Nickel Drive between M.R. 55 and Elm Street;
- Elm Street between Ethelbert Street and Elgin Street, and between Lisgar and Paris Street;

- Lasalle Boulevard between Frood Road and Crescent Park Road, and between Notre Dame avenue and Attlee Avenue;
- The Kingsway / Lloyd Street between Brady Street and Falconbridge Road;
- Westmount Avenue / Attlee Avenue between Hawthorne Drive and Barry Downe Road;
- Van Horne Street / Howey Drive between Paris Street and Somerset Street;
- Bellevue Avenue between Howey Drive and Bancroft Drive;
- Paris Street between Walford Road and north of Centennial Drive, and between Ramsey Lake Road and Van Horne Street;
- Kathleen Street between Frood Road and Beatty Street;
- Regent Street between Elm Street and Oak Street, and between Lorne Street and Wembley Drive.
- Southview Drive / Bouchard Street between Cranbrook Crescent and Regent Street;
- Riverside Drive between Kilpatrick Avenue and Broadway Street;
- Broadway Street between Riverside Drive and Brady Street;
- Ramsey Lake Road between University Road and Paris Crescent;
- Second Avenue between Kenwood Street and the Kingsway;
- Radar Road between Skead Road and Hydro Road;
- Guenette Road between Radar Road and Notre Dame Avenue;
- Notre Dame Avenue between Guenette Road and Armand Street;
- Lorne Street between Regent Street and Douglas Street; and
- Ontario Street between Martindale Road and Regent Street.

Figure 37: Volume to Capacity Plots - Do Nothing Alternative (Overview)

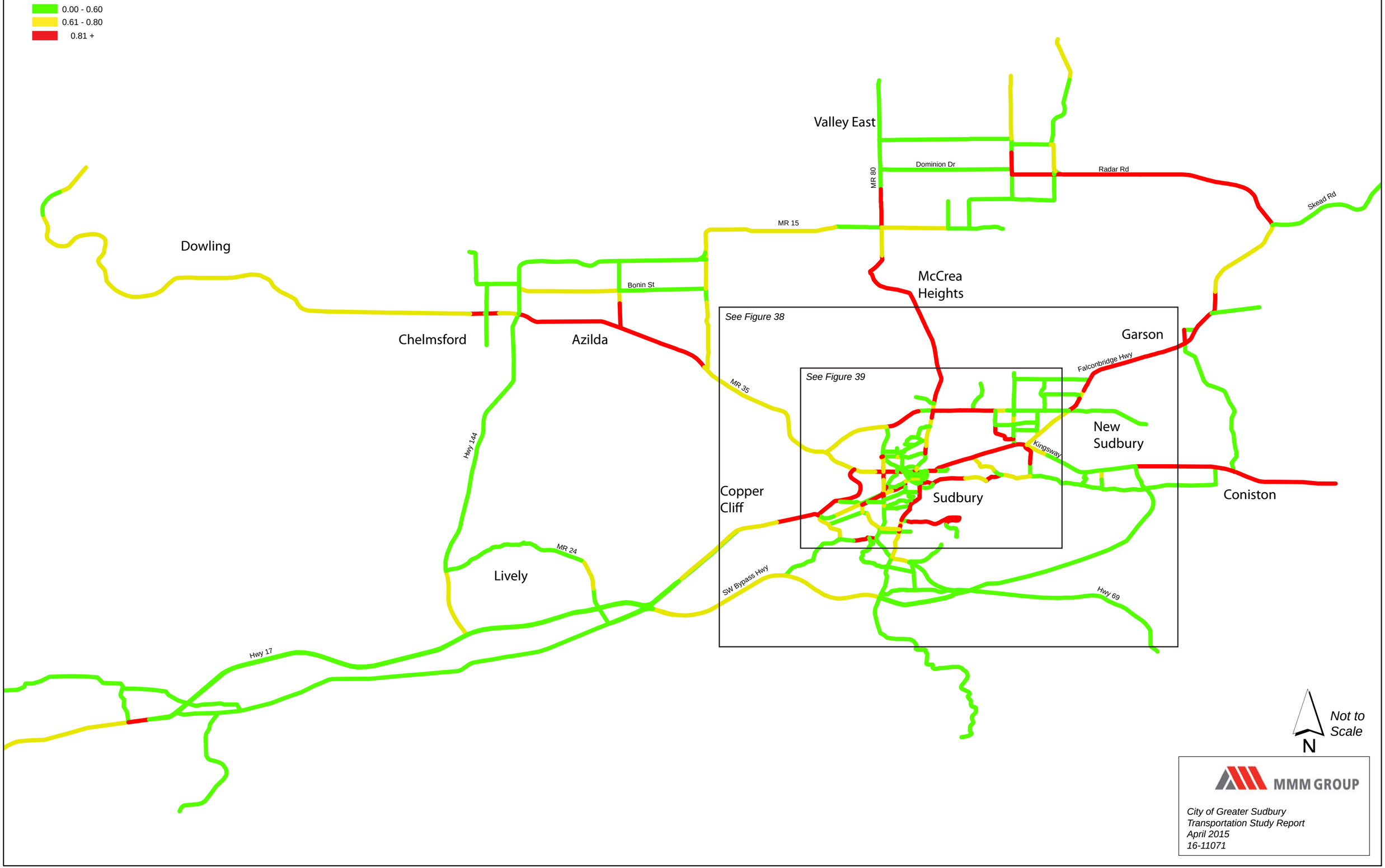


Figure 38: Volume to Capacity Plots - Do Nothing Alternative (Intermediate Zoom)

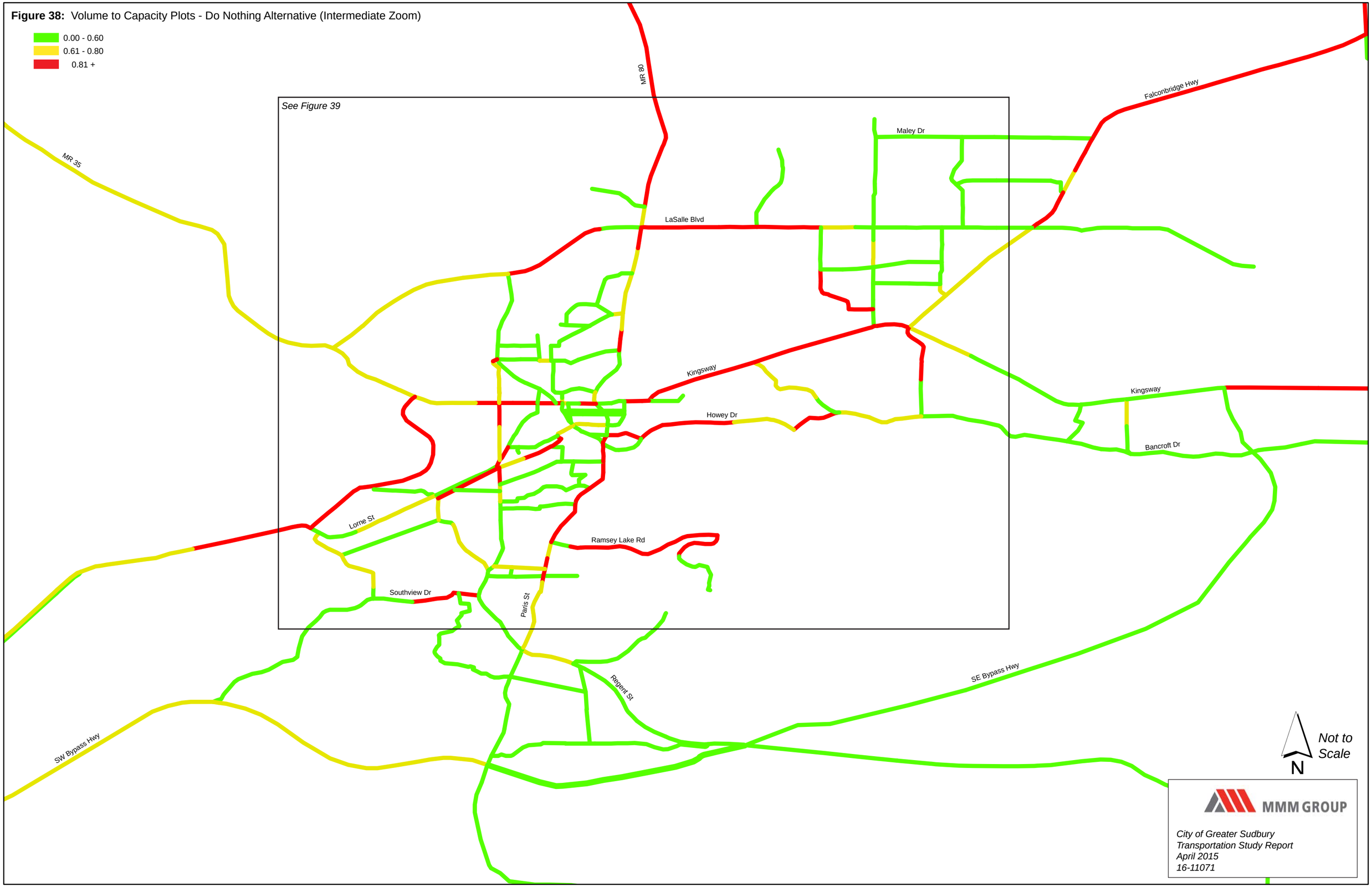
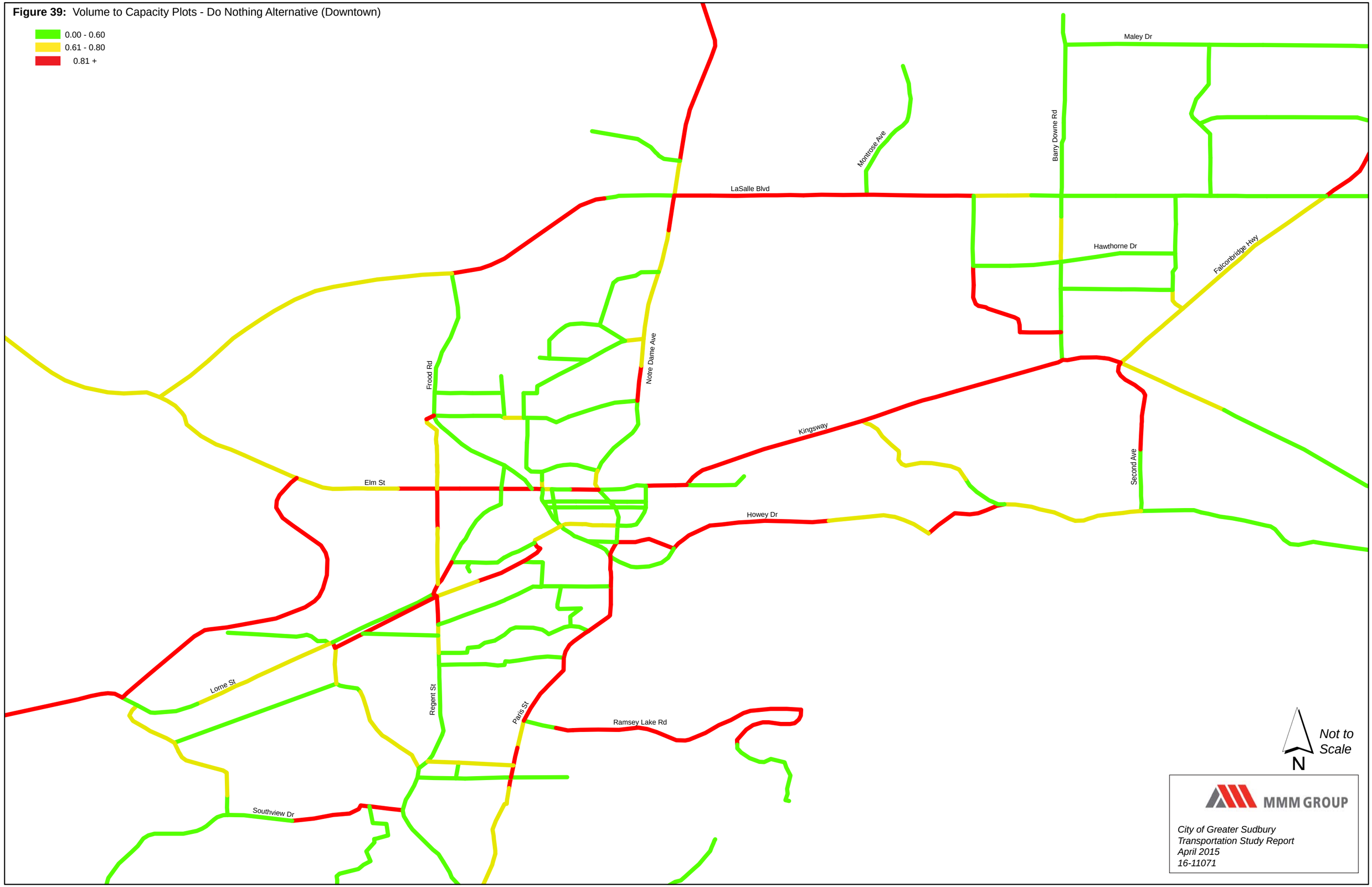


Figure 39: Volume to Capacity Plots - Do Nothing Alternative (Downtown)



7.2 Auto Focused Alternative

In addition to the 'Do Nothing' alternative, two additional alternatives were developed to respond to the Problem Statement outlined in **Section 4.4**. Key opportunities related to these needs were identified and include:

- Implementing short-term solutions for intersections and corridors of traffic congestion;
- In the longer term, creating a transportation network which offers more direct routings; and
- Providing the transportation network needed to support intensified land use in designated growth areas.

This 'Auto Focused' alternative includes projects identified in Schedule 6 of the Official Plan and the 2005 Transportation Study Report. The candidate proposals involve widening some existing roads to ease congestion on the following corridor sections:

- Notre Dame Avenue (MR 80) from Main Street to Kathleen Street [four-lane to six-lane];
- Maley Drive from Barry Downe Road to Falconbridge Highway [two-lane to four-lane];
- Falconbridge Highway from Maley Drive to Garson Coniston Road [four-lane to five-lane];
- Second Avenue (Donna Drive to Scarlett Road) [two-lane to five-lane];
- Barry Downe Road from Westmount Avenue to the Kingsway [five-lane to six-lane];
- The Kingsway east of Lloyd Street [four-lane to five-lane];
- Howey Drive from Elgin Street to Bancroft Drive [two-lane to four-lane];
- Ramsey Lake Road (Health Sciences North Road to South Bay Road) [two-lane to four-lane];
- Maley Drive from Lasalle Boulevard to MR 35; and
- MR 35 from MR 15 to Notre Dame Street East [two-lane to five-lane].

Some new roads are proposed for construction, including new bypasses and shorter links to offer more direct routings:

- Maley Drive extension (Lasalle Boulevard to Barry Downe Road);
- Montrose Avenue extension to the north (current terminus to Maley Drive extension);
- Ste. Anne Road extension to College Street;
- Larch Street extension between Elgin Street and Lorne Street;
- Martilla Drive Extension to Paris Street
- Garson connection proposed between Falconbridge Highway and Maley East Bypass;
- Big Nickel Drive connection to Southview Drive;
- Barry Downe Extension from Maley Drive to Main Street and Bodson Drive;
- South Bay Road Extension;
- Maley East Bypass;
- Silver Hills Drive (from Bancroft Drive to Marcus Drive);
- Remington Road (from current terminus to Gateway Drive); and
- Montrose Avenue south extension to Hawthorne Drive and Notre Dame Avenue.

Alignments for these new links should continue to be protected even though, in some cases, implementation may come after the 2031 horizon.

It is recommended that Environmental Assessments be conducted to determine the optimal corridor for the South Bay Road extension and the Maley East Bypass. In the latter case, the alignment shown in the 2005 Transportation Study Report has been carried over for modelling purposes. This would connect the existing intersection of Maley Drive with Falconbridge Road to the upgraded interchange of the Trans-Canada Highway with the Kingsway. However, the final alignment is to be determined in conjunction with the Ministry of Transportation of Ontario (MTO). As an alternative to the connection with Highway 17, Maley Drive may be extended east to Garson Coniston Road.

For each of the two alignment options, the distance that would be travelled between the Maley Drive / Falconbridge Road intersection is similar, however the Highway 17 connection provides the best connectivity to the Southeast Bypass. The application of this alignment to the modelling analysis allows for the most accurate assessment of demand for a continuous bypass linking Lasalle Boulevard and Highway 69. Widening and local realignments of the provincial Highways 17 and 69 have been incorporated into the network, although these fall under the jurisdiction of MTO.

The Official Plan includes proposed connections in Valley East and New Sudbury. However, the modelled network only includes those links that relate to developments that are reflected in the 2031 land use data.

For the 'Auto Focused' alternative, traffic volumes between the key locations in the region in the p.m. peak period are shown in **Table 33**.

Table 33: 'Auto Focused' Traffic Volumes – PM Peak Period (2031)

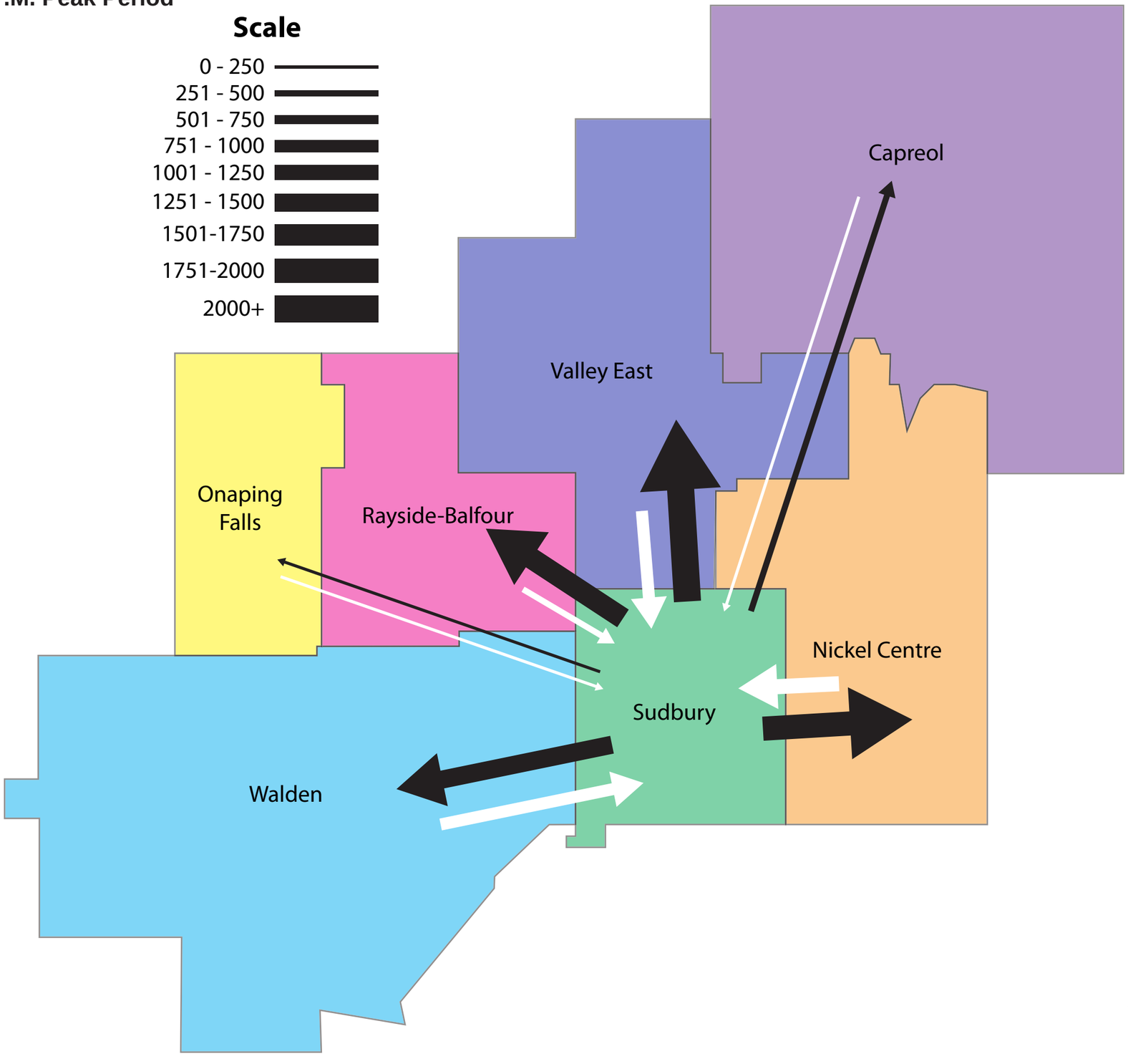
FROM \ TO	Sudbury	Nickel Centre	Capreol	Valley East	Rayside-Balfour	Onaping Falls	Walden
Sudbury	14,269	1,886	412	2,783	1,531	217	1,405
Nickel Centre	1,047	163	48	273	138	21	98
Capreol	119	24	4	61	29	3	14
Valley East	808	136	57	340	227	25	106
Rayside-Balfour	450	60	22	191	243	70	121
Onaping Falls	93	13	5	44	139	508	29
Walden	877	113	25	177	154	16	167

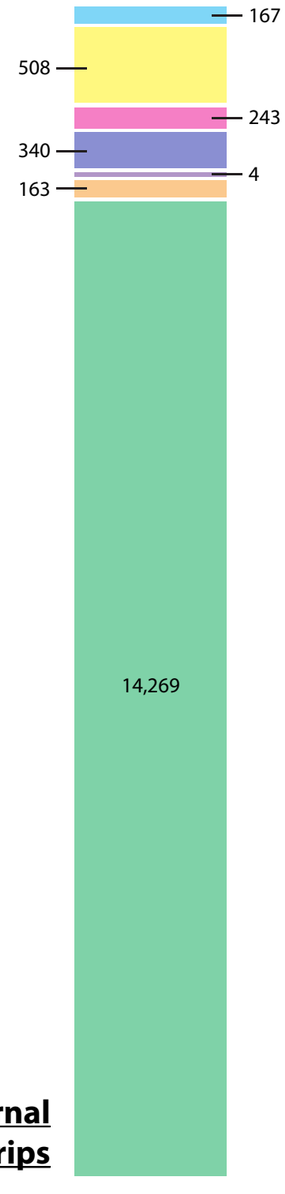
The map diagram in **Figure 40** shows trips to and from the former City of Sudbury. The thickness of the arrows is proportional to the traffic volumes into and out of the former City of Sudbury. Similarly, the bars to the right of the figure represent the internal trips within each area. **Table 34** summarizes the characteristics of the major traffic flows leaving the Sudbury city centre bound for the surrounding areas in the 'Auto Focused' alternative. It also identifies the main positive and negative impacts of the proposed projects on the ability of the road network to support these movements.

P.M. Peak Period

Scale

0 - 250
251 - 500
501 - 750
751 - 1000
1001 - 1250
1251 - 1500
1501-1750
1751-2000
2000+





Internal Trips

Legend

Direction of Trips

To Sudbury

From Sudbury

Figure 40

Key Traffic Flows -
'Auto Focused' Alternative

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April 2015
16-11071

Table 34: Characteristics of Traffic Flow Leaving the Sudbury City Centre: 'Auto Focused'

DESTIN-ATION	FLOW CHARACTERISTICS	POSITIVES	NEGATIVES
Valley East	The anticipated number of northbound trips nearly double compared to the 'Do Nothing' alternative to become the most popular movement between areas. The proposed extension of Barry Downe Road between Sudbury and Valley East is the key determining factor for this. Trips to Capreol passing through Valley East are predicted to more than double, however they represent a much lower volume.	The additional traffic will reach Barry Downe Road via Maley Drive which will have extra capacity due to its proposed widening and extension.	No widening is proposed on Barry Downe Road south of Maley Drive, and this northbound section will consequently be at capacity. Despite the additional northbound link, the volume on Notre Dame Avenue in that direction will actually be higher than in the 'Do Nothing' case. This will be partly mitigated by the proposed widening of that route.
Nickel Centre	A slight decrease in volume is expected compared to the 'Do Nothing' case; however it is still predicted to be marginally higher than the existing conditions.	Congestion on the Falconbridge Highway will be reduced by this, as well as the proposed widening of that road and the availability of new alternative routes such as the Garson connection and Highway 17. The latter relieves the congestion on the existing Trans-Canada Highway to the east of Sudbury. The v/c ratio on the section of Falconbridge Road between Lasalle Boulevard and Maley Drive will reduce as vehicles use Maley Drive instead. This will become a thoroughfare by virtue of its planned extension to the west.	The Southeast Bypass is projected to be congested northbound. The Trans-Canada Highway improvements also attract additional eastbound volumes leaving Sudbury. The v/c ratio will increase on the Kingsway between Kitchener Avenue and Barry Downe Road where widening is not feasible due to right-of-way constraints, as well as routes connecting to downtown Sudbury such as Van Horne Street.
Rayside-Balfour	Northwestbound traffic is channelled along Municipal Road 35. The number of trips from Sudbury to Rayside-Balfour is projected to increase by 20% compared to the 'Do Nothing' case.	In the existing conditions, capacity is constrained at Azilda west of Notre Dame Street East where the four-lane highway reduces to two lanes. The proposed widening of this section of M.R. 35 removes this geometric pinch point and is a key factor in attracting the additional trips from Sudbury.	Although the highest volume/capacity ratio in the section to be widened is lower in the 'Auto Focused' alternative than in the 'Do Nothing' case, it is still over the critical 0.8 threshold. Also, the additional traffic impacts the capacity of the northwestbound approach to the section proposed for widening.
Walden	Trips to this area to the southwest of Sudbury are distributed between M.R. 55 and the Trans-Canada Highway (17). There is a marginal increase in the predicted trips from Sudbury.	In general, vehicles from downtown Sudbury will use M.R. 55 and journeys originating in southern Sudbury will follow the Trans-Canada Highway. However, there is flexibility for the balancing of flows between the two routes whereas drivers heading to most of the other communities around Sudbury only have one route option available.	M.R. 55 is approaching capacity east of Balsam Street, where traffic joining from Copper Cliff and Gatchell will cause an increase in the volume/capacity ratio. The Trans-Canada Highway between Southview Drive and M.R. 55 is also operating at a volume/capacity ratio of 0.8.

Similarly, **Table 35** summarizes the characteristics of the major traffic flows entering Sudbury from the surrounding areas in the 'Auto Focused' alternative. It also identifies the main positive and negative impacts of the proposed projects on the performance of the road network.

Table 35: Characteristics of Traffic Flow Entering the Sudbury City Centre: 'Auto Focused'

ORIGIN	FLOW CHARACTERISTICS	POSITIVES	NEGATIVES
Valley East	The proposed Barry Downe Road extension will significantly increase demand for this movement.	For vehicles heading into the centre of Sudbury that entered the city via Barry Downe Road, Silver Hills Drive connects to Howey Drive and provides an alternative route to the congested Kingsway.	Although Lasalle Boulevard is proposed to be widened to the west of its intersection with the Maley Drive extension, the resultant spare capacity will be used up by this additional volume. Consequently, in the westbound direction the volume/capacity ratios on the widened section of Maley Drive between Lasalle Boulevard and MR 35 are expected to be similar to those in the 'Do Nothing' case.
Nickel Centre	There is an anticipated increase in traffic from Nickel Centre of over 25% compared to the 'Do Nothing' alternative.	The road improvements proposed on the east side of Sudbury have sufficient capacity to manage volumes into New Sudbury and the eastern side of the City of Sudbury.	Entering the downtown, the same constraints exist on the Kingsway and Van Horne Street as for travel flows out of Sudbury.
Rayside-Balfour	A significant but manageable increase in Sudbury-bound traffic is expected following the partial widening of M.R. 35.	The widening of M.R. 35 provides additional capacity to accommodate the increase in central Sudbury-bound trips.	No issue.
Walden	There is an anticipated 15% increase in trips from Walden into Sudbury compared to the 'Do Nothing' case.	As with the flow out of Sudbury, the distribution of trips between the Trans-Canada Highway (17) and M.R. 55 gives flexibility. The Trans-Canada Highway (17) is expected to operate well in the eastbound direction.	M.R. 55 is at capacity east of Balsam Street, where traffic joining from Copper Cliff and Gatchell will cause an increase in the volume/capacity ratio.

Major travel flows within the Sudbury city centre include:

- Commuter and commercial trips between New Sudbury and the remainder of the City. These add to demand on the Kingsway, Lasalle Boulevard, and other links;
- Traffic on Paris Street to and from Laurentian University and Health Sciences North. The South Bay Road extension would give university traffic an alternative route to and from southern Sudbury and the highway network. This would relieve some of the congestion on the only existing route, Paris Street, immediately south of Ramsey Lake Road; and
- Commercial and retail trips to the Paris Street/Long Lake Road/Regent Street intersection, known locally as the Four Corners.

Some movements within Greater Sudbury but not starting or ending in the former City of Sudbury are expected to see significant percentage increases, however the volumes are still relatively low. Between areas, the same movements dominate as in the 'Do Nothing' alternative: between Valley East and Rayside-Balfour on M.R. 15, and heading into Valley East along the Radar Road / Skead Road corridor from Nickel Centre.

For the communities surrounding the Sudbury city centre, traffic flows that remain within the same area are significantly lower than in the 'Do Nothing' alternative. Nickel Centre, Rayside-Balfour and Walden can expect a reduction of around 40%, whereas the predicted decline is over 60% for Valley East. This confirms that the proposed improvements to the roads linking the Sudbury city centre to the surrounding areas will be a significant motivating factor in encouraging residents to commute to places of employment outside of their home area.

Roadway sections that have been identified as having a volume/capacity ratio of greater than 0.8 are shown in red in **Figure 41, Figure 42** and **Figure 43,** which use the same Level of Service designations as shown in **Table 32**.

- Highway 144 westbound between Edward Avenue and M.R. 15;
- M.R. 35 between M.R. 15 and Lasalle Boulevard;
- Montée Rouleau between M.R. 35 and south of Bonin Street;
- Notre Dame Avenue / M.R. 80 between Thomas Street and Lasalle Boulevard, and north of Lasalle Boulevard to Valleyview Road;
- Falconbridge Road / Falconbridge Highway / Skead Road between Maley Drive and Racicot Drive, and Garson Coniston Road and Longyear Drive;
- M.R. 55 between Balsam Street and Big Nickel Mine Drive;
- Elm Street between Lasalle Boulevard and Big Nickel Mine Drive, Ethelbert Street and Lorne Street, between Frood Road and Elgin Street, and between Lisgar and Paris Street;
- Lasalle Boulevard between Frood Road and Maley Drive extension;
- The Kingsway between Lloyd Street and Falconbridge Road;
- Silver Hills Drive southern portion connecting to Bancroft Drive;
- Hawthorne Drive extension from Montrose Avenue to Notre Dame Avenue;
- Westmount Avenue / Attlee Avenue, between Hawthorne Drive and Barry Downe Road;
- Van Horne Street, between Paris Street and Howey Drive;
- Ste. Anne Road / Mackenzie Street from Ignatius Street to Baker Street;
- Paris Street, between Ramsey Lake Road and Van Horne Street;
- Beatty Street, between Elm Street and Kathleen Street;

- Regent Street between Oak Street and Elm Street, and between Hyland Drive and Riverside Drive;
- Southview Drive / Bouchard Street westbound between Cranbrook Crescent and Regent Street;
- Radar Road between Guenette Drive and Cote Boulevard;
- Church Street in Garson north of Falconbridge Highway;
- Notre Dame Avenue between Bodson Drive and Armand Street;
- Bodson Drive between Notre Dame Avenue and Hydro Road;
- Lorne Street between Regent Street and Douglas Street.
- Highway 144 between the Trans-Canada Highway (17) and Highway 24;
- Trans-Canada Highway (17), between Kantola Road and Southview Drive.

In some cases, additional traffic is attracted by proposed improvements to one section of their route, leading to increased congestion on other parts where no changes are proposed. In other cases, wider network improvements have encouraged growth in a particular area and bottlenecks form or are exacerbated as a result. To ensure that the transportation network supports intensified land use in designated growth areas, delays on the following roadway sections would need to be monitored as the proposed projects are implemented and development progresses. Where required, improvements should be considered at a future date, which may be beyond the 2031 horizon:

- M.R. 35 westbound between Marier Street and Big Nickel Drive; Elm Street, westbound between Big Nickel Drive and Lasalle Boulevard; and Big Nickel Drive itself in both directions. Volumes on these roadway sections are expected to increase due to improvements to M.R. 35 and Lasalle Boulevard among others, as well as background population and employment growth.
- Van Horne Street will be over-capacity in both directions between Howey Drive and Paris Street. This is associated with attraction of traffic due to the widening of Howey Drive, which makes it a more feasible alternative to the Kingsway. Also on that route, but not proposed for widening is Bancroft Drive east of the proposed connection with the Kingsway. The section between Shappert Avenue and Neelon Avenue is predicted to experience the highest volumes.
- The proposed Larch Street extension between Elgin Street and Lorne Street would be highly utilized in the eastbound direction, as is Elgin Street between Elm Street and the Larch Street extension. Although this new link is predicted to reduce the northbound volumes on Regent Street, traffic flows on Lorne Street will increase significantly as a result. The link has been modelled at grade, which would require permission from the Canadian Pacific Railway.
- The volume/capacity ratio on Beatty Street will increase in both directions between Frood Road and Elm Street, in part due to the attraction of improved links to the north.
- Higher volumes entering downtown Sudbury from Walden will result in increased congestion on: Brady Street southwestbound between Broadway Street and Minto Street; Brady Street northeastbound between Broadway Street and Paris Street; and

Riverside Drive / Broadway Street northbound between Edinburgh Street and Brady Street.

- Ste. Anne Road / MacKenzie Street northbound between Elgin Street and Baker Street is impacted by northbound traffic that feeds in from both Elgin Street and the Ste. Anne Road extension.
- The additional traffic attracted by the widening of Notre Dame Avenue results in congestion south of Kathleen Street and on the northbound approach to the Lasalle Boulevard intersection.
- The western end of the Kingsway is proposed to be widened. However, higher volumes are expected in both directions west of the Barry Downe Road intersection due to the extension of that route to the north.
- Roads in and around the Valley East development area are expected to be highly utilized, particularly those that would connect to the northern end of the Barry Downe extension. These include: Notre Dame Avenue northbound between Bodson Drive and Armand Street; Hydro Road / Radar Road northbound between Bodson Drive and Cote Boulevard; and Bodson Drive eastbound between Notre Dame Avenue / Barry Downe extension and Hydro Road.
- Congestion is projected northbound on Highway 144 north of the Trans-Canada Highway (17) and on M.R. 24 southbound through Lively. Access to Lively from the west and north is via Highway 144; from Sudbury and the east it is via M.R. 55 and M.R. 24 as the latter has no interchange with the Trans-Canada Highway.
- The Silver Hills Drive road that is proposed to connect the Kingsway with Bancroft Drive is expected to be highly utilized in the southbound direction by traffic transferring from the congested Kingsway to the widened Howey Drive, as well as new trips associated with the Silver Hills development.
- Likewise, the Montrose Avenue South extension will be well used by residential traffic from the east as well as vehicles transferring from Maley Drive and Lasalle Boulevard.
- Barry Downe Road northbound is expected to be over capacity between Lillian Boulevard and Maley Drive. All possible routes from the Barry Downe Road / Maley Drive intersection into downtown Sudbury include at least one road section operating at a high volume/capacity ratio. Consequently, the benefit to commuters of the additional route between Sudbury and Valley East would be partially cancelled out by the delays caused by congestion on the southern portion of the journey.
- Through volumes on the Trans-Canada Highway (17) will increase due to improved connections to the east of Sudbury and with Highway 69 to the south. Eastbound volumes joining the Trans-Canada Highway from southern Sudbury are also expected to increase, with additional traffic exiting Laurentian University via the proposed South Bay Road extension. As a result, the volume/capacity ratio will rise just above 0.8 in the eastbound direction between the proposed link with Highway 69 and the Kingsway, and westbound between Southview Drive and M.R. 55.

Figure 41: Volume to Capacity Plots - Auto Focused (Overview)

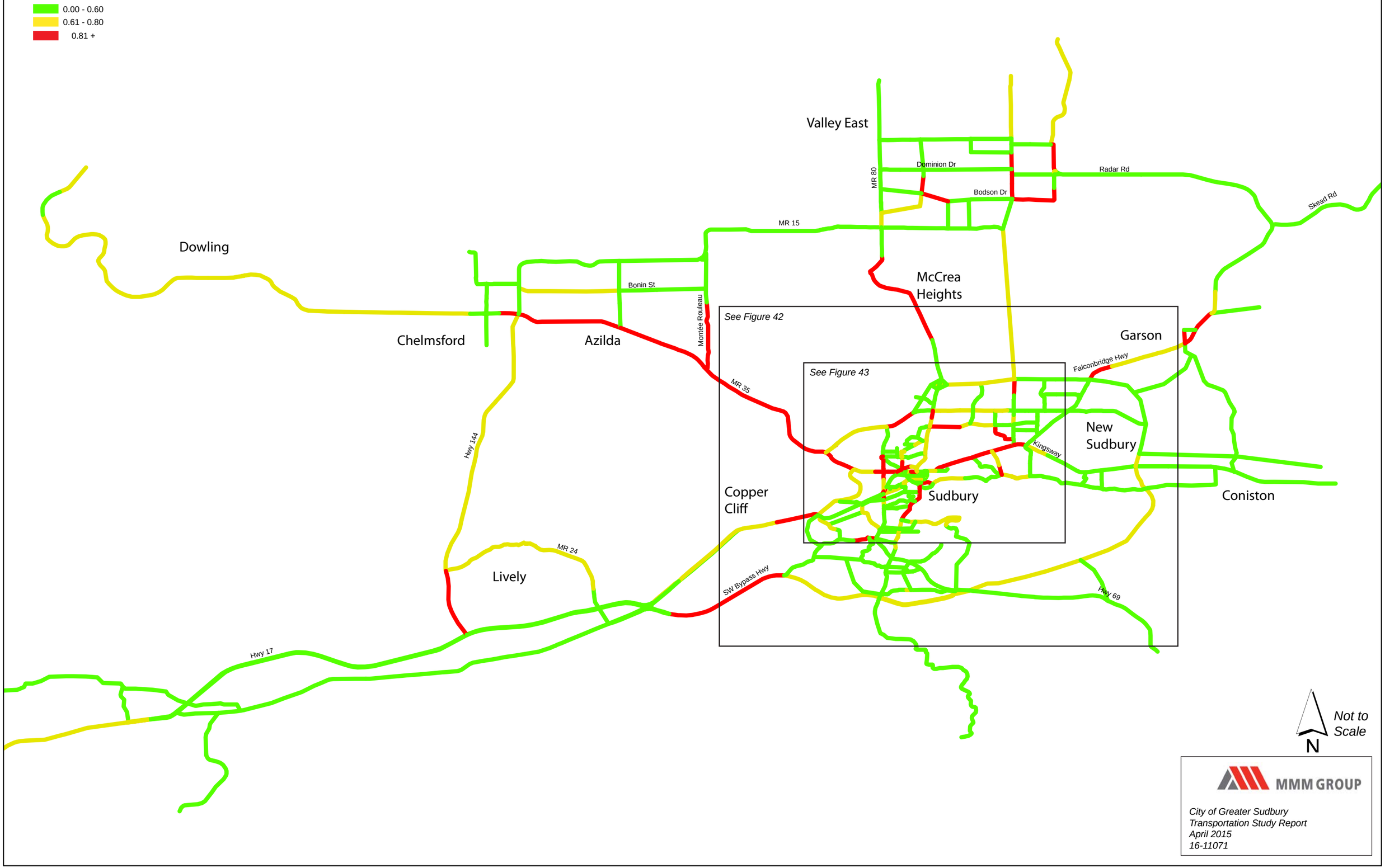


Figure 42: Volume to Capacity Plots - Auto Focused (Intermediate Zoom)

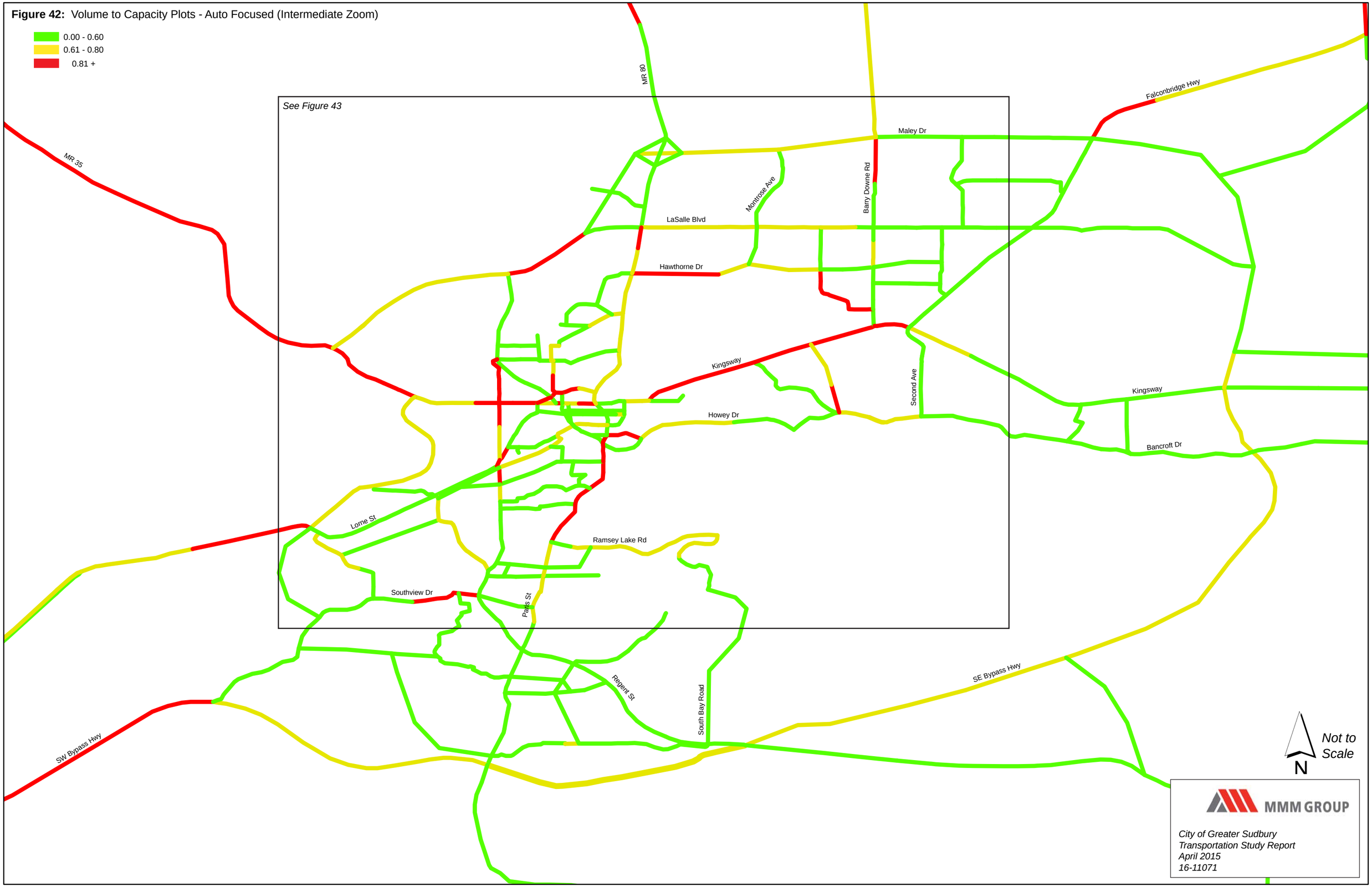
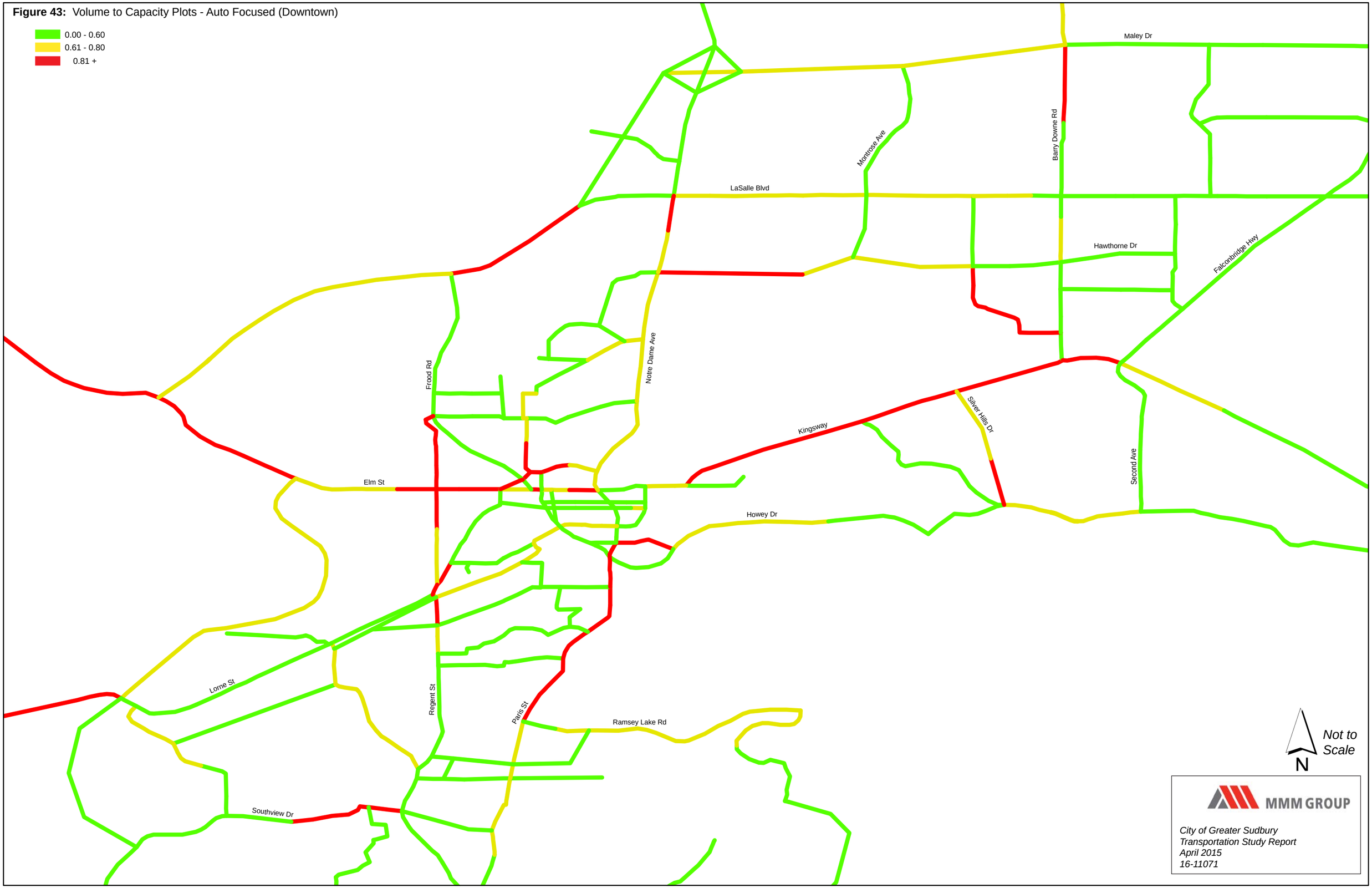


Figure 43: Volume to Capacity Plots - Auto Focused (Downtown)



7.3 Sustainability Focused Alternative

The third alternative is to focus on improvements that can enhance the sustainability of the City's transportation network. It is a refinement of the 'Auto Focused' alternative which, as described in **Section 7.2**, was developed in addition to the 'Do Nothing' alternative featured in **Section 7.1**. It aims to respond to the Problem Statement outlined in **Section 4.4** and take advantage of the key opportunities related to these, which included:

- Implementing short-term solutions for intersections and corridors of traffic congestion;
- In the longer term, creating a transportation network which offers more direct routings; and
- Providing the transportation network needed to support intensified land use in designated growth areas.

A fourth opportunity was identified in **Section 4.4** and involves creating transportation choices to better support biking, walking, and transit. By limiting the extent of new road projects and reallocating resources to create a balanced multi-modal system, the 'Sustainability Focused' alternative aims to provide the most beneficial solution to the Problem Statement and its related opportunities. It is also the strategy that most closely resembles the recommended option from the 2005 Transportation Study Report, which is to improve the transportation system through the betterment of both the road network and increased use of transit systems, ridesharing, bicycling and walking. Please refer to **Section 8** for details of the recommended active transportation plan that will cater for biking and walking.

To determine which projects to include in the 'Sustainability Focused' alternative, the candidate road improvements were considered individually through an additional Multiple Account Evaluation. This assessed whether the projects:

- Enhance network connectivity, by increasing the number of routing options available such that the average distance travelled between given points in the network is reduced;
- Relieve congestion, improving the relative ease of travel through the network and access to truck and commuter corridors;
- Have minimal impact on environmentally-sensitive areas or involve road construction on land that is designated for development; and
- Are cost efficient relative to alternative options.

For each account, one point was awarded where the project demonstrated a benefit or neutral impact. A higher score of two points was applied in the case of a disbenefit. The first three accounts were weighted equally, with a double weighting applied to the 'cost efficiency' score. The threshold for further consideration was set at 7 points. This was to allow projects with favourable scoring for every category except cost to be progressed as they are likely to represent good value. Conversely, a project that only scores favourably on cost would not be brought forward to the 'Sustainability Focused' alternative, however its alignment would continue to be protected to allow for implementation beyond the 2031 horizon.

The scoring for proposed roadway widening and construction projects is shown in **Tables 36 and 37**, respectively.

Table 36: Multiple Account Evaluation for Candidate Roadway Widening Projects

#	PROJECT	ACCOUNTS (Weighting in brackets)					SCORE	INCLUDE IN SUSTAIN-ABILITY FOCUSED ALTERNATIVE?
		Enhance network connectivity (1)	Congestion relief and truck/ commuter accessibility (1)	Environ-mental Protection (1)	Cost efficiency relative to alternative option (2)	Alternative Project		
1	Notre Dame Avenue (MR 80) from Main Street to Kathleen Street [four-lane to six-lane]	2	1	1	1	Extend Barry Downe Road	**6**	**YES**
4	Maley Drive from Barry Downe Road to Falconbridge Highway [two-lane to four-lane]	2	1	1	1	Widen Lasalle Boulevard	**6**	**YES**
5	Falconbridge Highway from Maley Drive to Garson Coniston Road [four-lane to five-lane]	2	1	1	1	New parallel connection	**6**	**YES**
7	Second Avenue from Donna Drive to Scarlett Road [two-lane to five-lane]	2	1	1	1	Widen 3rd Avenue	**6**	**YES**
8	Barry Downe Road from Westmount Avenue to the Kingsway [five-lane to six-lane]	2	1	1	1	New parallel road or new connection to Falconbridge Road	**6**	**YES**
11	The Kingsway east of Lloyd Street [four-lane to five-lane]	2	1	1	1	Widen Van Horne Street	**6**	**YES**
13	Howey Drive from Elgin Street to Bancroft Drive [two-lane to four-lane]	2	1	1	1	Widen the Kingsway	**6**	**YES**

#	PROJECT	ACCOUNTS (Weighting in brackets)					SCORE	INCLUDE IN SUSTAIN-ABILITY FOCUSED ALTERNATIVE?
		Enhance network connectivity (1)	Congestion relief and truck/ commuter accessibility (1)	Environ-mental Protection (1)	Cost efficiency relative to alternative option (2)	Alternative Project		
15	Ramsey Lake Road from Health Sciences North Road to South Bay Road [two-lane to four-lane]	2	2	1	1	Extend South Bay Road	**7**	**YES**
17	Maley Drive from Lasalle Boulevard to MR 35 [two-lane to four-lane]	2	1	1	1	New parallel road	**6**	**YES**
18	MR 35 from MR 15 to Notre Dame Street East [two-lane to five-lane]	2	1	1	1	New parallel road	**6**	**YES**

Table 37: Multiple Account Evaluation for Candidate Roadway Construction Projects

#	PROJECT	ACCOUNTS (Weighting in brackets)					SCORE	INCLUDE IN SUSTAIN-ABILITY FOCUSED ALTERNATIVE?
		Enhance network connectivity (1)	Congestion relief and truck/ commuter accessibility (1)	Environ-mental Protection (1)	Cost efficiency relative to alternative option (2)	Alternative Project		
2	Maley Drive Extension (Barry Downe Road to Lasalle Boulevard)	1	1	1	1	Widen Lasalle Boulevard	**5**	**YES**
3	Montrose Avenue north extension (current terminus to Maley Drive extension)	1	2	1	1	Widen Barry Downe Road / Notre Dame Avenue	**6**	**YES**
6	Maley Drive extension / Maley East Bypass	1	1	1	2	Widen Falconbridge Road and the Kingsway	**7**	**YES**
9	Montrose Avenue extension south to Hawthorne Drive and Notre Dame Avenue	1	2	2	1	Widen Lasalle Boulevard	**7**	**YES**
10	Silver Hills Drive	1	1	2	1	Widen Bancroft Drive / Second Avenue	**6**	**YES**
12	Ste. Anne Road extension	1	2	1	1	Area wide improvements	**6**	**YES**
14	Larch Street extension	1	1	1	1	Area wide improvements	**5**	**YES**
16	Remington Road extension from current terminus to Gateway Drive	1	2	1	1	Area wide improvements	**6**	**YES**

#	PROJECT	ACCOUNTS (Weighting in brackets)					SCORE	INCLUDE IN SUSTAIN-ABILITY FOCUSED ALTERNATIVE?
		Enhance network connectivity (1)	Congestion relief and truck/ commuter accessibility (1)	Environ-mental Protection (1)	Cost efficiency relative to alternative option (2)	Alternative Project		
-	South Bay Road Extension	1	2	2	2	Widen Ramsey Lake Road	**9**	**NO**
19	Martilla Drive connection to Paris Street	1	2	1	1	Widen Walford Avenue	**6**	**YES**
-	Garson connection: Falconbridge Highway Maley East Bypass	1	1	2	2	Widen Falconbridge Road	**8**	**NO**
-	Southview Drive connections to Moonrock Avenue / Arnold Street and Treeview Road	1	1	2	2	Widen Southview Drive	**8**	**NO**
-	Barry Downe Extension from Maley Drive to Main Street and Bodson Drive	1	1	2	2	Widen Notre Dame Ave or Falconbridge Highway	**8**	**NO**
-	Big Nickel Drive extension	1	2	1	2	Widen M.R. 55	**8**	**NO**
20	John Street (Valley) extension	1	2	1	1	Widen Old Highway 69 and Dominion Drive	**6**	**YES**

For the 'Sustainability Focused' alternative, traffic volumes between the key locations in the region in the p.m. peak period are shown in **Table 38**.

Table 38: 'Sustainability Focused' Traffic Volumes – PM Peak Period (2031)

FROM \ TO	Sudbury	Nickel Centre	Capreol	Valley East	Rayside-Balfour	Onaping Falls	Walden
Sudbury	15,108	1,975	330	2,247	1,268	174	1,402
Nickel Centre	996	64	54	326	135	20	94
Capreol	51	15	7	116	46	5	14
Valley East	415	91	105	577	360	41	111
Rayside-Balfour	233	37	42	336	310	81	117
Onaping Falls	47	8	9	71	157	515	26
Walden	818	106	27	197	185	19	177

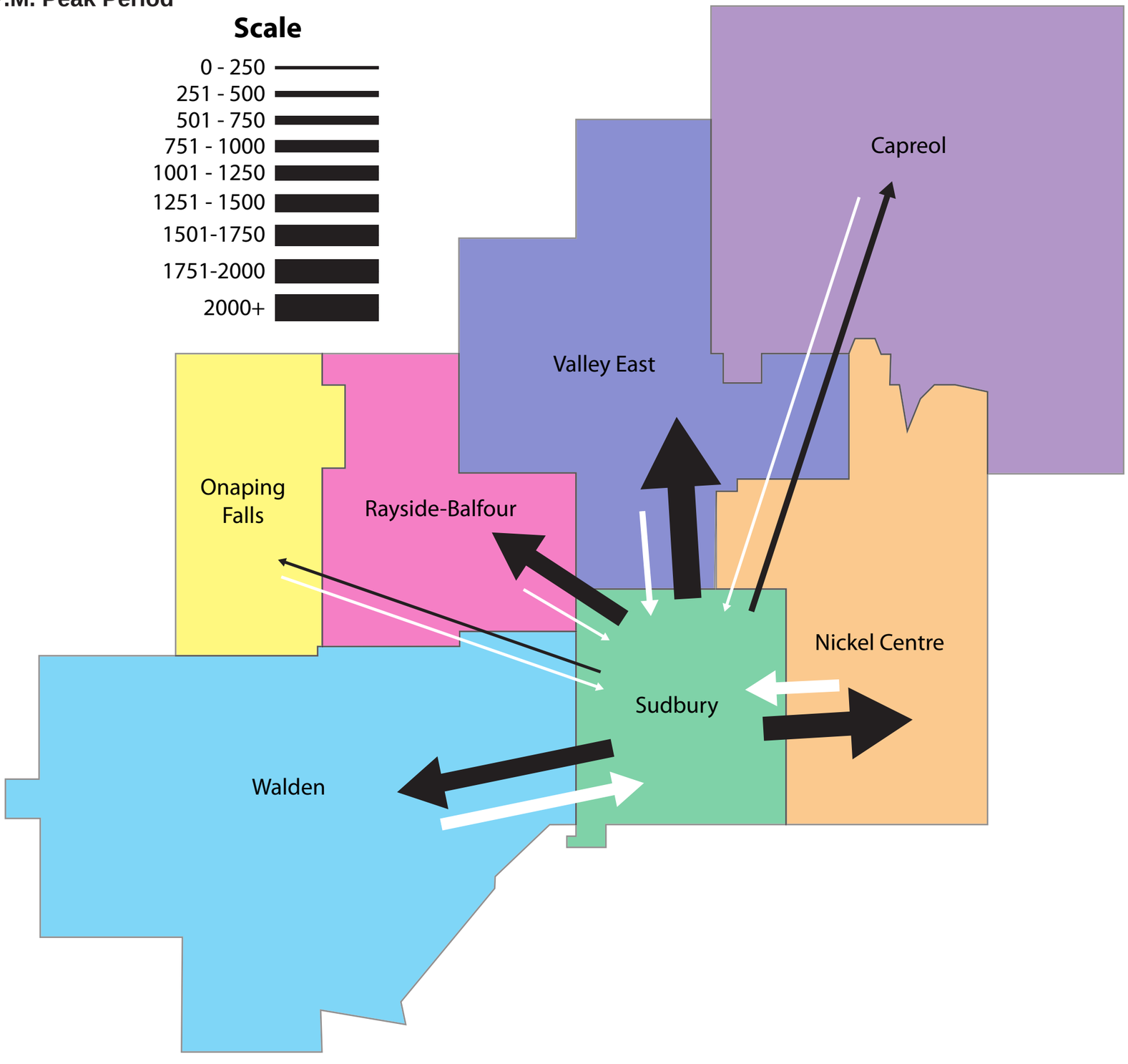
The map diagram in **Figure 44** shows trips to and from the former City of Sudbury. The thickness of the arrows is proportional to the traffic volumes into and out of the former City of Sudbury. Similarly, the bars to the right of the figure represent the internal trips within each area.

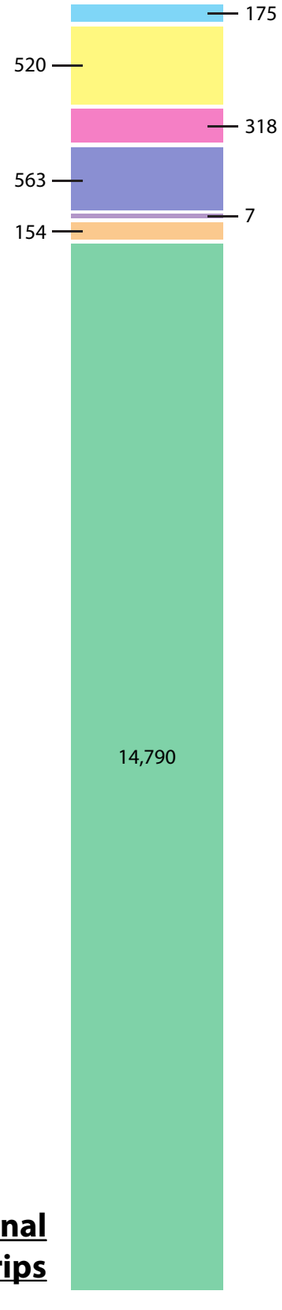
Table 39 summarizes the characteristics of the major traffic flows leaving Sudbury bound for the surrounding areas in the 'Sustainability Focused' alternative. It also identifies the main positive and negative impacts of the proposed projects on the ability of the road network to support these movements.

P.M. Peak Period

Scale

0 - 250
251 - 500
501 - 750
751 - 1000
1001 - 1250
1251 - 1500
1501-1750
1751-2000
2000+





Internal Trips

Legend

Direction of Trips

To Sudbury

From Sudbury

Figure 44

Key Traffic Flows - 'Sustainability Focused' Alternative

MMM GROUP

City of Greater Sudbury
Transportation Study Report
April 2015
16-11071

Table 39: Characteristics of Traffic Flow Leaving the Sudbury City Centre – 'Sustainability Focused'

DESTINATION	FLOW CHARACTERISTICS	POSITIVES	NEGATIVES
Valley East	An increase in trip volumes of 20% is expected compared to the 'Do Nothing' case. However, flows are 20% lower than the 'Auto Focused' alternative given the absence of the Barry Downe Road extension in this basket of proposals. Trips to Capreol passing through Valley East are predicted to increase by around 50% compared to the 'Do Nothing' alternative, however they represent a much lower volume.	Despite the lack of an alternative direct north-south route between Sudbury and Valley East, volumes along Notre Dame Avenue south of Lasalle Boulevard are lower in this alternative than with the 'Auto Focused' alternative where the Barry Downe Road extension is proposed as an alternative.	M.R. 86 is more congested northeastbound, particularly on Falconbridge Highway between Spruce Street and Longyear Drive, compared to the 'Auto Focused' alternative in which the Barry Downe Road extension would be available.
Nickel Centre	The volume is expected to be similar to the 'Do Nothing' alternative and slightly higher than the 'Auto Focused' alternatives.	Congestion on the Falconbridge Highway south of Garson will be reduced by the proposed widening of that road and the availability of new alternative routes such as the Garson connection and Highway 17. The latter relieves the congestion on the existing Trans-Canada Highway to the east of Sudbury. The v/c ratio on the section of Falconbridge Road between Lasalle Boulevard and Maley Drive will reduce compared to the 'Do Nothing' alternative as vehicles instead use Maley Drive, which will become a thoroughfare by virtue of its planned extension to the west.	Due to the potential for congestion as mentioned above, M.R. 86 should be monitored as plans to expand the airport are developed and implemented. Widening should be considered where required at a future date, which may be beyond the 2031 horizon. The Southeast Bypass is projected to be congested. The Trans-Canada Highway improvements also attract additional volumes leaving Sudbury. Although the impact of this will be partially mitigated by the proposed widening of sections of both routes, the volume/capacity ratio will increase on the Kingsway between Lloyd Street and Barry Downe Road, where widening is not feasible due to right-of-way constraints, as well as on routes connecting to downtown Sudbury such as Van Horne Street.

DESTINATION	FLOW CHARACTERISTICS	POSITIVES	NEGATIVES
Rayside-Balfour	Northwestbound traffic is channelled along Municipal Road 35. The number of trips from Sudbury to Rayside-Balfour is projected to be 20% more than the 'Do Nothing' case and approximately 25% less than in the 'Auto Focused' alternative.	In the existing conditions, capacity is constrained at Azilda west of Notre Dame Street East where the four-lane highway reduces to two lanes. The proposed widening of this section of M.R. 35 removes this geometric pinch point and is a key factor in attracting the additional trips from Sudbury.	Although the highest volume/capacity ratio in the section to be widened is lower in the 'Auto Focused' alternative than in the 'Do Nothing' case, it is still over the critical 0.8 threshold. Also, the additional traffic pushes the approach to the section proposed to be widened over capacity. However, as the number of trips from Sudbury to Rayside-Balfour is less than in the 'Auto Focused' alternative, so too is the predicted volume/capacity ratio.
Walden	Trips to this area from the southwest of Sudbury are distributed between M.R. 55 and the Trans-Canada Highway (17). There is a marginal decrease in the predicted trips from Sudbury, comparable to that associated with the 'Auto Focused' alternative.	In general, vehicles from downtown Sudbury will use M.R. 55 and journeys originating in southern Sudbury will follow the Trans-Canada Highway. However, there is flexibility for balancing of flows between the two routes whereas drivers heading to most of the communities around Sudbury only have one route option available.	M.R. 55 is approaching capacity east of Balsam Street, where traffic joining from Copper Cliff and Gatchell will cause an increase in the volume/capacity ratio. The Trans-Canada Highway between Southview Drive and M.R. 55 is also operating at a volume/capacity ratio over 0.8.

Similarly, **Table 40** summarizes the characteristics of the major traffic flows entering the Sudbury city centre from the surrounding areas in the 'Sustainability Focused' alternative. It also identifies the main positive and negative impacts of the proposed projects on the performance of the road network in the p.m. peak hour.

Table 40: Characteristics of Traffic Flow Entering the Sudbury City Centre – 'Sustainability Focused'

ORIGIN	FLOW CHARACTERISTICS	POSITIVES	NEGATIVES
Valley East	As this alternative does not include the Barry Downe Road extension, the volumes for this movement are significantly less than those associated with the 'Auto Focused' alternative.	Widening of M.R. 80 provides additional capacity to accommodate demand.	No issue.
Nickel Centre	A small increase in traffic is anticipated compared to the 'Do Nothing' alternative, however volumes are expected to be similar to those for the 'Auto Focused' alternative.	The road improvements proposed on the east side of the Sudbury city centre have sufficient capacity to manage volumes into New Sudbury and the eastern side of the City of Greater Sudbury.	Entering the downtown, the same constraints exist on the Kingsway and Van Horne Street as for travel flows out of Sudbury.
Rayside-Balfour	A significant but manageable increase in Sudbury-bound traffic is expected following the partial widening of M.R. 35.	Widening of M.R. 35 provides additional capacity to accommodate demand.	No issue.
Walden	The volumes for this movement are comparable to the 'Do Nothing' alternative and less than for the 'Auto Focused' alternative.	As with the flow out of Sudbury, the distribution of trips between the Trans-Canada Highway (17) and M.R. 55 gives flexibility. The Trans-Canada Highway (17) is expected to operate well.	M.R. 55 is at capacity east of Balsam Street, where traffic joining from Copper Cliff and Gatchell will cause an increase in the volume/capacity ratio.

Major travel flows within the Sudbury city centre include:

- Commuter and commercial trips between New Sudbury and the remainder of the City. These add to demand on the Kingsway, Lasalle Boulevard, and other links;
- Traffic on Paris Street to and from Laurentian University and Health Sciences North. The South Bay Road extension would give university traffic to and from southern Sudbury and the highway network an alternative route. This would relieve some of the congestion on the only existing route, Paris Street, immediately south of Ramsey Lake Road; and
- Commercial and retail trips to the Paris Street/Long Lake Road/Regent Street intersection, known locally as the Four Corners.

Although some movements within Greater Sudbury but not starting or ending in the City of Sudbury are expected to see significant percentage increases, the volumes are still relatively low. The same movements dominate as in the existing conditions: between Valley East and Rayside-Balfour on M.R. 15, and heading into Valley East along the Radar Road / Skead Road corridor from Nickel Centre.

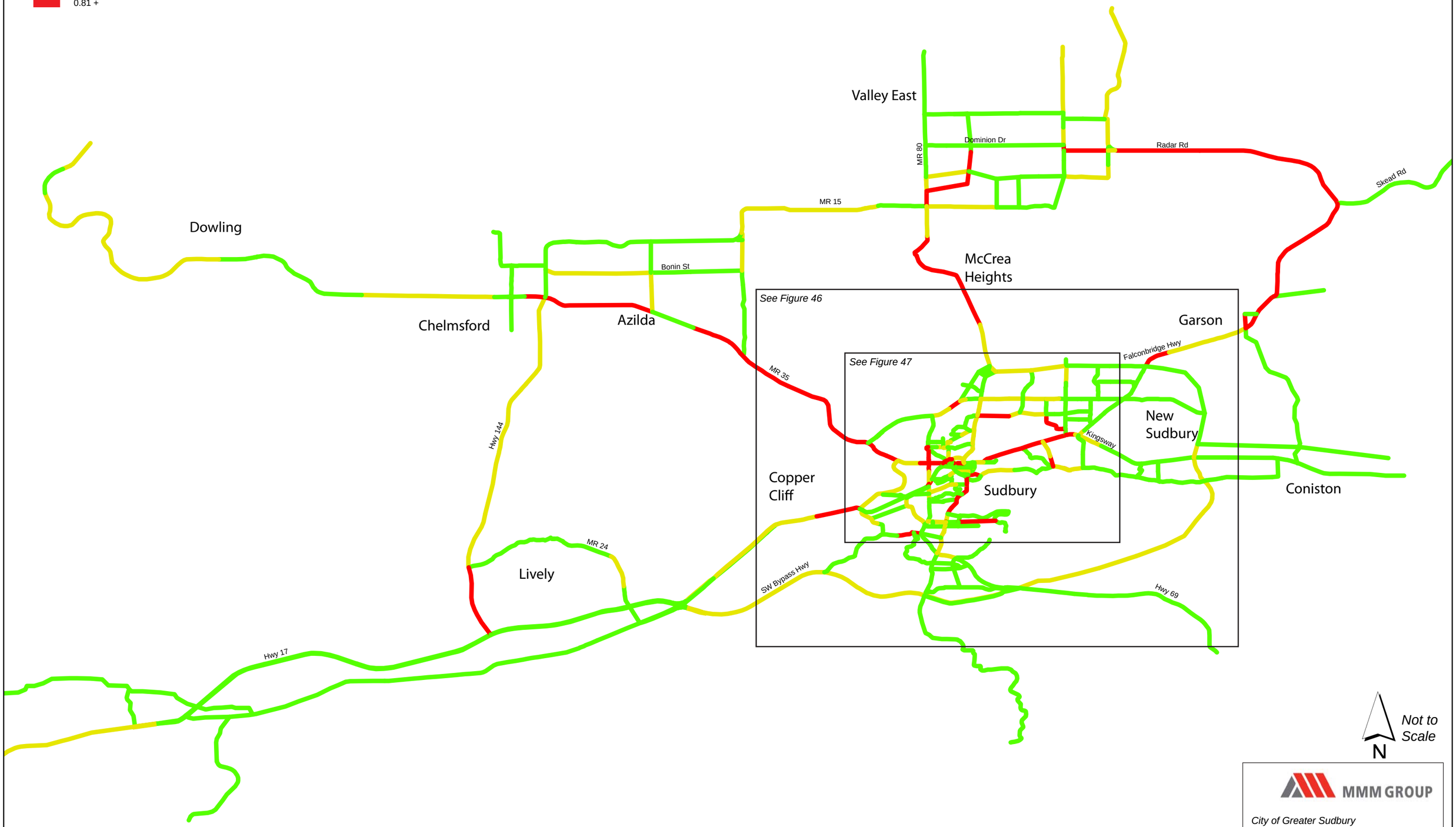
For the communities surrounding the Sudbury city centre, traffic flows that remain within the same area are lower than in the 'Do Nothing' alternative but the overall predicted decrease is less than that expected for the 'Auto Focused' alternative. Although Nickel Centre, Walden and Valley East can still expect a reduction of around 40%, the predicted decline is 30% for Rayside-Balfour. This indicates that although the proposed improvements to the roads linking the Sudbury city centre to the surrounding areas will encourage existing and future residents to commute over greater distances, the effect is tempered compared to the 'Auto Focused' alternative.

The majority of roadway sections that have been identified as having a volume/capacity ratio of greater than 0.8 in the 'Sustainability Focused' case are also highlighted in the 'Auto Focused' alternative. They are listed below and are shown in red in **Figure 45, Figure 46** and **Figure 47**, which uses the same Level of Service designations as shown in **Table 32**:

- Highway 144 westbound between Edward Avenue and M.R. 15;
- M.R. 35 westbound between M.R. 15 and Montée Principale, and Marier Street to Lasalle Boulevard;
- Falconbridge Highway between Maley Drive and Donnelly Drive, and between Garson Coniston Road and Longyear Drive;
- Skead Road between Longyear Drive and Radar Road;
- M.R. 55 between Balsam Street and Big Nickel Drive*;*
- Elm Street between Lasalle Boulevard and Big Nickel Drive, between Ethelbert Street and Durham Street, and between Lisgar Street and Notre Dame Avenue;
- Lasalle Boulevard between Boreal College and Maley Drive extension;
- The Kingsway between Lloyd Street and approaching Falconbridge Road;
- Silver Hills Drive southern portion connecting to Bancroft Drive;
- Hawthorne Drive extension from Montrose Avenue to Notre Dame Avenue;
- Westmount Avenue / Attlee Avenue between Hawthorne Drive and Barry Downe Road;
- Van Horne Street in both directions between Paris Street and Howey Drive;
- Ste. Anne Road / Mackenzie Street from Ignatius Street to Baker Street;
- Centennial Drive extension between Paris Crescent and South Bay Road;
- Paris Street between Ramsey Lake Road and Van Horne Street;
- Beatty Street between Elm Street and Kathleen Street;
- Regent Street between Victoria Street and Elm Street;
- Southview Drive between Cranbrook Crescent and Regent Street;
- Lorne Street between Regent Street and Douglas Street;
- Hawthorne Drive extension east of Notre Dame Avenue;
- Radar Road between Guenette Drive and Cote Boulevard;
- Church Street in Garson north of Falconbridge Highway; and
- Highway 144 between the Trans-Canada Highway (17) and Highway 24.

Figure 45: Volume to Capacity Plots - Sustainability Focused (Overview)

0.00 - 0.60
0.61 - 0.80
0.81 +



Not to Scale
N

MMM GROUP

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Figure 46: Volume to Capacity Plots - Sustainability Focused (Intermediate Zoom)

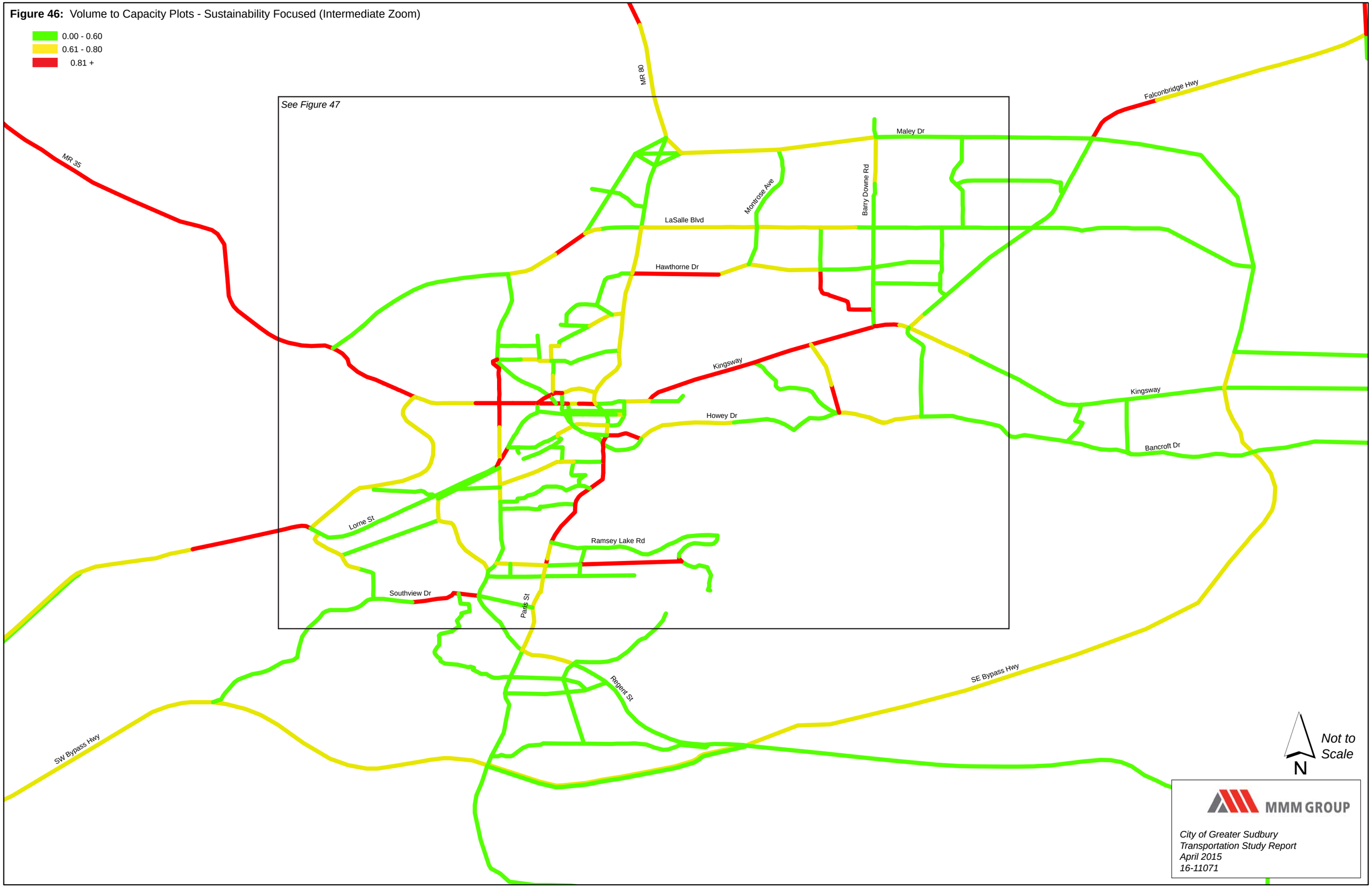
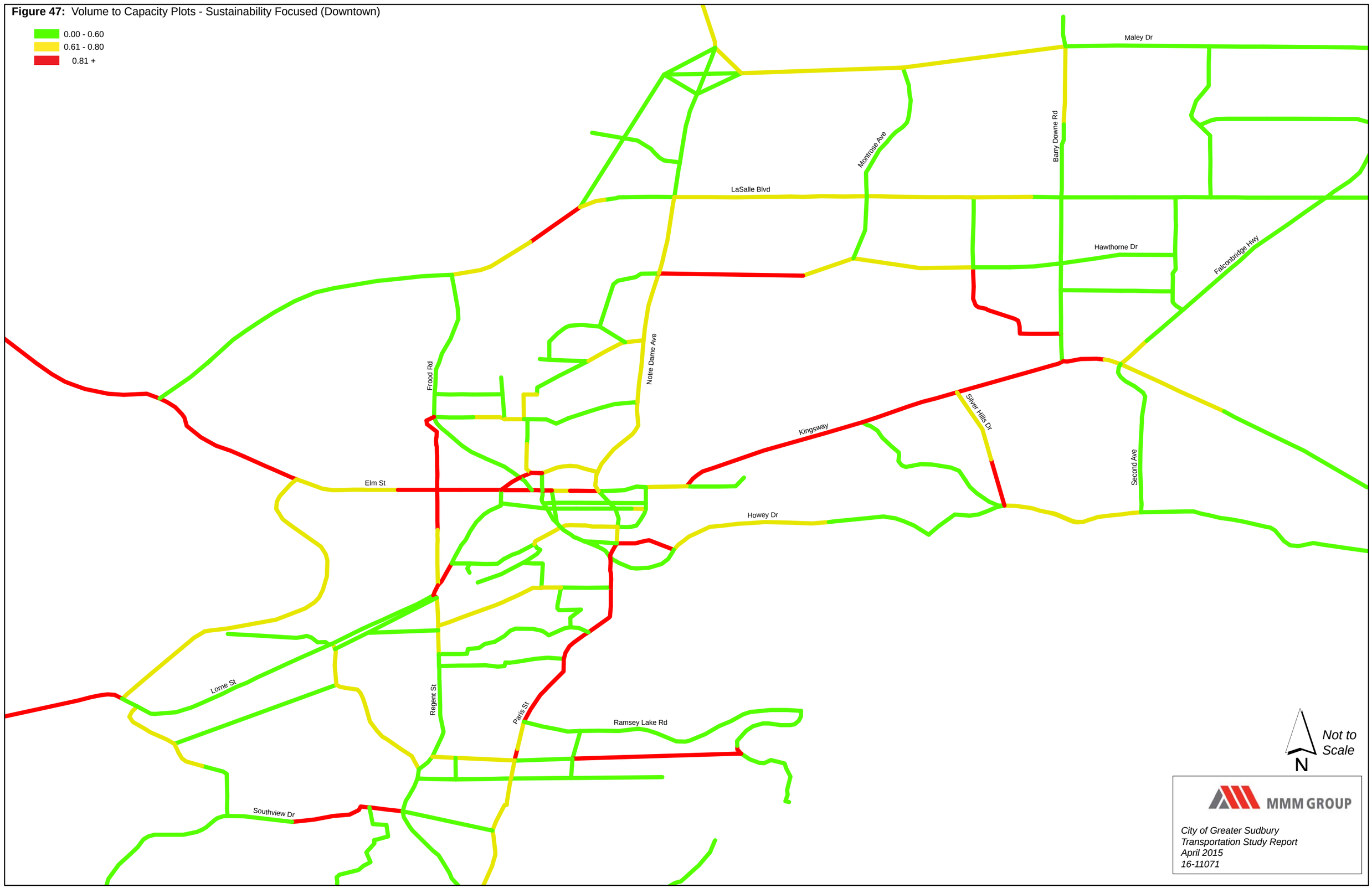


Figure 47: Volume to Capacity Plots - Sustainability Focused (Downtown)

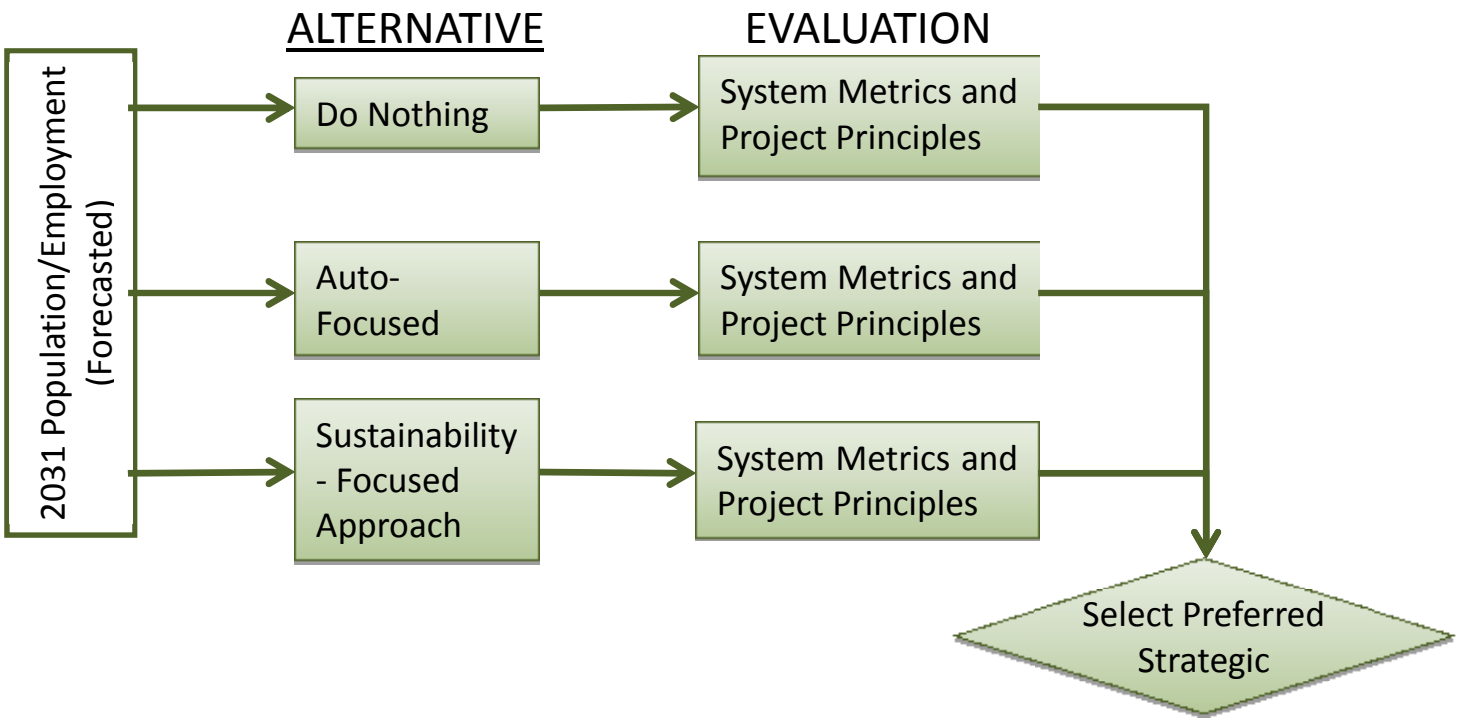


7.4 Process for Alternatives Analysis

In addition to the analysis in **Section 7.1** above, the evaluation of each alternative considered system metrics related to network performance, such as: volume to capacity ratio; vehicle kilometres traveled; vehicle hours traveled and cost. There was also an assessment of the extent to which each alternative satisfies the principles defined for the project. In the City of Greater Sudbury's case, these are: healthy communities, sustainability and economic vitality.

Based on the evaluation, the preferred strategic alternative was selected. The next step involved a refinement and selection of the specific projects to be included in the preferred network. The process for analyzing the alternatives is shown in **Figure 48**.

Figure 48: Alternatives Analysis



7.5 Evaluation Framework

An evaluation framework was developed to analyze the three alternatives based upon system metrics extracted from the travel demand model as well as quantitative and qualitative measures related to the project principles.

7.5.1 Project Principles Evaluation

Project principles were developed in consultation with the public and key stakeholders to consider other factors aside from those reported by the travel demand model. These principles form evaluation criteria and can be quantitative such as vehicle kilometres traveled or new kilometres of bike lanes, or qualitative such as increased connectivity or protection of environmentally-sensitive areas. They guide the evaluation of the alternatives and the selection of the preferred solution. The set of study-specific principles were developed through a review of:

- The City's 2005 Transportation Study Report and other related planning documents;
- Sustainable transportation principles developed by other agencies, such as Transport Canada, and the National Cooperative Highway Research Program; and
- Input received during the public consultation sessions held in the City on January 11, 2012 and June 19, 2013.

The set of Principles developed for this project recognizes the strong connection between transportation, healthy communities, a sustainable natural environment, and economic vitality. They also recognize the need to develop meaningful ways to engage the public in the planning process and to foster cooperation and coordination.

The project principles are to:

- Relieve congestion;
- Enhance network connectivity;
- Protect the environment; and
- Relative cost efficiency.

Goals and objectives were developed for each principle along with key performance measures that could be used to consider how the alternative addressed them for each of the three alternatives. These are shown in **Table 41** along with the key performance indicators; those that may be obtained from modelling outputs are shown in bold. The remainder should be monitored on an ongoing basis.

Table 41: Project Principles Evaluation Framework

Principle	Goals	Objectives	Key Performance Measure for Alternatives Analysis	Healthy communities	Sustainability	Economic vitality
Enhance Network Connectivity	• Create a transportation network which offers more direct routings	• Providing more direct routings and increasing the number of routing options available. In this way, the average distance travelled between given points in the network is reduced for all road users, be they auto drivers, transit riders or cyclists • Each transportation trip begins and ends with a pedestrian trip hence active transportation network connectivity will promote an active lifestyle and community well-being	• **Mean trip length / Vehicle Kilometres Travelled (VKT)** • Amenities within walking distance of residential and employment centres	✓	✓	
Congestion relief and truck/ commuter accessibility	• Integrate transportation and land use planning • Implement and Support Transportation Demand Management Initiatives	• Integrating transportation planning into an urban form that is compact, mixed-use and creates a sense of community • Transportation planning as one component of a growth management system that also includes human services, the environment, the economy and fiscal capacity • Reducing single-occupant vehicle trips and promoting a preference for sustainable transportation choices by providing more reliable and convenient alternative modes of travel • Improving truck access to high capacity and high speed roads for efficient goods movement	• Self-containment in existing Urban Area • **Mean trip travel time / Vehicle Hours Travelled (VHT)** • Average vehicle occupancy • Inclusion of improvements that support higher vehicle occupancy (e.g. queue jump lanes, HOV lanes) • Access to high capacity and high speed roads for trucks • Capacity constraints along truck corridors		✓	✓

Principle	Goals	Objectives	Key Performance Measure for Alternatives Analysis	Healthy communities	Sustainability	Economic vitality
Protect Environment	• Protect and enhance our environment and cultural heritage	• Protect, restore and enhance the natural environment through integrated growth, system planning, and advanced construction and operations practices • Respect and protect its cultural heritage, particularly with regard to First Nations	• Estimate of road construction avoided (lane-km) in environmentally sensitive areas		✓	
Relative Cost Efficiency	• Support our economic well-being • Ensure fiscal sustainability and equitable funding • Implement and Support Transportation Supply Management Initiatives	• Ensuring that its transportation systems support economic development • Providing full cost accounting for all transportation infrastructure projects and services • Achieving value-for-money in delivering transportation services • Managing its transportation system in an efficient and cost-effective, socially and environmentally responsible manner • Improving travel connections between communities and major urban areas within the municipality	• Overview comparison of capital and operating costs for road improvements to costs of sustainable network improvements and other programs and services • Length of new roadway required per additional resident			✓

7.5.2 System Metrics Evaluation

System metrics extracted from the travel demand model included:

- Vehicle Kilometres Travelled (VKT) in the peak hour;
- Vehicle Hours Travelled (VHT) in the peak hour;
- Daily VKT per Capita;
- Daily VHT per Capita;
- Lane kilometres with volume to capacity ratios greater than 0.9; and
- Percentage of lane kilometres that are congested (v/c > 0.9); and
- Average travel time in the peak hour.

The results of the evaluation by each of the metrics are reported for each alternatives. Relevant project and transportation principles are shown as identified in **Section 7.3.1**.

Table 42: Transportation Alternatives Analysis Using System Metrics

Metric	Alternative			Relevant Project Principles	Relevant Transportation Principle(s)
	Do Nothing	Auto Focused	Sustainability Focused		
Vehicle Kilometres Traveled (VKT) – Peak Hour	450,527	528,673	511,939	• Enhance Network Connectivity • Protect Environment	• Healthy Communities • Sustainability
Vehicle Hours Traveled (VHT) – Peak Hour	7,476	5,451	5,190		
Daily VKT per Capita	33.37	39.16	37.92	• Relieve Congestion • Protect Environment	• Sustainability • Economic Vitality
Daily VHT per Capita	0.55	0.40	0.38		
Lane kilometres with volume to capacity (v/c) ratios greater than 0.9	48.1	61.7	64.2	• Relative Cost Efficiency	• Economic Vitality
Percentage of lane kilometres that are congested (v/c > 0.9)	3.8%	4.1%	4.5%		
Average Travel Time – Peak Hour	46.1	17.7	25.4	• Enhance Network Connectivity • Relieve Congestion	• Sustainability • Economic Vitality

While the 'Do Nothing' alternative shows fewer daily vehicle kilometres travelled (VKT) per capita than the 'Auto Focused' or 'Sustainability Focused' alternatives, the daily vehicle hours travelled (VHT) is much higher. This shows that in the absence of new road projects, congestion will increase and people will spend more time in traffic.

In the 'Sustainability Focused' alternative, the number of vehicle kilometres traveled and the vehicle hours traveled (both in per capita and absolute terms) is lower than for the 'Auto Focused' alternative, indicating that residents are commuting over shorter distances on average and are more likely to stay within their home area. They also are spending less time on the

road. Although the absolute number of vehicle hours travelled is higher in the 'Sustainability Focused' alternative than in the 'Do Nothing' alternative, the vehicle hours traveled is less.

Congested lane kilometres is greatest in the 'Sustainability Focused' alternative, however, the percentage of lane kilometres that is congested, 4.5%, is a very small percent of the overall road network.

The Sustainability Focused alternative balances road investments and achieves reasonable average travel times in the p.m. peak hour. This alternative exhibits the lowest number of vehicle hours traveled per capita of the three alternatives and exhibits fewer vehicle kilometres traveled and vehicle hours traveled than the Auto Focused alternative. Implementation of the Sustainability Focused alternative would be expected to result in the best overall network performance.

Table 43: Evaluation of Transportation Planning Alternatives

Criterion		Transportation Planning Alternative					
Principle	**Goal**	**Alternative 1 – Do Nothing**		**Alternative 2 – Auto Focused**		**Alternative 3 – Sustainability-Focused**	
Relieve Congestion	Integration of transportation and land use planning.	3	Not supportive – no new transportation investments to support changes in land use.	2	Transportation planning would be focused on land uses reliant on the personal automobile.	1	Supportive – land use and transportation decisions would be made hand-in-hand.
	Implementation and Support of Transportation Demand Management (TDM) Initiatives.	3	Not supportive – new TDM initiatives would not be developed.	2	Some TDM measures could be adopted, but would not be considered a major component of future mobility.	1	Supportive – TDM would be an integral part of future transportation solutions.
Enhance Network Connectivity	Increasing the number of routing options available such that the average distance travelled between given points in the network is reduced.	3	Not supportive – no new transportation investments to improve access and mobility.	1	All of the proposed additional road links would be implemented.	2	Many of the proposed additional road links would be implemented.
	Provision of access and mobility for everyone by putting pedestrians, cyclists and transit first.	3	Not supportive – pedestrian and transit systems remain as-is with no future investments to provide new links or enhance / expand service networks.	3	Pedestrians, cyclists and transit second, behind cars, in terms of the focus of the improvements program.	1	Supportive – emphasis on “complete streets” with balanced investments for all users. Pedestrian and transit systems are key to a sustainability-focused transportation system.
Protect Environment	Protection and enhancement of our environment and cultural heritage.	1	A lack of new investments in transportation infrastructure would limit further encroachment on the environmental and cultural heritage; however, future congestion could result in worsening air quality, which would have a negative effect on the environment.	2	Continued road widening and new road construction could encroach on environmentally and culturally-sensitive lands.	2	Seeks to maintain the integrity of the environmental and cultural heritage with a focus on sustainable development of transportation and land use.
	Adoption of energy efficient (Carbon Neutral) transportation systems.	3	Not supportive, transportation systems will become more congested without investments in infrastructure. The added congestion will lead to increased emissions from cars, trucks and buses.	2	This alternative could ease congestion but could also contribute to a higher number of vehicle kilometres travelled (VKT).	1	Supportive – balanced focus between private vehicles and active transportation provides options to travel in ways that reduce a person’s carbon footprint.
Relative Cost Efficiency	Supporting our economic well-being.	3	Not supportive, mobility will be hampered by a lack of investment in transportation infrastructure.	1	Supports economic industries reliant on the automobile.	2	Supportive – provides transportation investments to support the economy.
	Ensuring fiscal sustainability and equitable funding.	1	No funding needed for transportation investments.	3	Funding would focus on roads and improvements for vehicles, with a lesser emphasis on alternative modes of transportation.	2	Supportive – costs associated with road building are less than the ‘Auto Focused’ alternative and funding would be distributed to support a variety of modes of transportation.
	Implementation and Support of Transportation Supply Management Initiatives.	2	No funding needed for transportation supply management initiatives.	2	Funding would focus on providing auto-focused transportation supply.	1	Supportive – a balance would be sought to provide funding for a multi-modal transportation network.
Overall		**22**		**18**		**13**	

Evaluation Ranking System:
1 = Supportive; 2 = Somewhat supportive; 3 = Not supportive

The analysis of Project Principles favours the 'Sustainability Focused' alternative. This alternative has been designed with the Project Principles in mind and scores "Supportive" on almost all of the evaluation criteria shown in **Table 43**.

7.5.3 Discussion of Residual Congested Road Links

Even with the implementation of the projects in the recommended 'Sustainability Focused' alternative, some links are predicted to operate with a volume-to-capacity ratio over 0.8. This is generally due to the topographical constraints associated with Sudbury's rugged terrain, which limits the number of available and potential entry points into the Sudbury city centre. The physical barrier formed by Ramsey Lake also funnels trip from the southern section of the city through the constrained downtown core. In some cases, there are mitigating measures that may be considered beyond the year 2031.

In both the 'Do Nothing' and 'Sustainability Focused' alternatives, the heaviest movement between areas is from the former City of Sudbury to Nickel Centre. The most direct route for those leaving or passing through the downtown core will include one of the following road sections:

- Notre Dame Avenue between Elm Street and Kathleen Street;
- The Kingsway between Fabbro Street and Falconbridge Road; or
- Van Horne Street and Howey Drive between Paris Street and Bancroft Drive.

The widening of each of these three road sections is restricted by the presence of buildings, rocky outcrops or both. The construction costs and consultation requirements associated with improvements at these pinch points are significant and potentially prohibitive. Each of these sections exhibits a volume/capacity ratio over 0.8 in all future alternatives tested. The route along Elgin Street and Howey Drive is a fourth option, however it is less direct and has limited connectivity due to grade separations at Paris Street and Brady Street.

For the movement that is expected to show the second-highest volume, northbound from the former City of Sudbury to Valley East, the only direct option for leaving downtown Sudbury is via the aforementioned section of Notre Dame Avenue between Elm Street and Kathleen Street. To the west is M.R. 38 (Beatty Street and Regent Street) which is the only direct north/south route outside of the downtown core.

Elm Street connects the Sudbury city centre to Rayside-Balfour to the northwest and, along with Beatty Street and Regent Street, is predicted to have a volume-to-capacity ratio over 0.8 in the vicinity of their intersection. Opportunities for widening are limited due to restricted roadway width and the proximity of the property line to the back of the sidewalk.

There are two ways to reduce volume/capacity ratios: if increasing capacity is not feasible, this may be achieved by reducing traffic volumes. Encouraging active transportation, as outlined in **Section 8**, will have an effect. However, it is not anticipated that the numbers of drivers transferring to cycling and walking modes will be sufficient on its own. Consequently, it is recommended that a Transit Master Plan study be undertaken to investigate opportunities and quantify the potential benefits of improved public transit for the transportation network as a whole.

7.5.4 Intersection Capacity Analysis for the Preferred Transportation Alternative

Traffic operations for the same intersections analyzed in existing conditions in Chapter 2 were also analyzed for the 2031 horizon year to determine the forecast future levels of service during the weekday p.m. peak hour based on the preferred 'Sustainability Focused' alternative. This analysis was undertaken to determine if any of the intersections may experience congestion beyond current levels, if any intersections should be monitored in the coming years and if any intersection improvements might need to be considered for implementation. Turning movement volumes were estimated by applying the Furness method to projected 2031 model link volumes. The results of the intersection capacity analysis are summarized in **Table 44**. The overall level of service for each intersection is reported. Any movements with a forecast volume to capacity ratio of 0.85 or greater are highlighted. These movements are forecast to be approaching capacity and, in some instance, over capacity in the year 2031.

Table 44: LOS Results – 2031 Sustainability Focused Alternative

Intersection	Control Type	P.M. Peak Hour	
		LOS (Delay in seconds)	Critical Movements (v/c)
Main Street at M.R. 80	Signalized	C (27)	NB-L (0.86)
Lasalle Boulevard at Barry Downe Road	Signalized	C (28)	--
The Kingsway at Barry Downe Road	Signalized	D (36)	--
The Kingsway at Silver Hills Drive	Signalized	B (10)	--
The Kingsway at Bancroft Drive	Signalized	B (16)	--
Bancroft Drive at Second Avenue	Signalized	B (17)	--
Lloyd Street at Brady Street	Signalized	B (17)	--
Lloyd Street/Elm Street at Notre Dame Avenue/Paris Street	Signalized	E (65)	EB-L (1.53) NB-T (0.85)
Lloyd Street/Elm Street at Notre Dame Avenue/Paris Street (Improved)	*Signalized*	*E (60)*	*EB-L (1.35)* *SB-L (1.15)*
Paris Street at Brady Street	Signalized	D (48)	EB-L (1.06) EB-T (0.89) WB-L (1.03)
Paris Street at Brady Street (Improved)	*Signalized*	*D (44)*	*EB-L (0.88)* *EB-T (0.86)* *WB-L (0.88)* *NB-L (1.05)*
Douglas Street at Regent Street	Unsignalized	F (162)	WB-L (0.42) NB-LTR (1.07) SB-LTR (1.25)
Douglas Street at Regent Street (Improved)	*Signalized*	*B (12)*	--

Intersection	Control Type	P.M. Peak Hour	
		LOS (Delay in seconds)	Critical Movements (v/c)
Ramsey Lake Road at Paris Street	Signalized	C (29)	WB-R (0.94)
Regent Street at Paris Street Intersection (Four Corners)	Signalized	D (38)	--
M.R. 24 at M.R. 55	Signalized	C (25)	--

The majority of the intersections analyzed are anticipated to operate at acceptable levels of service (LOS D or better). For most intersections, it is expected that reserve capacity will be available and that there will be no critical movements (volume/capacity > 0.85).

It is recognized that the traffic volumes used in this analysis were derived from a combination of existing traffic volumes and the traffic volumes reported in the strategic model for the preferred 2031 transportation alternative. A limiting factor of the model is that only major roads are represented, therefore, volumes at major intersections could see additional volume that would otherwise actually be captured by a nearby minor intersection not included in the model. Where traffic congestion is reported, no physical improvements, such as dual left turn lanes, are recommended at this time. Intersections with reported deficiencies should be monitored by the City through regularly scheduled traffic counts in order to determine whether or not physical improvements are needed in the future.

The intersection of Lloyd Street/Elm Street at Notre Dame Avenue/Paris Street is projected to operate at LOS E with the eastbound left-turn movement over capacity. An alternate scenario was analyzed where the signal timings were optimized by adjusting the green time splits, while keeping the cycle length at 110 seconds. In this improved scenario, the average vehicle delay is reduced by 10 seconds, however, the eastbound left-turn is still projected as over capacity. No physical improvements are recommended at this time; however, signal timing optimization and further monitoring of the intersection is warranted.

At the intersection of Paris Street at Brady Street, it is expected that multiple movements will be over capacity with the overall intersection operating at LOS F. An improved scenario was analyzed which included signal timing optimization. In the alternate scenario, the intersection is anticipated to operate at LOS E with the average delay per vehicle reducing by 25 seconds. However, the eastbound through and northbound left-turn movements would still be expected to operate over capacity. Future monitoring of these movements is warranted. It is recommended that signal timing optimization be performed.

The Douglas Street at Regent Street intersection is anticipated to operate at LOS F with multiple critical movements. The intersection was analyzed with a traffic signal, following the timing of the adjacent intersection of Lorne Street at Regent Street, improving the expected operation to LOS B with no critical movements. As previously mentioned in Section 2.2.6 regarding existing conditions, a signal is still warranted at the intersection for future conditions based on the methodology from Book 12 of the Ontario Traffic Manual. It is recommended that the intersection of Douglas Street at Regent Street be signalized to mitigate anticipated capacity concerns.

7.6 Recommended 2031 Road Network of the Preferred Transportation Alternative

The preferred transportation alternative is presented graphically in one city-wide map and four maps zoomed in to specific parts of the city. The maps include:

- **Figure 49:** Recommended 2031 Road Network;
- **Figure 50:** Downtown Enlargement;
- **Figure 51:** New Sudbury Enlargement;
- **Figure 52:** South End Enlargement; and
- **Figure 53:** Enlargement Areas.

Figure 49
Greater Sudbury Transportation Study
Recommended 2031 Road Network

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List of Proposed Road Network Improvements

1. Notre Dame Ave. widening (4-lane to 6-lane, Main St. to Kathleen St.)
2. Maley Dr. extension (Lasalle Blvd. to Barry Downe Rd.)
3. Montrose Ave. north extension (current terminus to Maley Dr. extension)
4. Maley Dr. widening (2-lane to 4-lane, Barry Downe Rd. to Falconbridge Highway)
5. Falconbridge Highway widening (4-lane to 5-lane, Maley Dr. to Garson Coniston Rd.)
6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
7. Second Ave. widening (2-lane to 5-lane, Donna Dr. to Scarlett Rd.)
8. Barry Downe Rd. widening (5-lane to 6-lane, Westmount Ave. to Kingsway)
9. Montrose Ave. extension south from Notre Dame Ave. to Lasalle Blvd.
10. Proposed road for construction in Silver Hills Development
11. Widening of the Kingsway east of Lloyd St. (4-lane to 5-lane)
12. St. Anne Rd. extension
13. Howey Dr. widening (2-lane to 4-lane, Elgin St. to Bancroft Dr.)
14. Larch Street extension
15. Ramsey Lake Rd. widening (2-lane to 4-lane, Paris St. to South Bay Rd.)
16. Remington Road extension from current terminus to Gateway Dr.
17. Lasalle Blvd. widening (2-lane to 4-lane, Municipal Rd. 35 to south of rail corridor)
18. Municipal Rd. 35 widening (2-lane to 5-lane, Municipal Rd. 15 to Notre Dame St.)
19. Martilla Drive connection to Paris Street
20. John Street (Valley) extension

Final alignment within the approximate envelope shown in yellow to be determined in conjunction with MTO.

The City should conduct an environmental assessment (EA) to confirm the need for this corridor relative to other options. If the need is identified, the EA would also define the corridor for the Southern University Link within the approximate envelope shown in yellow. This would facilitate an orderly development plan which is in line with the long term road network concept for the area.

Proposed interchange improvements to Highway 17 and Maley East Bypass

Proposed interchange along Highway 17

Proposed Road Improvements to Highway 17

Proposed Road Improvements to Highway 69

Legend

Existing Road Network
- Existing Provincial Road / Highway
- Existing Roads

Proposed Road Network
- Proposed Roads for Construction
- Proposed Roadway Widening
- Proposed Road Improvements to Provincial Highways
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other
- Lakes and Rivers
- Parks and Conservation Areas
- Active Railway
- Abandoned Railway

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N W E S

0 1.75 3.5 7 Kilometres

Figure 50
Greater Sudbury Transportation Study
Recommended 2031 Road Network
Downtown Enlargement

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List of Proposed Road Network Improvements

1. Notre Dame Ave. widening (4-lane to 6-lane, Main St. to Kathleen St.)
11. Widening of the Kingsway east of Lloyd St. (4-lane to 5-lane)
12. St. Anne Rd. extension
13. Howey Dr. widening (2-lane to 4-lane, Elgin St. to Bancroft Dr.)
14. Larch Street extension
17. Lasalle Bvd. widening (2-lane to 5-lane, Maley Dr. extension to south of rail corridor)

Legend

Existing Road Network
- Existing Provincial Road / Highway
- Existing Roads

Proposed Road Network
- Proposed Roads for Construction
- Proposed Roadway Widening
- Proposed Road Improvements to Provincial Highways
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Destinations
- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Regional Trails and Routes
- Trans Canada Trail

Other
- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

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DOWNTOWN

0 250 500 1,000 Metres

Figure 51
Greater Sudbury Transportation Study
Recommended 2031 Road Network
New Sudbury Enlargement

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List of Proposed Road Network Improvements

2. Maley Dr. extension (Lasalle Blvd. to Barry Downe Rd.)
3. Montrose Ave. north extension (current terminus to Maley Dr. extension)
4. Maley Dr. widening (2-lane to 4-lane, Barry Downe Rd. to Falconbridge Highway)
5. Falconbridge Highway widening (4-lane to 5-lane, Maley Dr. to Garson Coniston Rd.)
6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
7. Second Ave. widening (2-lane to 5-lane, Donna Dr. to Scarlett Rd.)
8. Barry Downe Rd. widening (5-lane to 6-lane, Westmount Ave. to Kingsway)
9. Montrose Ave. extension south from Notre Dame Ave. to Lasalle Blvd.
10. Proposed road for construction in Silver Hills Development

Legend

Existing Road Network
- Existing Provincial Road / Highway
- Existing Roads

Proposed Road Network
- Proposed Roads for Construction
- Proposed Roadway Widening
- Proposed Road Improvements to Provincial Highways
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other
- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

Final alignment within the approximate envelope shown in yellow to be determined in conjunction with MTO

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NEW SUDBURY

0 260 520 1,040 Metres

Figure 52
Greater Sudbury Transportation Study
Recommended 2031 Road Network
South End Enlargement

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Legend

Existing Road Network
- Existing Provincial Road / Highway
- Existing Roads

Proposed Road Network
- Proposed Roads for Construction
- Proposed Roadway Widening
- Proposed Road Improvements to Provincial Highways
- Potential Roads for Future Consideration (after 2031)

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other
- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

15

The City should conduct an environmental assessment (EA) to confirm the need for this corridor relative to other options. If the need is identified, the EA would also define the corridor for the Southern University Link within the approximate envelope shown in yellow. This would facilitate an orderly development plan which is in line with the long term road network concept for the area.

19

16

List of Proposed Road Network Improvements

15. Ramsey Lake Rd. widening (2-lane to 4-lane, Paris St. to South Bay Rd.)
16. Remington Road extension from current terminus to Gateway Dr.
19. Martilla Drive connection to Paris Street

N W E S

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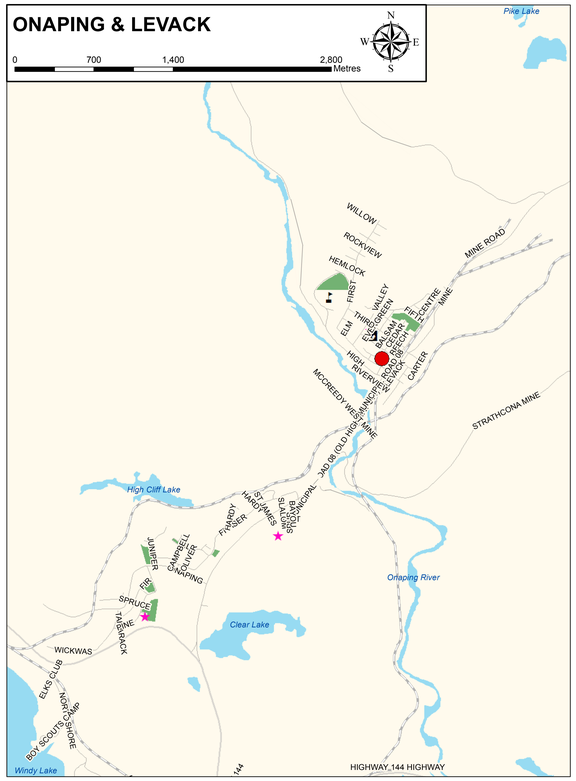
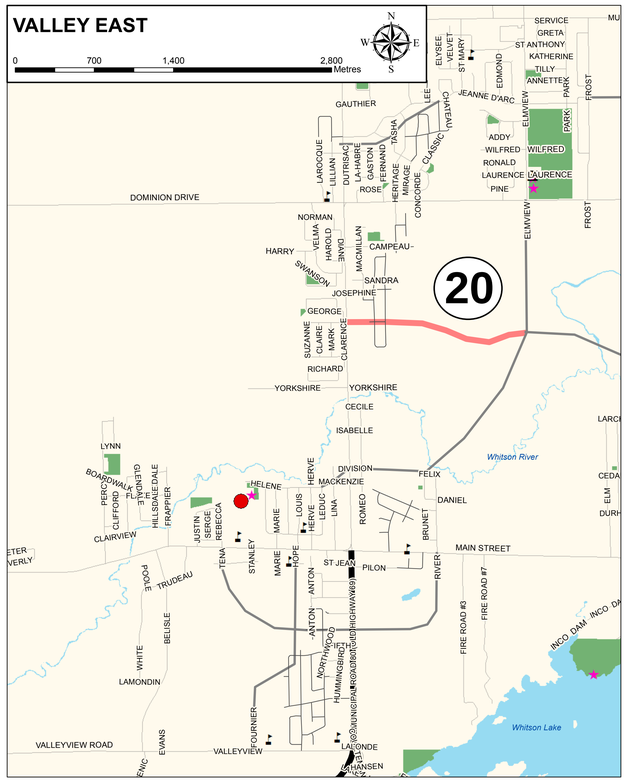
SOUTH END

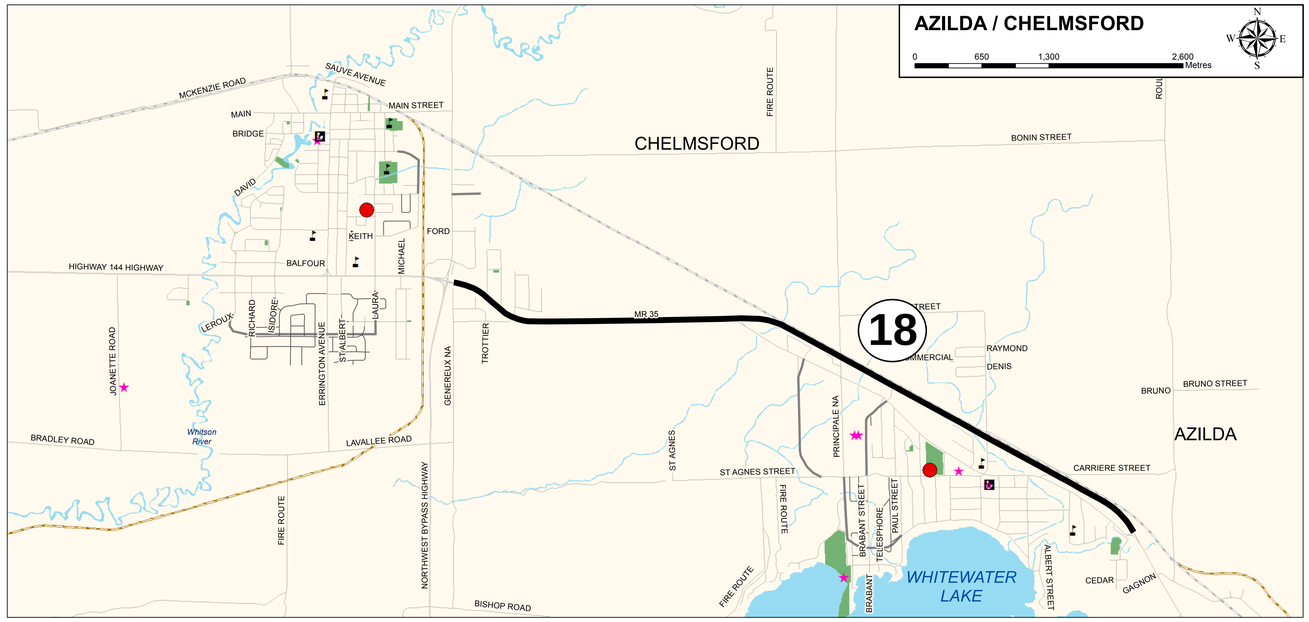
0 260 520 1,040 Metres

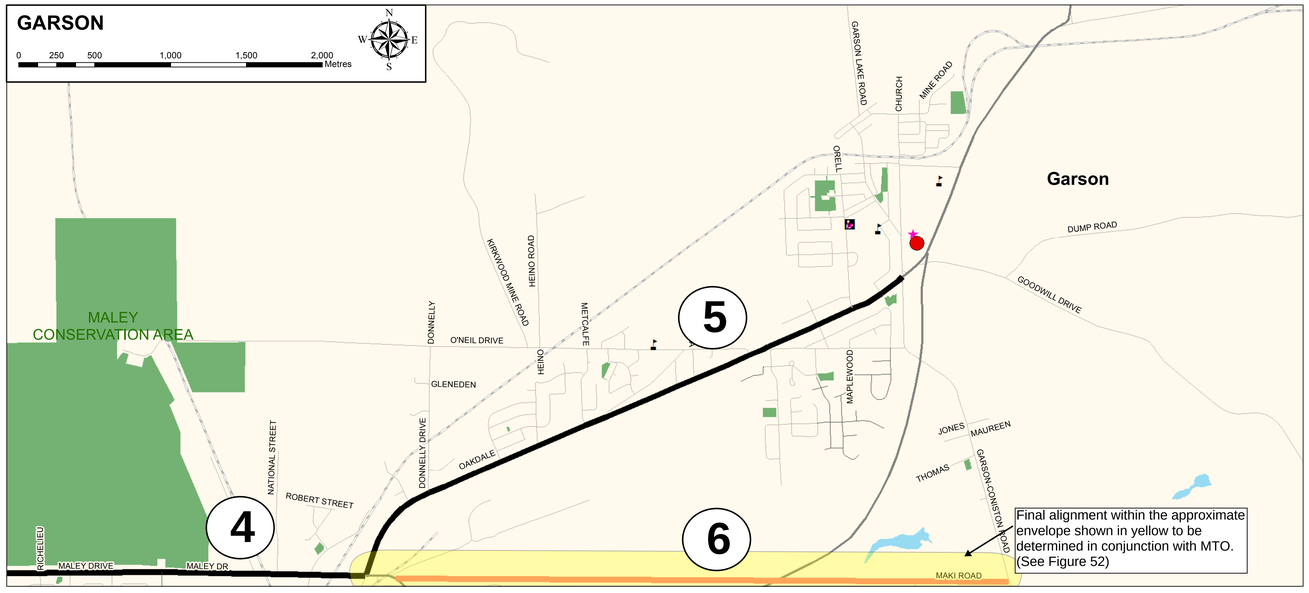
Figure 53
Greater Sudbury Transportation Study
Recommended 2031 Road Network
Enlargement Areas

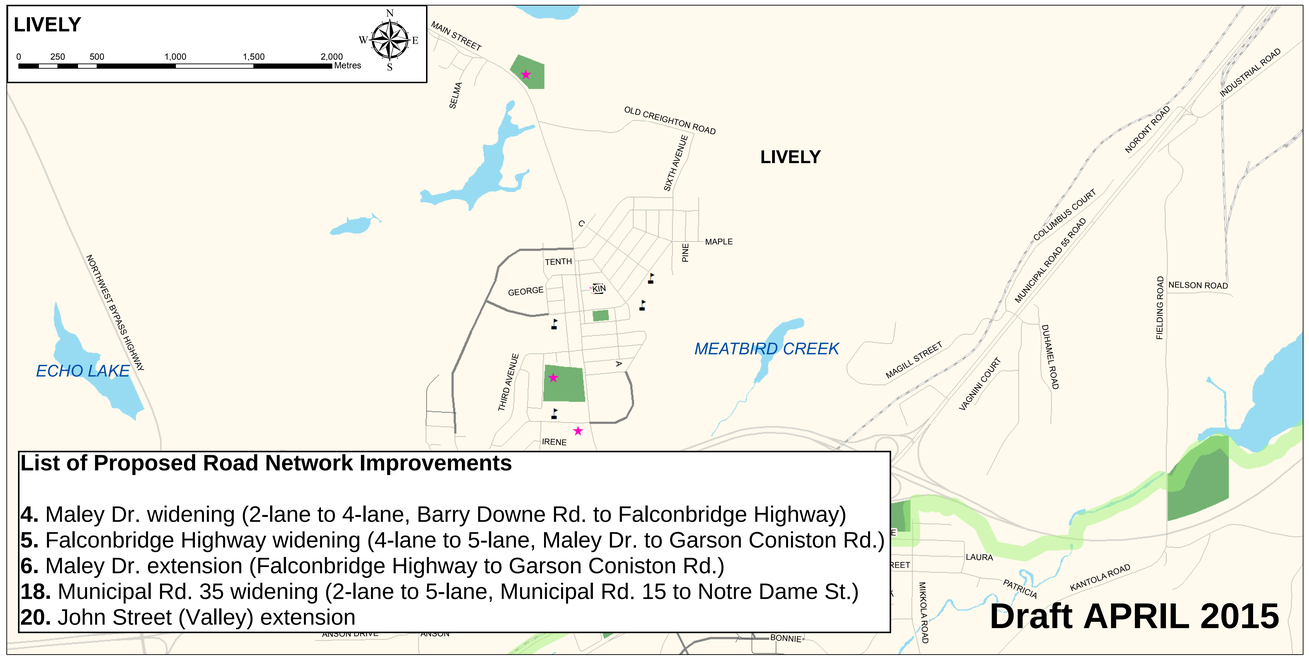
Revisit. Review. Revise.
Revisitez. Reexaminez. Révisez.
Official Plan Review • Révision du Plan officiel











Legend

Existing Road Network
- Existing Provincial Road / Highway
- Existing Roads

Proposed Road Network
- Proposed Roads for Construction
- Proposed Roadway Widening
- Proposed Road Improvements to Provincial Highways
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other
- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

List of Proposed Road Network Improvements

4. Maley Dr. widening (2-lane to 4-lane, Barry Downe Rd. to Falconbridge Highway)
5. Falconbridge Highway widening (4-lane to 5-lane, Maley Dr. to Garson Coniston Rd.)
6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
18. Municipal Rd. 35 widening (2-lane to 5-lane, Municipal Rd. 15 to Notre Dame St.)
20. John Street (Valley) extension

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7.7 Discussion Regarding Proposals for Individual Road Links

There are multiple road projects recommended for construction by the year 2031, some of which have generated considerable public debate, particularly:

- Maley Drive;
- South Bay Road;
- Municipal Road 80;
- Montrose Avenue North;
- Martilla Drive Extension;
- Remington Road;
- John Street, Val Caron;
- Ste. Anne Road;
- Montrose Avenue South;
- Frood / Regent;
- Big Nickel Drive; and
- Falconbridge Community Truck By-pass.

Each of these road projects is discussed in the subsections below in order to present the pertinent issues and to better explain the rationale for the recommended action.

7.7.1 Maley Drive

Maley Drive has been the City's number one road construction priority since at least 1991 and should remain at the top of the priority list. The Maley Drive project includes widening existing segments and constructing missing segments to create a new east-west corridor along the northern edge of New Sudbury. The extensions and widening of segments of Maley Drive are indicated in **Figure 54**.

Figure 54: Maley Drive Proposed Extensions and Widenings

Maley Drive offers benefits to multiple segments of the City by providing an east-west truck route. This by-pass would reduce the number of heavy, slow moving vehicles in the residential and commercial areas of New Sudbury, which currently contribute to the congestion there. The greatest alleviation of traffic would be expected to be along Lasalle Boulevard.

A key impediment to this project is funding, which is a significant reason for the fact that the project has not yet been built. If funding can be secured for this important link, it is recommended for construction, with many benefits in terms of mobility and congestion alleviation anticipated.

7.7.2 South Bay Road Extension (Southern University Link)

The South Bay Road Extension, connecting Laurentian University in the north with Regent Street in the south, as shown conceptually in **Figure 55**, has been proposed for many years. This road link was re-examined as part of this Transportation Study.

Figure 55: South Bay Road Extension

From a traffic capacity perspective, the road link is not essential to accommodate traffic volumes and would not help to alleviate congestion at the Paris Street and Ramsey Lake Road intersection. It is recognized that the majority of traffic on Ramsey Lake Road has origins and

destinations north, not south of the road. The South Bay Road extension will do little to address this travel pattern.

While the South Bay Road extension does not solve capacity concerns on Ramsey Lake Road, it does have several merits. From a safety point of view, the South Bay Road extension would provide a secondary access to Laurentian University and the entire peninsula, which is currently served solely by Ramsey Lake Road. The extension could help accommodate planned future growth at Laurentian University, as well as development pressures toward the south end of the extension near Regent Street. It could become a new gateway to Greater Sudbury for traffic arriving from the south and could be designed as a parkway with trails on each side.

Based on public feedback collected as part of this study, there is strong opposition to proposals for South Bay Road to be extended. Residents have stressed the value of the open spaces and the multiple trails that exist in this area. These trails are seen as a major selling point for Greater Sudbury, attracting students and staff to Laurentian University as well as drawing people to settle in the wider City. It is perceived that the extension will irreversibly compromise this community asset.

Members of the public have suggested several alternatives in lieu of this road, such as widening Ramsey Lake Road, creating reversible lanes on Ramsey Lake Road to accommodate peak traffic flow and realigning the South Bay Road extension to reduce its impact on the trail network.

As part of this Transportation Study, additional road links to address capacity concerns on Ramsey Lake Road were tested. A road link from Laurentian University connecting to either Centennial Drive or Walford Road was tested in the transportation model. Such a connection is shown in the transportation model to attract a considerable number of trips and to help mitigate traffic concerns on Ramsey Lake Road. Such a connection could open room for university expansion and could foster greater interaction between the University and Health Sciences North.

The South Bay Road extension and improvements to Ramsey Lake Road are recommended for further study through one Environmental Assessment (EA). The EA needs to address not only access but also capacity. The EA would allow for robust analysis of multiple alternatives to be considered in defining the road corridor for development. The EA process would also require additional public input giving the opportunity for review and comment on the alternatives, which would include a 'Do Nothing' alternative. Once the preferred option has been identified, assuming that it involves construction, the appropriate number of lanes and the precise alignment of the road can be determined. The recommended road alignment could be the South Bay Road extension but also could be widening Ramsey Lake Road, a new road connecting to Centennial Drive or Walford Road, no road construction, or another alternative not considered as part of this report. It is recommended that candidate corridors be protected to allow for potential future construction pending this EA process. For the purposes of the analysis in this report, South Bay Road extension was included in the Auto-Focused alternative only. Widening Ramsey Lake Road was included in the Auto Focused and Sustainability Focused alternatives.

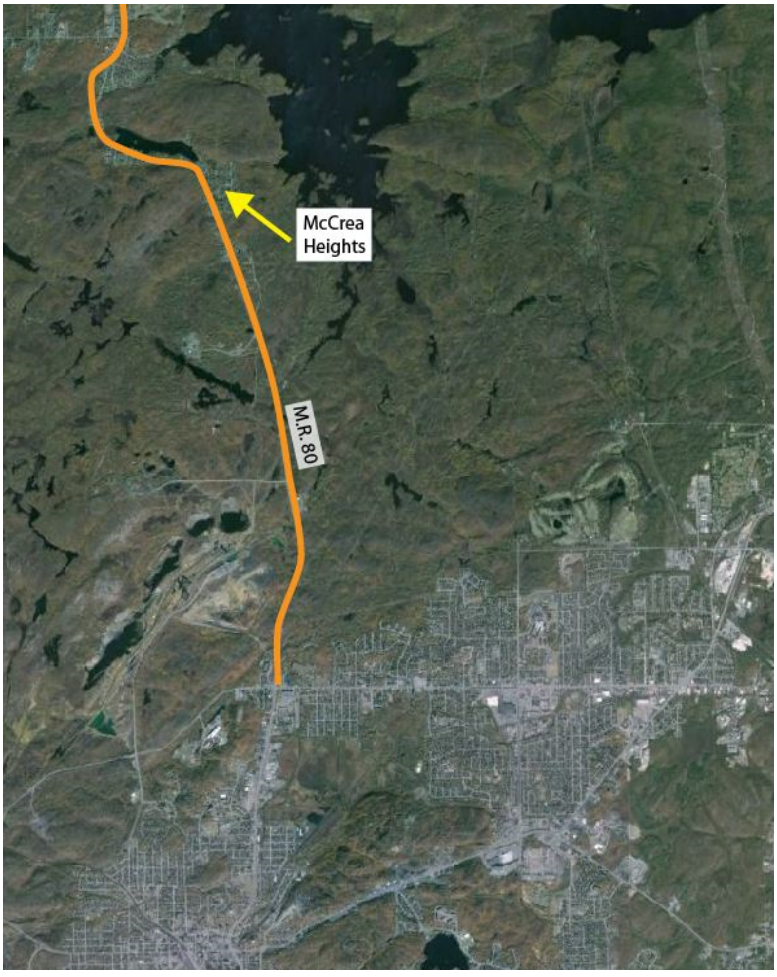
7.7.3 Municipal Road 80

Municipal Road (MR) 80 is the main connection between the Valley and central Sudbury. It experiences heavy southbound traffic flows in the a.m. peak hour and heavy northbound traffic flows in the p.m. peak hour. As part of this Transportation Study, MR 80 is recommended to be widened to accommodate these existing and future forecast traffic volumes. The MR 80 corridor for widening is shown in **Figure 59**.

Before widening could occur, an Environmental Assessment will need to be completed to verify the alignment and confirm the suitability of this recommendation. It is recognized that widening could be constrained in the McCrea Heights neighbourhood.

Alternatives to widening would be explored as part of the Environmental Assessment. The main alternative identified would be the extension of Barry Downe Road from its present terminus in New Sudbury north to the Valley. This was considered as part of this Transportation Study but is not recommended for construction by the year 2031. Through the multiple account evaluation process, widening MR 80 was determined to be more appropriate than constructing a new road extension. However, land for the Barry Downe extension should be protected in case future conditions warrant construction of this extension.

Figure 56: Municipal Road 80 Widening



7.7.4 Montrose Avenue North

Montrose Avenue is a residential street that runs between Lasalle Boulevard on the south and Forestdale Drive and Thorncliffe Court on the north. In order to accommodate further development north of the road's current terminus, Montrose Avenue has been shown on subdivision plans to extend north and eventually connect to the proposed Maley Drive extension, as shown in **Figure 57**. Montrose Avenue previously had been classified as a secondary arterial road. As part of this Transportation Study, Montrose Avenue is being reclassified as a collector road to meet the intention of the road as collecting local traffic in this residential area and distributing the local traffic to Maley Drive in the north or Lasalle Boulevard in the south.

Figure 57: Montrose Avenue North Extension

Public input received through the development of the Transportation Study has indicated that the community along Montrose Avenue is very concerned that if Montrose Avenue is connected to Maley Drive, Montrose Avenue will become a short cut for commuter traffic and shoppers accessing the retail areas on Lasalle Boulevard east of Montrose Avenue, as well as trucks servicing these same shopping areas. The community is strongly opposed to the Montrose Avenue connection to Maley Drive.

The modeling analysis suggests that the total volume using this extension in the peak hour, including both northbound and southbound traffic, will be no more than 300 vehicles. This is a moderate volume appropriate for a collector road. The modeling results further suggest that through traffic will not use this link as a short cut and will stay on the major arterials such as Notre Dame Avenue, Maley Drive and Lasalle Boulevard.

A separate model run was undertaken with the Maley Drive extension but without the Montrose Avenue connection to Maley Drive. In this scenario, Montrose Avenue actually performed worse, with higher traffic volumes, than in the scenario with Montrose Avenue connected to Maley Drive. Without the connection, all neighbourhood traffic is forced south on Montrose Avenue. With the connection, the traffic redistributes, with some traffic traveling north to Maley Drive and some traffic traveling south to Lasalle Boulevard. Even if there is some short cutting traffic, it does not have as great an effect as sending all Montrose Avenue-specific traffic south to Lasalle Boulevard in the "No Connection" scenario.

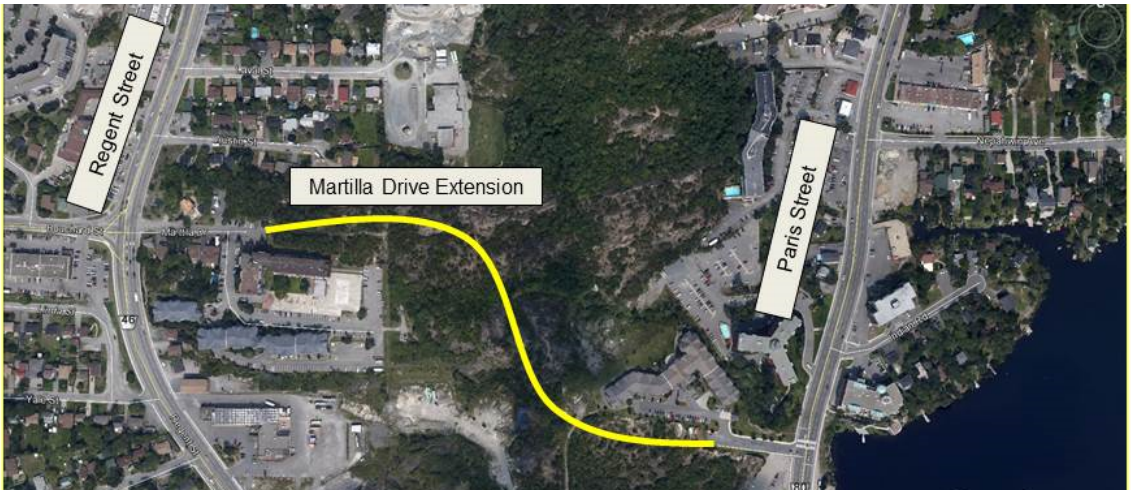
The development of Maley Drive and Montrose Avenue will occur independently, as Maley Drive is a City-driven project and Montrose Avenue is a development-driven project. The City should continue to monitor traffic volumes in this part of the city prior to the ultimate connection. In time, public perception might change and a connection could be desired in order to provide greater connectivity and travel routes for this neighbourhood.

The connection between the Maley Drive extension and Montrose Avenue should be designed such that the road maintains its residential nature; the mid-block cross sections and intersection connection with Maley Drive should be appropriate for a collector road to help encourage use only by Montrose Avenue-area traffic. The new portion of Montrose Avenue should be designed as a collector road with a bike lane and sidewalks on both sides of the road in order to create a "complete street."

7.7.5 Martilla Drive

Martilla Drive presently is a dead end road that serves a housing complex east of Regent Street. In order to accommodate future development, Martilla Drive is required to be extended east to connect to Paris Street, as shown in **Figure 58**.

Figure 58: Martilla Drive Extension



In addition to facilitating further land development, this extension would provide a new east-west link in an area where mobility is limited and could help balance the traffic between Regent Street and Paris Street. The connection could provide some traffic relief to the Four Corners intersection by providing an alternate route between Regent Street and Paris Street.

7.7.6 Remington Road

Remington Road is a short local road which services two commercial plazas that front Regent Street. In order to facilitate future development, Remington Road could be extended west to connect to Gateway Drive, as shown in **Figure 59**. This extension would improve connectivity in the southern portion of the city.

Figure 59: Remington Road Extension

7.7.7 John Street, Val Caron

John Street in Val Caron has been proposed to be extended east to Bodson Drive through currently vacant land east of MR 80 in order to accommodate land development. An extension of John Street would facilitate future development and could connect to future north-south road links between Dominion Drive on the north and Yorkshire Drive on the south. The extension is shown in **Figure 60**.

Figure 60: John Street Extension, Val Caron

7.7.8 Ste. Anne Road

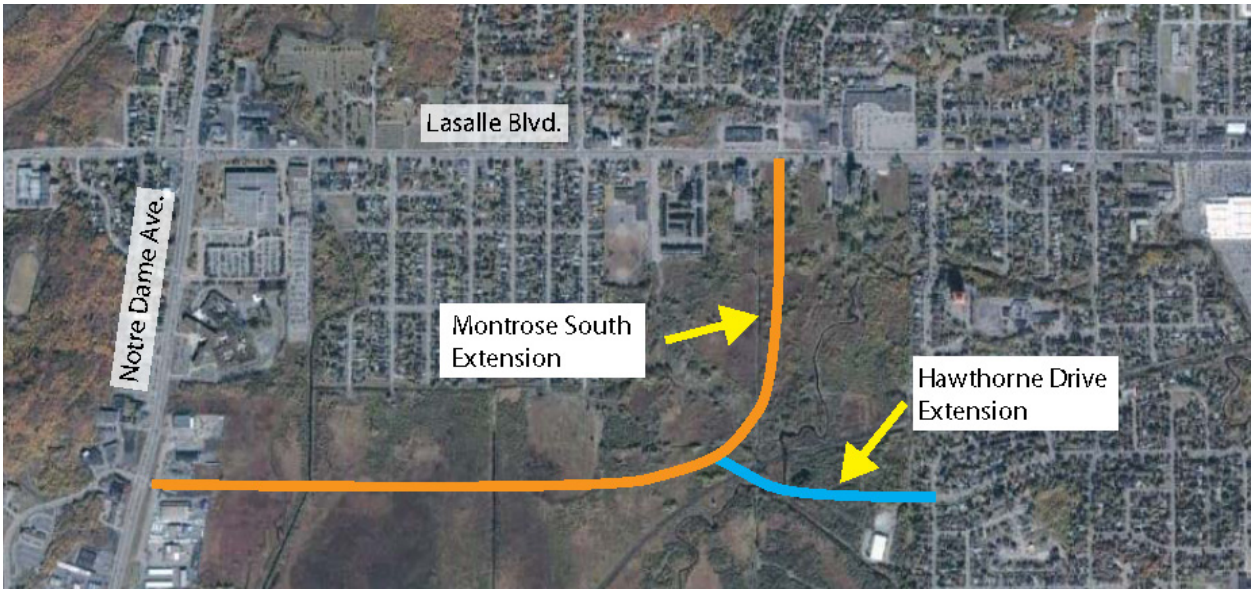
St. Anne Road is an east-west road between Notre Dame Avenue and Frood Road. An extension of this road underneath the railroad tracks to connect to Pine Street or College Street was considered in the 1992 and 2005 Transportation Studies. There is an existing underpass of the railroad tracks at College Street. The new road link, shown in yellow on **Figure 61**, is proposed for construction along with the reconstruction of the existing underpass at College Street. Doing so would remove the existing vertical restriction.

Figure 61: Ste. Anne Extension

7.7.9 Montrose Avenue South

Montrose Avenue is a residential street that runs between Lasalle Boulevard on the south and Forestdale Drive and Thorncliffe Court on the north. As part of the Transportation Study, Montrose Avenue was analyzed to extend south of Lasalle Boulevard to Notre Dame Avenue and extend to Hawthorne Drive, as shown in **Figure 62**, in order to facilitate future development. The Montrose Avenue south extension would serve as a collector road for the local roads south of Lasalle Boulevard and should only be constructed in conjunction with further development in this area. Due to existing environmental constraints, further study of this road link would be needed to determine if environmental concerns could be mitigated to permit construction of this road link and development of adjacent lands. Environmental constraints were echoed by the public through the consultation process.

Figure 62: Montrose Avenue South Extension



7.7.10 Frood / Regent

The Frood Road / Regent Street corridor, shown in **Figure 63**, has been analyzed in past Transportation Studies as a possible alternative north-south arterial in the city. The main concern has been the rail crossings near the intersection of Frood Road and Regent Street. A grade-separated interchange would disrupt the urban fabric of the residential neighbourhoods on either side of the railroad track and would encounter another railroad track on Regent Street just north of McNeill Boulevard, as well as topographical challenges due to a hill. While roadway operational improvements could result from an improved connection by way of a grade separated crossing, the costs, both financial and community-based, have led to no further study of this corridor at this time.

Figure 63: Frood / Regent

7.7.11 Big Nickel Drive

Big Nickel Drive could be extended south from MR55 to Southview Drive, as diagrammed in **Figure 64**. This extension was analyzed in the 2005 Transportation Study and was forecast to attract a low volume of traffic and traverse a long stretch of undisturbed natural environment. Since the 2005 report, there have not been new growth-related pressures that would suggest that this road link is needed. The benefit of the new connection would not be expected to justify the cost. Further analysis of this road link was not conducted as part of this study.

Figure 64: Big Nickel Drive Extension

7.7.12 Falconbridge Community Truck By-Pass

A privately-constructed truck by-pass of the Falconbridge community is being considered as the current truck route on Longyear Drive divides the community almost in half and results in conflicts between truck through movements and pedestrians attempting to cross from one side of the community to the other. The City continually receives complaints about trucks idling in front of residences. There have also been complaints regarding speeding, which have been confirmed to be an issue through speed studies conducted by the City.

A truck by-pass would improve the quality of life and improve safety in the Falconbridge community by removing trucks from the residential portion of the community. As part of the road works, a portion of Longyear Drive would be eliminated to remove cars and trucks traveling through the s-curve section of Longyear Drive, which is an existing safety concern.

The truck by-pass would intersect Edison Road at a proposed roundabout. A new road link would connect Edison Road to Longyear Road. The general concept for the by-pass and associated road works are shown in **Figure 65**.

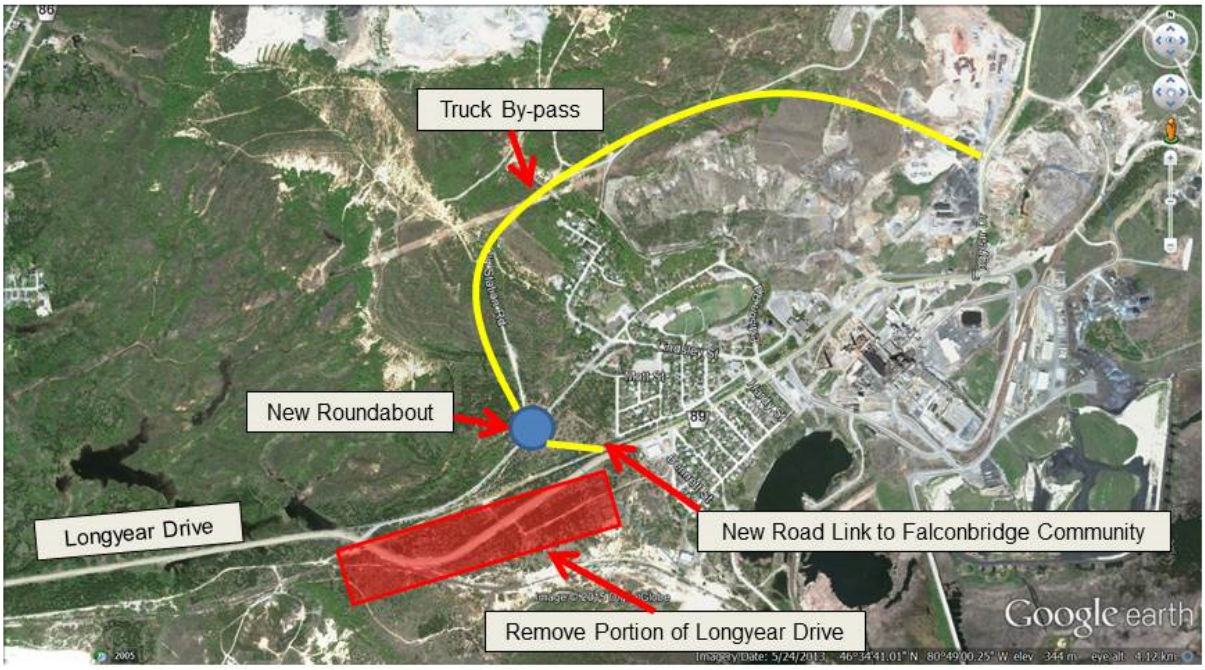
Roundabouts can have many advantages from a traffic operations perspective, with reduced impacts on the environment as well. When used at appropriate locations, roundabouts can improve safety and cut vehicular delay, thus improving travel times and reducing greenhouse

gas emissions. By avoiding installation of traffic signals, they can also reduce long-term ongoing expenses as well.

The following steps should be taken to confirm that a roundabout is suitable for this location on Edison Road:

- Assess the existing conditions of a potential site by looking at traffic volume and collision data to evaluate safety and operational issues;
- Compare the predicted performance and cost of a roundabout to that of other means of traffic control; and
- Identify the appropriate number of lanes for the roundabout and the associated land requirements.

Figure 65: Falconbridge Community Truck By-pass



7.8 Intersection of Capreol Road and Cote Boulevard

The intersection of Capreol Road and Cote Boulevard is an off-set intersection, with the northbound and southbound approaches situated to the east and west of the train tracks, respectively. To the north of the intersection, Capreol Road crosses the train tracks just to the north of the Linden Drive intersection. It is the only road connection from the Capreol community to the rest of Greater Sudbury to the south; if it were to be blocked by a stopped or disabled train, there would be no way in or out of Capreol for vehicular traffic, which poses a safety concern.

To mitigate this, the section of Capreol Road between Cote Boulevard and Linden Drive should be relocated from its current alignment on the west side of the train tracks over to the east side, as illustrated conceptually in **Figure 66**. Linden Drive should be extended across the train tracks to form a new intersection with Capreol Road, maintaining access for the properties to the west.

Figure 66: Conceptual Realignment of Capreol Road

7.9 Public Consultation Regarding the Preferred Transportation Alternative

The second Public Information Centre (PIC) was held on June 19, 2013 to obtain feedback on the recommended preferred transportation alternative for the road network, the recommended active transportation network and the transportation policies that support the various elements of the Transportation Study.

Following the large turnout experienced at the first PIC, it was anticipated that there would be significant interest in this second session so the workshop was widely publicized. Newspaper advertisements were distributed in English and French and the PIC meeting notice was posted on the City's website as shown in **Appendix F**.

The PIC was conducted as a drop-in open house and an estimated 80 to 100 people attended throughout the evening. Residents were given the opportunity to read about the study through a series of 20 poster boards, visual displays and discussions with representatives from the City and MMM Group. Attendees were encouraged to provide their feedback on the presented road and active transportation networks. The following is a summary of the major themes and comments received.

South Bay Road Extension

- No other campus can boast a trail network like Laurentian University: do not destroy the University's best feature;
- Leave New Sudbury Conservation Area, the area on the west side of Lake Laurentian and the Nickeldale Conservation Area alone;
- Drop the South Bay Road extension proposal: the improvement is not needed;
- Do not destroy the Laurentian University trails;
- Ramsey Lake Road should be widened to include a reversible lane operating eastbound in the morning and westbound in the afternoon;
- The road extension would be a waste of money;
- The green space is used very frequently; and
- The proposed link should be removed from the Official Plan.

Maley Drive

- There should be a dedicated truck route;
- It should be converted to a toll highway, similar to Highway 407; and
- The proposals are too expensive and not needed.

Montrose Avenue

- There are grave concerns regarding potential short cutting trucks and cars;
- There is concern about the secondary arterial designation, the size of the road and the speed of vehicles travelling along it;
- Do not destroy peaceful residential neighbourhood; and
- Conduct a study to forecast traffic movements on Maley Drive and Montrose Avenue.

Active Transportation Network Comments

- Signed routes do nothing to protect cyclists;
- Parkwood Street is not appropriate for cycling due to high-speed traffic, bad visibility and a significant incline;
- Lorne Street is not cyclist friendly;
- There is a big hill on Martindale Road;
- Southview Drive has traffic volume and speed issues with conflict areas at intersections;
- York Street has a big hill;
- To avoid the hill on Hyland Drive, it is better to continue west on Wembley Drive, turn onto Wellington Heights and then onto Hyland to reach the signal-controlled intersection at Regent Street;
- Regent Street is not signed near Lake Nepahwin and is not a safe route; and
- Old Highway 69 is a dangerous route for bikes: there is a shoulder only on one side of the road, in the northbound direction.

Roads or Destinations Requiring Active Transportation Connections

- Moonrock Avenue and Regent Street;
- Ramsey Lake Road and Laurentian University; and
- Cambrian Heights Drive extension and side streets such as Madeleine Avenue and Martin Avenue.

Complete Streets

- This is a good idea, but will it be implemented?
- Why are roads being reconstructed today without active transportation facilities?

Other Suggestions/Comments:

- More emphasis should be placed on carpool lanes and bike lanes before constructing on new roads;
- Bike facilities should be provided on more arterial roads;
- Steps on Brady Street and Larch Street should be fitted with bike ramps;
- Cycle tracks, paved shoulders or in-boulevard facilities should be added to Falconbridge Highway;
- Sidewalks are needed on Ramsey Lake Road and Paris Street;
- It is currently difficult to access businesses on the Kingsway; and
- Municipal Road 80 should be widened to provide bike lanes.

The presentation boards used at PIC#2 are included in **Appendix G**. Public and stakeholder comments received throughout the duration of the study have been summarized in the Consultation Register provided in **Appendix H**.

8 CYCLING AND PEDESTRIAN MASTER PLAN

8.1 Network Development Process and the Recommended Network

The following section describes the recommended active transportation (AT) network and the key steps in the development process. The approach used was an iterative process for identifying proposed facility types; it was guided by the overall vision for active transportation and the route selection principles identified in **Section 5.2**. Key steps included:

1. Collection and Assembly of Background Information

Existing or previously proposed active transportation facilities in the City of Greater Sudbury were consolidated into a digital map which included connections to surrounding municipalities. Base information was provided by the Sustainable Mobility Advisory Panel (SMAP), Bicycle Advisory Panel (BAP) and Sudbury Cyclist Union (SCU). This included a list of capital projects for 2011, 2012 and beyond, an updated sidewalk inventory and preliminary input from staff and stakeholders.

2. Review of Consolidated Base Mapping with Sustainable Mobility Advisory Panel Committee

Base mapping was reviewed by the study team in conjunction with the Sustainable Mobility Advisory Panel at a number of key stages throughout the study and refined as additional information became available.

3. Development of Route Selection Principles

A set of qualitative principles was developed to guide the selection of Candidate Routes, as described in **Section 5.2**. These principles were discussed with attendees at the first stakeholder workshop and the first Public Information Centre.

4. Preparation of Candidate Routes Mapping

Candidate routes were mapped and refined based on the outcomes of the first three stages. This desktop analysis was undertaken using the City's high resolution aerial imagery and street view images (where available) from Google Earth.

5. Public Input To The Candidate Network and Route Selection Principles

The City held a second Public Information Centre (PIC) in June 2013 to provide the opportunity for residents to review the proposed candidate network and existing conditions as well as the route selection principles. The proposed network was further refined in response to public feedback from this session and the associated online questionnaire.

6. Field Review and Assessment of Candidate Routes and Preparation of Draft Route Network

Candidate Routes identified for the AT network were reviewed in the field by the study team in Fall 2011. Data was collected on site characteristics and was used to inform the decision to accept or reject each candidate route. The network for consideration was then refined using the

route selection principles, information collected in the field and stakeholder input. The draft route network was subsequently prepared for review by the Sustainable Mobility Advisory Panel.

7. Identification of Appropriate Facility Types

Potential facility types for each route in the network were narrowed down based on consideration of a number of characteristics including:

- Facility types recommended in other City plans or studies;
- Current traffic characteristics;
- Motor vehicle operating speeds;
- Number of travel lanes;
- Existing lane widths;
- Available right-of-way, public land or potential for access agreements on other linear corridors;
- Adjacent land uses;
- Types of destinations along the route;
- Anticipated user groups;
- Capital improvement plans; and
- Distance to the nearest existing or proposed route.

Observations made by the study team were then balanced by comments received from the City, the Sustainable Mobility Advisory Panel, the public and local stakeholders.

8. Review of Input on the Draft Route Network and Recommendation of the Final Route Network

Feedback on the draft route network, facility types and implementation priorities was gathered through discussions with the Sustainable Mobility Advisory Panel, stakeholders and the public. A second stakeholder workshop and round of Public Information Centres was held in June 2013. Some routes were rejected and previously-considered routes were incorporated as part of the refinement and finalization of the recommended route network.

9. Preparation of Implementation Plan

A detailed implementation and phasing plan was developed to guide the short, medium and long-term development of the AT network throughout the City. Policies and general recommendations were developed to guide the future development and implementation of the proposed active transportation facilities.

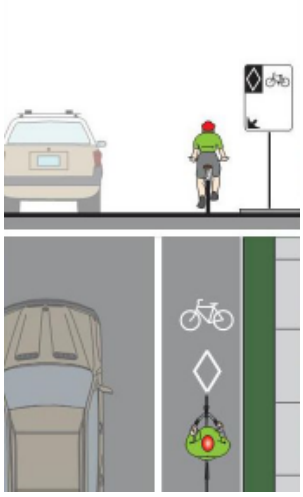
8.2 Cycling and Pedestrian Network Facility Types (Overview)

The following sections provide a brief summary of the facility types envisioned for the Cycling and Pedestrian network in the City of Greater Sudbury.

8.2.1 On-Road Cycling Facilities – Dedicated Space

CONVENTIONAL BICYCLE LANE

This is a portion of a roadway which has been designated by pavement markings and signage for the preferential or exclusive use of cyclists. A bicycle lane is typically located on urban arterial or collector roadways that have higher traffic volumes, operating speeds and proportion of commercial vehicles compared to local urban roadways. Bicycle lanes should typically be provided on both sides of two-way streets. On one-way streets, conventional bike lanes operate in the direction of travel, although contraflow lanes are also permitted. Bike lanes are typically implemented on urban arterial and major collector roads where traffic volumes and speeds are higher.



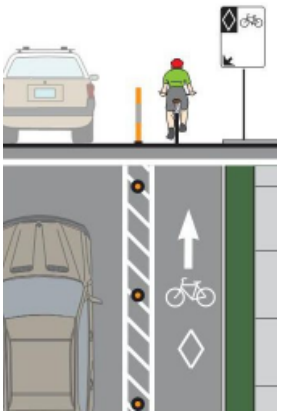
8.2.2 On-Road Cycling Facilities – Separated Space

RAISED CYCLE TRACK

This is a bicycle facility adjacent to but vertically separated from motor vehicle travel lanes. A raised cycle track is designated for exclusive use by cyclists, and is distinct from the sidewalk. A raised cycle track is typically implemented on high volume urban arterial or collector roadways with high bicycle traffic volumes. Raised cycle tracks are typically raised and curb separated to the level of the adjacent sidewalk or an intermediate level between that and the roadway. The raised cycle track may be designed for one-way or two-way travel and are typically used by both experienced and casual cyclists for utilitarian purposes.

SEPARATED BICYCLE LANE

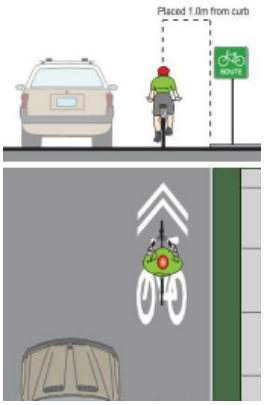
This is a portion of a roadway which has been designated for the exclusive use of cyclists by signage along with a physical or marked buffer. This facility type provides additional spatial or physical separation between motorists and cyclists. A separated bicycle lane, also sometimes referred to as a 'segregated bicycle lane' may be separated by a buffer with hatched pavement markings or by a physical barrier such as a line of bollards, a median or parked vehicles. Physical separation restricts the encroachment of motor vehicle traffic into the separated bicycle lane, and is perceived to create a more secure and comfortable environment for cyclists. It may, however, restrict a cyclist's ability to manoeuvre into or out of the lane midblock. Where a roadway allows on-street parking, the separated bicycle lane may be positioned between the parking lane and the curb. A separated bicycle lane is typically used for utilitarian purposes.



8.2.3 On-Road Cycling Facilities – Shared Space

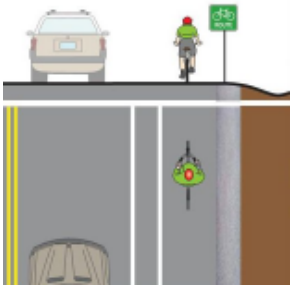
SIGNED BIKE ROUTE

Signed Routes are typically installed on quiet, residential and local or collector streets where motor vehicle traffic volumes and speeds are low. In addition to 'bicycle route' marker signs, shared use lane markings (sharrows) may be applied to guide both motorists and cyclists on relative positioning. Where shared lanes are sufficiently wide for cyclists to ride alongside motorists, sharrows are applied near the curb, otherwise they are placed in the centre of the lane. 'Share the Road' or 'Shared Use Lane Single File' signage may also be installed.



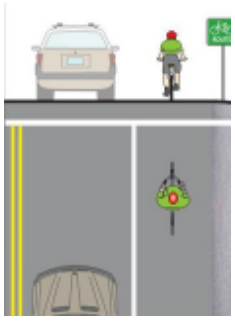
SIGNED BIKE ROUTE WITH PAVED SHOULDER (RURAL)

This is a road with a rural cross section which is signed as a bike route that also includes a paved shoulder. A paved shoulder is a portion of a roadway which is contiguous with the travelled way, and is used to accommodate stopped vehicles, emergency use, pedestrians and cyclists as well as for lateral support of the pavement structure. A paved shoulder on a designated bike route may include a buffer zone to provide greater separation between motorists and cyclists travelling in the same direction.



EDGE LINE / URBAN PAVED SHOULDER

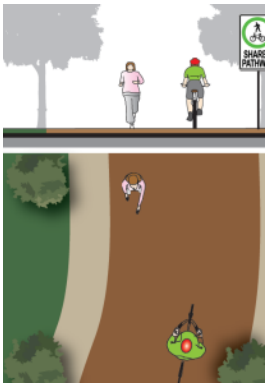
Signed-only Bike Routes in urban areas may be supplemented with edge lines to create urban paved shoulders. These provide cyclists with operating space outside the motor vehicle travelled portion of the roadway without restricting on-street parking. The perceived reduction in width available to the motorist may also have a traffic calming effect. It should be noted that urban paved shoulders are not an alternative to bicycle lanes but may be used on roadways where there is a strong, site specific justification for not implementing conventional bicycle lanes.



8.2.4 Off-Road Cycling Facilities – Separated Space

OFF-ROAD MULTI-USE TRAILS

Off-Road Multi-Use Trails are shared facilities located outside the road right-of-way for use by cyclists and pedestrians. If permitted, multi-use trails may also be used by recreational motorized vehicles. They are typically located in parklands, valley lands, utility corridors and along the alignment of former rail lines.



8.3 The Recommended Cycling and Pedestrian Network

One of the primary objectives of the City of Greater Sudbury Active Transportation Master Plan is to develop a continuous and integrated cycling and pedestrian network of safe recreational and utilitarian routes. It builds upon, connects and supports existing and planned local regional routes and facilities such as the Rainbow Routes and Trans Canada Trail.

The recommended cycling and pedestrian network, as well as the proposed facility types for the City of Greater Sudbury, are illustrated in **Figure 67** and key areas are shown enlarged in:

- **Figure 68**: Cycling and Pedestrian Network Downtown Enlargement;
- **Figure 69**: Cycling and Pedestrian Network New Sudbury Enlargement;
- **Figure 70**: Cycling and Pedestrian Network South End Enlargement;
- **Figure 71**: Cycling and Pedestrian Network Enlargement Areas, including Valley East, Capreol, Azilda, Chelmsford, Garson, Lively, Onaping and Levack.

A summary of the cycling and pedestrian network facility types is provided in **Table 45** below.

Table 45: Facility Type by Distance

Facility Type	Existing (KM)	Proposed (KM)	Total (KM)
Bike Lane	8.6	14.0	**22.6**
Cycle Track	0.0	19.9	**19.9**
Signed Bike Route	0.6	89.5	**90.1**
Signed Bike Route with Paved Shoulder (Rural)	26.4	78.4	**104.8**
Edge line (Urban Paved Shoulder)	0.0	11.3	**11.3**
Multi-Use Trail	102.9	55.4	**158.3**
TOTAL (KM)	**138.6**	**268.5**	**407.1**

8.4 Recommended Phasing / Implementation Strategy

The proposed infrastructure improvements and additions are part of a long-term strategy to improve active transportation infrastructure and develop a cohesive, comprehensive and sustainable network.

The implementation strategy is designed to be fiscally responsible, coordinated with other long-term capital investments as they are scheduled and respectful of the fact that a significant investment is proposed and could take the City many years to complete. It is important to note that the actual phasing of the proposed cycling and pedestrian network will ultimately be determined by the future availability of resources and decisions yet to be taken by the councillors and staff of the City of Greater Sudbury.

The recommended implementation strategy is divided into three phases:

- Short Term (generally 0 – 5 years);
- Medium Term (generally 6 – 10 years); and
- Long Term (generally 11 – 15 years and beyond).

Figure 72 through **Figure 76** illustrate the recommended cycling and pedestrian network by implementation phase.

Figure 67
Greater Sudbury Transportation Study
Recommended 2031
Cycling and Pedestrian Network

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Legend

On-Road Facilities
- Existing Bike Lane
- Proposed Bike Lane
- Existing Signed Bike Route with Paved Shoulder
- Proposed Signed Bike Route with Paved Shoulder
- Existing Signed Bike Route
- Proposed Signed Bike Route
- Proposed Edgeline

Separated Facilities
- Proposed Cycle Track

Off-Road Facilities
- Existing Rainbow Routes
- Existing Multi-Use Trail
- Proposed Multi-Use Trail
- Desired Connections

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- Active Railway
- Abandoned Railway

Under MTO jurisdiction

Final alignment to be determined in conjunction with MTO.

The City should conduct an environmental assessment (EA) to confirm the need for this corridor relative to other options. If identified, the EA would define the corridor for the Southern University Link, in order to facilitate an orderly development plan which is in line with the long term road network concept for the area.

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

N W E S

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0 2 4 8 Kilometres

Figure 68
Cycling and Pedestrian Network
Downtown Enlargement

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Legend

On-Road Facilities
- Existing Bike Lane
- Proposed Bike Lane
- Existing Signed Bike Route with Paved Shoulder
- Proposed Signed Bike Route with Paved Shoulder
- Existing Signed Bike Route
- Proposed Signed Bike Route
- Proposed Edgeline

Separated Facilities
- Proposed Cycle Track

Off-Road Facilities
- Existing Rainbow Routes
- Existing Multi-Use Trail
- Proposed Multi-Use Trail
- Desired Connections

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- Active Railway
- Abandoned Railway

* Consider adding rumble strip between roadway and signed bike route.

DOWNTOWN

NEW SUDBURY CONSERVATION AREA

DELKI DOZZI PARK

BELL PARK

RAMSEY LAKE

JUNCTION CREEK

Bell Park Path - Cycling Path

Jim Gordon Boardwalk - Hiking / Walking Path

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

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N W E S

0 250 500 1,000 Metres

Figure 69
Cycling and Pedestrian Network
New Sudbury Enlargement

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Official Plan Review • Révision du Plan officiel

Legend

On-Road Facilities
- Existing Bike Lane
- Proposed Bike Lane
- Existing Signed Bike Route with Paved Shoulder
- Proposed Signed Bike Route with Paved Shoulder
- Existing Signed Bike Route
- Proposed Signed Bike Route
- Proposed Edgeline

Separated Facilities
- Proposed Cycle Track

Off-Road Facilities
- Existing Rainbow Routes
- Existing Multi-Use Trail
- Proposed Multi-Use Trail
- Desired Connections

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- Active Railway
- Abandoned Railway

* Consider adding rumble strip between roadway and signed bike route.

MALEY CONSERVATION AREA

NICKELDALE CONSERVATION AREA

NEW SUDBURY CONSERVATION AREA

As an interim solution, consider a one-way cycling path in the boulevard on each side of the road, in the existing service strip. Long term, consider adding cycle tracks.

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

NEW SUDBURY

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NEW SUDBURY

0 255 510 1,020 Metres

Figure 70
Cycling and Pedestrian Network
South End Englargement

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Legend

On-Road Facilities
- Existing Bike Lane
- Proposed Bike Lane
- Existing Signed Bike Route with Paved Shoulder
- Proposed Signed Bike Route with Paved Shoulder
- Existing Signed Bike Route
- Proposed Signed Bike Route
- Proposed Edgeline

Separated Facilities
- Proposed Cycle Track

Off-Road Facilities
- Existing Rainbow Routes
- Existing Multi-Use Trail
- Proposed Multi-Use Trail
- Desired Connections

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- Active Railway
- Abandoned Railway

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

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N W E S

0 250 500 1,000 Metres

Figure 71
Cycling and Pedestrian Network
Enlargement Areas

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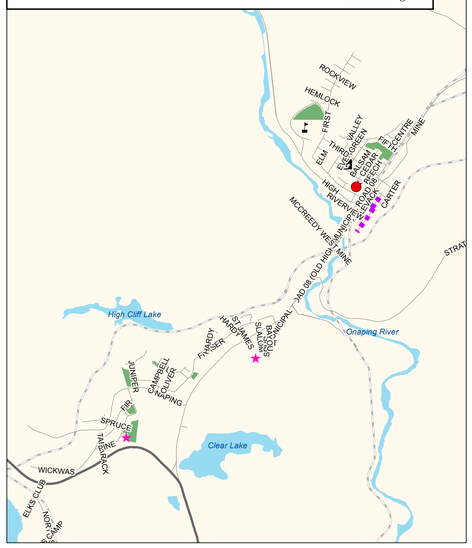
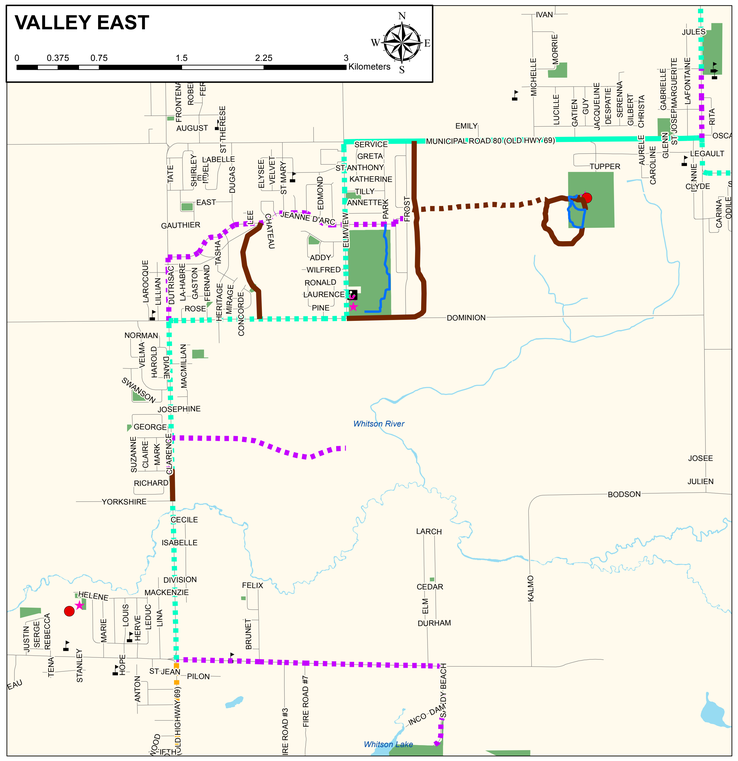
ONAPING & LEVACK

0 0.375 0.75 1.5 2.25 3 Kilometers



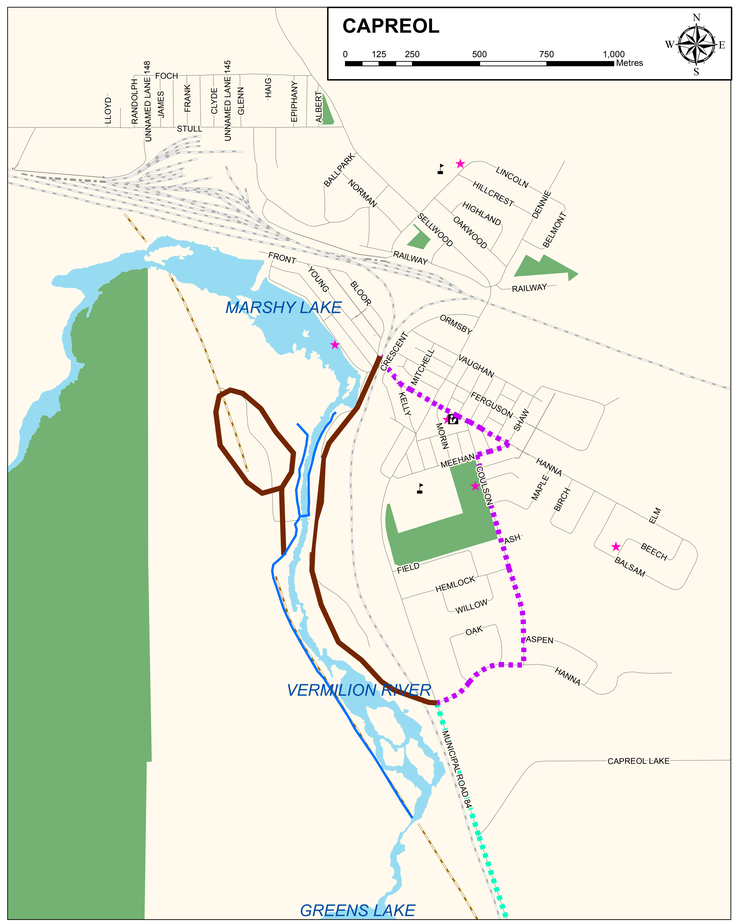
VALLEY EAST

0 0.375 0.75 1.5 2.25 3 Kilometers



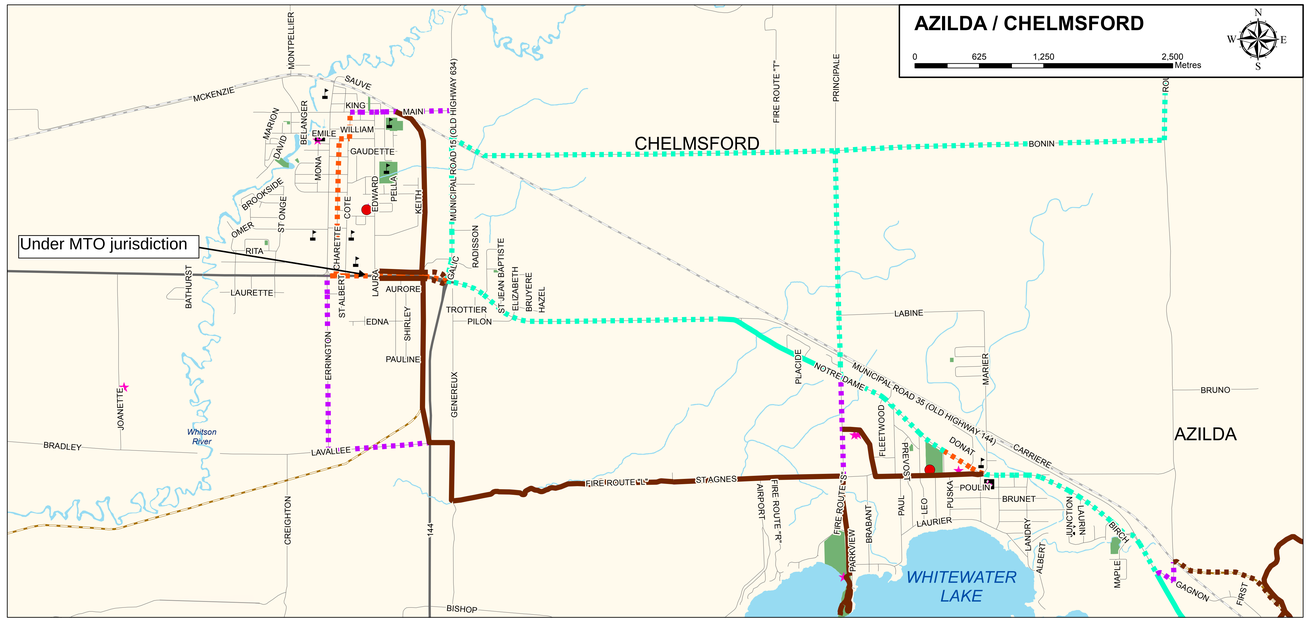
CAPREOL

0 125 250 500 750 1,000 Metres



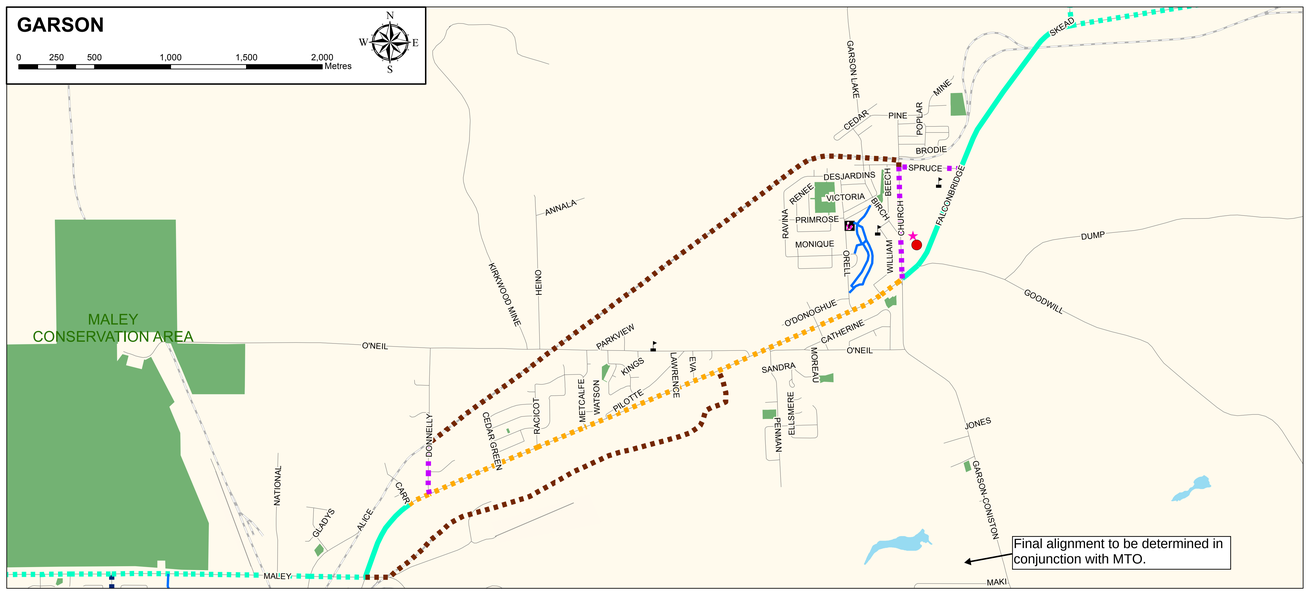
AZILDA / CHELMSFORD

0 625 1,250 2,500 Metres



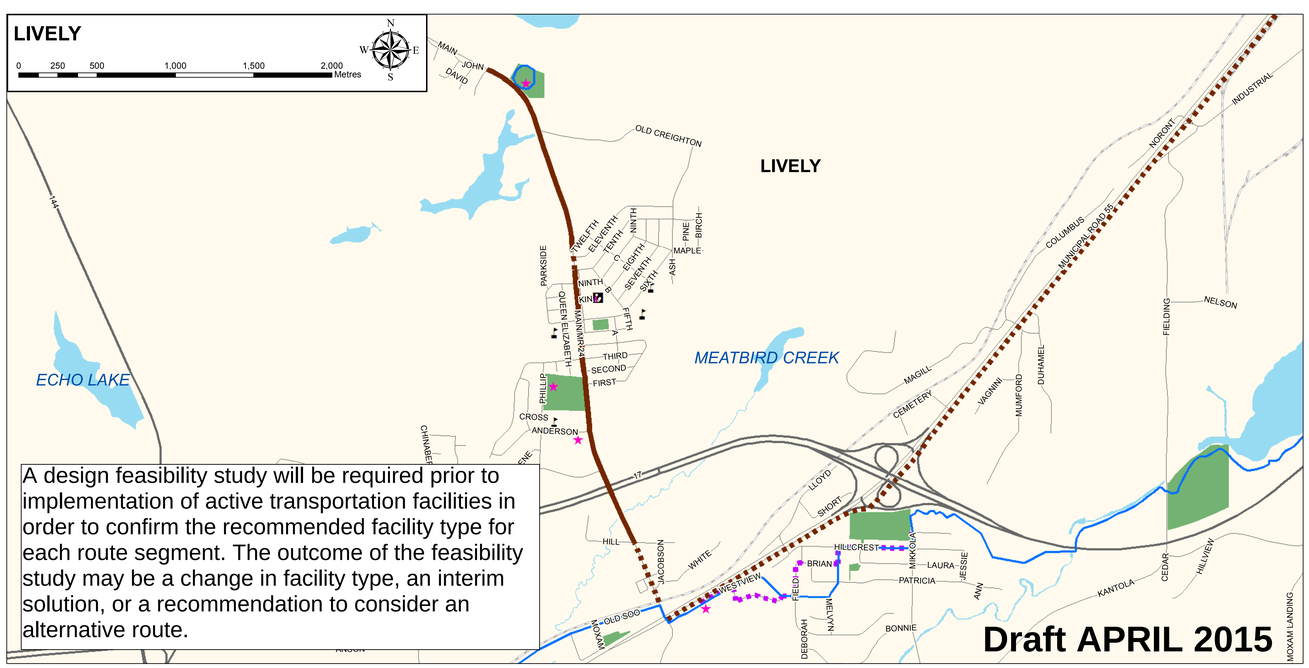
GARSON

0 250 500 1,000 1,500 2,000 Metres



LIVELY

0 250 500 1,000 1,500 2,000 Metres



A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

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Legend

On-Road Facilities
- Existing Bike Lane
- Proposed Bike Lane
- Existing Signed Bike Route with Paved Shoulder
- Proposed Signed Bike Route with Paved Shoulder
- Existing Signed Bike Route
- Proposed Signed Bike Route
- Proposed Edgeline

Separated Facilities
- Proposed Cycle Track

Off-Road Facilities
- Existing Rainbow Routes
- Existing Multi-Use Trail
- Proposed Multi-Use Trail
- Desired Connections

Regional Trails and Routes
- Trans Canada Trail

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- Active Railway
- Abandoned Railway

* Consider adding rumble strip between roadway and signed bike route.

Figure 72
Cycling and Pedestrian Network Phasing

Revisit. Review. Revise.
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Legend

Network Phasing
- Existing
- Phase 1 (0 - 5 Years)
- Phase 2 (6 - 10 Years)
- Phase 3 (11 - 15+ Years)

Destinations
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Provincial Road / Highway
Local Road
Active Railway
Abandoned Railway

Other
- Lakes and Rivers
- Parks and Conservation Areas

* Consider adding rumble strip between roadway and signed bike route.

Under MTO jurisdiction

The City should conduct an environmental assessment (EA) to confirm the need for this corridor relative to other options. If identified, the EA will define the corridor for the Southern University Link, in order to facilitate an orderly development plan which is in line with the long term road network concept for the area.

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N W E S

0 2 4 8 Kilometres

Figure 73
Cycling and Pedestrian Network
Phasing Downtown Enlargement

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Legend

Network Phasing
- Existing
- Phase 1 (0 - 5 Years)
- Phase 2 (6 - 10 Years)
- Phase 3 (11 - 15+ Years)

Destinations
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- In-Use Railway
- Abandoned Railway

* Consider adding rumble strip between roadway and signed bike route.

NEW SUDBURY CONSERVATION AREA

DOWNTOWN

DELKI DOZZI PARK

BELL PARK

Bell Park Path - Cycling Path

Jim Gordon Boardwalk - Hiking / Walking Path

RAMSEY LAKE

JUNCTION CREEK

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

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N W E S

0 250 500 1,000 Metres

Figure 74
Cycling and Pedestrian Network
Phasing New Sudbury Enlargement

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Legend

Network Phasing
- Existing
- Phase 1 (0 - 5 Years)
- Phase 2 (6 - 10 Years)
- Phase 3 (11 - 15+ Years)

Destinations
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- In-Use Railway
- Abandoned Railway

* Consider adding rumble strip between roadway and signed bike route.

MALEY CONSERVATION AREA

NICKELDALE CONSERVATION AREA

NEW SUDBURY CONSERVATION AREA

As an interim solution, consider a one-way cycling path in the boulevard on each side of the road, in the existing service strip. Long term, consider adding cycle tracks.

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

NEW SUDBURY

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NEW SUDBURY

N W E S

0 255 510 1,020 Metres

Figure 75
Cycling and Pedestrian Network
Phasing South End Enlargement

Revisit. Review. Revise.
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Legend

Network Phasing
- Existing
- Phase 1 (0 - 5 Years)
- Phase 2 (6 - 10 Years)
- Phase 3 (11 - 15+ Years)

Destinations
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- In-Use Railway
- Abandoned Railway

A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

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N W E S

0 250 500 1,000 Metres

Figure 76
Cycling and Pedestrian Network Phasing Enlargement Areas

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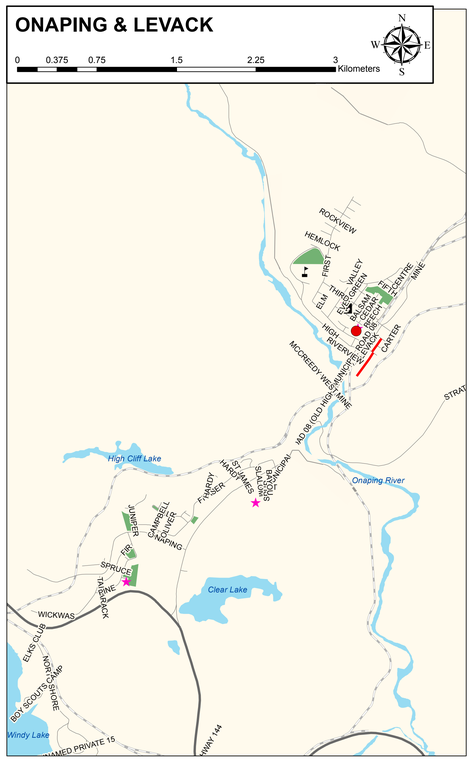
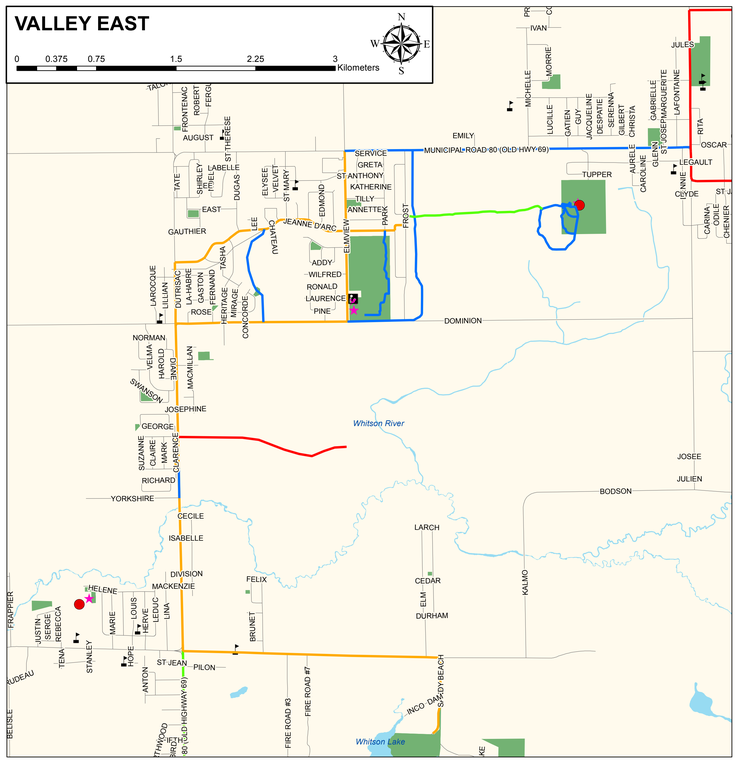
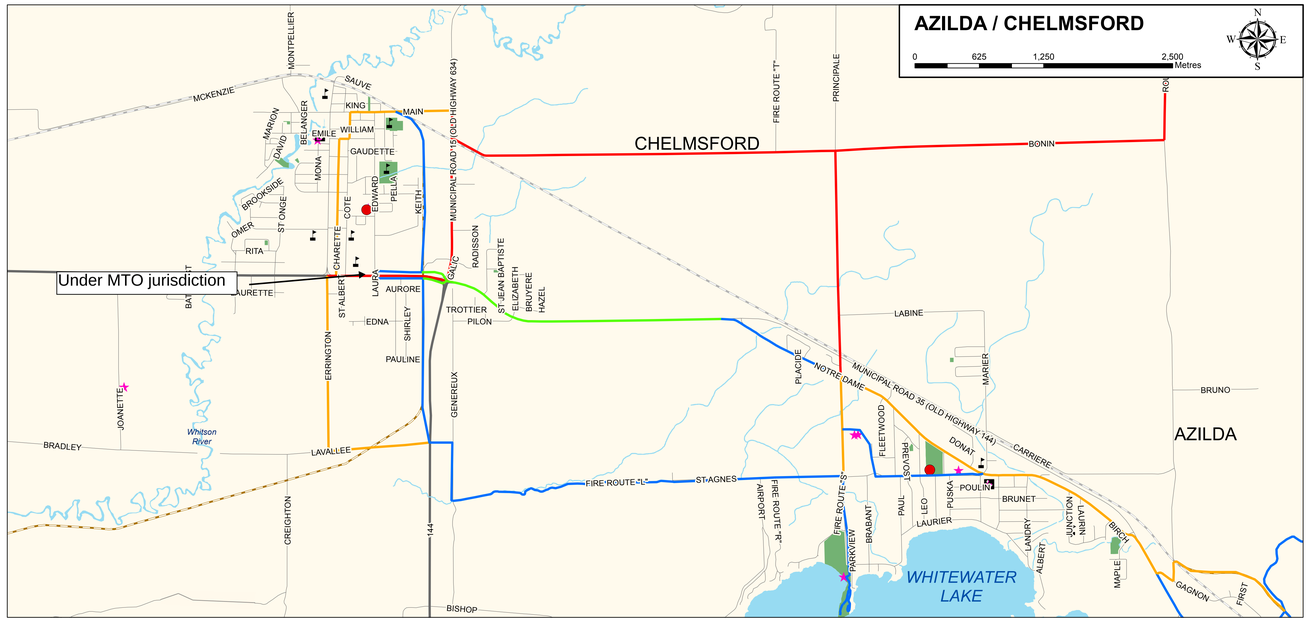
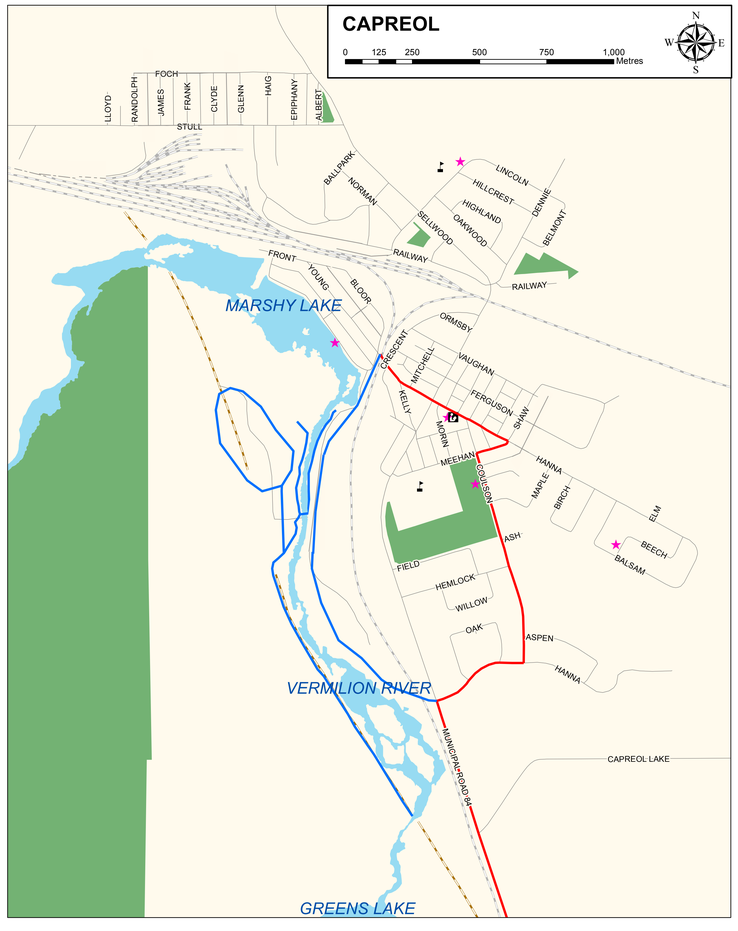
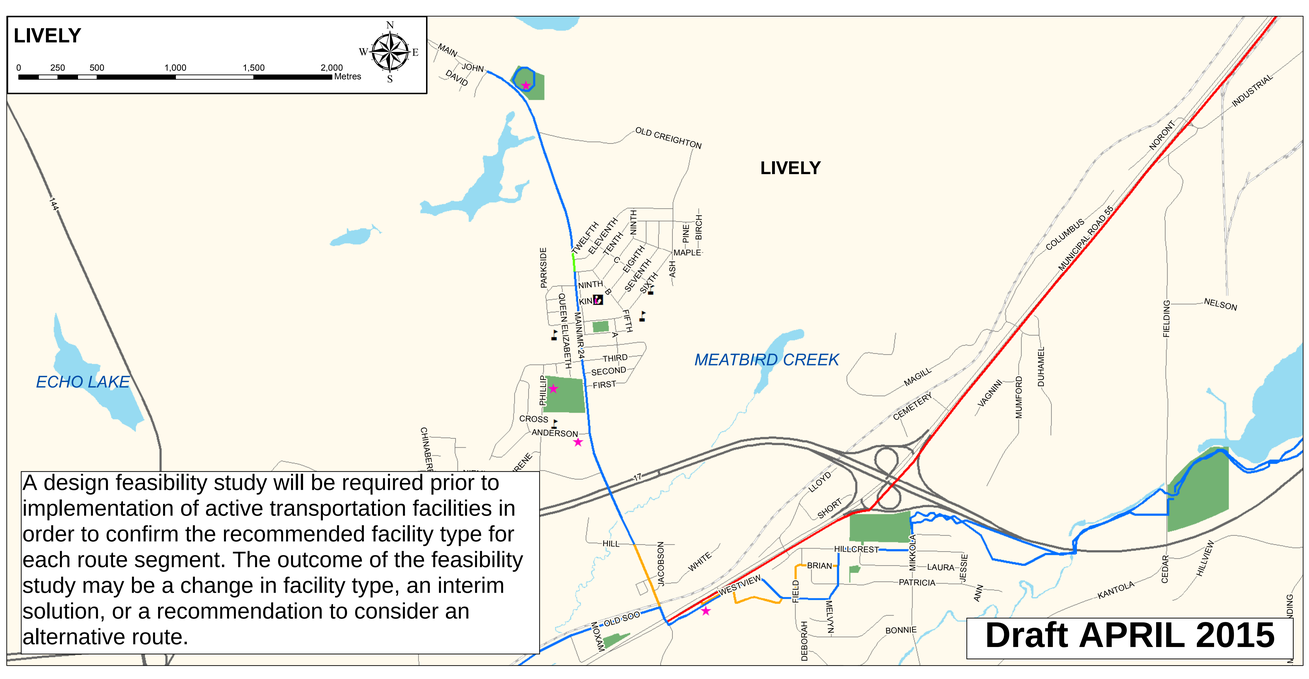










A design feasibility study will be required prior to implementation of active transportation facilities in order to confirm the recommended facility type for each route segment. The outcome of the feasibility study may be a change in facility type, an interim solution, or a recommendation to consider an alternative route.

Draft APRIL 2015

Legend

Network Phasing
- Existing
- Phase 1 (0 - 5 Years)
- Phase 2 (6 - 10 Years)
- Phase 3 (11 - 20+ Years)

Destinations
- Arena / Community Centre
- College/University
- Schools
- Libraries
- Tourist Attractions
- Parks and Conservation Areas

Other
- Lakes and Rivers
- Provincial Road / Highway
- Local Road
- In-Use Railway
- Abandoned Railway

* Consider adding rumble strip between roadway and signed bike route.

8.4.1 Establishing Priorities

An efficient reporting and implementation structure is vital to ensure that the decision-making process associated with the cycling and pedestrian network is managed effectively and all relevant City and local departments are appropriately engaged. The suggested structure for managing and implementing the cycling and pedestrian network would see interaction between the Roads and Transportation Services Department and Community and Strategic Planning Department as well as interaction with groups outside of the City departments, such as the Sustainable Mobility Advisory Panel, the Rainbow Routes Association, the Trans Canada Trail Organization, Sudbury and District Public Health Unit and the Greater Sudbury Police.

Roles & Responsibilities:

- A core team will be formed by the City's Community and Strategic Planning Services as well as the Roads and Transportation Services. This team would be responsible for overseeing recommendations made regarding funding and priorities as well as other active transportation-related initiatives; and
- A group of additional committee members including local agencies and organizations have been identified who will be responsible for presenting the trail and active transportation related ideas from the community.

8.4.2 Implementation Recommendations

Table 46: Recommendations and Timelines for Implementation of the AT Network

	Recommendation	Timeline
1	The City of Greater Sudbury should adopt the AT network implementation plan and use it to guide the implementation of the network over time.	Short term / ongoing
2	The City of Greater Sudbury should take the lead in establishing an Inter-Municipal Active Transportation Working Group including but not limited to staff representatives from the City, Sudbury District Public Health Unit and other key agencies as determined.	Short term
3	The City of Greater Sudbury should continue to work with representatives from local advocacy groups, citizens-at-large, local businesses and other key groups as determined to further active transportation goals and objectives.	Short term
4	The City of Greater Sudbury should coordinate the AT network implementation with the City's Roads and Transportation Services Department as well as the Community and Strategic Planning Department and other Departments.	Short term / ongoing
5	The City of Greater Sudbury should explore the development of the role of an Active Transportation coordinator who would be responsible for the "championing" of AT related issues, initiatives and programming throughout the City. This role could be a new full-time position at the City.	Short term
6	The Active Transportation Coordinator would be responsible for the implementation of the AT network and would provide updates on the progress of the study when necessary to stakeholders and interest groups.	Short term / ongoing
7	The AT Plan should be reviewed and given consideration when road improvements and other capital infrastructure projects are programmed.	Short term
8	As an interim solution in advance of future road improvements to install cycle tracks, the City of Greater Sudbury should modify current by-laws to continue to restrict cycling on sidewalks for adults but not prohibiting cycling on paved portions of boulevards where it is safe to do so.	Long term
9	As part of demonstrating leadership, the City should provide bicycle parking facilities at public buildings under their ownership.	Short term
10	The City, in partnership with local partners should investigate the potential to develop a bicycle parking program whereby bicycle racks would be installed in locations where there is a demonstrated need for bicycle parking facilities.	Short term
11	The City should adopt the proposed network phasing strategy as the guide for implementing the AT network.	Short term
12	In addition to capital funding, the City of Greater Sudbury should explore other outside partnerships, cost-sharing and funding opportunities for the implementation of the AT Network.	Short term
13	The City of Greater Sudbury should recognize that future refinement of the proposed AT network will be required. This is consistent with a goal of ensuring that the plan is flexible and can respond to changes and new opportunities.	Short to medium term

9 POLICIES TO SUPPORT THE PREFERRED TRANSPORTATION ALTERNATIVE

A number of policies have been developed as part of the Transportation Study Report to help facilitate the development of a more interconnected, multi-modal transportation network in the city. These policies support the preferred transportation alternative and include:

- Complete Streets;
- Road Classifications;
- Appropriate Implementation of Urban Cross Sections; and
- Sidewalk Priority.

Each of these policies is described in more detail below.

9.1 Complete Streets

The concept of 'Complete Streets', introduced in **Section 1.4**, focuses on the design, construction and maintenance of a street for all modes of transportation and all users. Although the benefits of complete streets vary by travel mode and user, they:

- Provide appropriate facilities for cars, trucks, transit, cyclists and pedestrians;
- Are safer for all users;
- Support liveable communities;
- Bring positive impacts for public health; and
- Induce economic benefits as people are attracted there.

9.1.1 Purpose and Goals

The purpose of this policy is for the City to embrace the concept of complete streets and meet the following three goals:

- Ensure that the needs of all transportation users are balanced throughout the surface transportation network;
- Create a balanced, comprehensive, integrated, fully interconnected, functional and visually attractive surface transportation network; and
- Encourage the use of the appropriate Complete Streets design standards, principles, policies and guidelines within the context of the community.

9.1.2 Policy Directions

The policy direction for the City of Greater Sudbury is to plan, design, construct, operate and maintain the transportation network to accommodate each mode of transportation and all types of system users. It should be consistent with and supportive of the local community, recognizing that all streets are different and that the needs of various users should be balanced in a flexible manner. Additional policy directions include:

- Transportation infrastructure making up the network, such as: roadways, sidewalks, street crossings, pedestrian signals, signs, street furniture, transit stops and associated infrastructure, bicycling facilities, multi-use trails and connections shall be planned, designed, constructed, operated and maintained for all transportation users.
- The planning and design of street projects will consider bicycle, pedestrian and transit facilities from the very start of the planning and design work. This will apply to all roadway projects, including those involving new construction, reconstruction, re-paving or rehabilitation of transportation infrastructure.

- Where not all users can be accommodated, reasonable efforts shall be made to identify adjacent alternative routes or methods of travel to form a safe, reliable, integrated and interconnected transportation network.
- The implementation of this policy shall reflect the context and character of the surrounding built and natural environments, enhancing their appearance. Reasonable efforts should be made to avoid and minimize impacts on those features.
- The design and development of transportation infrastructure shall be in accordance with appropriate City ordinances, codes, plans, polices and guidelines.

9.2 Road Classifications

Greater Sudbury presently has five road classifications: primary, secondary and tertiary arterial roads, collector roads and local roads. Proposed road classification criteria are provided in **Table 47**. Historically, the criteria for road classification have been based on three main elements; the function of the road and its role in facilitating vehicle travel between points of origin and destination (roadway service function), land access, and vehicle traffic flow characteristics.

9.2.1 Revised Classification – Focus on Complete Streets

In line with the vision for Complete Streets that are designed, built, maintained and operated for all modes of transportation and for all types of users, we recommend that these existing road classifications be slightly modified and also expanded to include transit, cycling and pedestrian travel modes. The road classification table has been expanded to include three new columns for provision related to transit, cycling and pedestrians, respectively.

Right-of-way widths have been revised to better define the classifications by narrowing the width to what is available today as well as what is considered to be needed in the future.

In the Transit Provision column, bus services should be considered on all except local roads. This may take the form of a rapid bus service that stops at major intersections only and may have one kilometre or more between stops, or a local bus service that would be expected to provide service at every intersection. Heavily traveled bus routes could have a combination of rapid bus and local bus service.

On secondary and tertiary arterials with a daily traffic volume in excess of 15,000 vehicles, a separated cycling facility such as a cycle track, separated bike lane or in-boulevard facility is suggested; if these are not feasible, alternate routes should be investigated. On secondary and tertiary arterials with fewer than 15,000 vehicles a day, designated cycling operating space, such as a conventional bike lane or paved shoulder, may be sufficient.

In urban areas, sidewalks should be provided on both sides of the road for arterial and collector roads and at least one side of local roads. Please refer to the sidewalk priority criteria outlined in **Section 9.4** for more details on how to prioritize constructing new sidewalks to fill in missing links in the urban sidewalk network.

One of three categories of cycling facility type has been included with representative examples of facilities for each road classification under the Cycling Provision column. The facility types include:

- Separated Facility or Alternate Routes;
- Designated Cycling Operating Space; or
- Shared Roadway.

The facility type is based on the average annual daily traffic and the design speed of the road. The nominated facility types and examples are the first step in a selection process. These are provided for general guidance in the road classification scheme. The suitability of cycling facility types for any given road should be assessed on a case by case basis to reflect context sensitive conditions.

It should be recognized that bicycles are vehicles under the Highway Traffic Act and are therefore permitted on all public roads unless restricted by the Ministry of Transportation or by a municipal bylaw. Consequently, accommodation of cycling on roads of all classifications should be considered, even when a desired facility type for specific class of roadway is not practical. For example, if a separated bike lane is suggested for a specific road class, but existing conditions reduce the feasibility of implementing this type of facility, other facility types may be considered in an effort to improve conditions for cycling. These may include a conventional bike lane, an in-boulevard active transportation path or wide curb lanes with sharrows combined with bike route signing depending on the characteristics of the route. Safety should always be a key determining factor, hence it is recommended not to formally designate and promote a bike route along arterial road classes that cannot accommodate an appropriate facility type for the context assessed.

All road classifications include sidewalks in the Pedestrian Provision column. On the higher order roads, such as primary arterials, or on any type of road in rural locations, sidewalks may not be appropriate. However, in urban areas where development is present sidewalks on both sides of the road are appropriate in order to create a complete street that provides transportation infrastructure for all road users, including pedestrians.

Table 47: Proposed Road Classifications

Class of Road	Function	Access	Right-of-Way Width (Metres)	Daily Traffic Volume	Design Speed (Kilometres per hour)	Minimum Intersection Spacing (Metres)	Other Regulations	Transit Provision	Potential Cycling Provision	Pedestrian Provision
Primary Arterial	• Connect the City with other major centres outside the City and/or separate communities within the City • Facilitate long distance person or goods movement travel through the City or between major activity areas within the City • Traffic movement primary consideration.	• Intersections with other arterial roads or collector roads • Driveways to major regional activity centres	35-45 in urban areas 45-90 in rural areas	15,000 – 50,000	60 – 100	400	• No on-street parking • Buffers between the roadway and adjacent uses in rural areas	Considered/ Reviewed for Bus service	Separated Facility or Alternate Routes[1] in urban areas Buffered paved shoulders in rural areas	Sidewalks on both sides of the road in urban areas
Secondary Arterial	• Connect two or more communities or major activity centres • Connect two primary arterial roads • Connect a community or activity centre with a primary arterial road • Traffic movement primary consideration.	• Intersection with other roads • Access from adjacent property strictly regulated and kept to a minimum	30-36	5,000 – 35,000	50 – 80	200	• No on street parking	Considered/ Reviewed for Bus service	Separated Facility / Alternate Route for roads with AADT greater than or equal to 15,000[1] Designated Cycling Operating Space for roads with AADT less than 15,000[2]	Sidewalks on both sides of the road in urban areas
Tertiary Arterial	• Connect small / rural communities • Connect communities to primary or secondary arterial roads	• Intersections with other roads • Access from adjacent property strictly regulated and kept to a minimum	30-36	5,000 – 15,000	50 – 80	200	• No on street parking	Considered/ Reviewed for Bus service	Separated Facility / Alternate Route for roads with AADT greater than or equal to 15,000[1] Designated Cycling Operating Space for roads with AADT less than 15,000[2]	Sidewalks on both sides of the road in urban areas
Collector	• Connect properties within neighbourhoods • Connect a neighbourhood with an arterial road • Provide direct access to adjacent lands	• Intersections with other roads • Regulated access from adjacent property	20 – 30	1,000 – 12,000	50 – 70	60	• On street parking may be permitted	Considered/ Reviewed for Bus service	Designated Cycling Operating Space[2]	Sidewalks on both sides of the road in urban areas
Local	• Provide direct access to adjacent lands • Connect properties within a neighbourhood to collector roads	• Intersections with collectors or other local roads • Access from adjacent property permitted	+ / - 20	Less than 1,000	30 – 50	60	• On-street parking is generally permitted • Goods movement restricted except for that having origin or destination along the road	Generally no regularly scheduled transit service	Shared Roadway[3]	Sidewalks on at least one side of the road in urban areas

1. Options may include: buffered paved shoulders in rural areas; active transportation path in rural or urban areas; separated bicycle lanes / cycle tracks in urban areas; or alternate route
2. Options may include: paved shoulders or buffered paved shoulders in rural areas; exclusive bicycle lanes or separated bicycle lanes / cycle tracks in urban areas
3. Options may include: shared lane markings (rural or urban areas); standard or wide curb lanes (rural or urban areas)

9.2.2 Road Cross Sections

New road cross sections for each road classification have been prepared to illustrate how the concept of Complete Streets can be applied to roads in Greater Sudbury. Pedestrian and cycling facilities have been shown for each classification. Road cross sections are provided in:

- **Figure 77**: Proposed Primary Arterial Road Cross Sections;
- **Figure 78**: Proposed Urban Secondary or Tertiary Arterial Road Cross Section;
- **Figure 79**: Proposed Rural Secondary or Tertiary Arterial Road Cross Section; and
- **Figure 80**: Proposed Collector Road Cross Section.

9.2.3 Reassignment of Roads to Classifications

As part of the process of revising the road classifications to incorporate Complete Streets, the current classification of roads also was reviewed to determine whether the classification met the road's intended function. In two cases, changes were made to the road classification. These include:

- New Collector Roads
    - Montrose Avenue (from Secondary Arterial)
    - Elmview Drive (from Tertiary Arterial)

Montrose Avenue presently functions as a collector road in a residential neighbourhood. It is planned to be connected to the Maley Drive extension. Even after this new connection, the road would continue to function as a collector road. The reassignment of this road to the Collector Road classification meets the current and planned use of the road.

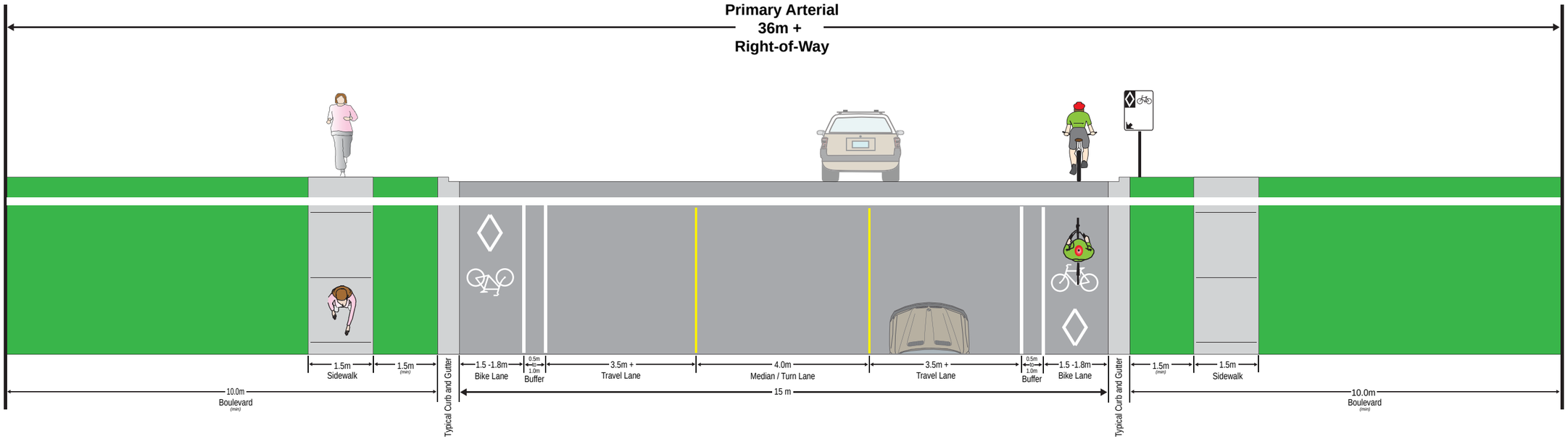
Elmview Drive is constructed with an urban cross section. This road was reclassified as a Collector Road as it primarily acts to collect traffic from residential streets in Val Therese.

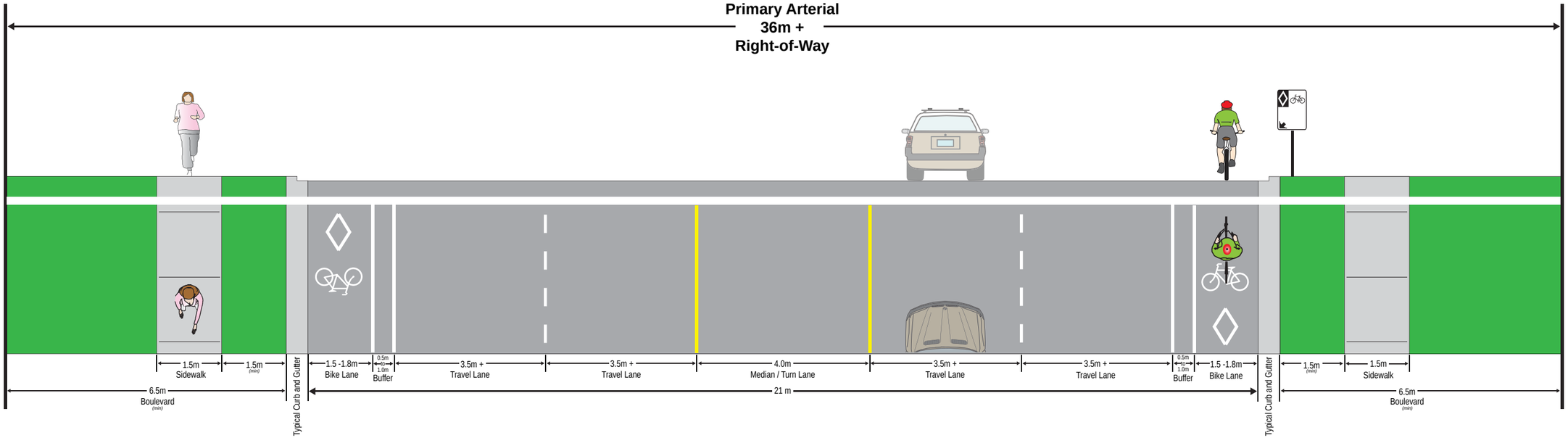
A revised road classifications map is shown in **Figure 81**.

Proposed Primary Arterial Road Cross Sections - AADT < 15,000

Figure 77

Function	Access	Right-of-Way Width (m)	Addition / Subtraction
• Connect the City with other major centres outside the City and/or separate communities within the City • Facilitate long distance person or goods movement travel through the City or between major activity areas within the City • Traffic movement primary consideration	• Intersections with other arterial roads or collector roads • Driveways to major regional activity centres	36+	





Scale - 1:100
(Tabloid)

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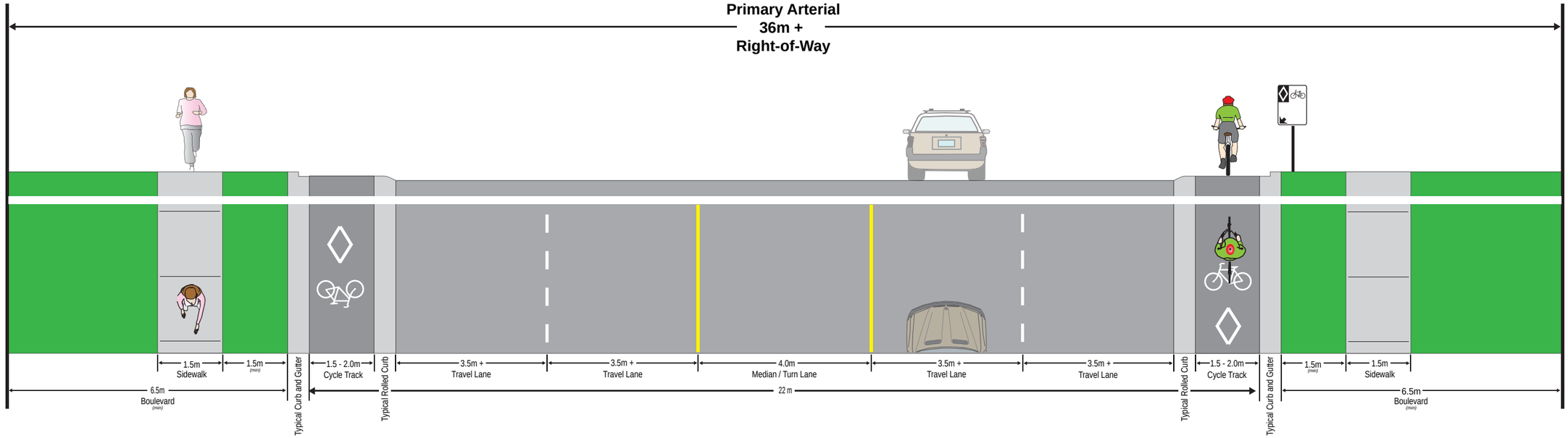
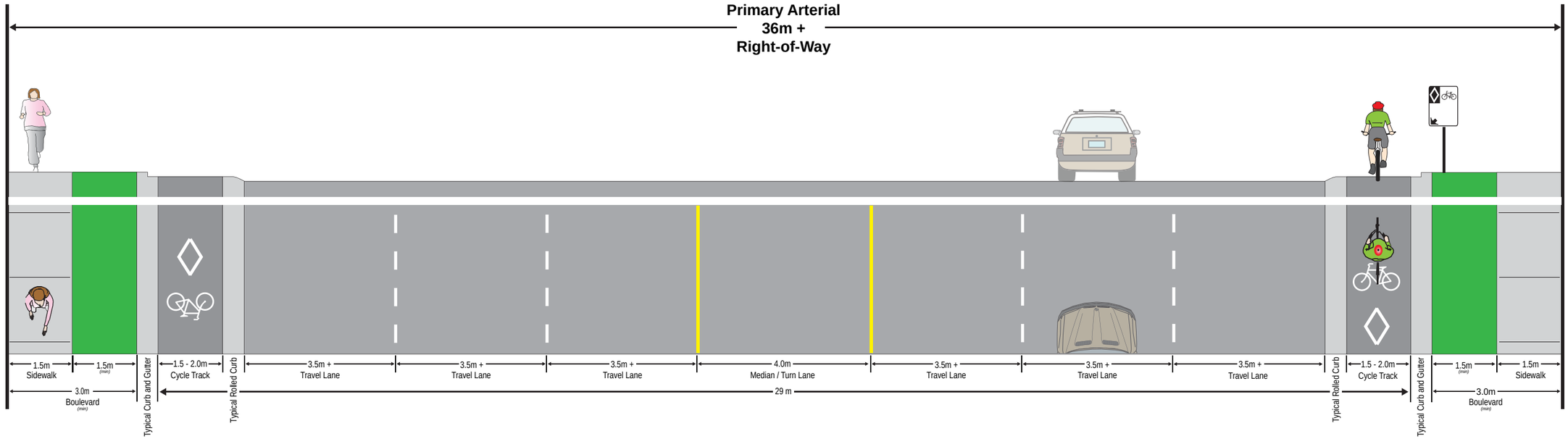
Function	Access	Right-of-Way Width (m)	Addition / Subtraction
• Connect the City with other major centres outside the City and/or separate communities within the City • Facilitate long distance person or goods movement travel through the City or between major activity areas within the City • Traffic movement primary consideration	• Intersections with other arterial roads or collector roads • Driveways to major regional activity centres	36+	





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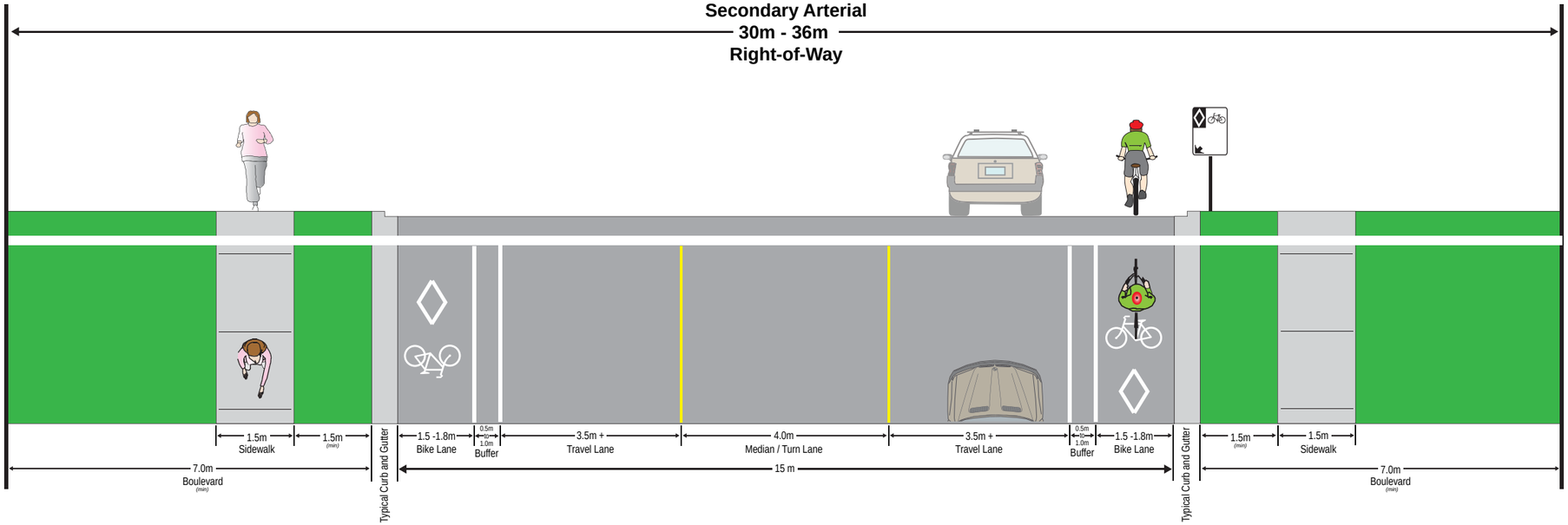
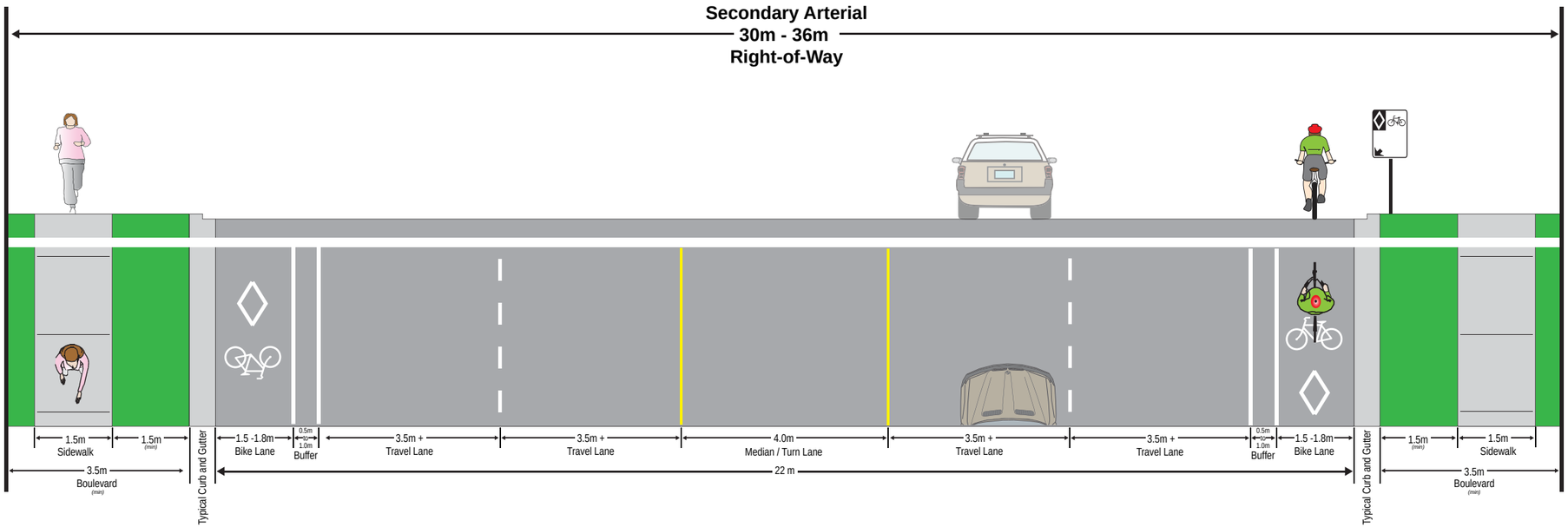
Proposed Urban Secondary or Tertiary Arterial Road Cross Sections

Figure 78

Function	Access	Right-of-Way Width (m)	Addition / Subtraction
• Connect two or more communities or major activity centres • Connect two primary arterial roads • Connect a community or activity centre with a primary arterial road • Traffic movement primary consideration	• Intersections with other roads • Access from adjacent property strictly regulated and kept to a minimum	30-36 (Urban Area)	• Montrose Avenue *(to Collector Road)* • Elmview Drive *(to Collector Road)*





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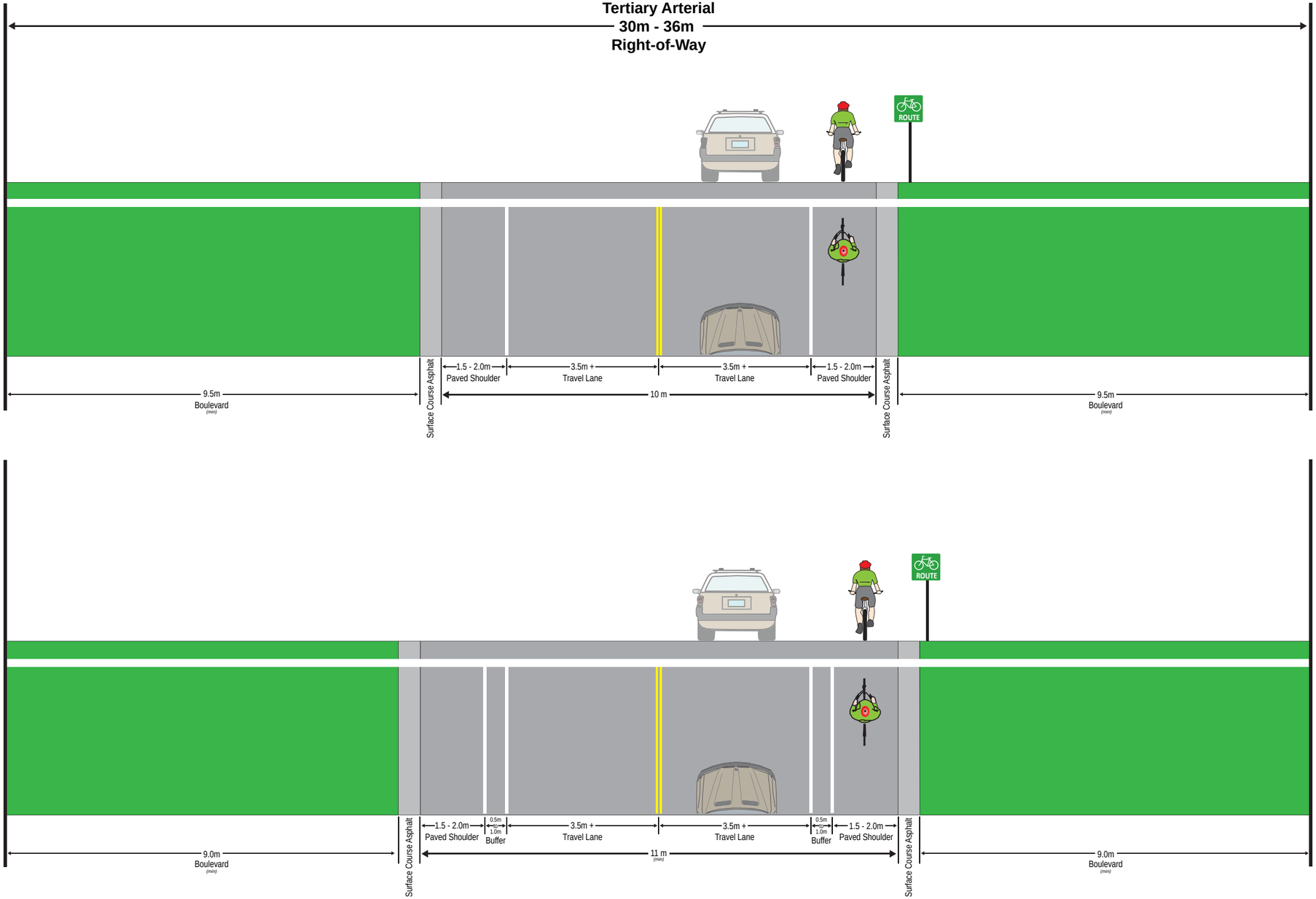
MMM GROUP

Proposed Rural Secondary or Tertiary Arterial Road Cross Sections

Figure 79

Function	Access	Right-of-Way Width (m)	Addition / Subtraction
• Connect small / rural communities • Connect communities to primary or secondary arterial roads	• Intersections with other roads • Access from adjacent property strictly regulated and kept to a minimum	30-36 (Rural Area)	



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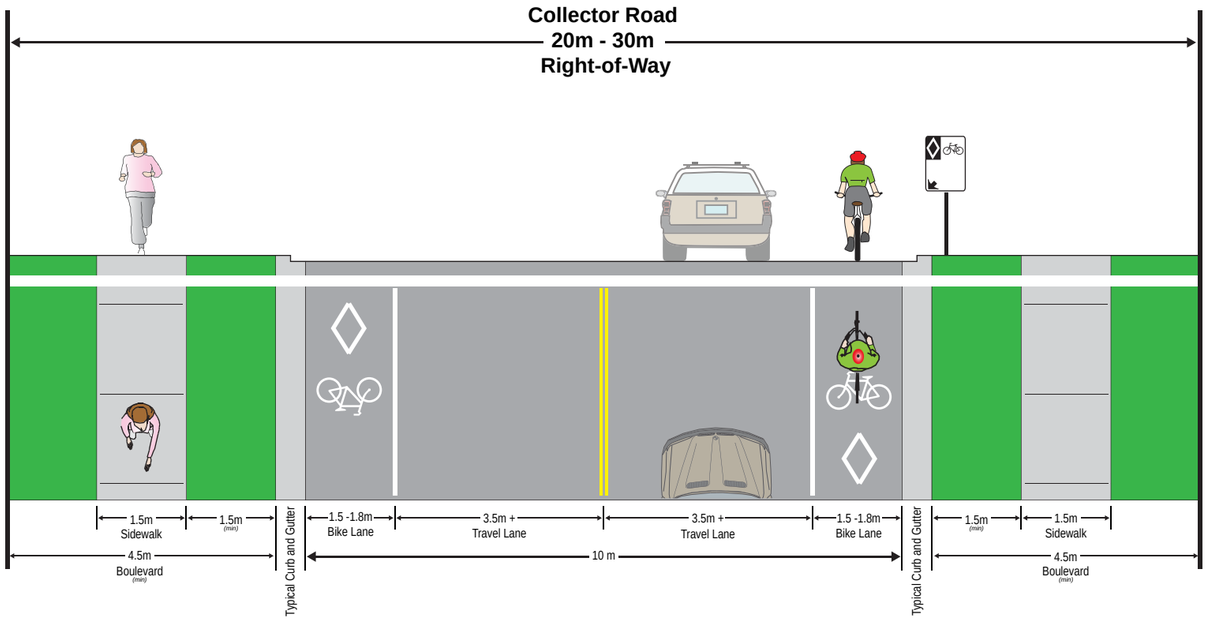
MMM GROUP

Proposed Collector Road Cross Sections

Figure 80

Function	Access	Right-of-Way Width (m)	Addition / Subtraction
• Connect properties within neighbourhoods • Connect a neighbourhood with an arterial road • Provide direct access to adjacent lands	• Intersections with other roads • Regulated access from adjacent property	20-30	• Montrose Avenue *(from Secondary Arterial)* • Elmview Drive *(from Tertiary Arterial)*



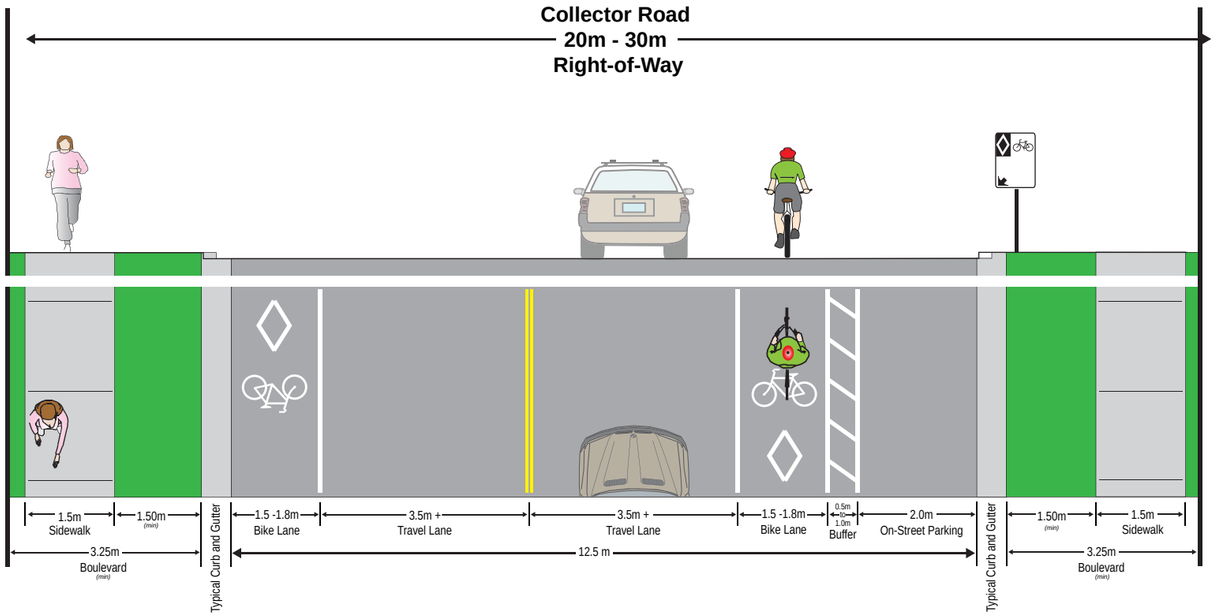


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Figure 81
Greater Sudbury Transportation Study
Revised Road Classification Map

Revisit. Review. Revise.
Revisitez. Réexaminez. Révisez.
Official Plan Review • Révision du Plan officiel

Legend

Existing Road Classification
- Existing Roads
- Existing Provincial Road / Highway

Other
- Lakes and Rivers
- Parks and Conservation Areas
- Active Railway
- Abandoned Railway

Road Classification
- Existing Roads
- PRIVATE_ROAD_CL
- Proposed Road
- Primary
- Secondary
- Tertiary
- Collector
- Bicycle Path

Draft APRIL 2015

N W E S

0 2.5 5 10 Kilometres

9.3 Appropriate Implementation of Urban Cross Sections

The conversion from rural to urban roadway cross sections is important to sustainable mobility in the City of Greater Sudbury. This will help the City achieve the goal of constructing Complete Streets that are designed, built, operated and maintained for all types of transportation and for all types of transportation network users. In addition to travel lanes for vehicles, the conversion from rural to urban cross sections provides the opportunity for the City to supply transportation infrastructure for all other transportation modes and all transportation system users, such as:

- Bus stops and bus lay-bys for transit;
- On- or off-street cycling lanes for cyclists; and
- Sidewalks for pedestrians.

To conform to the Official Plan, cross sections should only be converted in land use areas designated as 'Living Area', 'Employment Area' or 'Industrial Area.' These areas are fully-serviced by municipal sewer and water and are the primary focus of residential development. They also include the majority of the designated employment areas. The non-urban settlements, as well as the rural and waterfront areas, are typified by low density development. In many cases, the City does not currently, or plans to, provide infrastructure services for these areas and rural cross sections are expected to remain.

9.3.1 Criteria for Rural to Urban Conversion

The justification for road segments to be converted from rural to urban cross sections can be evaluated using a series of criteria, including:

- land use of the nearby area and associated pedestrian trips;
- high average annual daily traffic (AADT) values, since this can pose a safety concern for pedestrians;
- bus routes which, even when passing through an area with few pedestrian attractors, should be accessible by potential passengers without the need to walk in the roadway;
- nearby existing sidewalks and curbed segments; and
- the installation of non-transportation related infrastructure to expand a utility network or convey a water course, for example.

9.4 Sidewalk Priority

The provision of sidewalks on both sides of urban roads is significant for sustainable mobility in the City of Greater Sudbury and will help the City achieve the goal of constructing 'Complete Streets' that are designed, built, operated and maintained for users of all types of transportation, including pedestrians.

9.4.1 Criteria for High Priority Road Segments for Sidewalk Implementation

Several factors should be considered to determine whether conversion to an urban cross section alone may not be sufficient and sidewalk implementation may be warranted. These include:

- identification as a link for the provision of pedestrian or cycling facilities as part of the development of the active transportation network;
- the formal classification of the road, such as arterial, collector or local;

- the proximity to, and potential connectivity between, generators of pedestrian traffic such as hospitals, libraries, transit terminals, retirement or nursing homes, high-density housing, tourist attractions, arenas or places of work;
- the degree of commercial land use in the area;
- existing or proposed bus routes along or bisecting the segment, where providing safe access for potential passengers will encourage more people to take transit;
- the proportion of local residents who are seniors or belong to other vulnerable groups and who, compared to residents of other areas, are less agile as pedestrians and less likely to have access to an automobile;
- the distance from an elementary, secondary, or post-secondary school, which is inversely proportional to the number of children to be expected and the resultant need to separate pedestrians from traffic;
- the presence of nearby public green spaces;
- the potential of a new link to reduce local automobile trips undertaken due to its impact on cutting walking distances to nearby attractors;
- whether the link will complete an otherwise continuous sidewalk or create an isolated segment;
- the number of alternative connections with a reasonable degree of directness, particularly where physical barriers such as highways, rivers and railway lines are present;
- whether sight lines are affected by topography or physical obstructions that could increase the risk of motor vehicles colliding with any pedestrians forced to walk in the roadway; and
- the potential for redevelopment which, if anticipated to occur in the near term, may provide the opportunity for developers to fund the facilities through the site plan process.

9.5 Policy Recommendations for Rural to Urban Conversion and Sidewalks

Based upon available funding and consultation with the community, road segments can be identified and programmed for conversion to urban cross-section or for sidewalk installation. As policy in 'communities', these upgrades should:

- seek to improve facilities for transit users, cyclists and pedestrians in order to create more 'Complete Streets';
- engage the existing community to promote the benefits of the 'Complete Streets' concept and, in the case of the urban cross section, evaluate the level of enthusiasm for the conversion;
- consider the road classification since, for example, rural arterials would not be prime candidates for conversion;
- be coordinated with regularly scheduled maintenance and road works planned in the capital improvement program;
- be tied to development charges in the case of new development; and
- consider the 5-year capital budgets prepared by the City of Greater Sudbury Roads and Transportation Services and ratified by the City Council.

9.6 Transit

Transit is an important part of Greater Sudbury's transportation network. The transportation improvements in this Transportation Study Report will help Greater Sudbury Transit maintain reliable schedules because the recommended improvements help address congestion and connectivity. The active transportation network planned complements the road improvements

and will help extend the reach of transit by providing appropriate cycling and pedestrian facilities that can be used to access transit routes. The recommendation for transit is to build upon this Transportation Study Report with a detailed Transit Master Plan that leverages the planned road and active transportation improvements to encourage increased ridership and expanded coverage of the transit network.

Recommendation: Develop a Transit Master Plan to leverage the road and active transportation plans recommended in the Transportation Study Report.

9.7 Greater Sudbury Airport

Greater Sudbury Airport services city residents and businesses and is a hub for air travel to parts of Northern Ontario. The Transportation Study Report recommends improvements to Falconbridge Highway, the key arterial road linking the airport with the major population centres in Greater Sudbury. The Maley Drive widening and extension would help facilitate access to the airport from population and employment centres and the Kingsway widening could improve access into and out of the downtown. Overall, the Transportation Study Report supports Greater Sudbury Airport by providing a surface transportation network that is convenient and reliable in which to access the airport.

Recommendation: Implement road improvements that will improve travel time and access to Greater Sudbury Airport.

9.8 Rail

Rail has played a vital role in Greater Sudbury's history and continues to play an important role in the movement of goods and people. The Transportation Study Report reaffirms the Official Plan policy for the City to work with rail companies to implement any feasible relocation of existing rail lines or rail yards. Relocation would ideally enable greater road network connectivity in the city, such as the proposed Larch Street extension to Lorne Street. Relocating rail lines also could facilitate realignment of roads, such as the Frood – Regent corridor. Relocating rail lines could have transportation safety benefits in the elimination of some at-grade rail crossings. Rail lines often create barriers to surface transportation due to limited crossing points. Rail line relocation could encourage greater multi-modal connectivity when these barriers are removed.

Recommendation: Should the rail companies consider the relocation of rail lines or rail yards, the City should work with them throughout the relocation process.

9.9 Roundabouts

Roundabouts are circular intersections with unique characteristics that are defined by their distinct design and operation. They have been widely accepted as a more operationally efficient and environmentally friendly method of traffic control when supported by robust engineering analysis. In addition, roundabouts are generally safer than signalized or stop-controlled intersections due to slower operational speeds and fewer vehicular conflicts.

Recommendation: The City should develop roundabouts guidelines that could be used to help determine the appropriateness of installing roundabouts at new intersections in the city, or at existing intersections where the method of traffic control is being reconsidered.

10 TRANSPORTATION STUDY REPORT IMPLEMENTATION

10.1 Recommended Transportation Strategy

Based on the analysis of the three transportation alternatives, the 'Sustainability Focused' alternative is recommended as the preferred transportation alternative. This chapter defines an implementation phasing for projects up to the ultimate horizon year, 2031.

10.2 Implementation Plan

An implementation plan has been developed to prioritize road improvements recommended in this Transportation Study Report. This includes short, medium and long term horizons that are approximately 5, 10 and 15 years into the future, respectively. Projects were assigned to each phase based on their likely impact on congested links identified in the existing conditions analysis, the phasing of nearby projects that are expected to generate increased traffic volumes, and the current understanding of the City's priorities.

A fourth category of recommended road improvements was designated for development-driven roads. As the name suggests, these projects will proceed when they are needed to provide access to new developments. For the purposes of this analysis, the development-driven projects are assumed to be constructed by the year 2031.

10.3 Phasing of the Recommended Road Improvements

The short, medium and long term transportation improvements, and development-driven transportation projects, are summarized in **Table 48**, **Table 49, Table 50** and **Table 51**, respectively.

Table 48: Road Links Recommended for Construction in the Short Term (Generally 0 to 5 Years)

#	Road Name	Recommendation	From	To
2	Maley Drive	Extend	Lasalle Boulevard	Barry Downe Road
4	Maley Drive	Widen two-lane to four-lane	Barry Downe Road	Falconbridge Highway
15	Ramsey Lake Road (or alternate, subject to Class EA)	Widen two-lane to four-lane	Paris Street	South Bay Road
18	MR 35	Widen two-lane to five-lane	MR 15	Notre Dame Street East
1	MR 80 (or alternate, subject to Class EA)	Widen four-lane to six-lane	MR 15	Kathleen Street
11	The Kingsway	Widen four-lane to five-lane	Downtown	East of Lloyd Street
7	Second Avenue	Widen two-lane to five-lane	Donna Drive	Kenwood Drive

Table 49: Road Links Recommended for Construction in the Medium Term (Generally 6 to 10 Years)

#	Road Name	Recommendation	From	To
17	Maley Drive	Widen two-lane to four-lane	Lasalle Boulevard	MR 35
8	Barry Downe Road	Widen five-lane to six-lane	Westmount Avenue	The Kingsway
13	Howey Drive	Widen two-lane to four-lane	Elgin Street	Bancroft Drive
14	Larch Street	Extend	Elgin Street	Lorne Street

It is recommended that the time between the implementation of the extension and widening of the aforementioned sections of Maley Drive be minimized. This will avoid traffic volumes generated by one improvement increasing congestion on sections still awaiting improvement.

Table 50: Road Links Recommended for Construction in the Long Term (11 to 15 or More Years)

#	Road Name	Recommendation	From	To
5	Falconbridge Highway	Widen four-lane to five-lane	Maley Drive	Garson-Coniston Road
6	Maley East Bypass	New road construction	Falconbridge Highway	Subject to EA and consultation with MTO
12	Ste. Anne Road	Extend	MacKenzie Street	College Street

It is recommended that an Environmental Assessment be conducted to determine the optimal corridor for the Maley East Bypass. The alignment shown in the 2005 Transportation Study Report has been carried over for modelling purposes. This would connect the existing intersection of Maley Drive with Falconbridge Road to the upgraded interchange of the Trans-Canada Highway with the Kingsway. However, the final alignment is to be determined in conjunction with the Ministry of Transportation of Ontario (MTO). As an alternative to the connection with Highway 17, Maley Drive may be extended east to the Garson Coniston Road.

The alignment used in the modelling analysis allows for the most accurate assessment of demand for a continuous bypass linking Lasalle Boulevard and Highway 69. In the 'Sustainability Focused' alternative, the highest projected unidirectional volume on the Maley East Bypass links (between Falconbridge Road, Lasalle Boulevard and Highway 17) is 152 vehicles. This represents less than 10% of the available capacity. Even in the 'Auto Focused' alternative, in which higher volumes are generated by the Barry Downe Road extension, no more than 463 vehicles are expected. Consequently it is recommended that the Maley East Bypass or the Maley Drive extension to Garson-Coniston Road be part of the long-term strategy, with further evaluation of projected traffic demand to be undertaken following implementation of the surrounding highway upgrades to assess whether either of those links is required.

The proposed widening of Falconbridge Highway to add a two-way left turning lane between Maley Drive and Garson-Coniston Road is also included in the long term phase. However, traffic volumes should be monitored following implementation of the Maley Drive improvements and there may be benefit in bringing forward the widening of the southern section between Maley Drive and Metcalfe Avenue.

The two-way left turning lane is currently proposed to extend as for east as the Garson-Coniston Road. As highlighted in **Section 7.1.3**, congestion is also expected along the section between Garson and Greater Sudbury Airport. There is an opportunity to develop a commercial hub at the airport. As plans to expand the airport are developed and implemented, the performance of this roadway section should be monitored closely. Widening should be considered where required at a future date, which may be beyond the 2031 horizon, or may be co-ordinated with the widening that is currently proposed.

The Ste. Anne Road extension is one component of the Downtown Master Plan and the priority may change based on the implementation of the Downtown Master Plan.

Table 51: Development-driven Road Projects

#	Road Name	Recommendation	From	To
3	Montrose Avenue North	Extend	Current terminus	Maley Drive extension
9	Montrose Avenue South	Extend	Notre Dame Avenue	LaSalle Boulevard
10	Silver Hills Drive	New road construction	Bancroft Drive	Kingsway
16	Remington Road	Extend	Current terminus	Gateway Drive
20	Martilla Drive	Extend	Current terminus	Paris Street
21	John Street	Extend	MR 80	Bodson Drive

The recommended phasing of short, medium and long term road improvements is displayed in **Figure 82** for the overall city and **Figure 83** through **Figure 86** for specific areas.

Figure 82
Greater Sudbury Transportation Study
Phasing Plan for Road Improvements

Revisit. Review. Revise.
Revisitez. Réexaminez. Révisez.
Official Plan Review • Révision du Plan officiel

List of Proposed Road Network Improvements

1. Notre Dame Ave. widening (4-lane to 6-lane, Main St. to Kathleen St.)
2. Maley Dr. extension (Lasalle Blvd. to Barry Downe Rd.)
3. Montrose Ave. north extension (current terminus to Maley Dr. extension)
4. Maley Dr. widening (2-lane to 4-lane, Barry Downe Rd. to Falconbridge Highway)
5. Falconbridge Highway widening (4-lane to 5-lane, Maley Dr. to Garson Coniston Rd.)
6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
7. Second Ave. widening (2-lane to 5-lane, Donna Dr. to Scarlett Rd.)
8. Barry Downe Rd. widening (5-lane to 6-lane, Westmount Ave. to Kingsway)
9. Montrose Ave. extension south from Notre Dame Ave. to Lasalle Blvd.
10. Proposed road for construction in Silver Hills Development
11. Widening of the Kingsway east of Lloyd St. (4-lane to 5-lane)
12. St. Anne Rd. extension
13. Howey Dr. widening (2-lane to 4-lane, Elgin St. to Bancroft Dr.)
14. Larch Street extension
15. Ramsey Lake Rd. widening (2-lane to 4-lane, Paris St. to South Bay Rd.)
16. Remington Road extension from current terminus to Gateway Dr.
17. Lasalle Blvd. widening (2-lane to 4-lane, Municipal Rd. 35 to south of rail corridor)
18. Municipal Rd. 35 widening (2-lane to 5-lane, Municipal Rd. 15 to Notre Dame St.)
19. Martilla Drive connection to Paris Street
20. John Street (Valley) extension

Final alignment within the approximate envelope shown in yellow to be determined in conjunction with MTO.

Proposed interchange improvements to Highway 17 and Maley East Bypass

Proposed interchange along Highway 17

Proposed Road Improvements to Highway 17

Proposed Road Improvements to Highway 69

The City should conduct an environmental assessment (EA) to confirm the need for this corridor relative to other options. If the need is identified, the EA will also define the corridor for the Southern University Link within the approximate envelope shown in yellow. This would facilitate an orderly development plan which is in line with the long term road network concept for the area.

Legend

- Development - Driven
- Phase 3 - Generally 11-15 years and beyond
- Phase 2 - Generally 6-10 years
- Phase 1 - Generally 0-5 years
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Existing Road Network

- Existing Provincial Road / Highway
- Existing Roads

Regional Trails and Routes

- Trans Canada Trail

Destinations

- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other

- Lakes and Rivers
- Parks and Conservation Areas
- Active Railway
- Abandoned Railway

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N W E S

0 1.75 3.5 7 Kilometres

Figure 83
Greater Sudbury Transportation Study
Phasing Plan for Road Improvements
Downtown Enlargement

Revisit. Review. Revise.
Revisitez. Réexaminez. Revisez.
Official Plan Review • Révision du Plan officiel

List of Proposed Road Network Improvements

1. Notre Dame Ave. widening (4-lane to 6-lane, Main St. to Kathleen St.)
11. Widening of the Kingsway east of Lloyd St. (4-lane to 5-lane)
12. St. Anne Rd. extension
13. Howey Dr. widening (2-lane to 4-lane, Elgin St. to Bancroft Dr.)
14. Larch Street extension
17. Lasalle Blvd. widening (2-lane to 4-lane, Municipal Rd. 35 to south of rail corridor)

Legend

- Development - Driven
- Phase 3 - Generally 11-15 years and beyond
- Phase 2 - Generally 6-10 years
- Phase 1 - Generally 0-5 years
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Existing Road Network

- Existing Provincial Road / Highway
- Existing Roads

Destinations

- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Regional Trails and Routes

- Trans Canada Trail

Other

- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

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DOWNTOWN

N W E S

0 250 500 1,000 Metres

Figure 84
Greater Sudbury Transportation Study
Phasing Plan for Road Improvements
New Sudbury Enlargement

Revisit. Review. Revise.
Revisitez. Réexaminez. Révisez.
Official Plan Review • Révision du Plan officiel

List of Proposed Road Network Improvements

2. Maley Dr. extension (Lasalle Blvd. to Barry Downe Rd.)
3. Montrose Ave. north extension (current terminus to Maley Dr. extension)
4. Maley Dr. widening (2-lane to 4-lane, Barry Downe Rd. to Falconbridge Highway)
5. Falconbridge Highway widening (4-lane to 5-lane, Maley Dr. to Garson Coniston Rd.)
6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
7. Second Ave. widening (2-lane to 5-lane, Donna Dr. to Scarlett Rd.)
8. Barry Downe Rd. widening (5-lane to 6-lane, Westmount Ave. to Kingsway)
9. Montrose Ave. extension south from Notre Dame Ave. to Lasalle Blvd.
10. Proposed road for construction in Silver Hills Development

Final alignment within the approximate envelope shown in yellow to be determined in conjunction with MTO

Legend

- Development - Driven
- Phase 3 - Generally 11-15 years and beyond
- Phase 2 - Generally 6-10 years
- Phase 1 - Generally 0-5 years
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Existing Road Network

- Existing Provincial Road / Highway
- Existing Roads

Regional Trails and Routes

- Trans Canada Trail

Destinations

- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other

- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

MALEY CONSERVATION AREA
NICKELDALE CONSERVATION AREA
NEW SUDBURY CONSERVATION AREA
GRASSY HILL PARK
NEW SUDBURY

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NEW SUDBURY

0 260 520 1,040 Metres

Figure 85
Greater Sudbury Transportation Study
Phasing Plan for Road Improvements
South End Enlargement

Revisit. Review. Revise.
Revisitez. Réexaminez. Révisez.
Official Plan Review • Révision du Plan officiel

The City should conduct an environmental assessment (EA) to confirm the need for this corridor relative to other options. If the need is identified, the EA will also define the corridor for the Southern University Link within the approximate envelope shown in yellow. This would facilitate and orderly development plan which is in line with the long term road network concept for the area.

List of Proposed Road Network Improvements

15. Ramsey Lake Rd. widening (2-lane to 4-lane, Paris St. to South Bay Rd.)
16. Remington Road extension from current terminus to Gateway Dr.
19. Martilla Drive connection to Paris Street

Legend

- Development - Driven
- Phase 3 - Generally 11-15 years and beyond
- Phase 2 - Generally 6-10 years
- Phase 1 - Generally 0-5 years
- Potential Roads for Future Consideration (after 2031)
- Roads to be constructed as part of new developments

Existing Road Network

- Existing Provincial Road / Highway
- Existing Roads

Regional Trails and Routes

- Trans Canada Trail

Destinations

- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other

- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

N W E S

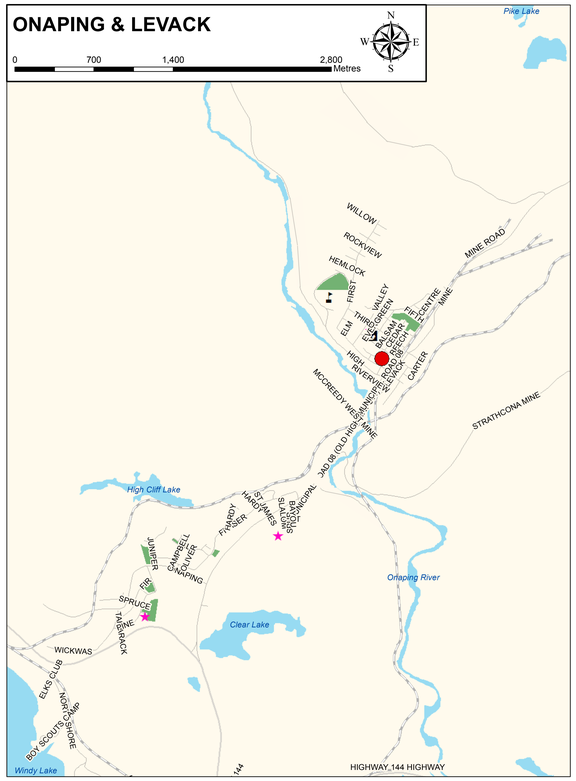
APRIL 2015

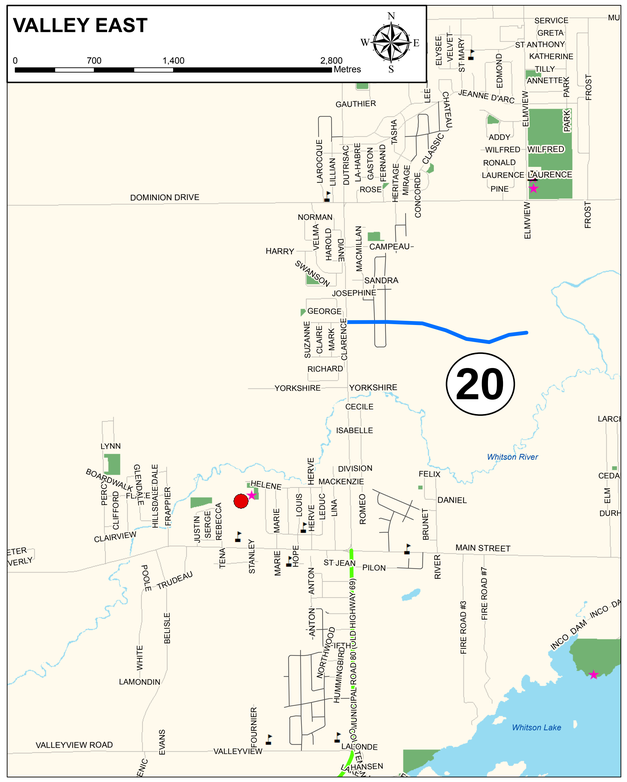
SOUTH END

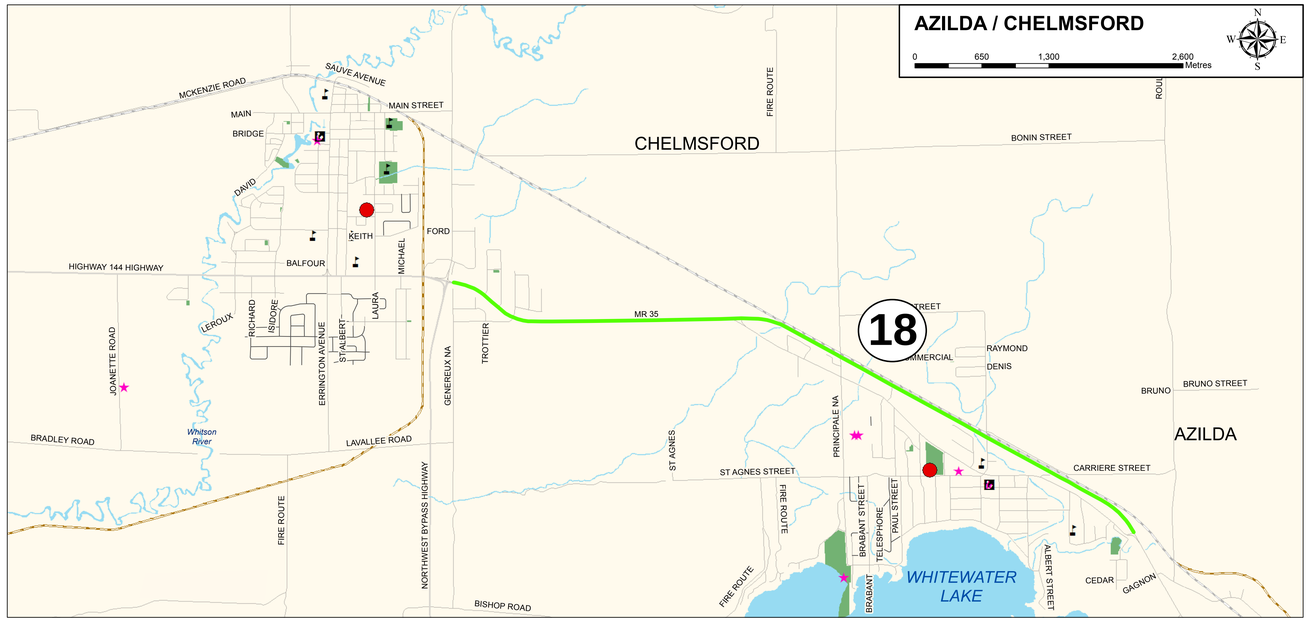
0 260 520 1,040 Metres

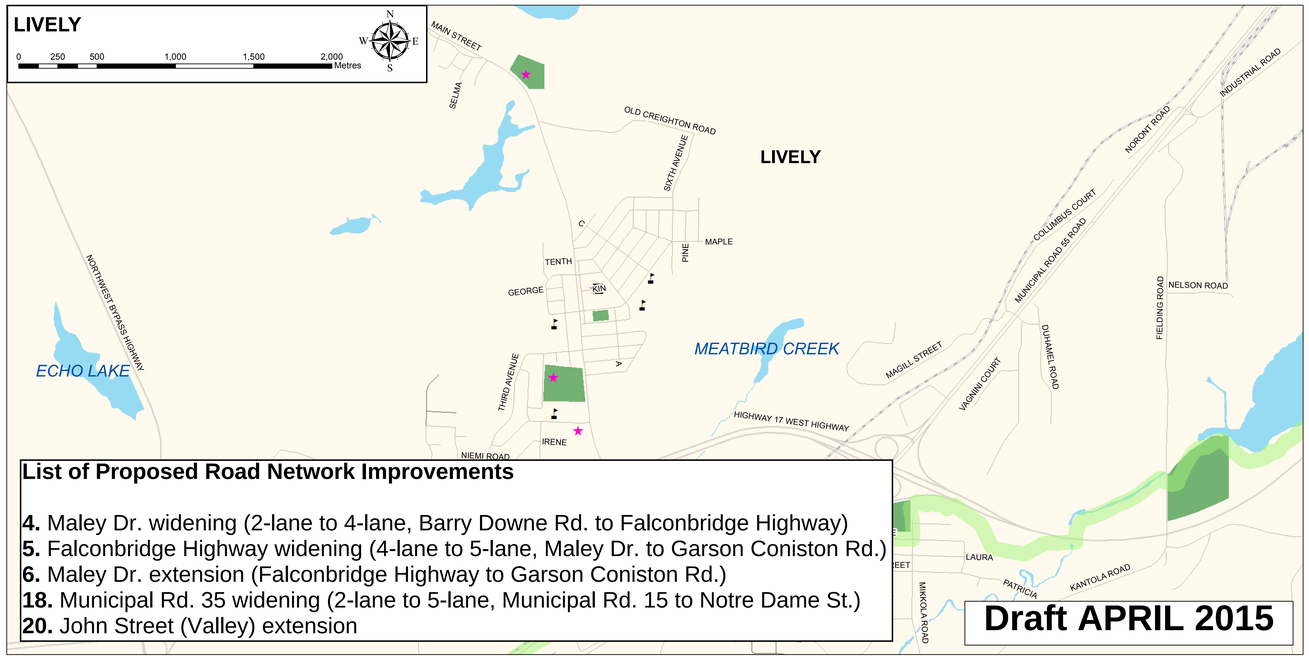
Figure 86
Greater Sudbury Transportation Study
Phasing Plan for Road Improvements
Enlargement Areas

Revisit. Review. Revise.
Revisitez. Réexaminez. Révisez.
Official Plan Review • Révision du Plan officiel









Legend

- Development - Driven
- Phase 3 - Generally 11-15 years and beyond
- Phase 2 - Generally 6-10 years
- Phase 1 - Generally 0-5 years

Existing Road Network

- Existing Provincial Road / Highway
- Existing Roads
- Roads to be constructed as part of new developments

Regional Trails and Routes

- Trans Canada Trail

Destinations

- Airport
- Arena / Community Centre
- College / University
- Schools
- Libraries
- Tourist Attractions

Other

- Lakes and Rivers
- Parks and Conservation Areas
- In-Use Railway
- Abandoned Railway

List of Proposed Road Network Improvements

4. Maley Dr. widening (2-lane to 4-lane, Barry Downe Rd. to Falconbridge Highway)
5. Falconbridge Highway widening (4-lane to 5-lane, Maley Dr. to Garson Coniston Rd.)
6. Maley Dr. extension (Falconbridge Highway to Garson Coniston Rd.)
18. Municipal Rd. 35 widening (2-lane to 5-lane, Municipal Rd. 15 to Notre Dame St.)
20. John Street (Valley) extension

Draft APRIL 2015

10.4 Use of the Transportation Study Report

The Transportation Study Report is the blueprint for future transportation improvements in the City of Greater Sudbury. The concept of 'Complete Streets' is woven throughout the document in order to plan for a transportation network that is accessible to all modes of transportation and all types of users.

The policies outlined in this report should be incorporated into the City's Official Plan in order to give them statutory backing. This study is designed to guide the City's transportation decision-making process and also provide justification for transportation infrastructure projects that require approval under the Municipal Class EA process. Phase 1 (problem statement) and Phase 2 (evaluation of alternatives) have been completed through the preparation of this document.

The study, through its road classification system, also identifies the role and function of streets within the City, how these streets are intended to operate and how they relate to and influence the land uses that they serve. The road classification system developed for the study is also incorporated into the Official Plan.

Finally, the study is not simply a plan of infrastructure actions but also provides the policy framework on which to make concrete operational decisions for the City. The concept of 'Complete Streets' should be the hallmark of City planning and will help Greater Sudbury to lead the way in northern Ontario in the development and maintenance of diverse and accessible transportation infrastructure.

10.5 Transportation Study Report Review and Updates

The Transportation Study Report is a living document. It must be reviewed regularly to ensure that it meets the transportation needs of the City, responds to the economic and environmental climate of the day and adapts to changes in community needs or the growth and development patterns.

It is recommended that the Transportation Study Report be reviewed and updated in conjunction with the mandatory five year mandatory of the Official Plan, and every five years thereafter in association with future statutory assessments of the Official Plan.

10.6 Funding Opportunities

Funding opportunities should be reviewed in order to maximize the ability of the City to construct the proposed improvements in line with the implementation phasing plan. Several funding alternatives have been identified and are summarized in this section.

10.6.1 Province of Ontario Programs

Infrastructure Ontario's Loan Program provides long-term financing to eligible public sector clients to help renew infrastructure and deliver value to customers and residents. Infrastructure Ontario (IO) advertises the loan program as benefiting from:

- Affordable rates;
- Access to capital market financing without any fees or commissions;
- Longer loan terms designed to match the life of the asset;

- No need to refinance over the life of the loan;
- Eligibility for any depreciable capital expenditure; and
- Online application with access to dedicated and experienced staff.

IO loans can be used for any capital investment including roads, bridges and other projects that enhance mobility for all transportation users.

A Province-specific funding source for Northern Ontario is the Northern Ontario Heritage Fund Corporation (NOHFC). NOHFC's program in infrastructure and community development supports municipalities through investments in infrastructure projects that promote growth and economic development. If funding is sought for road projects, the application must demonstrate that the road project serves a strategic economic development purpose.

10.6.2 Federal Programs

As part of the New Building Canada Plan, the New Building Canada Fund was established in 2014 to fund projects from 2014 to 2024. There is $2.7 billion designated for Ontario projects in the New Building Canada Fund, and an estimated $8.12 billion under the federal Gas Tax Fund. There are two major components under the New Building Canada Fund:

- The National Infrastructure Component (NIC) which provides funding for projects of national significance, with a focus on projects that have broad public benefits, and that contribute to long-term economic growth and prosperity.
- The Provincial-Territorial Infrastructure Component (PTIC) which supports infrastructure projects of national, regional and local significance that contribute to economic growth, a clean environment, and stronger communities. The PTIC is divided into two sub-components:
    - National and Regional projects (PTIC–NRP); and
    - Projects located in communities of fewer than 100,000 residents through the Small Communities Fund (PTIC–SCF).

Under the PTIC, each province and territory will receive a base amount of $250 million plus a per capita allocation over the 10 years of the program. The per capita amount is based on the Statistics Canada Final 2011 Census figures.

More specifically, FedNor, the Government of Canada's regional development organization for Northern Ontario, provides funding opportunities that support community economic development, business growth and competitiveness, as well as innovation through a number of different programs and funds.

The City of Greater Sudbury should monitor upcoming federal programs to identify any new funding opportunities for local transportation projects.

10.6.3 Development Charges

The City of Greater Sudbury uses development charges to recover some of the capital cost expenditures necessary to service new developments. The City has set rates for residential developments (single family dwellings and multiples / apartments) as well as non-residential developments (industrial and commercial/institutional). Development charge rates are indexed each year with the Construction Price Statistics that are issued by Statistics Canada.

10.6.4 Other Alternative Infrastructure Funding Mechanisms

Other alternative funding mechanisms that could be considered by the City in order to fund transportation infrastructure projects include private sector sponsorship and focused advertising. Revenues could be used to maintain, enhance or expand transit services as well as cycling and walking linkages to transit stops.

10.7 Implementation through the Official Plan

The Transportation Study Report is being prepared concurrently with an update to the City of Greater Sudbury's Official Plan. The transportation component of the Official Plan is covered by this report, including:

- Transportation objectives;
- Transportation policies such as 'Complete Streets';
- Road hierarchy and classification scheme;
- Road network improvements; and
- Active transportation network improvements.

11 RECOMMENDATIONS

Recommendations are based on the technical analysis of existing and future road and active transportation conditions, the results of the review of existing City policies and public feedback. This Transportation Study Report has identified a number of specific infrastructure improvements as well as new and revised policies for transportation infrastructure. These projects and policies should be incorporated into the City's Official Plan.

The recommendations are group into the following categories:

- Road improvements;
- Supporting active transportation;
- Active transportation implementation; and
- Transportation policies.

11.1 Road Improvements

Short Term (generally the next five years)

Construction for:

- Maley Drive extension and widening
- Ramsey Lake Road widening (pending results of Environmental Assessment)
- MR 35 widening
- Notre Dame Avenue (MR 80) widening
- The Kingsway widening
- Second Avenue widening

Intersection improvements for:

- Signalize the intersection of Douglas Street at Regent Street

Medium Term (generally the next six to ten years)

- Maley Drive widening
- Barry Downe Road widening
- Howey Drive widening
- Larch Street extension

Monitor traffic volumes at the following intersections:

- Lloyd Street / Elm Street at Notre Dame Avenue / Paris Street
- Paris Street at Brady Street

Long Term (generally 11 or more years)

- Falconbridge Highway widening
- Maley Drive East By-pass construction
- Ste. Anne Road extension

Development-driven Roads (generally by 2031)

- Montrose Avenue North extension
- Montrose Avenue South extension
- Silver Hills Drive road construction
- Remington Road extension
- Martilla Drive extension
- John Street extension

11.2 Supporting Active Transportation

- The City should consider utilizing educational programming and materials to promote and inform people of the benefits of active transportation as it relates to community health and fitness, transportation, environment and sustainability, economy and tourism.
- Develop and distribute newsletters and educational materials to promote and educate the public on active transportation opportunities, recommendations for routes and destinations and updates on available routes.
- The City should consider the implementation of educational programs on walking and cycling and partner with interested other agencies, not-for-profit organizations and school boards.
- The City should explore community-based social marketing as a means of encouraging people to adopt more sustainable transportation habits, including walking and cycling. Tools such as those outlined in Table 29 can be used to develop a community-based social marketing program.
- The City and local organizations should develop a comprehensive approach to encouraging students and employees to walk or cycle to school or work and combine these modes with public transit for longer distance trips.
- The City should explore partnerships with local public and private organizations and integrate end-of-trip facilities into active transportation and trail promotional strategies and initiatives.
- The City should further promote active transportation and multimodal activities through the production of Active Transportation maps that also include transit information. City staff should work with local cycling and hiking groups and update the maps at least every two years to ensure new routes and connections are shown.
- Consider transportation operational measures in the future as part of the transportation system management to support safe and convenient AT movement and trail use. These measures may include:
    - Exempting cyclists from turn prohibitions at intersections, such as ‘No Right Turn on Red’;
    - Installing bicycle detection at intersections such that traffic signals recognize and react to cyclists on sideroads, particularly where motorized traffic is infrequent; and
    - Enforcing speed limits on roadways where observed speeds exceed acceptable levels.
- Enforcement activities from the Greater Sudbury Police should focus on issues related to the misuse of bicycle and pedestrian facilities, particularly sidewalk obstruction and the inappropriate use of trails.
- The City should work with the Greater Sudbury Police in the development and delivery of cycling and walking-related safety programs.

- The City should develop partnerships with outside agencies, volunteer groups, individuals as well as regional representatives to promote and educate residents on active transportation use throughout the City.
- The City and its respective partners should make the development of support facilities such as bicycle parking, showers and change rooms, rest areas, washrooms and waste receptacles a priority during the planning and implementation of active transportation facilities.

11.3 Active Transportation Implementation

Short Term (Generally the next five years)

- The City of Greater Sudbury should adopt the AT network implementation plan and use it to guide the implementation of the network over time.
- The City of Greater Sudbury should take the lead in establishing an Inter-Municipal Active Transportation Working Group including but not limited to staff representatives from the City, Sudbury District Public Health Unit and other key agencies as determined.
- The City of Greater Sudbury should continue to work with representatives from local advocacy groups, citizens-at-large, local businesses and other key groups as determined to further active transportation goals and objectives.
- The City of Greater Sudbury should coordinate the AT network implementation with the City's Roads and Transportation Services Department as well as the Community and Strategic Planning Department.
- The City of Greater Sudbury should explore the development of the role of an Active Transportation coordinator who would be responsible for the "championing" of AT related issues, initiatives and programming throughout the City. This role could be a new full-time position at the City.
  The Active Transportation Coordinator would be responsible for the implementation of the AT network and would provide updates on the progress of the study when necessary to stakeholders and interest groups.
- The AT Plan should be reviewed and given consideration when road improvements and other capital infrastructure projects are programmed.
- As part of demonstrating leadership, the City should provide bicycle parking facilities at public buildings under their ownership.
- The City, in partnership with local partners should investigate the potential to develop a bicycle parking program whereby bicycle racks would be installed in locations where there is a demonstrated need for bicycle parking facilities.
- The City should adopt the proposed network phasing strategy as the guide for implementing the AT network.
- In addition to capital funding, the City of Greater Sudbury should explore other outside partnerships, cost-sharing and funding opportunities for the implementation of the AT Network.

Medium Term (generally the next six to ten years)

- The City of Greater Sudbury should recognize that future refinement of the proposed AT network will be required. This is consistent with a goal of ensuring that the plan is flexible and can respond to changes and new opportunities.

Long Term (generally 11 or more years)

- As an interim solution in advance of future road improvements to install cycle tracks, the City of Greater Sudbury should modify current by-laws to continue to restrict cycling on sidewalks for adults but not prohibiting cycling on paved portions of boulevards where it is safe to do so.

11.4 Transportation Policies

11.4.1 Complete Streets Policy

- Implement a "Complete Streets" policy so that the transportation network is designed, constructed, operated and maintained for all transportation users and all modes of transportation.

11.4.2 Road Classifications

- Revise the road classifications to include direction on transit, cycling and pedestrian provision, as detailed in Section 9.2.1.
- Adopt revised road cross sections as detailed in Section 9.2.2

11.4.3 Rural to Urban Conversion

- Adopt the rural to urban conversion criteria outlined in Section 9.3.

11.4.4 Sidewalk Policy

- Finalize a Sidewalk Policy as detailed in Section 9.4.

11.4.5 Transit

- Develop a Transit Master Plan to leverage the road and active transportation plans recommended in the Transportation Study Report.

11.4.6 Greater Sudbury Airport

- Implement road improvements that will improve travel time and access to Greater Sudbury Airport.

11.4.7 Rail

- Should the rail companies consider the relocation of rail lines or rail yards, the City should work with them throughout the relocation process.

11.4.8 Roundabouts

- Develop roundabouts guidelines that could be used to help determine the appropriateness of installing roundabouts at new intersections in the city, or at existing intersections where the method of traffic control is being reconsidered.

11.5 Incorporating the Transportation Study Report into the Official Plan

The Transportation Study Report contains numerous recommendations that should be incorporated into the ongoing Official Plan Review. The existing Official Plan language has been updated based on these recommendations. Changes to the transportation chapter of the Official Plan have been included in **Appendix I**.