City of Greater Sudbury Transportation Study Report

Prepared for:
City of Greater Sudbury
P.O. Box 5000, Station "A"
200 Brady Street, Tom Davies Square
Sudbury, Ontario
P3A 5P3

Prepared by:
Earth Tech (Canada) Inc.
1040 Lorne Street South, Unit #1
Sudbury, Ontario
P3C 4R9

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EXECUTIVE SUMMARY

Context

The City of Greater Sudbury (Greater Sudbury) is conducting a comprehensive review of its existing official plans that were developed for the former municipalities. The intent of this exercise is to produce a new Official Plan for Greater Sudbury under the Planning Act for the newly amalgamated City. As a key component of this review, the City is undertaking a series of Background Studies to set the context for the new Official Plan and identify both the challenges and opportunities that will be translated into Official Plan Policies and Programs. One such background study addresses transportation infrastructure, and is the subject of this report.

The last Transportation Study for the former Region of Sudbury was completed in 1992 and focused largely on specific problem areas in the City of Sudbury. While many of the recommendations from the 1992 Transportation Study have been implemented, there still remain a number of improvements, such as the Maley Drive Extension, that need to be confirmed. Furthermore, there have been some changes in the demographic, employment and commercial context as well as travel patterns since the early 1990's. This necessitates a re-examination and confirmation of the need, justification, and timing for infrastructure improvement recommendations that have not yet been implemented, as well as the development of new recommendations that were not previously identified.

Study Objectives

The purpose of the document is to present background information, policy options and network improvement options to be considered during the process of creating a new Official Plan. It should be noted that this is not a policy document and not all of the options discussed herein may find a place in the new Official Plan. Similarly, new ideas not discussed in this report may emerge during the consultations and deliberations associated with the new Official Plan process.

This study has also included the development of a new transportation model that can assist with determining the impact of future changes in the community on the road network.

The study followed the Municipal Class Environmental Assessment process during the analysis of various transportation options and road network improvement alternatives.

Consultation Process

The Municipal Class Environmental Assessment 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 simply a notification of study commencement that introduces the study, supplies contact information and provides the opportunity for the public, stakeholders and government agencies to provide input or ask to be included on a future contact list.

A contact database was developed to track those who asked to be contacted directly regarding study events or findings.

Two Public Information Sessions were held to present information to, and obtain input from, the public, stakeholders and government agencies. The Public Information Sessions were coordinated with ongoing public consultation associated with the preparation of the new Official Plan. The Sessions followed a "drop-in" format with display boards presenting project information.

The first Public Information Session was held at the following three locations:

Centre Lionel E. Lalonde Centre (former Trillium Centre)
239 Montée Principale, Azilda
Wednesday, January 21, 2004 - 1 p.m. to 3 p.m.

Valley East Citizen Service Centre/Library
4100 Elmview Drive, Hanmer
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Tom Davies Square
200 Brady Street, Sudbury
Thursday, January 22, 2004 - 7 p.m. to 9 p.m.

At this first Public Information Session, the following was presented:

- The study purpose and scope.
- Existing conditions and identified challenges and opportunities.
- The improvement strategies developed to address the identified challenges and opportunities.
- The proposed criteria to be used for evaluating alternatives.
- A description of the next steps in the study.

The Session provided an opportunity for the public to discuss the study, identify and/or confirm major transportation challenges facing Greater Sudbury, and share ideas about improving Greater Sudbury's Transportation system. Comments and input received at the sessions were carefully reviewed and incorporated into the subsequent phase of the study.

A second series of public information sessions were held at the following locations:

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239 Montée Principale, Azilda
Monday, June 14, 2004 - 1 p.m. to 3 p.m.

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200 Brady Street, Sudbury
Tuesday, June 15, 2004 - 7 p.m. to 9 p.m.

At the second Public Information Session, draft recommendations and action plans necessary to address identified challenges and opportunities were presented. These included:

- Alternative planning solutions and alternative road network improvements;
- Evaluation of the alternatives;
- Identification of recommended alternatives; and
- Draft transportation policy directions.

The sessions afforded an opportunity for the public to discuss the draft recommendations and share ideas about improving Greater Sudbury's Transportation system. All comments and input received were considered during formulation of the final recommendations.

Recommendations

Recommendations are based on technical analysis, evaluation of alternatives, and are also reflective of the input and comments received from the general public and key stakeholders. This Transportation Study has identified a number of specific infrastructure improvements, and policies that require implementation over the life of the plan. It is important to note that the success of the plan will depend on implementation of all or most of its elements, since many of these elements work together within the overall transportation system.

The following is a listing of specific recommendations relating to each transportation element.

Road Rehabilitation

1. Give priority to the preservation of existing infrastructure before adding new roadway sections.

2. Develop and implement an Asset Management Strategy that considers life cycle costing, desirable pavement condition indices, and the availability of funding.

3. Give higher priority to roads with higher classification, and with heavier traffic volumes.

4. Maintain roads that are predominantly used by trucks at a higher standard.

Road Improvements

5. Initiate the following within the next five years:

    a. Environmental Assessment Studies (update previous EA studies) for the following:

        i. Maley Drive extension and widening.

        ii. Alternate Access to Laurentian University and South Shore of Ramsey Lake.

        iii. MR 15 widening.

        iv. MR 35 widening.

        v. LaSalle Boulevard widening.

        vi. The Kingsway widenings.

        vii. MR 80 widening.

    b. Construction of the Maley Drive extension and widening.

    c. Construction of the New University Link.

    d. Construction of the MR 15 widening.

    e. Construction of the MR 35 widening.

    f. Construction of the LaSalle Boulevard widening.

    g. Construction of the Kingsway widenings.

    h. Construction of the MR 80 widening.

    i. Conversion of the existing left turn through lanes on Paris Street and Long Lake Road to left turn lanes and the construction of additional through lanes on Paris Street and Long Lake Road at the Four Corners.

    j. Construction of a northbound right turn channelization at the Paris Street/Ramsey Lake Road intersection.

    k. Construction of dual eastbound, westbound and southbound left turn lanes and additional northbound and southbound through lanes at the LaSalle Boulevard/Notre Dame Avenue intersection.

l. Construction of one additional westbound and one additional northbound left turn lanes at the LaSalle Boulevard/Barrydowne Road intersection as well as one additional northbound through lane.

m. Construction of southbound left turn lane improvements and a right turn lane at the LaSalle Boulevard/Falconbridge Highway intersection.

6. Continue to monitor traffic growth and service levels along MR 80.

   A future Class EA study of the widening of MR 80 should consider the Barrydowne Road extension and the potential by-pass of the McCrea Heights area as viable alternatives. At the time of this future study, updated growth forecasts should be prepared for Valley East, based on observed growth trends and known development activity or planning applications in the area. The Class EA study should reconfirm the need and justification for the improvements and include a detailed evaluation of social, cultural, and environmental impacts, which was beyond the scope of this Transportation Study, to confirm the recommended planning alternative. Greater Sudbury should ensure that any planning applications received in this area do not preclude the option of the Barrydowne Road extension, until such time as a future Class EA and route planning study can be completed.

7. Initiate the remaining road improvements identified in Chapter 11 after the above short-term improvements have been implemented.

8. Undertake detailed feasibility / operational studies for the following localized improvements that may be required to address area growth or other localized operational deficiencies:

   a. The Hawthorne Drive Connection between Notre Dame Avenue and Barrydowne Road and the Montrose Avenue Extension southerly to the Hawthorne Drive Connection.

   b. Operational improvements and the westerly extension of Ste. Anne Road under the railway tracks to Pine Street/College Street.

   c. The extension of Treeview Gateway Drive from Long Lake Road to Regent Street.

9. Recognize and protect for the following long-term road improvement needs that may be required beyond the planning horizon.

   a. The widening of Falconbridge Highway from Garson-Coniston Road to Radar Road.

   b. The construction of the Northeast Bypass from Maley Drive to Highway 17.

   c. The extension of LaSalle Boulevard easterly to the future Northeast Bypass.

   d. The widening of MR 55 from Highway 17 to Big Nickel Mine Drive.

   e. Improvement of the Frood Road/Regent Street corridor to create an alternative north-south arterial route.

10. Communicate with the Ontario Ministry of Transportation the following:

    a. The need to widen the Southwest Bypass (Provincial facility) to 4 lanes.

    b. The importance of four-laning Highway 69 from Sudbury southerly to Parry Sound which will promote Greater Sudbury's economic growth.

    c. The need to widen sections of Highway 17 east of the Southeast bypass, and Highway 144 west of Chelmsford in the long-term (beyond the planning horizon)

    d. The need for a Northeast Bypass from Maley Drive to Highway 17 in the long-term (beyond the planning horizon)

Funding

11. Seek funding support from the Federal and Provincial Governments for the transportation system through grants and/or additional revenue streams such as a portion of the gasoline tax.

12. Negotiate cost sharing agreements with major industries when these industries will benefit from the transportation improvement being proposed.

13. Explore means to generate new sources of revenues such as applying selective charges (area specific development charges) to new developments in areas where growth is not desirable and expensive to serve.

14. Seek ways to reduce costs for both capital and operating activities through operational efficiencies, technology application, and innovation.

Road Designations/Access Policies

15. Provide an integrated road network consisting of arterial and collector roadway grids as shown in Figure 10.2.1 to ensure adequate access and mobility for all areas in Greater Sudbury.

16. Develop, maintain, update, and apply Right-of-Way Classification Guidelines for all classes of roads under Greater Sudbury's jurisdiction.

17. Designate the Maley Drive extension, the existing section of Maley Drive between Barrydowne Road and Falconbridge Highway and the section of LaSalle Boulevard between MR 35 and the new Maley Drive interchange as Primary Arterial Roads, the Montrose Avenue extension as a Secondary Arterial Road and the New University Link as a Tertiary Arterial Road.

18. Continue to require the preparation of Transportation Impact Studies in support of planning applications for new developments. As a condition of approval, such studies shall identify all transportation system modifications required to accommodate the new developments, and will clearly demonstrate that these modifications do not compromise Greater Sudbury's transportation network objectives.

19. Conduct a review of Greater Sudbury's Access Control policy for Municipal Roads and undertake an Access Management Review of key arterial corridors in Greater Sudbury.

Pedestrian/Bicycle

20. Provide the following on new and reconstructed roads, when feasible:

    a. Sidewalks on both sides of urban arterial roads and collector roads adjacent to developed lands;

    b. Sidewalks on at least one side of local roads;

    c. High quality pedestrian connections to transit;

    d. Pedestrian connections between neighbourhoods; and

    e. Pedestrian linkages to major attractions/generators.

21. Require landowners, as a condition of Site Plan Approval, to provide direct, safe, secure, and well-delineated access routes for pedestrians between main building entrances and adjacent public sidewalks.

22. Consider providing bicycle facilities on all new road links and road widening projects. Assess feasibility in terms of safety, usage, cost, and connection with major educational / institutional / cultural centres.

23. Provide a bicycle/pedestrian facility along the new road link to Laurentian University.

24. Emphasis enforcement and education to promote safe bicycle/pedestrian travel.

25. Continue to improve coverage through improvement of the current bicycle network, with special emphasis given to major generators (e.g., community centres, educational institutions, and recreation centres).

26. Update the Bicycle Advisory Committee Reference Manual and undertake a bicycle network study.

27. Give full consideration to Greater Sudbury's Accessibility Plan for all transportation matters.

Transit

28. Upgrade the fare collection system through acquisition of electronic fare boxes.

29. Develop transportation solutions and fare systems that entice students.

30. Institute a program of bus bay construction in view of the new legislation giving right-of-way to buses at intersections. The program needs to be given a higher priority to roads with a large number of buses.

31. Provide adequate funding to maintain the current service level (quantity and quality), and to keep fare increases below the cost-of-living index.

32. Address bus breakdown incidents within the large service area through such measures as provision of satellite garages or mobile repair units, or entering into agreements with private maintenance operators.

33. Improve integration with the VIA rail station

34. Continue to review the service to ensure that the service is meeting community needs.

35. Give full consideration to the City's Transit Accessibility Plan.

Trucks

36. Designate the Maley Drive extension as a major east-west truck route, thereby reducing heavy truck traffic on other roads including LaSalle Boulevard.

37. Improve liaison with industry to address such issues as operational problems and future infrastructure needs in a timely manner.

38. Improve enforcement of weight restrictions.

Land Use Policies

39. Focus on compact, mixed-use development at strategic locations to reduce reliance on the automobile.

40. Review development proposals to ensure that there are adequate bicycle/walking links, and adequate road network to facilitate efficient transit routing so that all dwellings in the development are within 400 metres walking distance of a bus stop.

41. Use TransCAD combined with other techniques to review and approve all major developments when traffic impacts extend beyond the localized area.

42. For new road corridors and existing corridors that have been identified for future widening, Greater Sudbury should consider the ultimate property requirements for the recommended projects when reviewing and approving development plans affecting these projects.

Data Collection and Monitoring

43. Develop and implement a cordon count program to be undertaken at least every 5 years.

44. Undertake a home interview survey every 5 years at the same time as the cordon count.

45. Update the travel demand-forecasting model every 5 years after completion of the cordon count and home interview survey.

46. Develop a set of transportation performance monitoring statistics based on available data (e.g. vehicle-kilometre traveled) to ensure that the transportation policies and objectives outlined in the Official Plan are meeting their goals.

1. INTRODUCTION

1.1. Context

The City of Greater Sudbury (Greater Sudbury) is conducting a comprehensive review of its existing official plans that were developed for the former municipalities. The intent of this exercise is to produce a new Official Plan for Greater Sudbury under the Planning Act for the newly amalgamated City. As a key component of this review, the City is undertaking a series of Background Studies to set the context for the new Official Plan and identify both the challenges and opportunities that will be translated into Official Plan Policies and Programs. One such background study addresses transportation infrastructure, and is the subject of this report.

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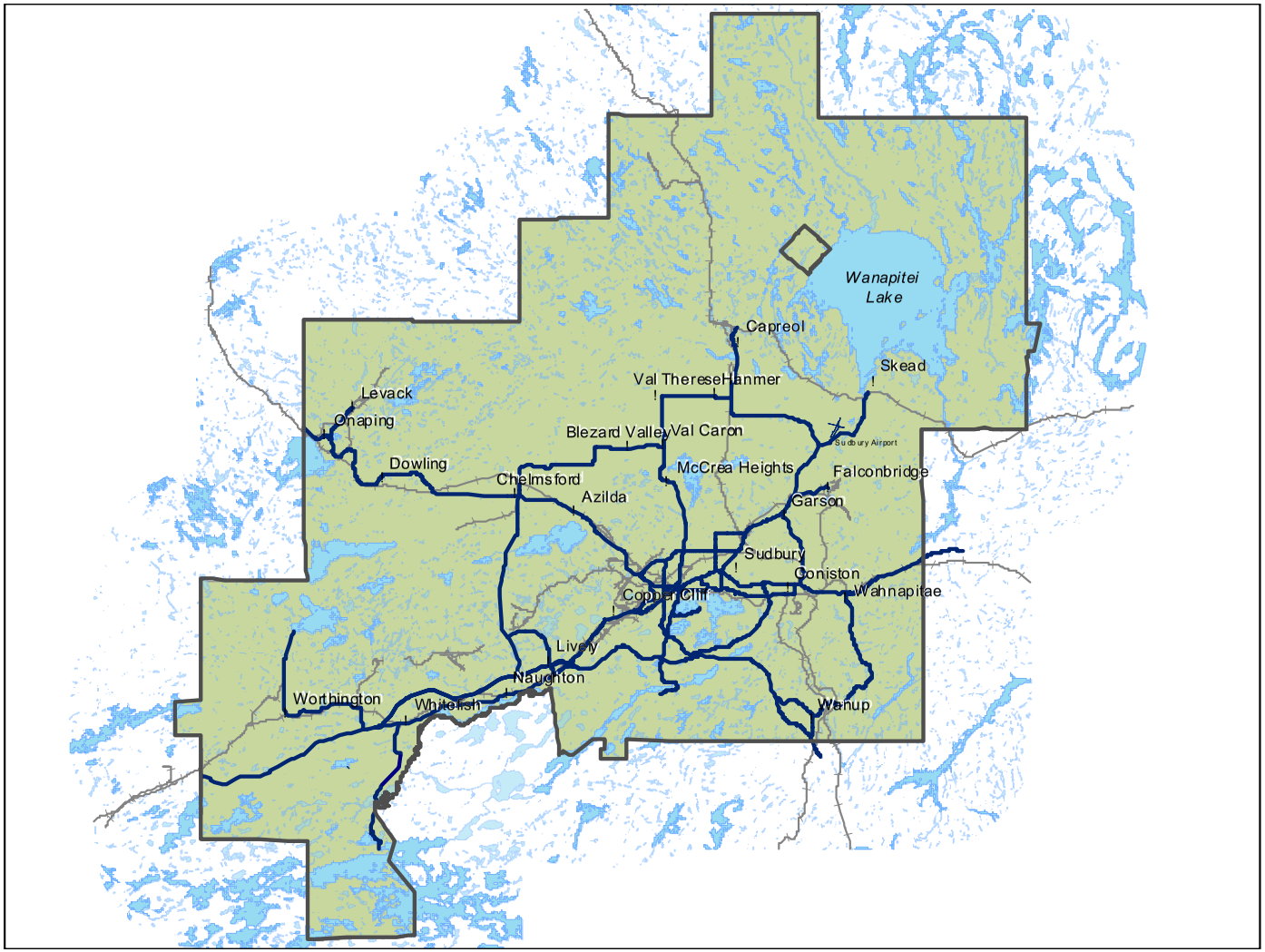
1.2. Study Objectives

The purpose of the document is to present background information, policy options and network improvement options to be considered during the process of creating a new Official Plan. It should be noted that this is not a policy document and not all of the options discussed herein may find a place in the new Official Plan. Similarly, new ideas not discussed in this report may emerge during the consultations and deliberations associated with the new Official Plan process.

This study has also included the development of a new transportation model that can assist with determining the impact of future changes in the community on the road network.

The study followed the Municipal Class Environmental Assessment process during the analysis of various transportation options and road network improvement alternatives.

Study Area


Wanapitei Lake
Capreol
Skead
Val Therese
Hanmer
Levack
Onaping
Blezard Valley
Val Caron
Sudbury Airport
Dowling
McCrea Heights
Falconbridge
Chelmsford
Azilda
Garson
Sudbury
Coniston
Copper Cliff
Wahnapitae
Lively
Naughton
Worthington
Whitefish
Wanup
N
Figure 1.3.1
Legend
Highway/ Major Road
Railway
City Boundary

1.3. Regional Setting

Greater Sudbury (Figure 1.3.1) was formed on January 1, 2001 and represents the amalgamation of the communities which comprised the former Regional Municipality of Sudbury (Sudbury, Capreol, Nickel Centre, Onaping Falls, Rayside-Balfour, Valley East and Walden), as well as several unincorporated townships (Fraleck, Parkin, Aylmer, Mackelcan, Rathbun, Scadding, Dryden, Cleland and Dill) and is now the largest city by population in Northern Ontario.

Greater Sudbury is strategically located 390 kilometres north of Toronto, 290 kilometres east of Sault Ste. Marie, 125 kilometres west of North Bay and 483 kilometres west of Ottawa. Four highways (Highway 69, Highway 17, Highway 144 and Highway 537) pass through Greater Sudbury.

Once primarily a mining center, the City has matured into a diversified regional urban center focusing on technology, education, major retail, government and health services as well as mining.

1.4. Master Plan Approach

Within the context of the Municipal Class Environmental Assessment (EA), the Ministry of the Environment has recognized the benefits of undertaking infrastructure planning using a Master Plan approach that addresses future infrastructure requirements on a system wide basis. For transportation infrastructure, The Class EA Master Plan approach permits a Municipality to address future requirements across an entire study area, identify / evaluate alternative means to address future travel demands, and identify / evaluate solutions / corridor needs for system improvements. In most cases, Municipalities use the Master Plan approach to address the first two phases of the Class EA process:

1. Phase 1: Identify the Problem or Opportunity.

2. Phase 2: Identify alternative Planning Solutions to the Problem or Opportunity; Evaluate the impact of Alternative Solutions on the natural, social, and economic environment; Identify Recommended Solutions; Select Preferred Solutions.

Once these two phases are complete, the Master Plan will typically identify preferred solutions that are required over the planning horizon, along with the applicable Class EA Project Schedule (A, B, or C), and any significant environmental constraints that should be taken into account during the evaluation of alternative design concepts for preferred solutions in Phase 3 of the Class EA.

Schedule A Projects generally include normal or emergency operational and maintenance activities. The environmental effects of these activities are usually minimal, and therefore, these projects are pre-approved.

Schedule B Projects generally include improvements and minor expansions to existing facilities. There is the potential for some adverse environmental impacts and therefore the proponent is required to proceed through a screening process including consultation with those who may be affected.

Schedule C Projects generally include the construction of new facilities and major expansions to existing facilities. These projects proceed through the environmental assessment planning process outlined in the Class EA.

By following this approach, a Municipality can avoid undertaking phases 1 and 2 for each individual improvement.

Master Plan Requirements under the Class EA

The Class EA Master Plan process requires a minimum of three points of contact with the public, stakeholders and government agencies during the Study. The first point of contact is simply a notification of study commencement that introduces the study; supplies contact information, and provides the opportunity for the public, stakeholders and government agencies to provide input or ask to be included on a project contact list. A database is typically developed to track those who have asked to be included on the project contact list so they can be contacted directly regarding study events or findings. The second point of contact is through a public information center (PIC #1) intended to present the problem / opportunity, and alternative planning solutions. The third point of contact is again through a public information center (PIC #2) where the recommended planning solution is presented.

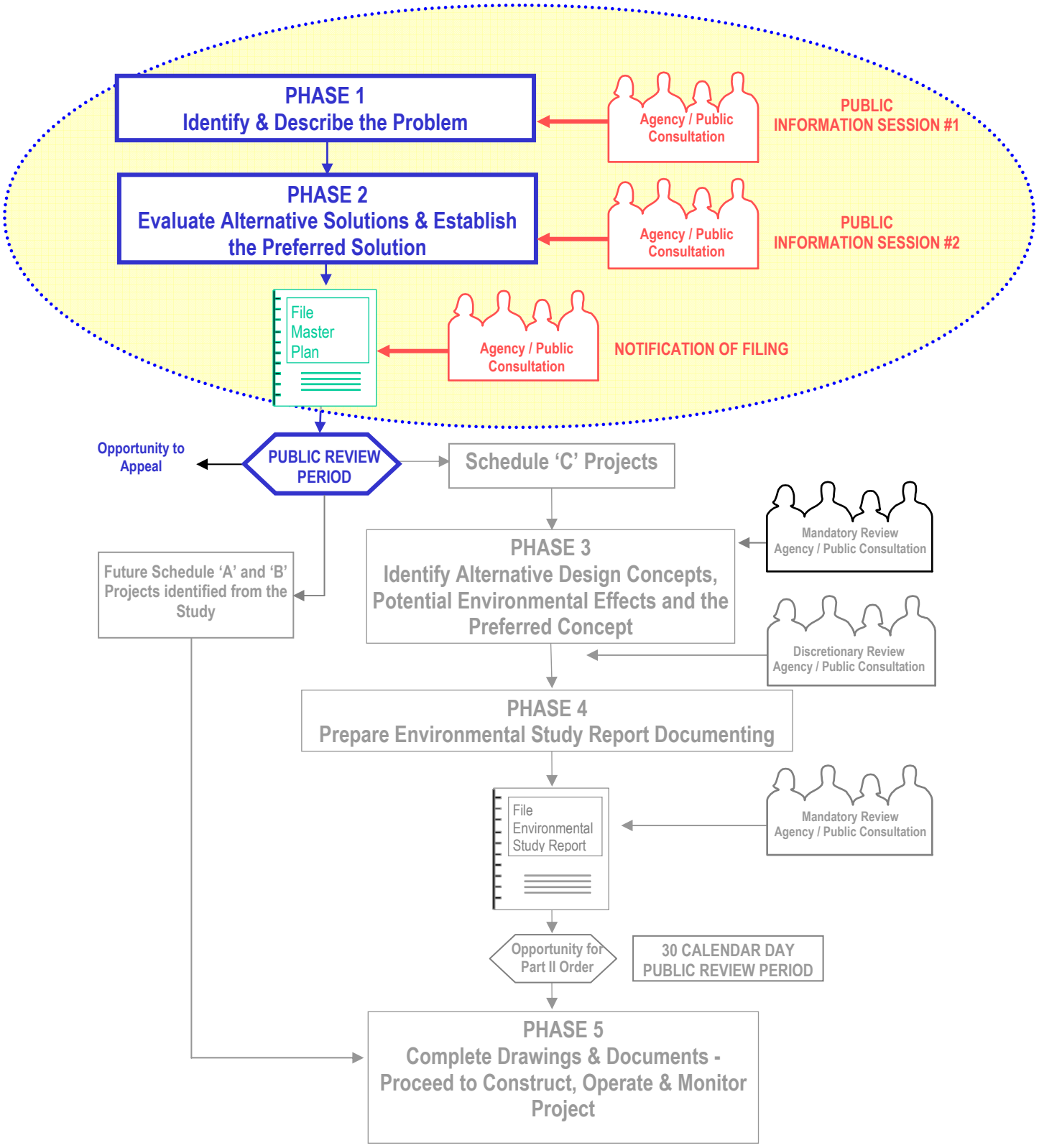
Upon completion, the Class EA Master Plan Report is typically filed for public review and a notice of study completion is published, following which begins a 30-day review period.

As this Transportation Study is being completed in support of the new Official Plan, a more streamlined approvals process is followed because any objections / concerns with either the Transportation Study or the new Official Plan through a formal appeal would be dealt with at one Ontario Municipal Board hearing rather than separately by the Minister of the Environment (Transportation Study) and the Ontario Municipal Board (new Official Plan).

Once the new Official Plan is approved, the Municipality can proceed with all identified Schedule B projects and Schedule C projects (subject to the completion of Phases 3 and 4 of the Class EA process without having to repeat Phase 1 and 2 for each project).

Illustrated in Figure 1.4.1, is the Class EA process.

FIGURE 1.4.1 - CLASS ENVIRONMENTAL ASSESSMENT PROCESS



1.5. Scope of Work

The scope of work has included tasks and activities, which have led to:

- The recommendation of physical improvements (new roads, widenings, operational upgrades) to the road network.

- The Prioritization of the recommended physical improvements in terms of short-term (less than 5 years), mid-term (5 to 10 years), and long-term (beyond 10 years).

- The estimated costs of the recommended physical improvements and identification of potential sources of funding.

- As a key component of the Official Plan, a roadway hierarchy and classification system has been developed to help define the role and function of the roads within the existing network, and guide the application of planning, design, and operational policies. A rationale for classifying and re-classifying roads has been developed. This includes the identification of typical cross-sections for each road classification and policies for access control, sidewalk construction, intersection spacing, parking, trucking, and provision of bicycle facilities.

- While the primary focus of the study is the automobile mode, other modes of transportation such as transit, cycling, and trucking have been reviewed to varying degrees, and appropriate policy recommendations have been formulated.

The Study reflects the changing economic, social, and environmental conditions, and addresses emerging issues. Given that the Study has been undertaken at a macro-level, it has not addressed localized or operational issues in great detail. If however, during the course of the study, general conclusions are obvious, recommendations have been made.

Much has changed in Greater Sudbury since the development of the existing transportation model in 1992. In order to update the model, new base travel data was collected for the entire Greater Sudbury area through a household survey. Data on trip making characteristics (trip generation), origin-destination (O-D) patterns, trip purpose, travel time, and travel modes were collected to provide a base for the development and calibration of the new transportation model.

As indicated earlier, the Study has been conducted in accordance with the Class EA process and the Official Planning process. Accordingly, the public, stakeholders and government agencies have been consulted at key points during completion of the study.

1.6. 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 simply a notification of study commencement that introduces the study, supplies contact information and provides the opportunity for the public, stakeholders and government agencies to provide input or ask to be included on a future contact list.

A list of stakeholders and government agencies was developed for this study, and is included in Appendix "A". The study notification is included in Appendix "B". A contact database was developed to track those who asked to be contacted directly regarding study events or findings.

Two Public Information Sessions were held to present information to, and obtain input from, the public, stakeholders and government agencies. The Public Information Sessions were coordinated with ongoing public consultation associated with the preparation of the new Official Plan. The Sessions followed a "drop-in" format with display boards presenting project information.

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- The study purpose and scope.
- Existing conditions and identified challenges and opportunities.
- The improvement strategies developed to address the identified challenges and opportunities.
- The proposed criteria to be used for evaluating alternatives.
- A description of the next steps in the study.

Details are included in Appendix "C".

The Session provided an opportunity for the public to discuss the study, identify and/or confirm major transportation challenges facing Greater Sudbury, and share ideas about improving Greater Sudbury's Transportation system. Comments and input received at the sessions were carefully reviewed and incorporated into the subsequent phase of the study.

A second series of public information sessions were held at the following locations:

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Monday, June 14, 2004 - 1 p.m. to 3 p.m.

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Tom Davies Square
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Tuesday, June 15, 2004 - 7 p.m. to 9 p.m.

A copy of the notification is provided in Appendix “D”.

At the second Public Information Session, draft recommendations and action plans necessary to address identified challenges and opportunities were presented. These included:

- Alternative planning solutions and alternative road network improvements;
- Evaluation of the alternatives;
- Identification of recommended alternatives; and
- Draft transportation policy directions.

Details are included in Appendix "E”.

The sessions afforded an opportunity for the public to discuss the draft recommendations and share ideas about improving Greater Sudbury’s Transportation system. All comments and input received were considered during formulation of the final recommendations.

Comments received during the second Public Information Sessions are provided in Appendix “F”.

1.7. Report Format

This report documents the findings of the Transportation Study. The following introduces the format of the report and identifies the issues discussed in each chapter.

Chapter 1 - INTRODUCTION

This chapter introduces the study in the context of other background studies and initiatives that have been or are being carried out by Greater Sudbury. It states the study objectives. It also outlines the consultative process and methodology followed to meet the requirements of the Municipal Class Environmental Assessment process and the Official Planning process.

Chapter 2 - EXISTING CONDITIONS

This chapter presents an existing socio-economic profile of Greater Sudbury. It describes the characteristics and role each transportation mode is currently fulfilling with respect to meeting Greater Sudbury's mobility needs.

Chapter 3 - HOUSEHOLD SURVEY

This chapter discusses the methodology used to conduct the household survey, geo-coding of the survey data, expansion and validation of the survey data to account for sample size, and the analysis of survey results.

Chapter 4 - TRAFFIC FORECASTING MODEL

This chapter presents the approach used to forecast future travel demands and describes each of the key elements of the forecasting model, i.e., traffic zone development, trip generation, trip distribution, and model validation.

Chapter 5 - FUTURE CONDITIONS

This chapter presents the projections of future population and employment by traffic zones, future travel demands, and assignment of future traffic on the existing (with committed improvements) road network.

Chapter 6 - OVERALL TRANSPORTATION STRATEGY

This chapter presents various options to address the transportation challenges in Greater Sudbury, the evaluation of these options and the major building blocks that have been used to facilitate implementation of the recommended option.

Chapter 7 - ASSESSMENT METHODOLOGY

This chapter describes the evaluation methodology and identifies the factors and indicator measures used to assess various network alternatives.

Chapter 8 - ROAD NETWORK IMPROVEMENTS

In this chapter, improvements that benefit the road network, as a whole, are discussed.

Chapter 9 - LOCAL ROAD IMPROVEMENTS

This chapter discusses local improvements that can be undertaken to provide relief to specific areas within the City.

Chapter 10 - ROAD DESIGNATIONS

This chapter identifies current road designations within Greater Sudbury. To meet future needs, required changes to the current designations are identified. Road access polices required to maintain an acceptable level of service are also discussed.

Chapter 11 - IMPLEMENTATION PLAN

Within this chapter, the prioritization of the recommended physical improvements in terms of short-term (less than 5 years), mid-term (5 to 10 years), and long-term (beyond 10 years) is presented. The estimated costs of the recommended physical improvements and identification of potential sources of funding are also discussed. A monitoring plan is also recommended.

Chapter 12 - RECOMMENDATIONS

This chapter summarizes the study recommendations in terms of physical improvements and policy initiatives.

2. EXISTING CONDITIONS

This chapter presents an overview of existing conditions in the context of a socio-economic profile of Greater Sudbury and the transportation system that serves the area. The information is crucial to understanding the current transportation system and provides the base from which to forecast future travel demand and identify future capacity deficiencies.

2.1. Socio Economic Profile

According to Statistics Canada's census information for the year 2001, the population of Greater Sudbury was just over 155,000. Associated with this population, were 63,020 dwelling units, resulting in an average household size of 2.46 persons. Population appeared to have peaked at approximately 170,000 in the year 1971. Over the last thirty years, the population has experienced several cycles of decline and recovery, directly associated with the level of economic activity in the study area, and the region as a whole. The overall decline in population is the result of an aging population and a net out-migration of younger age groups. Despite the decline in population, the number of dwelling units appears to have grown, which can be attributed to a trend in smaller household size primarily caused by an aging population, and a relatively large student population. Statistics used in the 1992 Transportation Study included a population that was just over 156,500 and 62,133 dwelling units resulting in an average household size of 2.52 persons.

The 2001 employment data is based on Statistics Canada's information on the "Place-of-Residence – Place-of-Work" (POR-POW data) at the census tract level. As noted earlier, the composition of economic sectors in Greater Sudbury has changed significantly over the years. Although employment in the mining sector has been decreasing, it is still the primary source of economic activity. Greater Sudbury is also being supported by other significant economic sectors such as technology, education, government and health services. This has caused significant changes to the employment distribution.

Table 2.1.1 below summarizes population and employment by former municipality in the study area. Also, labour participation rates as measured by an employment to population ratio are indicated for each of the areas.

Table 2.1.1 - Population and Employment

Municipality	2001 Population	2001 Employment	Labour Participation Rate
Capreol	3,486	730	0.21
Nickel Centre	12,672	2,505	0.20
Onaping Falls	4,887	1,890	0.39
Rayside-Balfour	15,047	2,800	0.19
Sudbury	85,358	49,749	0.58
Valley East	22,375	4,080	0.18
Walden	10,101	3,905	0.39
New Townships	1,299	*	N/A
Total	**155,225**	**65,659**	**0.42**

* Minimal

The former City of Sudbury makes up more than half (about 55%) of Greater Sudbury's population, and more than three quarters of its employment. As a result, the former City of Sudbury has a higher than average labour participation rate, meaning that more people travel to the former City of Sudbury for work than those who travel outside. More people travel from Capreol, Nickel Centre, Rayside-Balfour and Valley East then those who travel to these communities for work.

In the 1992 Transportation Study, the base population was 156,575 for the study area that is slightly higher than the current population. Comparing the 1992 and 2001 population figures for Capreol, Onaping Falls and the City of Sudbury reveals a decrease in population while the remaining municipalities have shown an increase with the highest percentage increase occurring in Valley East.

Employment figures have increased from the previous estimate of 61,683 used in the 1992 Transportation Study to 65,659 in 2001. While employment in Walden decreased by approximately 12%, employment in all other areas increased. Capreol had a 53% increase in employment (from 477 to 730), Rayside-Balfour had an increase of 37% (2,047 to 2,800) and employment in Valley East has increased by 38% (2,951 to 4,080).

2.2. Road Network

Greater Sudbury is well serviced by a network of provincial highways, arterial roads, collector roads and local roads totalling approximately 1600 kilometres of roadway within the City (excluding provincial highways). Figure 2.2.1 illustrates the public road network within Greater Sudbury. In addition to the public road network, there are an additional 335 known kilometres of private roads in Greater Sudbury.

The four provincial highways that pass through Greater Sudbury and link the city with other regional centres are Highway 69, Highway 17, Highway 144 and Highway 537.

Due to the high level of accessibility provided by the existing road network, trucking continues to be an efficient and cost-effective means of moving goods within Greater Sudbury. Existing truck routes are illustrated on Figure 2.2.2.

Existing Road Network

Figure 2.2.1

Legend

- Provincial Highway
- Municipal Road
- Other Roads

Truck Routes

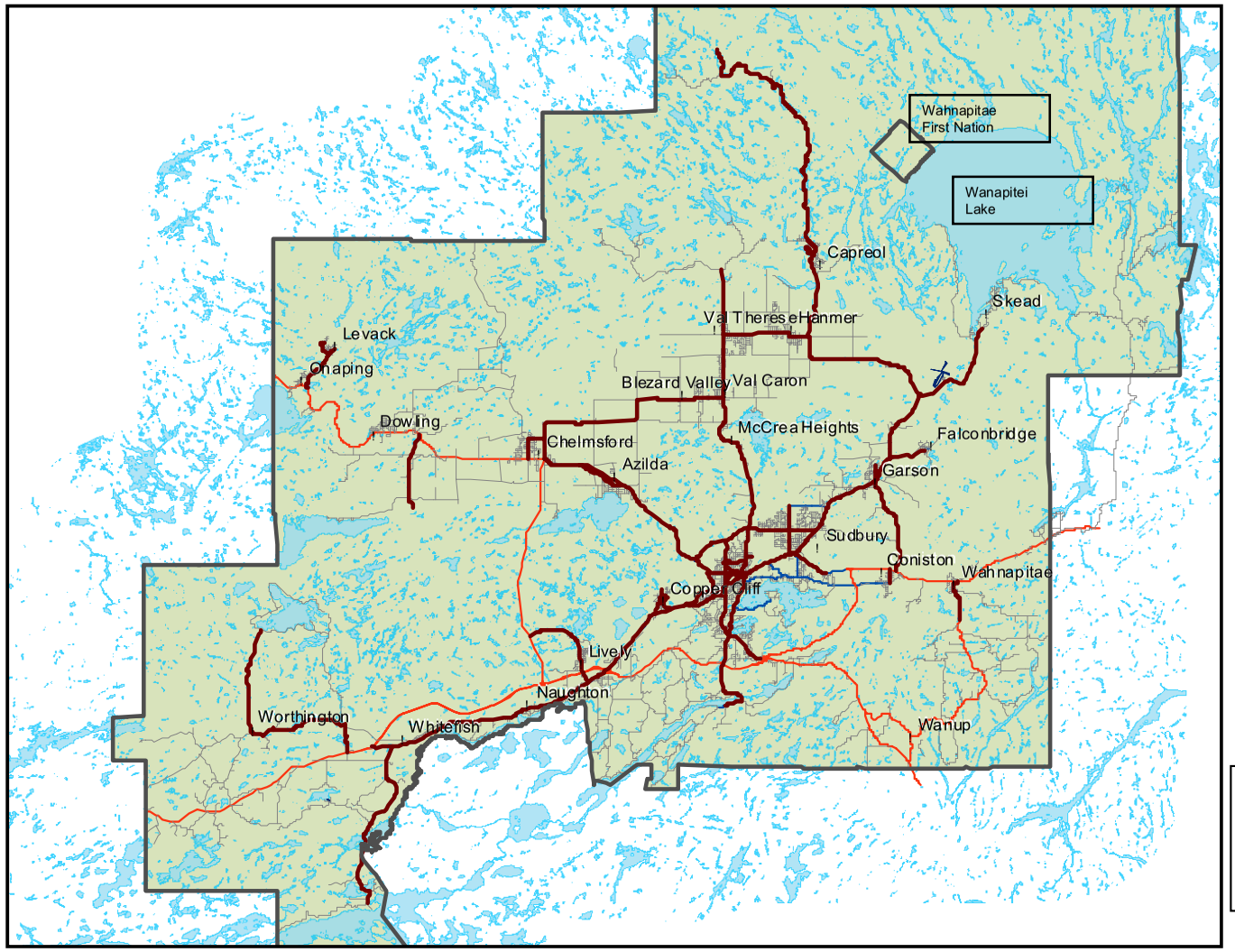


Figure 2.2.2

Legend

Truck Route

2.3. Existing Traffic

On a daily basis, almost 70% of the trips made in Greater Sudbury are by automobile. According to data provided by Greater Sudbury, there has been minimal change in the daily traffic volumes between 1999 and 2002. According to 2001 data, the major roads within Greater Sudbury carry a range of daily traffic volumes from a high of 45,000 AADT on the Kingsway (at Bancroft Drive) to a low of 3550 AADT on Highway 144 north of Onaping Falls. The daily traffic volumes on the major roads within Greater Sudbury are illustrated on Figure 2.3.1.

2.3.1. Major Travel Flows

On a daily basis, approximately 330,000 person trips are made within Greater Sudbury by all modes of travel including automobile, transit, school bus, bicycling and walking.

The existing daily travel demand (daily trips) within the study area, extracted from the household survey, is summarized in Table 2.3.1.

Table 2.3.1 Existing Daily Travel Demand

Origin \ Destination	City of Sudbury	Nickel Centre	Capreol	Valley East	Rayside-Balfour	Onaping Falls	Walden	External	Total
City Sudbury	172440	13860	3060	17220	8390	3620	8050	230	226860
Nickel Centre	13730	4030	110	1050	830	360	1020	70	21220
Capreol	2540	110	650	610	90	70	40	0	4110
Valley East	17960	1020	930	9330	1980	300	560	60	32140
Rayside- Balfour	9450	790	260	910	10100	1150	420	0	23070
Onaping Falls	2980	370	120	270	1270	2510	210	50	7780
Walden	8630	1260	200	720	400	230	4640	30	16110
External	150	20	0	40	0	30	50	N/A	290
Total	227880	21470	5330	30140	23060	8270	15000	440	331600

Existing daily travel demand between the City of Sudbury and the surrounding communities are illustrated on Figure 2.3.2.

Existing Daily Traffic Volumes (2002)

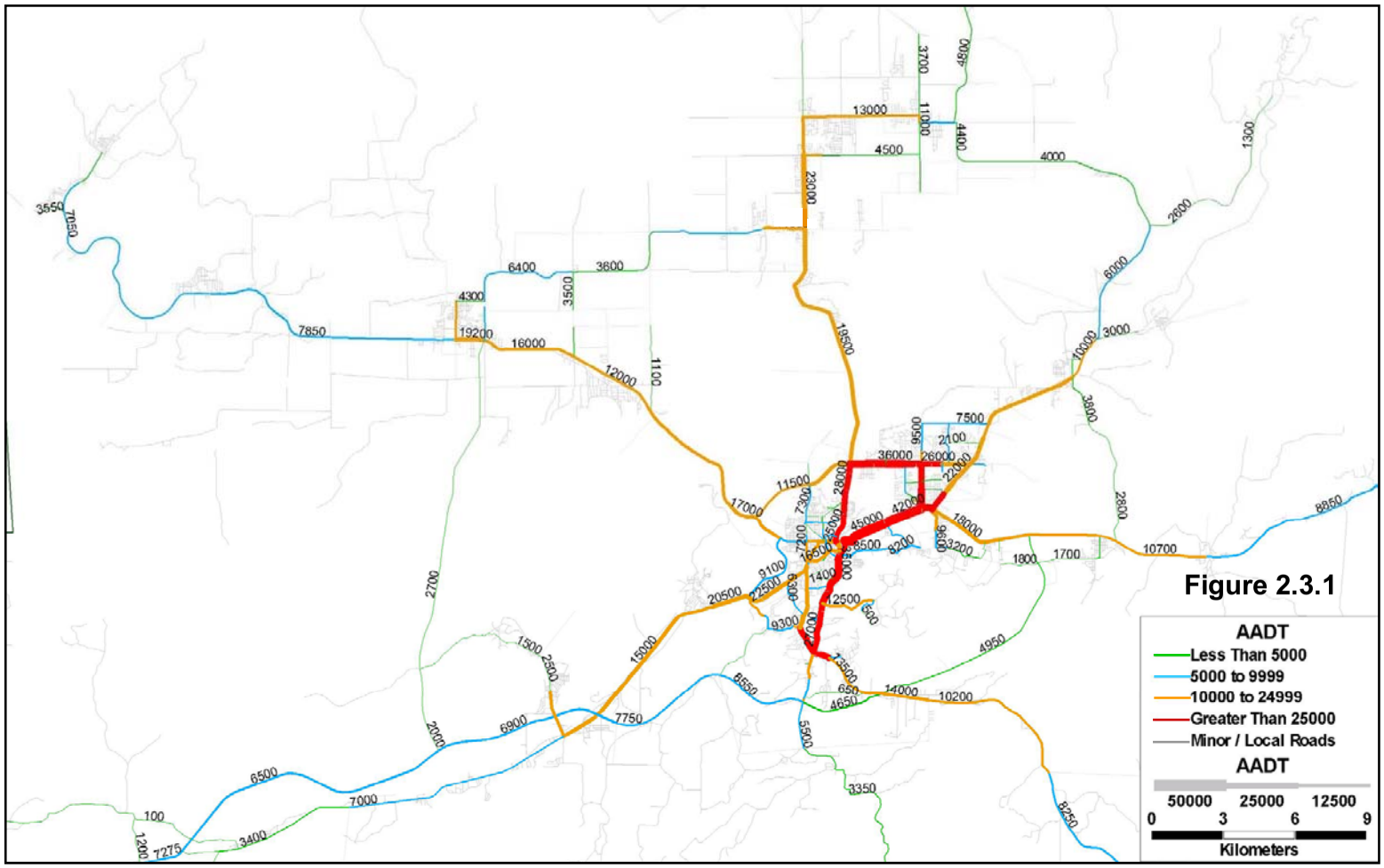
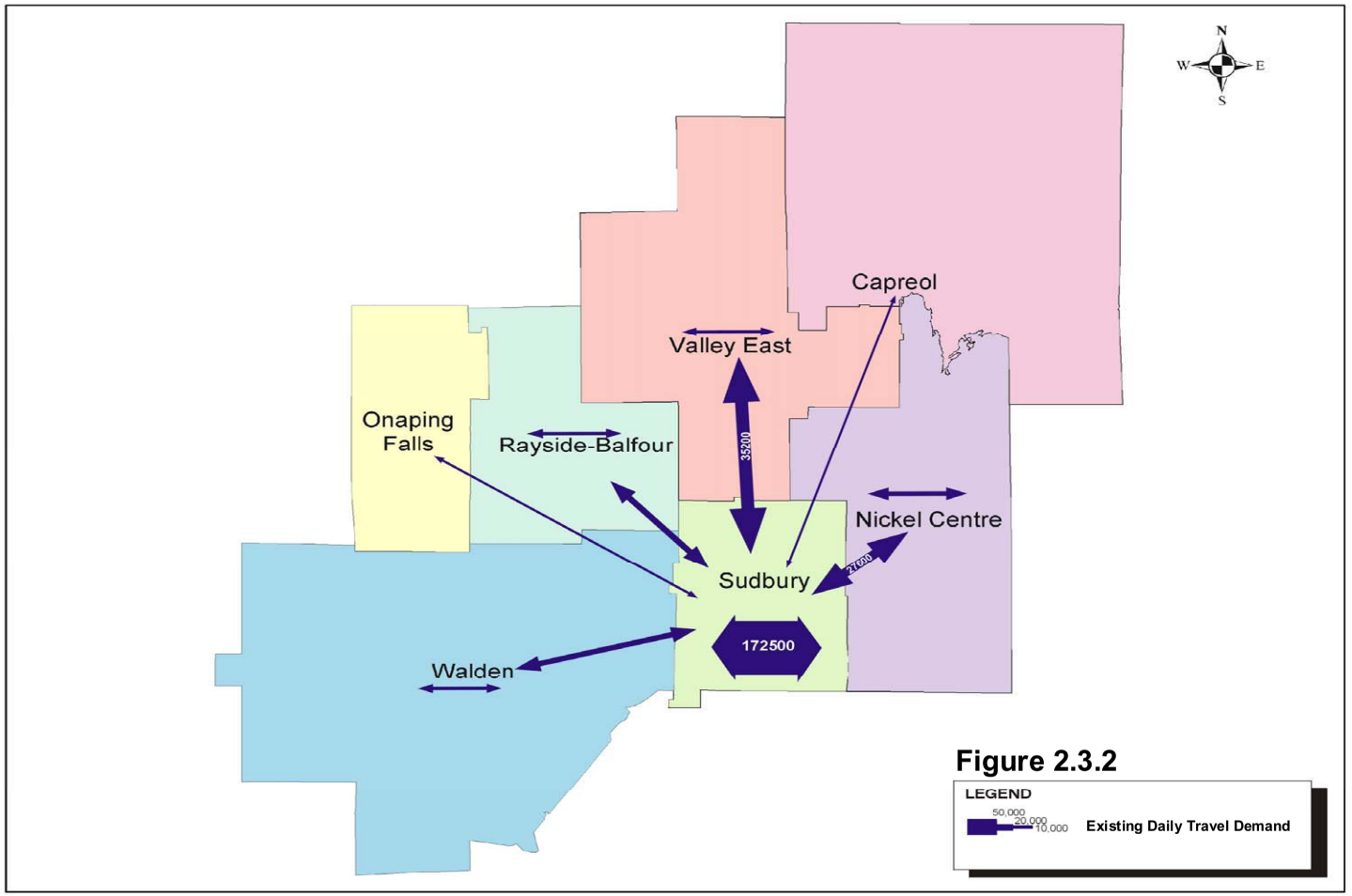


Figure 2.3.1

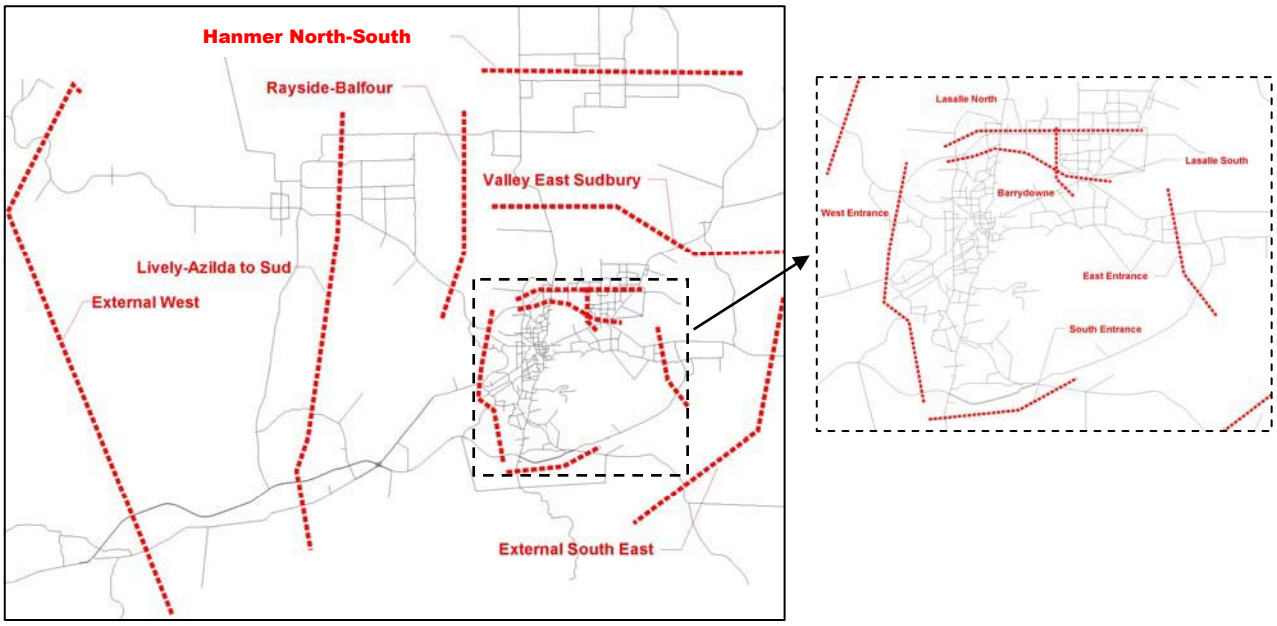
Existing Daily Travel Demand



2.3.2. Screenlines

The operation of the existing road network was assessed by analyzing the movement across twelve screenlines during the p.m. peak hour. The p.m. peak hour was determined to be the critical time period for the purposes of the analysis. The screenline locations were selected with consideration given to geographical constraints, municipal boundaries, existing traffic information, findings contained within the 1992 Transportation Study and suspected problem areas. The screenline locations are shown in Figure 2.3.3.

Figure 2.3.3 – Screenline Locations



The analysis concluded that there is sufficient road capacity to accommodate the existing p.m. peak hour traffic volumes. In the inbound direction (i.e. towards downtown), the highest volume to capacity ratio (v/c) occurs across the Barrydowne screenline at 0.79 or a Level of Service D (LOS D). Across the Rayside-Balfour screenline, the v/c ratio is 0.71. While the results of the analysis indicated that there is less capacity at these screenline locations than at the other screenline locations, which have v/c ratios ranging from 0.41 to 0.13 (LOS A), there is still sufficient capacity within the road network to accommodate existing traffic volumes. At the screenline level, in the outbound direction, the highest v/c ratio also occurs across the Barrydowne screenline at 0.76 (LOS C). The v/c ratios at the remaining screenline locations range from 0.14 to 0.53 (LOS A). Results of the screenline analysis are summarized in Table 2.3.2. A further breakdown for the roads crossing selected screenlines is shown in Table H.1 in Appendix H.

Table 2.3.2 - Screenline Analysis - Existing Road Network

SCREENLINE NUMBER	SCREENLINE NAME	INBOUND TRAFFIC		
		AUTOS	CAPACITY	VOLUME TO CAPACITY RATIO
1	South Entrance	1024	2500	0.41
2	West Entrance	2054	7700	0.27
3	LaSalle North	2195	10100	0.22
4	LaSalle South	2832	6700	0.42
5	Lively-Azilda to Sudbury	1522	7700	0.20
6	External South East	775	2900	0.27
7	Valley East-Sudbury	1089	4300	0.25
8	Hanmer North-South	681	3400	0.20
9	Rayside-Balfour	925	1800	0.51
10	East Entrance	865	3400	0.25
11	External West	715	5400	0.13
12	Barrydowne	2682	4000	0.67
		OUTBOUND TRAFFIC		
SCREENLINE NUMBER	SCREENLINE NAME	AUTOS	CAPACITY	VOLUME TO CAPACITY RATIO
1	South Entrance	645	2500	0.26
2	West Entrance	2911	7700	0.39
3	LaSalle North	3276	10100	0.32
4	LaSalle South	4235	6700	0.64
5	Lively-Azilda to Sudbury	2187	7700	0.28
6	External South East	1203	2900	0.41
7	Valley East-Sudbury	2061	4300	0.48
8	Hanmer North-South	1280	3400	0.38
9	Rayside-Balfour	1275	1800	0.71
10	East Entrance	1054	3400	0.31
11	External West	775	5400	0.14
12	Barrydowne	3014	4000	0.75

2.4. Existing Road Capacity Deficiencies

Although no problems were identified at the screenline level, analysis of the model results (p.m. peak hour) for individual corridors revealed several areas where capacity deficiencies currently exist. Problematic road links include:

- The Kingsway between Lloyd Street and Barrydowne Road in both directions.
- The Kingsway between Falconbridge Highway and 3rd Avenue in the eastbound direction.
- LaSalle Boulevard in the westbound direction between Barrydowne Road and MR 35.
- MR 35 in the westbound direction between Azilda and Chelmsford.

- Ramsey Lake Road in the westbound direction between South Bay Road and Paris Street.

- Falconbridge Highway in the Northbound direction between LaSalle Boulevard and Radar Road.

- MR 15 in the eastbound direction approaching the intersection with MR 80.

In addition, discussions with Greater Sudbury staff and technical analysis revealed that the following intersections are currently experiencing capacity problems:

- Paris Street at Ramsey Lake Road

- Paris Street at Regent Street

- The Kingsway at Barrydowne Road

- The Kingsway at Falconbridge Highway

- Notre Dame Avenue at LaSalle Boulevard

- Barrydowne Road at LaSalle Boulevard

2.4.1. Collision Rates

City of Greater Sudbury staff monitor collision rates at signalized intersections and along road corridors. Through these monitoring efforts, accident trends or accident-prone locations are revealed. Potential causes or contributing factors are then identified and used during the analysis and optimisation of corrective actions (Traffic Operation Studies). As the provision of a safe transportation system is one of the City's primary objectives, it is highly recommended that this practice continue.

2.5. Transit System

Greater Sudbury Transit provides transit service by conventional means, supplemented by a Transcab and Handi-Transit service. The goal of Greater Sudbury Transit is to be a public transit system that is accessible, that is integrated to the highest degree possible, that fully respects the rights and dignity of persons with disabilities and that provides appropriate alternatives for those who are unable to use even the most accessible conventional transit services. Based on these principles of integration and respect for dignity, it is the City's goal to integrate as many riders as possible on the accessible conventional transit system while providing a parallel system for those citizens who cannot access the conventional transit system. Accessible transportation service is provided to the more than 95% of the residents of Greater Sudbury who live within 2 kilometers of the service boundaries.

Some of the key features associated with the conventional transit service include:

- Service is provided within Greater Sudbury, which covers an area of approximately 3,627 square kilometres, the largest Ontario city by land mass.

- Over 83% of Greater Sudbury's population is within 400 metres of a transit route. For urban service, this percentage increases substantially.

- The service carries about 3.5 million revenue (fare paying) passengers, or 4.2 million total boardings (includes transfers).

- The ridership has been growing steadily at a rate of 5% annually since 1999.

- The transit system has about 50 buses that operate on 36 routes with a bus terminal in the downtown area.

- On weekdays and Saturdays, regular service is available between 6:00 a.m. and 10:00 p.m. and on Sunday between 10:00 a.m. and 8:00 p.m. on limited routes. Late evening service is also available on limited routes between 10:00 p.m. and 1:00 a.m.

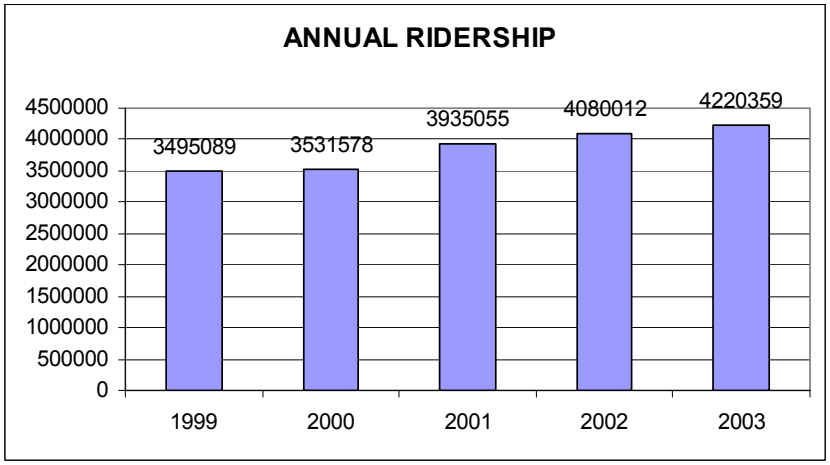
- 100% of the current bus fleet has accessibility features (21 of the 50 vehicles are fully wheelchair accessible).

- Fares have been increasing faster than the rate of inflation recently.

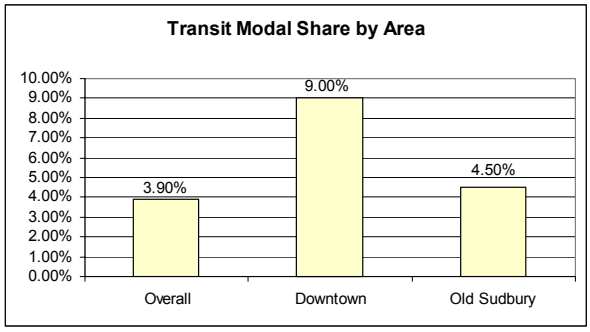
- Discount fares are available to students, seniors, and disabled persons.

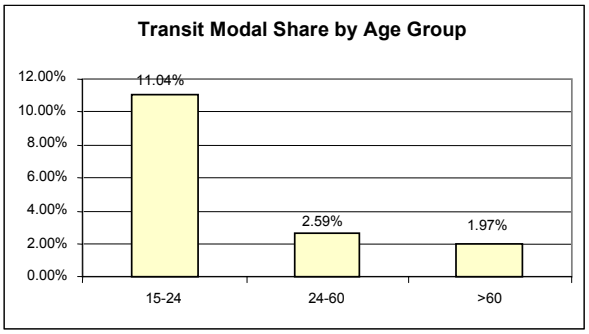
- The transit system recovers over 50% of its operating costs through fare box and other means. The City pays the remaining cost.

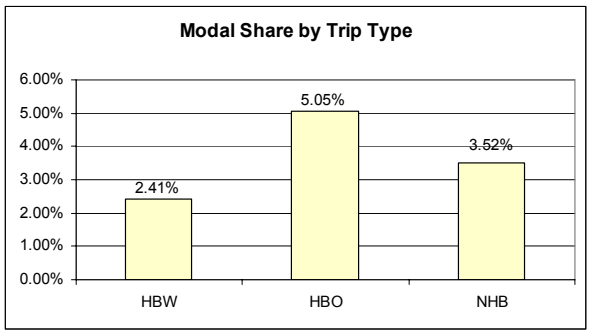
Transit ridership has been growing steadily from about 3.5 million annually in 1999 to about 4.2 million in 2003.



Based on findings of the household survey, transit accounts for about 4% of the total trips within Greater Sudbury. As would be expected, the transit modal share varies in different areas of Greater Sudbury, by age group, by trip purpose, and by duration. The following figures depict these variations.



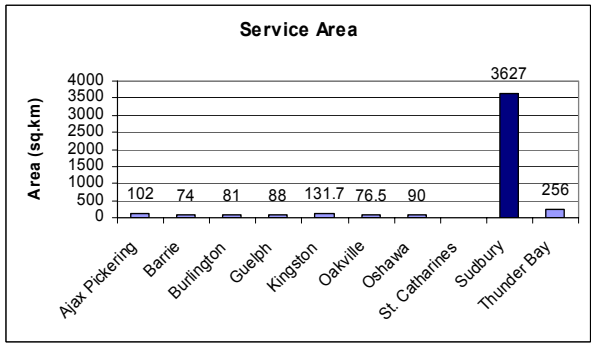


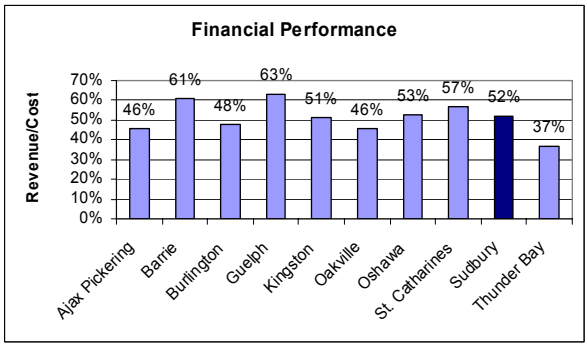


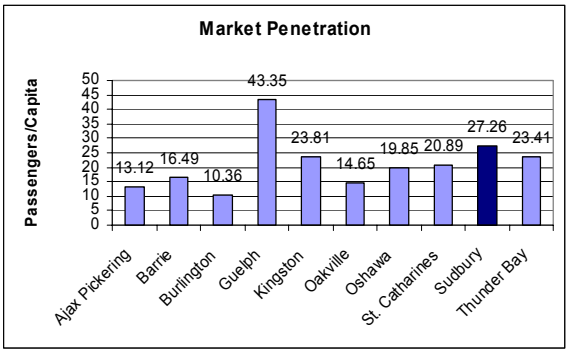
HBW- Home Base Work Trips
HBO – Home Base Other Trips
NHB – Non-Home Base Trips

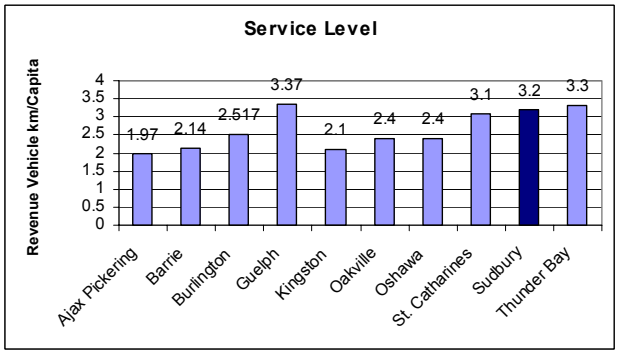
Of particular note is the significantly high transit modal share for the downtown, which is twice the average for the study area and the former City of Sudbury. Also, the transit modal share by people aged 15 to 24 is about three and a half times greater than other age groups. Sudbury is home to three post-secondary institutions all centrally located, which is likely, an important factor contributing to this high transit modal share. Furthermore, home-based non-work trips generally have a higher transit modal share.

Comparison of key indicators such as utilization, service area, service level, and financial performance was made with municipalities of similar population size, and are shown in the following figures.









The following is a summary of observations that can be made:

- The service area for Greater Sudbury Transit is by far the largest compared to its peer group.
- The financial performance, measured in terms of operating revenue and operating cost is above average. Given the large area that Greater Sudbury Transit serves, good financial performance reflects higher operating efficiencies and effective utilization of transit services.
- Greater Sudbury Transit offers a relatively high level of service as measured by revenue vehicle kilometre per capita. This is probably due to the large service area.
- In terms of market penetration (measured as transit trips per capita), Greater Sudbury Transit achieved 27.2 passengers per capita, which is higher than the level achieved by its peer group with the exception of the City of Guelph. Again, given the large service area, it is an impressive level that is likely due to good planning, a high student population, and effective service coverage.

In addition to conventional transit services, Greater Sudbury Transit provides transit service for the disabled. Handi-Transit complements conventional services for those individuals who cannot access the conventional route system due to physical disabilities. The Handi-Transit program uses fully accessible vehicles that are the same size as a small school bus to provide service to those who are physically unable to use conventional transit service. One Handi-Transit service provider with a centralized dispatch has recently replaced the decentralized service delivery model for Handi-Transit.

Greater Sudbury also offers a Transcab service, which is used to extend service to areas with lower population densities that have requirements for public transportation. Transcab uses taxis to connect to conventional bus routes to areas that are not easily accessible by Greater Sudbury Transit buses but have a population that depends on public transportation. Municipalities such as Onaping Falls, Levack, Dowling are serviced by Transcab routes, which connect to conventional bus routes in Chelmsford. Transcab service is also provided to Long Lake, Naughton/Whitefish, Richard Lake and Wahnapitae with connections to specified conventional transit routes.

Illustrated in Figure 2.5.1 are Greater Sudbury Transit routes serviced by conventional transit. It should be recognized that the service area expands to other smaller communities through the use of the Transcab service that connects to the conventional bus routes.

Conventional Transit Routes

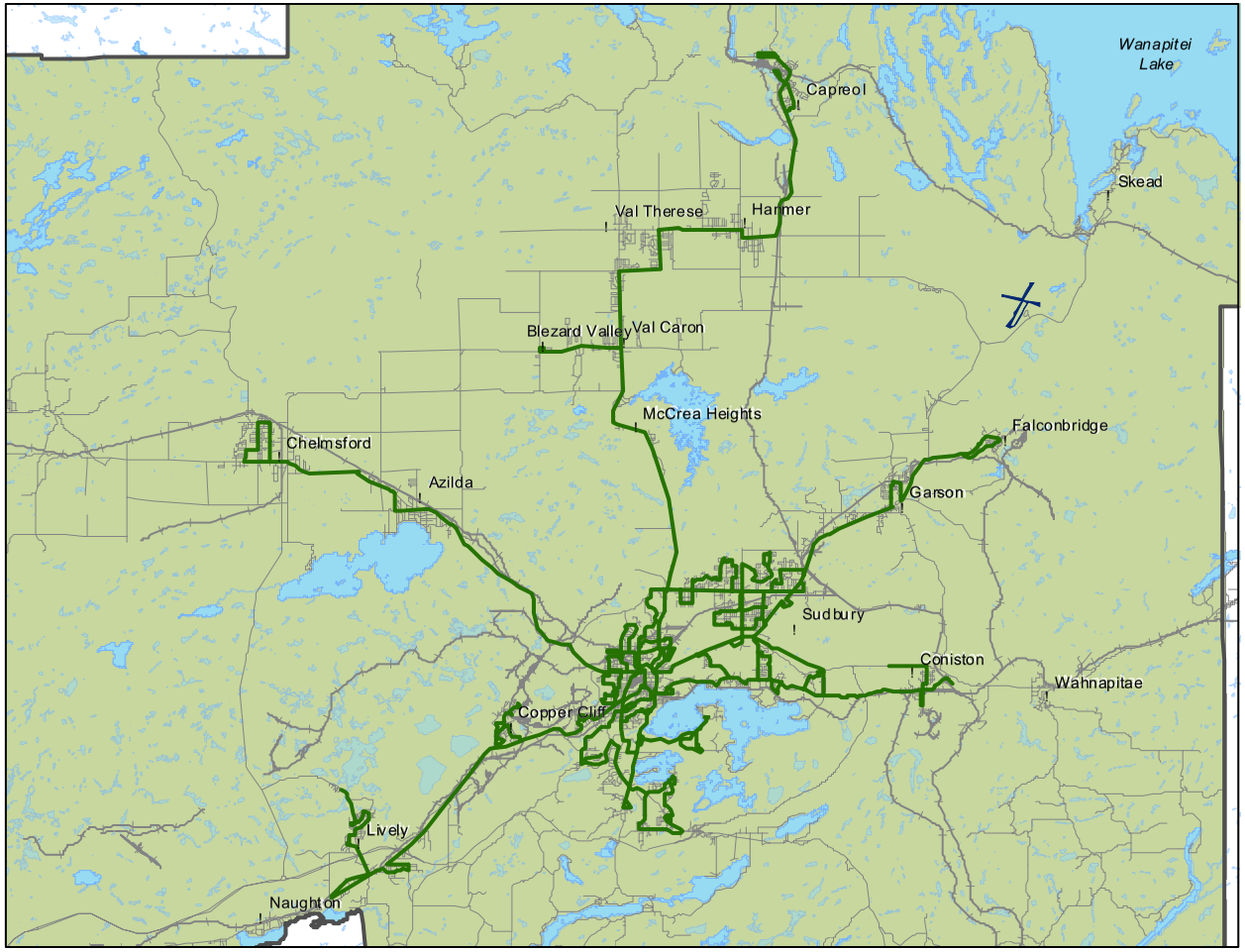


Figure 2.5.1

Legend

Transit Routes

2.6. Pedestrian and Bicycle Network

Walking and bicycling are recognized as alternative modes of transportation that enhance mobility throughout Greater Sudbury. Based on the findings of the household survey, approximately 5.7% of all the trips made in a 24-hour period were by either walking or by bicycling. The majority of these trips were by walking, with only 0.04% of the total by bicycle. It is concluded that because the survey was completed during the late fall and early winter months, the number of trips made by walking and bicycling are understated.

The former City of Sudbury has undertaken a significant amount of work to enhance and encourage bicycling in the area. In the fall of 1993, the former City of Sudbury established a Bicycle Advisory Committee whose role was to operate in an advisory and review capacity, advocate the needs of cyclists, identify opportunities for bicycling in the area, provide recommendations for action, and developed a list of priority projects to be completed. What resulted from the Bicycle Advisory Committee was the Bicycle Advisory Committee Reference Manual dated August 1997. This was approved by the former City of Sudbury council and was prepared to improve the opportunities and present a vision for cyclists in Sudbury. This document provides strategies and planning framework for use by the Bicycle Advisory Committee, provides technical information regarding bicycle route development and identifies programs to educate and promote awareness regarding safety, quality and quantity of cycling to all road uses in Greater Sudbury.

The Rainbow Routes Association (a not-for-profit organization) is a local community group, in Greater Sudbury, who in partnership with Greater Sudbury, in 2001, prepared the “Greater Sudbury Trail Guide” which identifies an extensive recreational trail system providing facilities available for walking, inline skating, cross-country skiing and bicycling for communities within Greater Sudbury.

2.7. Trucking

Due to the high level of accessibility provided by the existing road network, trucking continues to be an efficient and cost-effective means of moving goods within Greater Sudbury. However, there are a number of issues that are associated with trucking.

The rate of pavement degradation increases proportionately with truck use. Therefore, roads used by trucks have to be maintained at a much higher level than roads not used by trucks.

Trucks require more room to maneuver, more distance to stop, and more distance to accelerate to the prevailing speed. Traffic congestion makes it more difficult for trucks to operate safely, and increases the frustration of all drivers. Passenger vehicle actions such as cutting in front of trucks or rapid stopping result in collisions. Traffic signals are common on routes with heavy traffic volumes, and trucks can become the cause of congestion at signalized intersections because they require more time to accelerate to the speed of other traffic.

Trucking is safest on routes with adequate lane widths, intersections that allow trucks to turn from the curb lane into the proper departing lane, and where there is adequate capacity to meet all traffic demands without many traffic signals.

To address these issues, Greater Sudbury has designated certain roads that form truck routes. These truck routes were identified in Section 2.2.

In addition, a Trucking Action Plan completed as part of the 1992 Transportation Plan recommended the extension of Maley Drive and the upgrading of the existing Maley Drive as a preferred route for a northern truck bypass.

This truck bypass is required for a number of reasons:

- To reduce conflicts between truck and auto traffic on LaSalle Boulevard and the Kingsway, each of which is a major commercial street;

- To improve traffic operations on LaSalle Boulevard and the Kingsway; and

- To minimize the degradation of the road structure, and reduce the rate of pavement damage being incurred on LaSalle Boulevard as a result of truck traffic. This has the potential to create a safety problem.

2.8. Non Capacity Issues

2.8.1. Transit

As indicated earlier, transit in Sudbury is a fairly effective service as reflected both by impressive performance indicators and public opinion surveys. Nonetheless, there are a number of areas that could be addressed that would enable transit to be even more effective in meeting Greater Sudbury's mobility needs.

Greater Sudbury undertook a comprehensive review of its transit services and maintenance facilities in 1990. A fair number of the recommendations regarding service improvements have already been implemented. The average age of Greater Sudbury Transit's bus fleet has been a serious problem, especially in view of operations that involve longer distances and inclement weather conditions. Greater Sudbury Transit received delivery of six new buses in April 2004. With the arrival of these new buses, the average age of the fleet decreased (from more than 9 years to less than 7 years), resulting in a higher level of service, lower maintenance costs and more reliable service. The expected funding announcement regarding the allocation of a portion of the gas tax to transit may expedite the replacement and renewal of the fleet. Also, the fare collection system used by Sudbury Transit is quite old and needs to be upgraded. Replacement should be undertaken for the entire fleet since it is not desirable to have both electronic and non-electronic fare boxes in the system for operational reasons.

Within many communities that contain either a university or college, agreements exist between the local transit service provider and the university or college regarding the provision of discounted transit passes to students. The university makes the purchase of these discounted passes mandatory and includes the cost within the tuition fees. The transit service provider recovers the discount through increased operating revenues. It is understood that Greater Sudbury Transit held discussions with Laurentian University, Cambrian College and College Boreal; however, agreement with the student population was not achieved.

Consideration should be given to the integration of the public transit service with secondary school busing, which could potentially result in savings to both the school boards and Greater Sudbury Transit while providing a similar or a higher level of service to the public.

Transit fares in Greater Sudbury have been increasing at a rate higher than the inflation index. This may have been due to pressure to keep the operating deficit in check. This however is counterproductive to the objective of increasing transit use. Given that transit plays a significant role in serving Greater Sudbury's transportation needs, and contributes to broader socio-economic and environmental benefits, it is extremely important to at least maintain and hopefully increase transit usage in Greater Sudbury.

Greater Sudbury Transit serves a vast area and in the event that a bus breaks down it is very onerous to transport it to the main maintenance facility and service it. It is not only expensive but unduly affects the downtime for the bus service. There are certain strategies such as the use of satellite garages (private or public) or mobile maintenance units for light maintenance that need to be assessed in terms of applicability in Greater Sudbury.

2.8.2. Road Conditions

Greater Sudbury has undertaken a number of initiatives to address road conditions including completion of a Pavement Management Study in October 2002.

The goal of this study was the implementation of an automated system for the management of the paved elements in the Greater Sudbury road network. The objective was to produce an optimized, recommended pavement rehabilitation program.

In order for this system to provide reliable output, it must be properly maintained, therefore, it is highly recommended that the conclusions and recommendations of the Pavement Management Study be adhered to.

2.8.3. Accessibility

People with disabilities represent a growing percentage of the City's population. It is estimated that about 18,000 people in the City of Greater Sudbury have a long-term disability, of which 900 are children and 8,000 are 65 years of age or older. Furthermore, approximately 2,000 children in Greater Sudbury are considered to be "at risk" for physical disabilities. Statistics indicate that the number of people with disabilities will grow over the coming years (possibly from 13% of the population to 20%).

In response to these trends and Provincial legislation, the City has developed an Accessibility Plan that is intended to address existing barriers to people with disabilities and to prevent new barriers from being established. Barriers include anything that prevents a person with a disability from fully participating in all aspects of society because of his or her disability, including physical, architectural, informational, communicational, attitudinal, technological or policy/practice barriers. City Council has adopted a Policy of Universal Access that requires its services, programs and facilities to be accessible to people with disabilities regardless of the type of disability and age.

Relative to the Transportation Study is the recommendation within the Accessibility Plan that accessibility standards for road and intersection design be developed.

The following list of accessibility standards may not be complete and local conditions will determine which are applicable.

- Sidewalks should have two distinct surfaces: a smoothly paved path separated from the curb by textured "amenity strips" in which lamp standards, newspaper boxes, fire hydrants, plant boxes and other potential impediments are placed out of the main path of travel. Alternatively, a grassy boulevard may replace the hard-surfaced amenity strip.

- Sidewalk slopes should be gentle. Railings should be considered along and at the base of sloped paths.

- Curb cuts at corners and mid-block crosswalks should have a gentle slope and be textured to make them easier for people who are visually impaired to find and use.

- Adequate street width and curbside access should be provided for taxis, transit and other vehicles that serve people with disabilities.

- Pedestrian-only pathways should be provided to create short walking and wheelchair-accessible routes to public transit stops.

- Road patterns that feature connectivity and facilitate transit and access for emergency vehicles should be provided.

On June 30, 2005, members of the Study Team met with the City's Accessibility Committee to discuss the Official Plan project and related background Studies. The following is a summary of points raised at the meeting:

1. The condition of sidewalks in the City is a concern for those using wheelchairs as there are many breaks and heaves in the concrete. Where patching has occurred it is often quite rough. Also of concern is the close spacing of breaks (1.2m) between sheets of concrete which makes for uncomfortable wheelchair transportation.

2. It would be a good idea to map areas where there are larger populations of disabled and aging residents living and use such maps to establish priority areas for sidewalk maintenance including snow removal. The same could be said for mapping popular destinations for disabled and aging residents.

3. It would be helpful to mark common loading/unloading areas used by Handi-Transit to prevent these areas from being blocked and to encourage maintenance and snow removal.

4. The City should designate one on-street "barrier-free" parking space per block in the downtown area. Also, municipal lots downtown should include more 'barrier-free" spaces. Surface maintenance and snow removal are critical for 'barrier-free" spaces and this should be reflected in service schedules.

5. There is a need for more "barrier-free" parking spaces in shopping centres and other main activity areas. It is felt current ratios for providing "barrier-free" parking spaces are too low, considering the number of disabled individuals in the City and the aging population.

6. In some areas, the timing of pedestrian crossing lights is too short to allow for safe and comfortable crossings.

7. It would be helpful to have benches in close proximity to seniors/disabled residences to encourage people to get outside.

2.9. Public Issues

There have been a number of venues and opportunities for the public to provide input during completion of this study. The following sections summarize comments received during completion of the household survey, the Chamber of Commerce survey, the State of the Community survey and at the two public information sessions.

2.9.1. Household Survey

During completion of the household survey, participants were asked specific questions about transportation issues and invited to rank their level of concern as follows:

Rank	Level of Concern
1	Very dissatisfied
2	Somewhat dissatisfied
3	Neutral
4	Somewhat satisfied
5	Very Satisfied

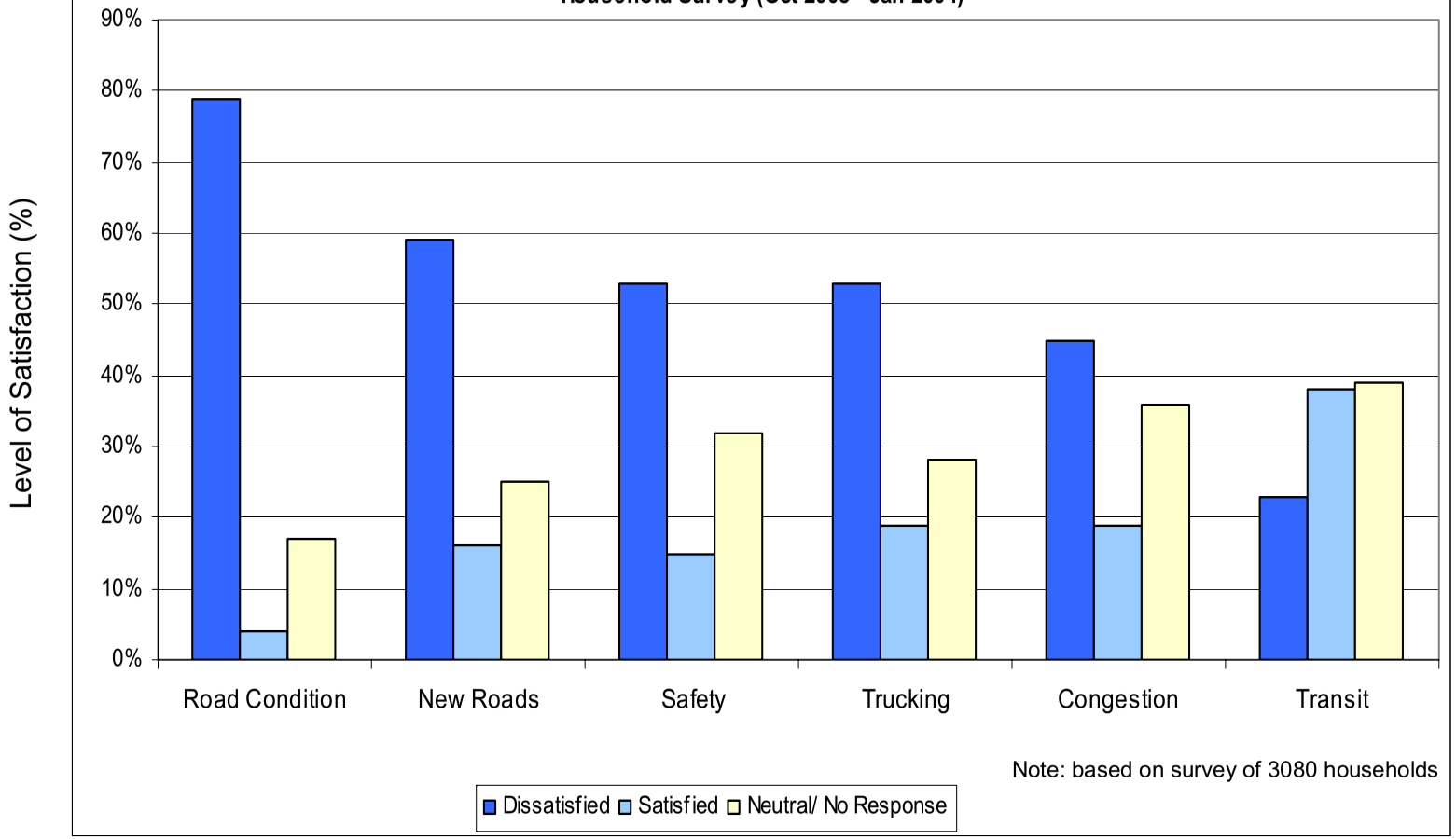
The results to these questions are tabulated in Table 2.9.1 and are illustrated in Figure 2.9.1.

Table 2.9.1 - Ranking of Transportation Issues

Issue	Rank				
	Very Dissatisfied		→		Very Satisfied
	1	2	3	4	5
Current Safety of Roads	25%	28%	32%	12%	3%
Level of Congestion	17%	28%	36%	17%	2%
Development of New Roads	32%	27%	26%	12%	4%
Quality of Existing Roads	48%	31%	16%	4%	0%
Number of Trucks	31%	22%	28%	15%	4%
Public Transit	12%	11%	39%	30%	8%

The results clearly show that the residents of Greater Sudbury are very concerned with the quality of existing roads as almost 48% of respondents indicated that they are very dissatisfied and an additional 31% are somewhat dissatisfied. 32% of respondents indicated that they are very dissatisfied with the development of new roads and an additional 27% are somewhat dissatisfied. 31% of respondents indicated that they are very dissatisfied with the number of trucks/transports on the roads and an additional 22% are somewhat dissatisfied.

Figure 2.9.1
Ranking of Transportation Issues
Household Survey (Oct 2003 - Jan 2004)



2.9.2. Chamber of Commerce

The Greater Sudbury Chamber of Commerce undertook a survey of it's members as a means to provide input for this study. Respondents indicated that the top Smart Growth strategies that should be emphasized are:

- Improved economic competitiveness;
- Build livable communities and create transportation choices;
- The need to address changing patterns due to a more influential role of Greater Sudbury in Northeastern Ontario;
- Implementation of major road links; and
- Clustering of new commercial development.

When questioned about alternative transportation strategies, 75% of the respondents felt that improving roadway conditions was very important, 46% felt that truck route designations and increased densities were very important and 35% felt that widening roads was very important.

In assessing the alternative transportation strategies, the respondents indicated that the following evaluation criteria were very important with equal weighting.

- Potential impact on air quality,
- Network improvement costs,
- Potential effects in existing environmentally sensitive areas, and
- Potential to reduce existing residential through traffic.

2.9.3. State of the Community

For the past four years a public opinion survey has been conducted to gauge the opinions of residents and businesses on a series of issues related to the quality of life in Greater Sudbury and quality of City services. The 2003 State of the Community Report, which summarizes the results of the survey, was based on interviews conducted between October 24 and November 7, 2002.

Respondents indicated that roads were the most important issue facing the community. This is a change from previous years, as roads did not appear on the list of issues. However, over the last few years the importance of roads has risen and become more important. From a business perspective, the issue of roads was also at the top of the list, sharing this position with jobs or unemployment.

In the 2003 State of the Community Report, the importance of the maintenance of the main roads topped the residents' list of important services currently provided by Greater Sudbury. The importance of this issue has grown by 5% over the previous year. With respect to municipal services, the business community identified winter road maintenance as the top priority in 2003 and the maintenance of main roads as third on the priority list.

The importance of transit service ranked higher with the business community than with residents. Of the 24 services provided by Greater Sudbury, the business community ranked transit service the 16th most important while residents ranked it the 20th most important.

The issue that both the business community and residents most agreed upon, in all four survey years, was that Greater Sudbury should invest in maintaining and improving existing facilities and roads rather than build new facilities or roads.

2.9.4. Public Information Sessions

Comments were received at the two public information sessions. The main issue was consideration and development of more facilities to accommodate pedestrians and bicycles. The need to develop a complete and accessible trail system including more bicycle paths throughout Greater Sudbury was reiterated a number of times.

Other comments included concerns regarding air emissions, support for the Maley Drive extension linking Maley Drive to MR 80 (parallel to LaSalle Boulevard) and concern regarding safety within the McCrea Heights area.

Comments received during the Public Information Sessions are provided in Appendix F.

3. HOUSEHOLD SURVEY

3.1. Methodology

To develop a better understanding of current travel patterns in Greater Sudbury, a household survey was undertaken. Approximately 5% of the households in Greater Sudbury were contacted and information regarding the travel patterns of all household members over the age of 15 was collected. The information included household type, start time of each trip, the mode of travel used for each trip, the purpose of each trip, the length of time for each trip, and the origin and destination of each trip. The trip origin and destination information took the form of an address, a major intersection, or the name of a major place. A copy of the survey questionnaire is provided in Appendix "G". The survey took place between October 2003 and January 2004 and over 3000 households were contacted. The information collected from the survey was used to calibrate and validate the travel demand forecasting model.

3.2. Conduct of the Survey

A 5% sample of households was drawn for each of the former municipalities in Greater Sudbury. Just prior to undertaking the survey, residents were notified that they might be contacted and asked to participate via an announcement in the Sudbury Star. Households were then contacted by telephone between the hours of 6:00 p.m. and 9:00 p.m. Household members over the age of 15 were queried on the trips they and their family members had made the day before.

3.3. Geocoding

The origin and destination of the trips recorded in the interviews were geographically coded (geo-coded) into the traffic zone system developed for Greater Sudbury, shown in Figures 4.2.1 and 4.2.2 (in Section 4 of this report). Greater Sudbury provided a street network file that gave address ranges for many road segments. Using TransCAD, a transportation modeling software, the traffic zone that these road segments were in, could be identified and in this way, part of the geo-coding process was automated. For those origins and destinations that could not be located using this method, the traffic zones were determined manually. Approximately half of the origins and destinations were geo-coded through the automated process and the remainder was manually geo-coded.

3.4. Expansion and Validation of the Survey

To calibrate the model, the 5% sample of households that participated in the survey was expanded to represent all households in Greater Sudbury. Two methods for performing this expansion were considered. The first involved expanding the information based on the number of households and the second involved expanding the information based on the population. Since population data was readily available at the Census Tract level, it was considered appropriate to expand the information for each Census Tract by the population of that Census Tract. Generally, due to the 5% sample size, expansion rates for each Census Tract were close to 20. After expansion, the next step was to validate the data with traffic information.

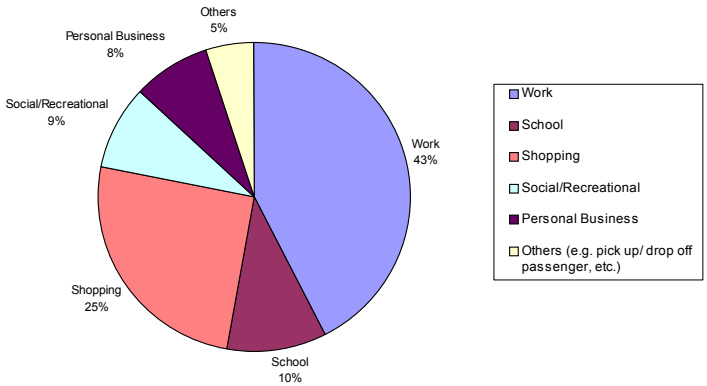
Validation of the survey data involved the creation of a 24-hour trip table at the traffic zone level from the survey data and, through the use of TransCAD, assigning this trip table to the base year road network. The resulting volumes were summarized on a screenline basis and compared to AADT information aggregated for roads crossing each screenline. Several screenlines were checked. Generally, for the screenlines on the outskirts of Greater Sudbury, the counts were higher than the assignment based on the household survey data. The reason for this is that the household survey data does not represent external data very well (i.e. trips going through Greater Sudbury, or trips originating in Greater Sudbury and leaving, or trips coming into Greater Sudbury). Screenlines closer to the center of Greater Sudbury compared well as these screenlines are less influenced by external traffic (i.e. a larger component of the traffic is internal to Greater Sudbury). Overall, the household survey data compared reasonably well to the daily count information and the survey was considered to accurately reflect the travel behavior of Greater Sudbury residents.

3.5. Overall Survey Results

After validation of the household survey data, the survey results were tabulated and comparisons were then made with the survey results from the 1992 Transportation Study. There were some major differences in the way the two household surveys were undertaken. For example, the earlier survey was a mail back survey while the new survey was a home interview survey conducted by telephone. Also, in the previous survey, travel information was collected for household members over the age of 12 while the new survey collected information for those over the age of 15.

With respect to trip purpose, the primary trip purpose for an entire day is work as shown in Figure 3.5.1 which shows the percent share that each trip purpose has in terms of total trips. School trips probably represent more than the 10% share of total trips shown in this Figure, however, as mentioned previously, children under the age of 16 were not surveyed. This has resulted in a lower percentage of total trips. A direct comparison of trip purpose with the previous survey results could not be undertaken as the previous survey results appear to be for a different time period (perhaps the a.m. peak hour or a.m. peak period) and not for an entire day as undertaken in this study.

Figure 3.5.1 - Primary Purpose of Trip



A comparison of trip purpose between this household survey and the 2001 Transportation Tomorrow Survey (TTS) undertaken in the Greater Toronto Area is shown in Table 3.5.1.

Table 3.5.1 - Primary Purpose of Travel

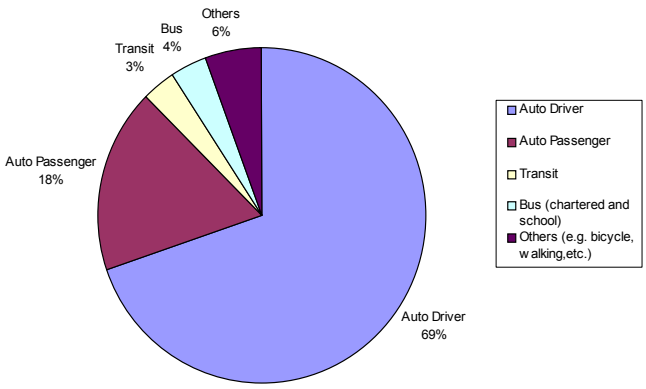
Primary Trip Purpose	2003 Greater Sudbury Survey	2001 TTS
Work	43%	37%
Shopping	25%	14%
School	10%	11%
Social/Recreational	9%	N/A
Personal Business	8%	12%
Other	5%	26%

Many of the "other" trips from the TTS could be "social/recreational trips". There also seems to be a significant difference in "shopping trips" with Greater Sudbury residents making a higher percentage of shopping trips then residents in the Greater Toronto Area.

In addition to automobile, transit, walking and bicycling, there were a number of other travel choices in Greater Sudbury that were captured in the survey. These other modes included ride sharing. Automobile passengers and taxi trips totaled approximately 18% of the total daily trips made in Greater Sudbury and chartered bus trips and school bus trips totaled approximately 3% of the daily trips.

Figure 3.5.2 shows the primary mode of travel. The majority of travel in Greater Sudbury is by automobile.

Figure 3.5.2 - Primary Mode of Travel



A comparison of the primary mode of travel captured in this household survey and the 2001 Transportation Tomorrow Survey (TTS) undertaken in the Greater Toronto Area is shown in Table 3.5.2.

Table 3.5.2 - Primary Mode of Travel

Primary Mode of Travel	2003 Greater Sudbury Survey	2001 TTS
Auto	69%	63.6%
Auto Passenger	18%	15.5%
Transit	3%	12.4%*
Bus (chartered and School)	4%	*
Other (walk, cycle & others)	6%	8.5%

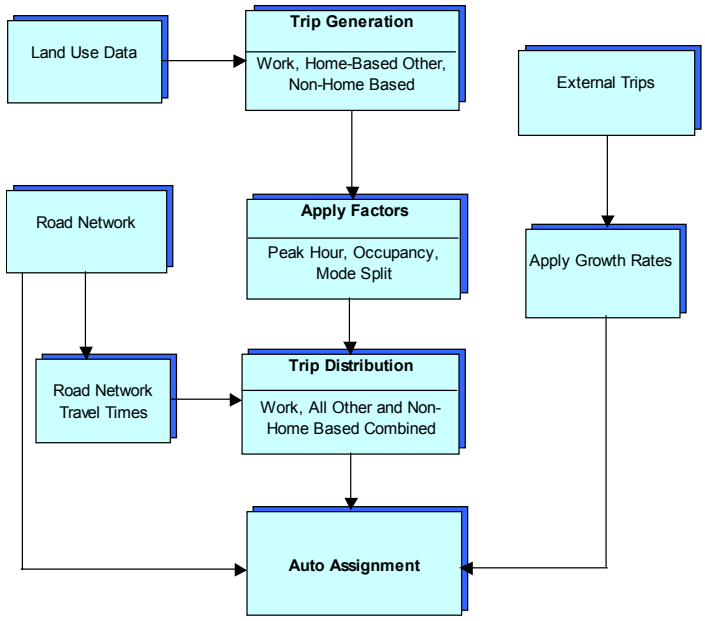
* "Transit" includes Charter and School bus

4. TRAFFIC FORECASTING MODEL

4.1. Model Overview and Model Limitations

Greater Sudbury's traffic forecasting model is comprised of four stages, which include Trip Generation, Trip Distribution, Mode Split and Assignment as shown in Figure 4.1.1. The components of the model are further explained in the following sections. Trip generation equations were developed to determine the number of trips generated by each traffic zone and the number of trips attracted to each traffic zone. The trip generation equations are based on the findings of the household survey. Trips have been categorized into three trip purposes; home-based work, home-based other and non-home based. Trip distribution involves the determination of the destination choices of trip makers (i.e. determines the flow of trips between traffic zones) using the productions and attractions determined from the trip generation model. A gravity model was used to distribute internal trips (trips having an origin and destination inside of Greater Sudbury) and the furness bi-proportional method for external trips (i.e. trips traveling through Greater Sudbury or having an origin or destination outside of Greater Sudbury). For many municipalities in Canada, this is the preferred method of performing trip distribution.

Figure 4.1.1 - Model



For the assignment of trips to the network, the equilibrium assignment technique within TransCAD was used. TransCAD is a travel demand modeling software that can be used to predict changes in travel patterns due to changes in development, demographics, and transportation choices. This is discussed further in the next section. Since the gravity model requires travel times, which reflect delays caused by traffic, the model is run iteratively between the gravity model and trip assignment.

The model was validated at the screenline level and is capable of producing reasonable forecasts at the screenline level and at the link level. Link level forecasts were compared to recent traffic counts to ensure accuracy. However, forecasts from this model cannot accurately simulate turning movements at intersections, as this model does not take into account driver behavior, delays at intersections and opposing traffic. For intersection turning movements, the validated link flows could be used as input into traffic simulation software that can be used to estimate turning movements.

4.2. Traffic Zone Development

The Traffic Zone System developed for the 1992 Transportation Study was reviewed and used as a starting point for the development of a new traffic zone system for use in the travel demand-forecasting model. Many zones in the former system were split into two or three additional zones, which resulted in 130 traffic zones, as shown in Figure 4.2.1.

General guidelines that were used to determine if the existing zones should be split are detailed in the following sections:

1. Conformance With Census Tract Boundaries

It is important to be consistent with Census Tracts so that traffic zones can be aggregated to Census Tracts. The rationale being:

- It allows comparisons between the Place-of-Residence/ Place-of-Work linkages and the household survey and assists in ensuring that the household survey data has been properly expanded; and

- It allows the use of POR-POW data in the development of the model.

2. Ability to Model Special Study Areas

The traffic zone system developed for the 1992 Transportation Study did not allow the modeling of special areas that demonstrate unique trip generation characteristics. This is a feature that the City wanted included in this transportation study.

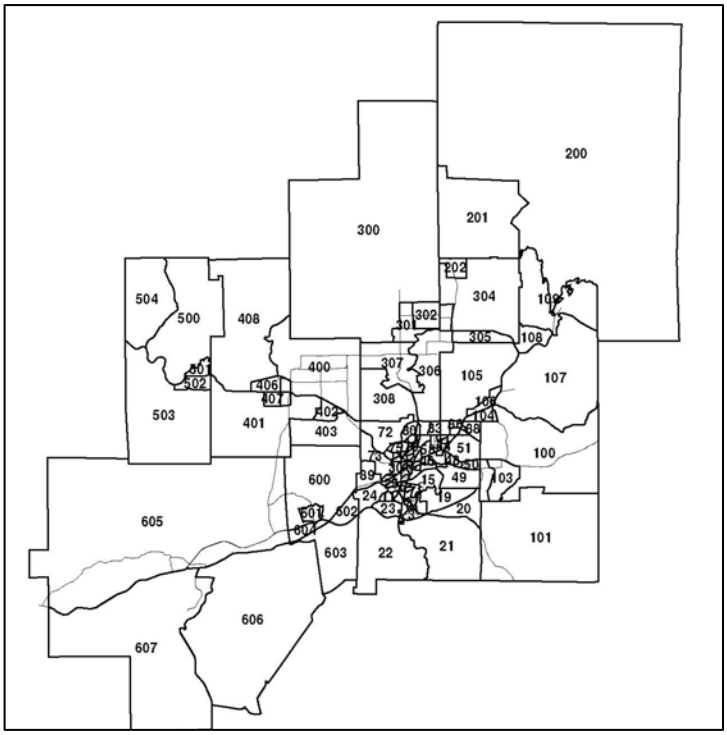
3. To Account for Future Development

The new traffic zone system had to account for future development. Several documents were reviewed to determine where future development could occur. These included active subdivision plans, Secondary Plans, etc. In order to reflect the anticipated future development patterns in Chelmsford, Val Caron, Hanmer and the former City of Sudbury, traffic zones were split in the transportation model.

4. For Accurate Calibration of the Travel Demand Forecasting Model

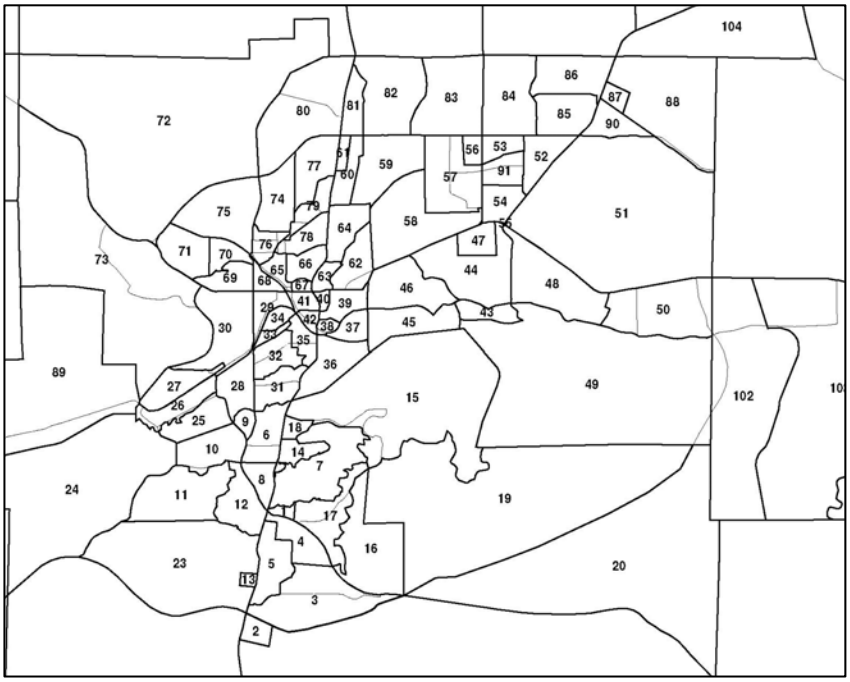
In some areas, the previous traffic zone system was not detailed enough to properly calibrate the model and produce reasonable forecasts. This was especially true in the downtown area and in some of the former municipalities. Generally, the level of detail for the road network in the model must be similar to the level of detail for the traffic zone system. The traffic zones in a travel demand-forecasting model are used to load trips onto the road system. Having too few zones and too many roads or visa-versa will make model calibration difficult and will produce poor forecasts. To meet the requirements of this Study, the road network, which has been developed for the model, is reasonably detailed; however further detailing of the previous traffic zone system was required.

Figure 4.2.1 - Traffic Zone System



City of Greater Sudbury

Former City of Sudbury



TransCAD allows a great deal of flexibility in the numbering of traffic zones. Traffic zone ranges were developed for each of the former municipalities within the City of Greater Sudbury. Assigned traffic zone ranges are as follows:

Former Municipality	Traffic Zone Range
City of Sudbury	1 to 99
Nickel Centre	100 to 199
Capreol	200 to 299
Valley East	300 to 399
Rayside-Balfour	400 to 499
Onaping	500 to 599
Walden	600 to 699
External Zones	700+

Traffic zone numbers were then assigned sequentially within each former municipality.

4.3. Road Network Development

The development of the TransCAD road network made use of a number of sources of information. The road network is comprised of centroids, which represent traffic zones, nodes, which represent intersections, and links, which represent the roads between the nodes. Links representing centroid connectors, highways, arterials and major collectors have been coded in the network. Although the nodes represent intersections, it must be acknowledged that TransCAD should not be used as an operational tool and that this type of strategic model cannot simulate operations at intersections. For example, for left turn movements, the model does not take into account the amount of opposing traffic and gaps in opposing traffic.

For the centroids and the nodes, coordinates are required. For the links, the following information is required:

- Posted Speed
- Length
- Road Type
- Capacity
- Number of Lanes by Direction

This information was culled from numerous sources including GIS files provided by Greater Sudbury, aerial photographs, and site inspections. Road types and assumed auto capacities are shown in Table 4.3.1.

Table 4.3.1 - Assumed Auto Capacities By Road Type

Road Type	Lanes Per Direction		
	1	2	3
Freeways	1800	3600	
Major Arterials/Rural Highways	900 - 1000	1800 - 2000	2700 - 3000
Medium Capacity Arterials	800	1600	
Minor Arterials	700	1400	
Collectors	500	1000	
Centroid Connector	10000		

Based on the road type, capacity and posted speed, a link performance function was assigned to each link. These functions are required by the equilibrium assignment technique used by TransCAD, for updating travel times. The equilibrium assignment technique uses an iterative process whereby trips are assigned and re-assigned to the road network until the paths between specific traffic zones converge at the same travel time (i.e. no traveler can improve their travel times by shifting routes). Travel times are determined by link performance functions assigned to each link. The link performance functions are based on the Bureau of Public Roads (BPR) formulae, which is as follows:

$t_c = t_{ff} (1+\alpha (v/c)^{\beta})$

where: t_c = travel time based on volume
$t_{ff=}$ free flow travel time
v = link volume
c = link capacity
α,β= calibrated link performance parameters

Table 4.3.2 shows the link performance parameters by road type used in Greater Sudbury's model.

Table 4.3.2 - Link Performance Parameters By Road Type

Road Type	Free-flow Speed(kph)	Parameters	
		α	β
Freeways	100	0.72	6.14
	90	0.72	6.14
Major Arterials/ Rural Highways	80	.597	5.87
	70	.597	5.87
	60	.597	5.87
Medium Capacity Arterials	60	.597	5.87
	50	.597	5.87
Minor Arterials	50	.507	4.96
Collectors	50	.507	4.96

These parameters are similar to those used in models in other municipalities within Ontario and Alberta.

4.4. Trip Generation

Trip generation involves the development of trip production and attraction equations or rates that will produce trip production and trip attraction to and from each traffic zone.

Trip generation rates have been developed based on the household survey for the p.m. peak period (3:30-5:29). The p.m. peak period was selected instead of the a.m. peak period in order to better determine the impact of special generators such as major shopping centers and institutions like hospitals, colleges and the University. Trip generation equations for both productions and attractions were tested for three areas and for three trip purposes. The areas consisted of the former City of Sudbury, the remaining areas outside the former City of Sudbury, and the special generators. The trip purposes are Home Based Work (HBW) which includes any trip with an origin or destination to or from home and work, Home Based Other (HBO) which includes any non-work trip having an origin or destination to or from home, and Non Home Based (NHB) which has neither an origin nor destination to or from home. The relevant variables used for each trip purpose are as follows:

- HBW – employment
- HBO - population and employment
- NHB - employment

In the development of the traffic zone system, an attempt was made to ensure that the major special generators had their own traffic zones to simplify the development of trip generation equations.

4.4.1. Trip Generation for Home Based Work Trips

For HBW trips, regression analysis was performed to determine the trip generation rates for trips having an origin in the former City of Sudbury and trip attraction rates were determined for trips having a destination in the former City of Sudbury. The variables used in this analysis included population and employment. Employment was considered the most important factor in terms of developing trip production and population was the most important factor for determining trip attraction. The final HBW trip generation and attraction rates for the former City of Sudbury are as follows:

HBW Trip Productions (within the former City of Sudbury) = 0.5425 * employment
(R-square = 0.734)

HBW Trip Attractions (within the former City of Sudbury) = 0.2532 * population
(R square = 0.723)

Results of the regression analysis for HBW trips within the former City of Sudbury are plotted in Figure 4.4.1 for productions and Figure 4.4.2 for attractions. The R-square value for both the generation and attraction equations are reasonable.

Figure 4.4.1 – P.M. Peak Period Home Based Work-Productions

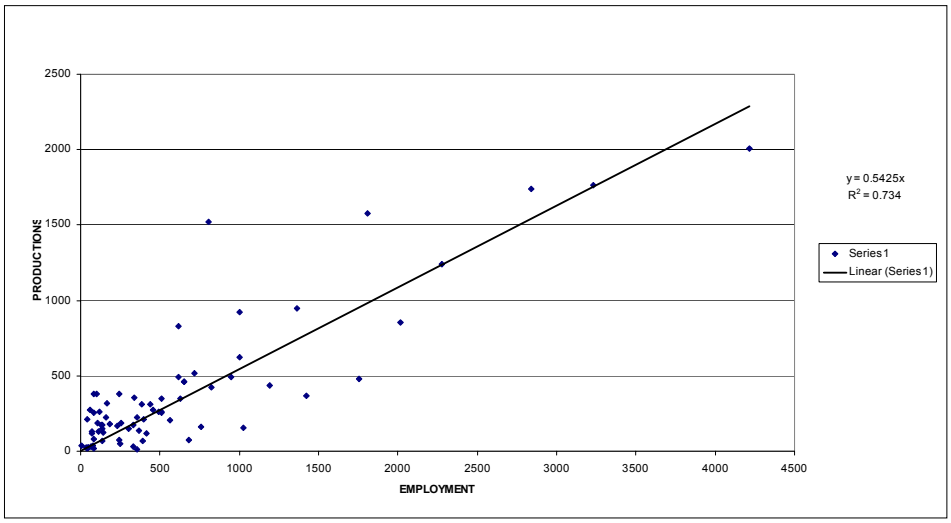
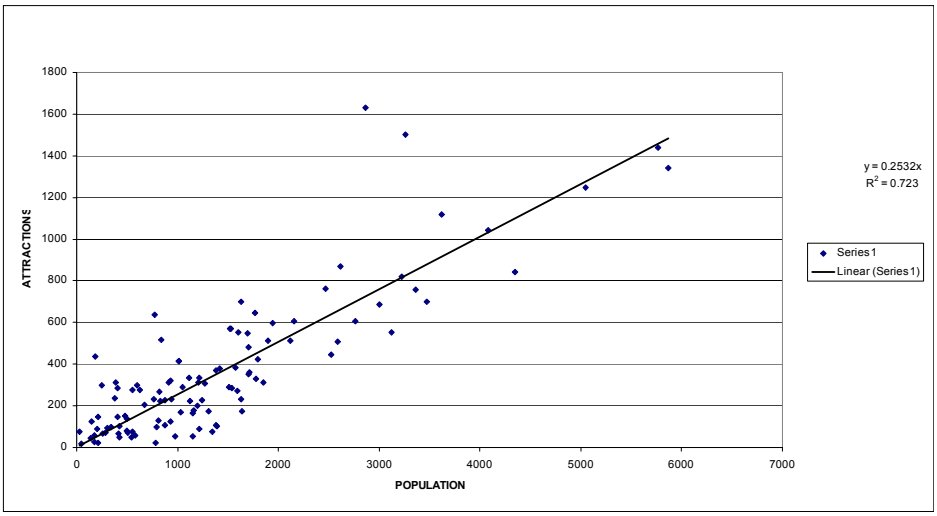


Figure 4.4.2 – P.M. Peak Period Home Based Work-Attractions



For trip productions with origins outside the former City of Sudbury and trip attractions with destinations outside the former City of Sudbury, regression analysis was also attempted. A good statistical fit could not be achieved for the trip productions and therefore, the following rate was developed:

HBW Trip Productions (outside the former City of Sudbury) = 0.627 * employment

However, for trip attractions it was found that the regression equation used for trip attractions within the former City of Sudbury also worked for trip attractions outside the former City of Sudbury, which is as follows:

HBW Trip Attractions (outside the former City of Sudbury) = 0.2532 * population
(R square = 0.7193)

4.4.2. Trip Generation for Home Based Other and non-Home Based Trips

Regression analysis for both HBO and NHB trips was undertaken using population and employment as variables. Good statistical fits could not be achieved, possibly due to the lack of trip records; therefore trip rates were developed for both inside the former City of Sudbury and outside. HBO trips are primarily shopping and school trips and it was elected to use both population and employment in the formulation of these rates. The HBO trip generation rates are as follows:

HBO Trip Productions (within the former City of Sudbury) = 0.111 * (population + employment)

HBO Trips Productions (outside the former City of Sudbury) = 0.033 * (population + employment)

HBO Trip Attractions (within the former City of Sudbury) = 0.083 * (population + employment)

HBO Trip Attractions (outside the former City of Sudbury) = 0.077 * (population + employment)

The NHB trips in the p.m. peak period are primarily trips between work and shopping or between shopping and shopping, and employment was considered to be the most important variable to consider in the development of these rates. The NHB rates are as follows:

NHB Trip Productions (within the former City of Sudbury) = 0.052 * employment

NHB Trip Productions (outside the former City of Sudbury) = 0.029 * employment

NHB Trip Attractions (within the former City of Sudbury) = 0.047 * employment

NHB Trip Attractions (outside the former City of Sudbury) = 0.046 * employment

4.4.3. Trip Generation for Special Generators

Several special generators were examined to determine if special trip generation rates should be developed or if the general rates previously described would suffice. The special generators selected were as follows:

- Laurentian Hospital
- Laurentian University
- Cambrian College
- College Boreal
- Southridge Mall

- Rio Can Centre
- Super Mall
- New Sudbury Centre

Trip generation was also checked for the Taxation Data Centre. The trip generation rates presented in Sections 4.4.1 and 4.4.2 were applied to the special generators and the number of trips from these "general" rates were checked against those generated from rates based on Institute of Transportation Engineers (ITE) Trip Generation Manual 6th Edition. The hospital trip generation was checked against the report prepared by TRANSPLAN & Associates regarding consolidation of the hospitals. In most cases, the "general" rates and equations for HBW, HBO and NHB trips produced similar trips as the ITE rates with the exception being the major shopping centers. HBO trips to and from the major shopping centers were under-represented by these "general" rates and special rates were developed using the household survey data. These are as follows:

HBO Trip Productions (malls) = 0.647* (population + employment)

HBO Trip Attractions (malls) = 0.083 * (population + employment)

A special trip attraction rate was also developed for NHB trips attracted to the major shopping centers and this is as follows:

NHB Attractions **(malls**) = 0.047 * employment

As a check to see how well overall the trip generation and attraction equations were functioning, they were applied to the base year population and employment figures and compared to the productions and attractions from the household survey. This comparison is shown in the following table:

	Based on Trip Generation Rates	Based on Survey
Trip Productions	60,260	61,150
Trip Attractions	60,579	61,150

For trip productions, the results from the household survey and those based on the trip generation rates are within 2.5%, which is considered very reasonable. The trip attractions are within 1 % of each other. An additional test is to compare the trip productions to the trip attractions both based on the trip generation rates. These should be within 10% of each other and in this case are less than 1% apart (60,260 vs. 60,579). These comparisons indicate that the trip generation and attraction equations are reasonable.

4.5. Trip Distribution

Trip distribution involves the calculation of flows between origin and destination zones using the productions and attractions determined from the trip generation model. Trip distribution was undertaken using two methodologies. The first methodology utilized a calibrated gravity model for trips having an origin and destination within Greater Sudbury (internal trips).

For all other trips (i.e. external trips either traveling through Greater Sudbury or having an origin or destination outside Greater Sudbury) a base year p.m. peak hour external trip table was developed using the household survey records, the external trip table from the 1992 Transportation Study, traffic counts, and a procedure in TransCAD which generates trip tables based on partial survey information and traffic counts.

Although there are several methods for performing trip distribution, a gravity model was deemed the most appropriate method for the Greater Sudbury model for internal trips. The determination of the number of trips between traffic zones becomes a function of the number of trip productions at the origin zone, the number of trip attractions at the destination, and some function of travel between the zones, which in the case of Greater Sudbury is travel time. The general form of the gravity model is shown in the following equations:

$$Tij = Ai * Bj * Oi * Dj * Fij$$

Where Tij= Trip interchanges between origin zone I and destination zone j,
Oi= Total trip productions at origin zone I
Dj= Total trip attractions at destination zone j,
$f(t(ij))$= Travel deterrence function, in the case of Sudbury it is an inverse exponential function of time defined as;

$$f(t(ij)) = e^{-ßt(ij)}$$

Where $ß$= a calibration parameter,
$t(ij)$= auto travel time from zone i to zone j
A,B = balancing factors

With this form of the gravity model, as travel time between zones increases, the number of trips between those traffic zones decreases.

Typically, home based work (HBW) trips have different trip making characteristics than home based other trips and non home based trips and for this reason it was decided to calibrate two gravity models for internal trips. This means that a ß parameter needs to be calibrated for HBW trips and another for all other trips (i.e. home based other and non-home based trips).

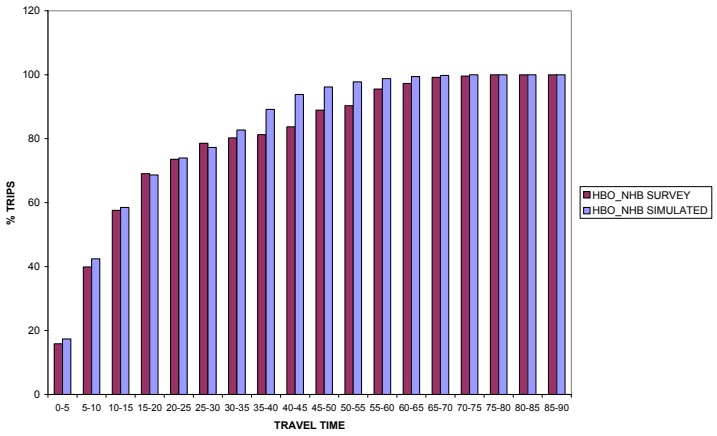
The TransCAD software has a built-in routine for calibrating gravity models and this was used to determine the β parameters to be used in the gravity models. A p.m. peak hour travel time matrix, and p.m. peak hour trip observed tables for both purposes are required to perform this task. These calibrated parameters are as follows:

Home Based Work - ß = 0.0370

All Other trips - ß = 0.0412

The goodness of fit for these parameters is measured by comparing aggregated observed and simulated trip tables for HBW and all other trips and the trip length distributions. Comparison of the observed and simulated trip tables at the former municipal level for each trip purpose indicated that the gravity model was properly simulating trips between these areas. This is discussed further in Section 4.6 of this report. The trip length distribution for each trip purpose based on application of their respective gravity models reasonably replicated the observed trip length frequencies for these trip purposes. A comparison of cumulative trip length frequency distributions for simulated and observed trips for HBW and All Other trips is shown in Figures 4.5.1 and 4.5.2. The overall average travel times between the trip tables extracted from the household survey and those generated by the gravity model compare well also. This comparison is as follows:

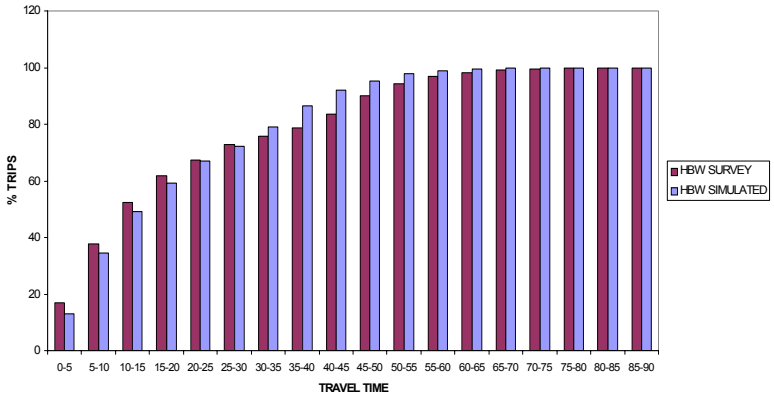
FIGURE 4.5.2 - CUMULATIVE TRIP LENGTH FREQUENCIES FOR ALL OTHER TRIPS



	Home-Based Work	All Other trips
Household Survey	21.18 minutes	21.56 minutes
Gravity Model	19.86 minutes	20.13 minutes

Prior to applying the gravity model to the productions and attractions generated by the trip generation model, factors need to be applied to the trip productions and attractions to convert them to p.m. peak hour autos. The trip generation model produces p.m. peak period person trips and factors are required to convert p.m. peak period trips to p.m. peak hour, to eliminate non-auto modes, and to account for auto occupancy.

FIGURE 4.5.1- CUMULATIVE TRIP LENGTH FREQUENCIES FOR HBW

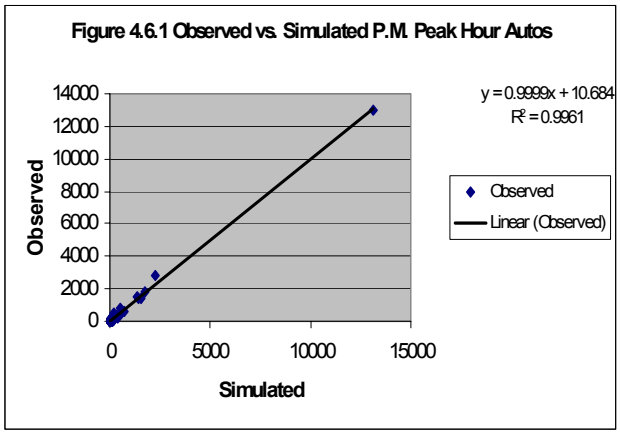


The factor for converting p.m. peak period person trips to peak hour is 0.57. To convert these to auto person trips, which removes trips made by non-auto modes, a factor of 0.92 is applied. Dividing auto person trips by an occupancy rate of 1.178 produces autos, which can then be used as input to the gravity model. For the future, application of the gravity model requires the future productions and attractions for each trip purpose, and the future road network.

4.6. Model Validation

Validation of the model involves comparisons of model simulations for a base year with observed data collected in that base year. In the case of the Greater Sudbury model, the observed data consists of the household survey data discussed in Section 3.1, which is summarized in a trip table, and count data collected from Greater Sudbury and the MTO, which is summarized, on a screenline basis.

The p.m. peak hour survey data is compared to the p.m. peak hour simulated trips on an aggregated trip table basis with the aggregation being on the former Municipalities. A comparison of the observed and simulated trips is shown in Figures 4.6.1 and 4.6.2. Figure 4.6.1 shows a direct comparison between observed and simulated trips while Figure 4.6.2 shows a comparison of the natural log (LN) of the observed trips with the LN of the simulated trips. The R-square indicates that the model is producing reasonable estimates of travel between the former municipalities.



Comparisons of simulated p.m. peak hour volumes with traffic counts at the screenline level are shown in Table 4.6.1. Also shown is the screenline summary of the home interview survey data. The "inbound" represents trips traveling towards the center of the City while the "outbound" represents trips traveling away from the center of the City. The household survey was geo-coded to the traffic zone level then assigned to the base year road network then summarized by screenline. In some cases the count data was lower than the model simulation and the results of the household survey. The p.m. peak hour count data was acquired from Greater Sudbury and from the MTO. Some of these counts were in the form of intersection counts collected manually while others were collected by Automatic Traffic Recorders (ATR) as part of the AADT count program. Counts were not always available for recent years, which meant that prior counts had to be used. Also, in a few instances the p.m. peak hour counts had to be estimated from the AADT counts. Also, some of the screenlines cross minor roads for which counts were not available. Ideally, for model validation purposes, the count data should be collected using the same method and the counts should all be done at the same time. The lack of consistency in terms of timing and the fact that some of the counts had to be estimated makes it difficult to use for model validation purposes. In spite of this, comparisons at the screenline level between the model simulation, the observed data from the household survey, and the count data indicates that the model has been well calibrated and validated. Figure 4.6.3 illustrates the screenlines used for the model validation.

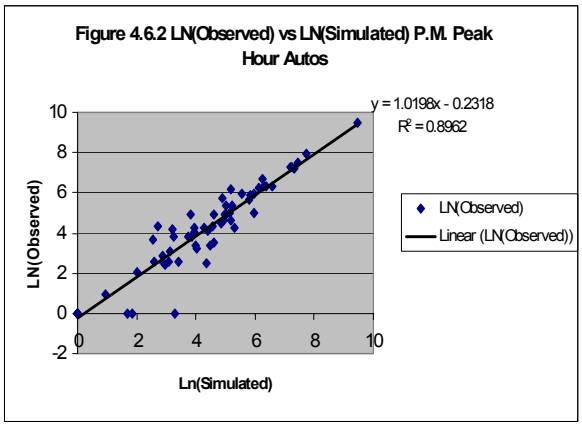
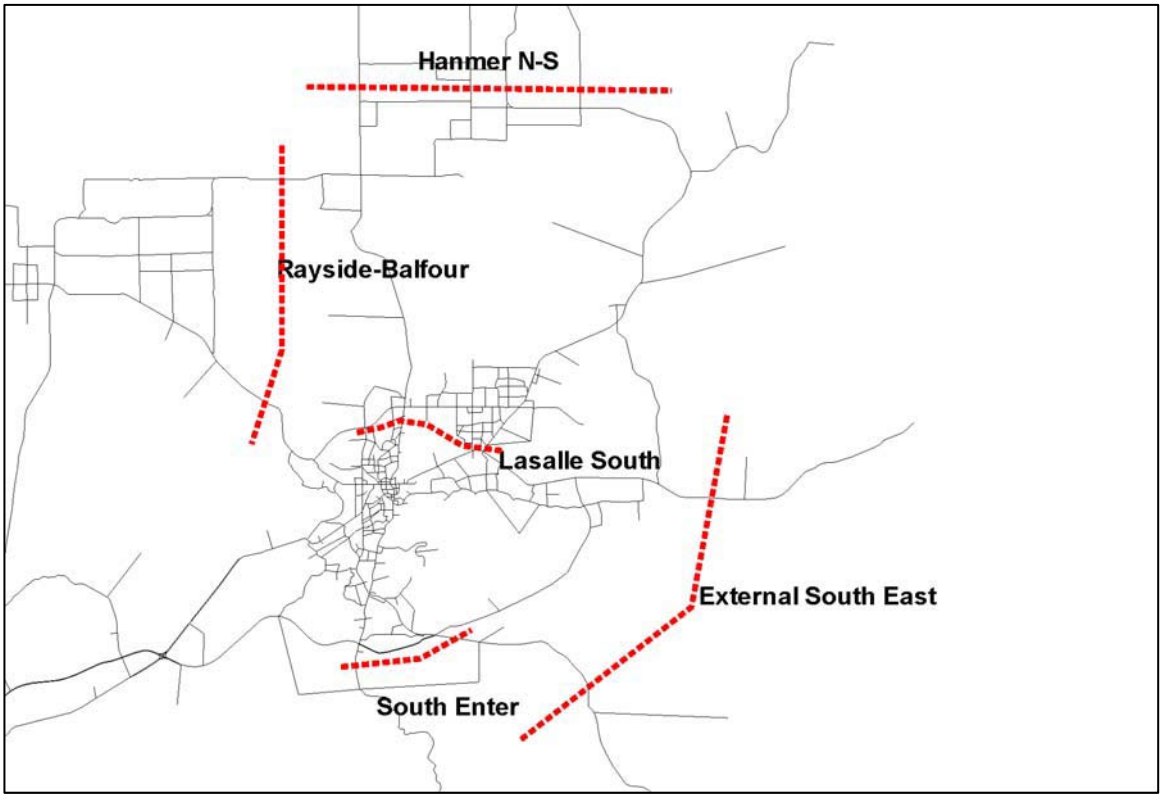


Table 4.6.1 - Model Validation Screenline Analysis

SCREENLINE		Inbound Survey	Inbound Simulation	Inbound Count	Inbound Simulation/ Survey	Inbound Simulation / Count
1	South Entrance	1621	1189	1024	0.73	1.16
2	LaSalle South	3596	3584	2832	1.00	1.27
3	External South East	1117	1137	775	1.02	1.47
4	Hanmer North-South	492	541	681	1.10	0.79
5	Rayside-Balfour	1393	1270	925	0.91	1.37

SCREENLINE		Outbound Survey	Outbound Simulation	Outbound Count	Outbound Simulation/ Survey	Outbound Simulation/ Count
1	South Entrance	961	839	645	0.87	1.3
2	LaSalle South	3944	4179	4235	1.06	0.99
3	External South East	1401	1504	1203	1.07	1.25
4	Hanmer North-South	1874	1648	1280	0.88	1.29
5	Rayside-Balfour	1067	1164	1275	1.09	.91

Figure 4.6.3 - Screenlines Used for Model Validation



5. FUTURE CONDITIONS

To generate future travel demands, the four stages of the model as described in Section 4 of this report were applied using future population, employment and road network as inputs.

5.1. Future Population and Employment

Future populations were provided by Greater Sudbury. This included a population of approximately 175,000, identified as a high in-migration scenario. The rational for modeling the high in-migration scenario was that it would have the greatest impact on the transportation system. This population level had been reached previously and it was proposed that this population could be reached again.

Year 2001 employment figures were developed using 2001 POR-POW data at the Census Tract level. Employment for each Census Tract was allocated to the traffic zones within each Census Tract. This allocation was augmented by employment data contained in the 1992 Transportation Study and information provided by Greater Sudbury.

Percentage increases in population for the former municipalities between the Year 2001 and Year 2021 were used as a basis to project the 2021 employment for each of the former municipalities. For example, based on the percent increase in population shown in Table 5.1.1, the 2001 employment figures for all the traffic zones in Valley East were increased by 14%.

Table 5.1.1 - Year 2021 Land Use Data

	Year 2001 Pop.	Year 2021 Pop.	% Population Increase	Year 2001 Employment	Year 2021 Employment	% Employment Increase
Capreol	3486	3743	7	730	784	7
Nickel Centre	12672	14096	11	2505	2786	11
Onaping Falls	4887	5283	8	1890	2043	8
Rayside-Balfour	15047	16807	12	2800	3128	12
Sudbury	85357	96847	13	49749	56445	13
Valley-East	22375	25539	14	4080	4657	14
Walden	10101	11367	13	3905	4394	13
New Townships	1299	1299	0	*	*	*
	155224	174981	13	65659	74237	13

*minimal

Greater Sudbury provided additional information regarding projected employment at new and existing mining sites, the Laurentian Hospital site, and several mall expansions. The employment for the affected traffic zones was updated and the final 2021 employment by former municipalities used in the assessment along with the 2001 employment is shown in Table 5.1.2.

Table 5.1.2 - Year 2021 Employment (Final)

	Year 2001 Employment	Year 2021 Employment
Capreol	730	784
Nickel Centre	2505	3086
Onaping Falls	1890	2043
Rayside-Balfour	2800	3128
Sudbury	49749	59650
Valley-East	4080	5337
Walden	3905	4733
	65659	78761

5.2. Future Travel Demands

Future travel demand and future capacity deficiencies were determined for the p.m. peak hour by applying the four stages of the model (i.e. trip generation, trip distribution, modal split and assignment) as described in Section 4 of this report, and using future population and employment figures and the existing and future road network as inputs.

To determine future travel demands, a Year 2021 daily auto trip matrix was developed using a growth factor technique and the Year 2021 population and employment figures. Figure 5.2.1 shows the current daily travel demand and the growth in daily travel demand projected by 2021 for the former municipalities. The largest increases are expected to be within Valley East, and, between Valley East and the former City of Sudbury. These increases are 22% and 18% respectively. 13% increases can be expected between Sudbury and Nickel Centre, Sudbury and Walden, within Walden, within Sudbury and within Nickel Centre.

Daily Travel Demand

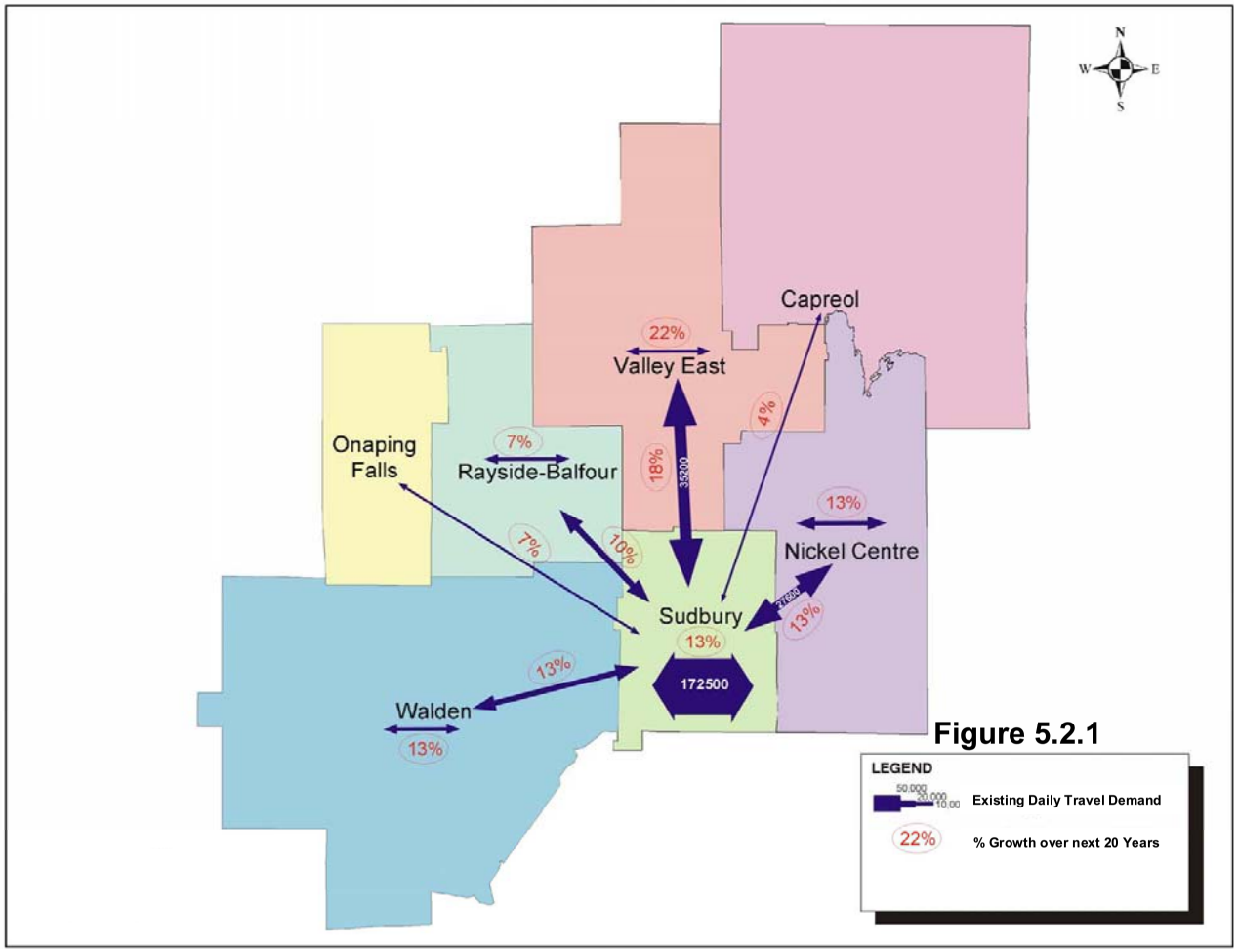


Figure 5.2.1

5.3. Assignment of Future Travel Demands on Existing Network

To identify future road network deficiencies, the p.m. peak hour was selected for future travel demand modeling purposes because the traffic volumes are at their highest levels during this time period. P.M. peak hour demands were estimated by running the travel demand-forecasting model with future population and employment projections. This analysis was used to identify deficiencies in the existing road network and to assist in identifying necessary improvements. The results of the assignment are described in Section 5.5.

5.4. Assignment of Future Demands on Committed Road Network

Greater Sudbury identified several road improvement projects that are scheduled to be built within the next two or three years. While these improvements are not considered as part of the existing road network (used to calibrate the model), they are assumed to be in place before the 2021 horizon year and form the "committed road network". These improvements include:

- Widening of MR 35 from two to four lanes between LaSalle Boulevard and Montee Rouleau.
- Widening of Long Lake Road from two to four lanes between Regent Street and Highway 17.
- Widening of MR 80, from two lanes to four lanes, from Desmarais Road to Notre Dame Avenue in Valley East.

A model run was undertaken to determine future deficiencies in 2021 using this "committed road network".

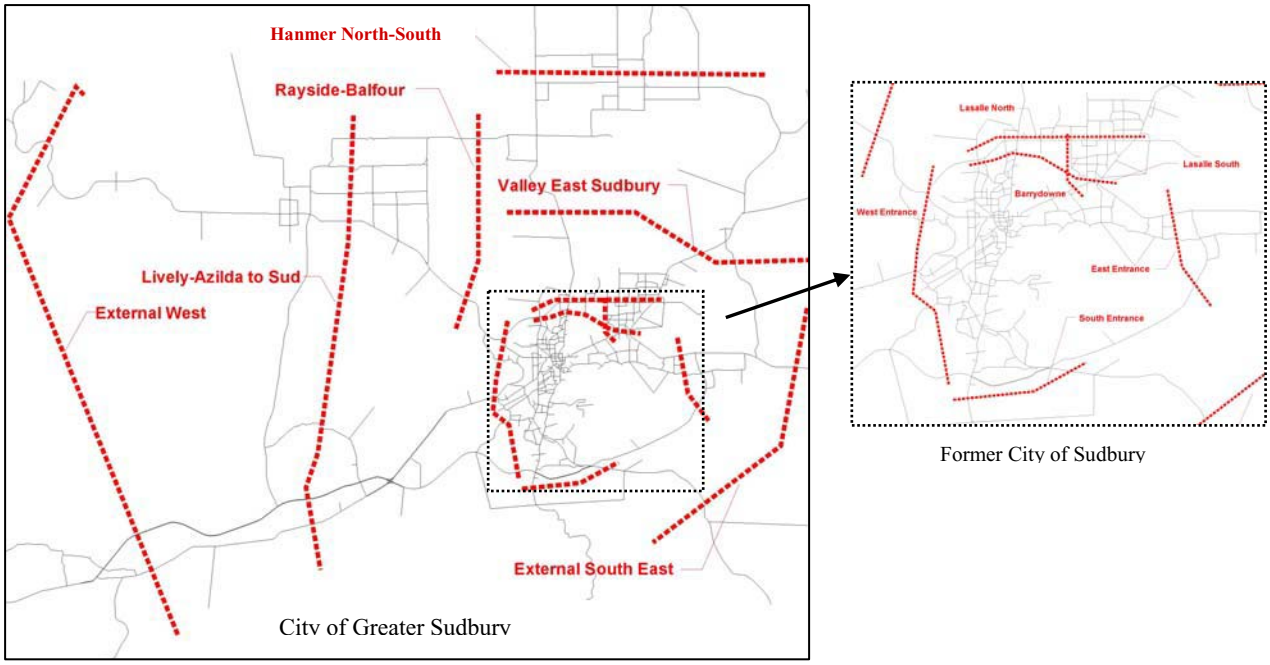
5.5. Future 2021 Road Capacity Deficiencies

Screenline analysis of the model run of 2021 traffic volumes on the committed road network is shown in Table 5.5.1. An expanded version of Table 5.5.1 is provided in Appendix H. The locations of the screenlines are shown in Figure 5.5.1.

Table 5.5.1 - Screenline Analysis - Future Traffic on Committed Road Network

SCREENLINE NUMBER	SCREENLINE NAME	INBOUND		
		AUTOS	CAPACITY	VOLUME TO CAPACITY RATIO
1	South Entrance	1306	2500	0.52
2	West Entrance	3957	7700	0.51
3	LaSalle North	2797	10100	0.28
4	LaSalle South	3945	6700	0.59
5	Lively-Azilda to Sudbury	3471	8200	0.42
6	External South East	1368	2900	0.47
7	Valley East-Sudbury	1358	4300	0.32
8	Hanmer North-South	846	3900	0.22
9	Rayside-Balfour	1341	2700	0.50
10	East Entrance	1772	3400	0.52
11	External West	1618	5400	0.30
12	Barrydowne	3631	4000	0.91
SCREENLINE NUMBER	SCREENLINE NAME	OUTBOUND		
		AUTOS	CAPACITY	VOLUME TO CAPACITY RATIO
1	South Entrance	964	2500	0.39
2	West Entrance	5378	7700	0.70
3	LaSalle North	6157	10100	0.61
4	LaSalle South	4858	6700	0.73
5	Lively-Azilda to Sudbury	2255	8200	0.28
6	External South East	1722	2900	0.59
7	Valley East-Sudbury	3831	4300	0.89
8	Hanmer North-South	2132	3900	0.55
9	Rayside-Balfour	2034	2700	0.75
10	East Entrance	2167	3400	0.64
11	External West	1620	5400	0.30
12	Barrydowne	3177	4000	0.79

Figure 5.5.1 – Screenline Locations - Future Traffic on Committed Road Network



A few problems were identified at the screenline level, however, analysis of the model results for individual corridors revealed several areas where capacity deficiencies will exist in 2021. Problematic road links include:

- Notre Dame Avenue in the northbound direction between Elm Street and LaSalle Boulevard.
- The Kingsway between Lloyd Street and 3rd Avenue in both directions.
- LaSalle Boulevard in the westbound direction between Barrydowne Road and MR 35.
- MR 55 in the westbound direction between Big Nickel Mine Road and Highway 17 West.
- The Southwest Bypass in the westbound direction between Long Lake Road and Highway 17 West.
- MR 35 in the westbound direction between Azilda and Chelmsford.
- Ramsey Lake Road in the westbound direction between South Bay Road and Paris Street.
- MR 80 (Notre Dame Avenue) in the northbound direction from north of LaSalle Boulevard to MR 15 (Main Street). This includes the section of MR 80 through McCrea Heights.
- Sections of Paris Street in the southbound direction between Elm Street and Regent Street.
- Falconbridge Highway in the northbound direction between LaSalle Boulevard and Radar Road.

Year 2021 Capacity Deficiencies

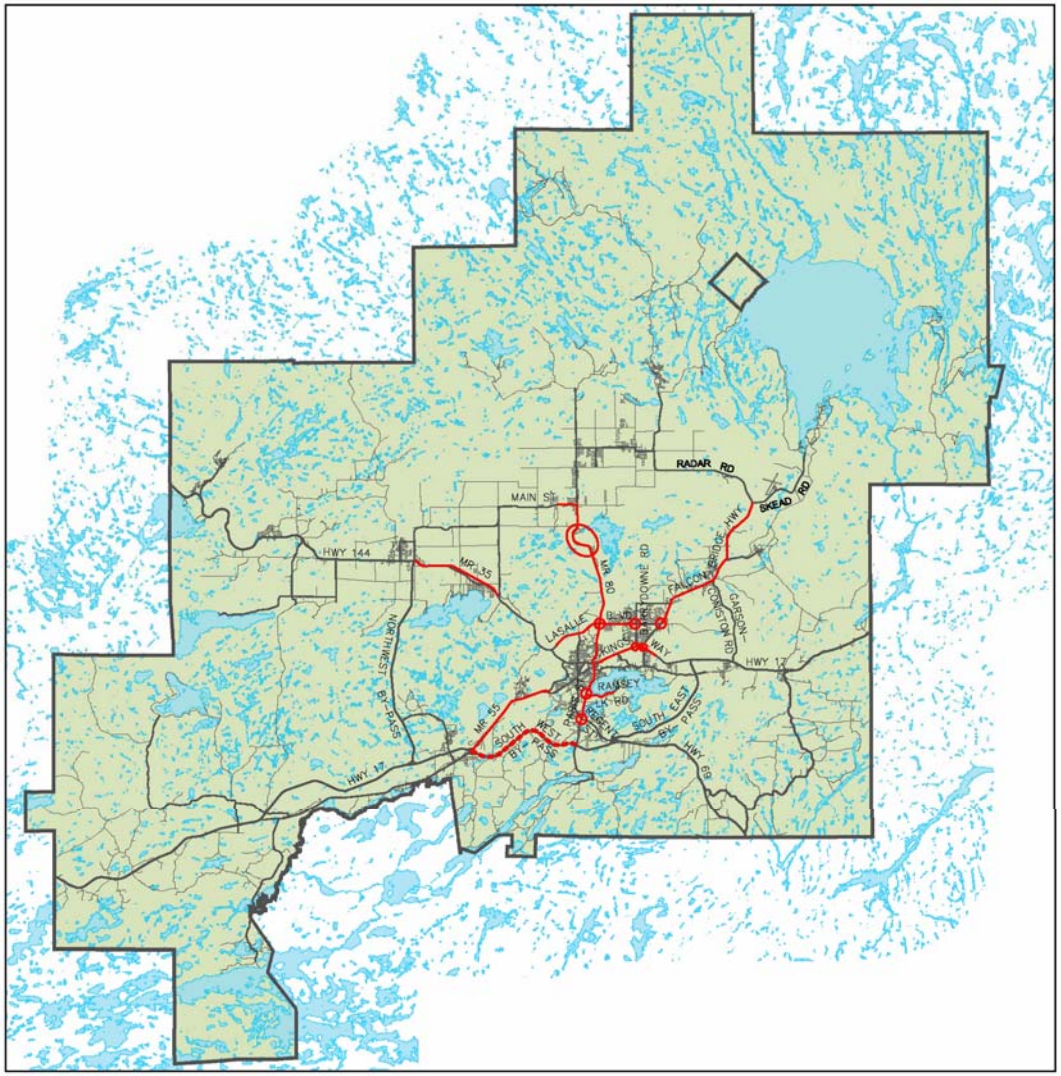


Figure 5.5.2

6. TRANSPORTATION STRATEGY

This chapter presents various options to address the transportation challenges in Greater Sudbury, the evaluation of these options, and the major building blocks that have been used to facilitate implementation of the recommended option.

6.1. Evaluation of Options

As indicated in previous chapters, Greater Sudbury faces a number of transportation challenges. To address these challenges, the following options have been considered:

1. Do Nothing:

   While the "Do-Nothing" option is the least expensive, it does not address congestion, safety, or other transportation related issues. By not addressing congestion, safety, or other transportation related issues, there would be a serious, negative impact on the City's socio-economic objectives, and the quality of life for its citizens would be adversely affected. Accordingly, this option is not viable, and is therefore rejected.

2. Improve the Transportation System through Increased use of Transit Systems, Ridesharing, Bicycling and Walking:

   By implementing this option, congestion, safety, and other transportation related issues would be addressed through the increased use of transit systems, ridesharing, bicycling and walking. No improvements to the existing road network would be made. From a social, cultural and natural environment perspective, it is a desirable option, however, given the current modal share by transit systems, ridesharing, bicycling and walking, congestion, safety, and other transportation related issues would not be fully addressed. Therefore the implementation of this option would have a negative result similar to the "Do-Nothing" alternative but to a lesser degree. Hence, this option was not selected for further consideration.

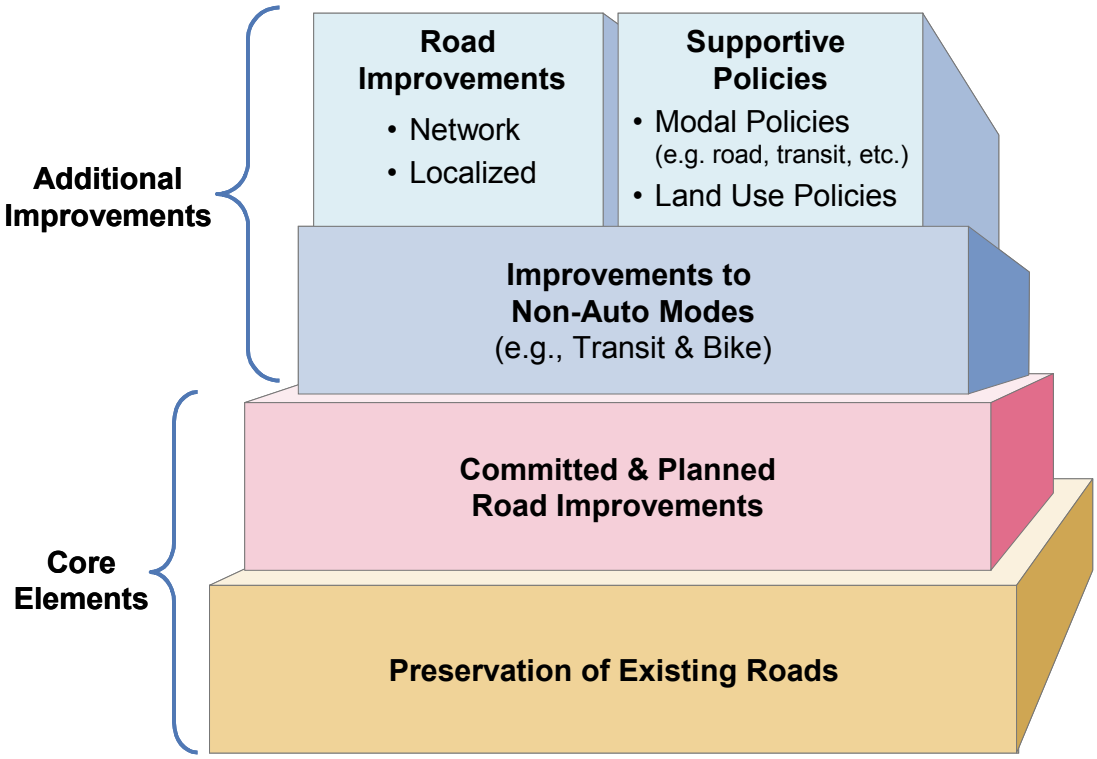
3. Improve the Transportation System through Betterment of both the Road Network and Increased use of Transit Systems, Ridesharing, Bicycling and Walking:

   By implementing this alternative, the transportation system would be improved through the betterment of both the road network and the increased use of transit systems, ridesharing, bicycling and walking. It addresses all travel modes; is compatible with community values; and provides real transportation choices for the citizens of Greater Sudbury. Therefore this option is recommended for further consideration.

6.2. Building Blocks

The major building blocks that will be used to facilitate implementation of the recommended option are shown in the following figure. It is to be noted that each of these elements are crucial and together provide an effective means to address congestion, safety, and other transportation related issues.

Building Blocks For
A Comprehensive Transportation Plan



The most basic building block for a comprehensive transportation plan is preservation of the existing road network before any new expansion projects are contemplated. It would be counter productive if the road network were to be expanded at the cost of not preserving and maintaining the existing road network. Once the existing road network is maintained at a desirable level, other improvements can then be made.

Greater Sudbury has already planned a number of road improvements, and has included these in its capital program. Following preservation of the existing road network, implementation of these planned/committed improvements becomes a priority. These improvements have been listed in Section 5.4

As noted in Section 3.5, a significant portion of travel is made using modes other than the auto. It is extremely important to at least maintain, and possibly improve the current modal share by non-auto modes. This may require making these modes more attractive through physical improvements such as expanding the transit or bicycle network, or by implementing policies that promote these non-auto modes.

Improvements to the road network consist of network improvements, localized improvements, and operational improvements. Network improvements are major improvements such as new roads and/or road widenings that significantly add capacity and improve the operations of the overall road network. Localized improvements are intended to address specific areas of congestion. By addressing site-specific issues, these localized improvements, also, to some degree, provide relief to the road network. These localized improvements can be in the form of either physical improvements (e.g. turning lanes, short roadway links) or operational improvements (e.g. signal optimization).

In addition to physical and operational improvements, it is necessary to have policies that effectively address transportation issues. These could be in the form of land use policies such as promotion of the self-containment of communities through an appropriate mix of employment and population or encouragement of certain land uses. In addition, there could be policies related to specific modes, such as designation and access control policies for roads, regulatory policies for trucking, and incentive policies to increase the use of the transit system and bicycles.

7. EVALUATION OF ROAD NETWORK IMPROVEMENTS

This chapter describes the evaluation methodology and identifies the factors and indicator measures used to assess various network improvement alternatives.

7.1. Evaluation Methodology

An evaluation methodology has been followed in a manner that strives to achieve Greater Sudbury's overall vision and values. The methodology is compatible with that of the Official Plan processes, which means that the outcome of the transportation planning exercise can be integrated within Greater Sudbury's new Official Plan. The methodology builds upon clearly defined goals, vision and broad principle statements as enunciated in Greater Sudbury's recent work regarding future directions.

The methodology is consistent with the requirements of the Class Environmental Assessment Process, in that it allows for effective consultation and ensures consistency, replication and traceability of the assessment process.

The evaluation methodology adopted for this study has been guided by the following principles:

- The Process is compatible with the City's overall vision, policies, and objectives for transportation and land use.
- The Process follows a logical, consistent approach so that the screening results are defensible and traceable.
- The Process is free of any pre-conceived answers.
- The Process involves stakeholder consultation so that the rationale and basis of screening results can be explained, if required.

7.2. Evaluation Factors and Indicators

The evaluation of network alternatives was completed using the factors and indicators presented in Table 7.2.1.

Indicator measures were developed for each of the factors to assist in identifying differences amongst the alternatives. Some of the indicator measures were quantified, whereas others, which could not be readily quantified, were qualified.

Table 7.2.1 - Evaluation Factors and Indicators

Factor	Indicator
Transportation	Potential Impact on Traffic Safety
	Total Network Travel Time
	Level of Service
Social/Cultural Environment	Potential Impact on the "Existing Character" of a Neighbourhood
	Potential to Reduce Residential Through Traffic
Natural Environment	Potential Impact on Terrestrial Ecosystems
	Potential Impact on Aquatic Ecosystems
	Potential Impact on Existing Environmentally Sensitive Areas
	Potential Impact on Air Quality
Economic Environment	Ease of Implementation
	Potential Impact on Community Accessibility
Land Use Planning	Capability to Influence Desirable Development Patterns
	Potential Impact on Existing Residences, Businesses, Institutions or Community Facilities
Construction Cost	Estimated Capital Cost

7.3. Comparative Analysis

To evaluate network alternatives, a comparative analysis was performed using the existing road network (existing plus committed roads improvements) as the base.

The comparative analysis was undertaken using a non-numerical approach. A five point symbolic rating was used to rank the alternatives relative to the factors. A full black circle indicated that the alternative was given a high rating, or was the most favorable option; a circle which was three quarters black indicated a moderately high rating; a circle which was half black indicated a medium rating or neutral condition; a circle which was one quarter black indicated a moderately low rating; and, an open (white) circle indicated a low rating or the least favorable option. The purpose of this comparative analysis was to highlight the major attributes of each alternative in a manner that allowed the alternatives to be readily compared to one another. The analysis also enabled evaluation of the impact of changing the relative importance (weightings) of the various factors. Using the following table as an example (Table 7.3.1), if transportation, economic environment and capital costs are the most important factors, then Alternative #1 is the most favorable. However, if natural environment and land use planning are considered the most important factors, then Alternative #3 is the most favorable.

Table 7.3.1 - Example of Comparative Evaluation

Evaluation Factors	Alt. #1	Alt. #2	Alt. #3	Alt. #4
Transportation	●	◕	◑	◔
Social/Cultural Environment	◔	◑	◔	◕
Natural Environment	◑	◕	●	◕
Economic Environment	●	◔	○	◑
Land Use Planning	◑	○	●	◕
Estimated Capital Costs	●	◑	◔	○

○ ◔ ◑ ◕ ●
Least Favourable — Most Favourable

8. ROAD NETWORK IMPROVEMENTS

Possible solutions that will address existing and future capacity deficiencies were determined through the review of findings contained within earlier studies, examination of right-of-way widths, site visits and discussions with City staff. Solutions took the form of new roads, road widenings, or operational improvements such as the addition of turning lanes, or traffic signal optimization.

In this chapter, improvements that benefit the road network, as a whole, are discussed. Road improvements that demonstrate a localized benefit to the immediate neighborhood or adjacent intersection and primarily service trips in the local area are discussed in Chapter 9.

The following list identifies the corridors that are either experiencing p.m. peak hour capacity problems now or will experience capacity problems by 2021.

1. Notre Dame Avenue between Elm Street and LaSalle Boulevard.

2. The Kingsway between Lloyd Street and 3rd Avenue.

3. LaSalle Boulevard between Barrydowne Road and MR 35.

4. MR 55 between Big Nickel Mine Drive and Highway 17, and the Southwest Bypass between Long Lake Road and MR 55.

5. MR 35 between Azilda and Chelmsford.

6. Ramsey Lake Road between South Bay Road and Paris Street.

7. MR 80 (Notre Dame Avenue) from north of LaSalle Boulevard to MR 15 (Main Street) in Valley East. This includes the section of MR 80 through McCrea Heights.

For each of the corridors experiencing problems, alternative improvements were identified and screened. In some cases, the screening process concluded that there was only one viable alternative to address the problem. In other cases, the screening process concluded that there was more than one viable alternative to address the problem. These alternatives were then carried forward for further evaluation.

1. <u>Notre Dame Avenue in the northbound direction between Elm Street and LaSalle Boulevard</u>

   Notre Dame Avenue, in the northbound direction, between Elm Street and LaSalle Boulevard is nearing capacity during the p.m. peak hour and expected to reach capacity by 2021. Possible solutions to mitigate this deficiency include widening the existing road, widening an alternate parallel road, or constructing a new road.

   Due to existing physical constraints in the east and the built up nature of the area to the west, it was concluded that constructing a new road parallel to Notre Dame Avenue is not a feasible alternative.

The use of Barrydowne Road as an alternative to Notre Dame Avenue is not considered viable as the Kingsway, the main arterial road linking the downtown to Barrydowne Road, does not have excess capacity. Even if capacity were available, this route would necessitate significant "out of way" travel for people with destinations on Notre Dame Avenue or in Valley East; therefore the attractiveness of this alternative is limited.

Widening Frood Road between Kathleen Street and LaSalle Boulevard would have significant social, cultural and economic impacts upon the area, as there are a large number of residential and commercial properties that have direct access onto Frood Road. To be a truly effective alternate route, this route would have to extend south of Kathleen Street and connect directly to Regent Street, so that a continuous north-south corridor is provided.

Widening Notre Dame from Kathleen Street to LaSalle Boulevard has the least impact upon the existing environment, therefore this alternative has been recommended.

2. The Kingsway

Presently, sections of the Kingsway are experiencing capacity problems during peak periods.

There are limited number roads that parallel the Kingsway that could be used to provide relief to the Kingsway.

The widening of Howey Drive/Bancroft Drive was considered during the 1992 Sudbury Transportation Study and during The Kingsway Improvements Class Environmental Assessment completed in 1998. Both of these studies concluded that this was not a viable alternative.

During analysis of this area, the extension of Barrydowne Road to Howey Drive/Bancroft Drive was modeled to determine if this improvement would divert traffic away from The Kingsway. It was concluded that without major improvements to Howey Drive/Bancroft Drive that would enable increased operating speeds, minimal traffic would be diverted from the Kingsway. Under current operating conditions, it was found that this road would not provide any relief to the Kingsway. Improvements such as the upgrade of its functional classification and operating conditions would be required to make Howey Drive/Bancroft Drive be a viable alternative to the Kingsway.

During both the 1992 Transportation Study and the 1998 Kingsway Class EA, the option of creating a new east-west route parallel to the Kingsway, by constructing a connection between Notre Dame Avenue and Hawthorne Drive, south of LaSalle Boulevard was reviewed. This alternative was modeled during completion of this study, and the results indicated that it would have limited impact upon the Kingsway, but may provide localized benefits to intersections along LaSalle Boulevard. These benefits are further discussed in section 9 of this report.

The only viable alternative to address the existing capacity problems along the Kingsway is to extend the current five-lane section from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue as identified in The Kingsway Improvements Class Environmental Assessment completed in 1998

In the future, the widening of the Kingsway to 7 lanes from Lloyd Street to Barrydowne Road may be required. Property along the Kingsway should be reserved to protect for this improvement, as there are no other viable alternatives at this time. The need and timing for this widening will be determined by the magnitude and pace of growth in the east and north-east parts of Greater Sudbury and the growth in traffic volumes on the Kingsway.

At the east end, the two-lane section of the Kingsway between Falconbridge Highway and the Southeast Bypass should be widened to four-lanes. Although the capacity problem currently exists between Falconbridge Highway and Third Avenue, future growth will justify the need to widen the two-lane section between Third Avenue and the South East Bypass.

3. LaSalle Boulevard between Barrydowne Road and MR 35

Presently, sections of the LaSalle Boulevard are experiencing capacity problems during peak periods.

As stated in the Maley Drive Extension Class Environmental Assessment completed in 1995, the idea of a northern bypass of the developed area of the former City of Sudbury arose from a number of sources in the latter part of the 1980's. These included:

- The mining and smelting industries which saw potential benefits in terms of more efficient transportation of materials;

- The public, which had concerns with respect to the impacts of large trucks on LaSalle Boulevard and on other streets in the Region; and

- The former Regional Municipality of Sudbury, which saw the need for additional east-west road capacity in the area north of Ramsey Lake. In this area, the Kingsway and LaSalle Boulevard are the only two continuous east-west arterials. These two roads serve a number of heavy traffic demands, including inter-urban traffic, commercial traffic generated by adjacent commercial development and commuter traffic within the Region.

A Trucking Action Plan completed as part of the 1992 Transportation Plan recommended the Maley Drive Extension and upgrading the existing Maley Drive as the preferred route for a northern truck bypass. The 1992 Transportation Plan recommended proceeding with the Environmental Assessment and construction of the Maley Drive Extension and upgrading of the existing Maley Drive.

Maley Drive will serve a number of traffic demands, including truck traffic, particular large mining and smelting trucks, and through traffic.

A truck bypass is required for a number of reasons:

- To reduce conflicts between truck and auto traffic on LaSalle Boulevard and the Kingsway, each of which is a major commercial street;

- To improve traffic operations of LaSalle Boulevard and the Kingsway; and

- To minimize the degradation of the road structure, and reduce the rate of pavement damage being incurred on LaSalle Boulevard as a result of truck traffic. This has the potential to create a safety problem.

East-west traffic capacity is also required in this area, which is constrained by both topography and the absence of opportunity to add other roads. All traffic crossing the northern section of the City is currently restricted to either LaSalle Boulevard or the Kingsway, the only two major through routes north of Ramsey Lake. Existing traffic demand exceeds the capacity of these two roads.

The analysis presented in the in Maley Drive Extension Class Environmental Assessment Report indicated that the Maley Drive Extension and the reconstruction of existing Maley Drive is the alternative, which best meets these needs. Analysis undertaken during completion of this study confirmed these findings.

LaSalle Boulevard, from 0.3 kilometres west of Notre Dame Avenue to just east of the CPR Overhead is basically a two-lane road. On either side of this section, LaSalle Boulevard is a four-lane road. LaSalle Boulevard is currently operating at or near capacity during peak periods through this short section. With continued growth in traffic volumes, this section will experience capacity problems if no improvements are made. By widening this section to four lanes, it will operate at a satisfactory level of service throughout the planning horizon.

4. MR 55 between Big Nickel Mine Drive and Highway 17 and the Southwest Bypass between Long Lake Road and MR 55

MR 55 between Big Nickel Mine Drive and Highway 17 is approaching capacity during peak periods under existing conditions. If no improvements are made, continued growth in the mining industry and residential development in Lively will increase traffic volumes on this road to undesirable levels by 2021. In addition, the Southwest Bypass is forecasted to be operating above capacity by 2021 if no improvements are made to it. Both of these deficiencies are related to the lack of east-west capacity in the west end of the city.

MR 55 is a four-lane high-speed arterial road. Widening this road to six lanes will not address the capacity problem on the Southwest bypass, as this traffic is typically longer distance through traffic and truck traffic that should not infiltrate the city to get to MR 55.

The widening of the Southwest Bypass to four lanes, combined with the planned improvements to Long Lake Road, will attract some local traffic as traffic volumes grow on MR 55. This will provide greater overall benefits to the transportation network in the area, and will service a significantly larger number of vehicles, including long distance truck traffic.

5. MR 35 between Azilda and Chelmsford

   MR 35, between Azilda and Chelmsford, transitions from a four-lane road to a two-lane road. Under existing conditions, delays are experienced in the transition areas between the two lane and four lane sections. These delays will increase as growth in both outlying communities and truck traffic continues. As there are limited number of viable alternate routes that could be considered, widening MR 35 to four lanes, between Azilda and Highway 144, is recommended to address existing and future travel demands, and to provide a continuous four lane road to service these travel movements.

6. Ramsey Lake Road between South Bay Road and Paris Street

   Capacity related problems currently exist on Ramsey Lake Road. Following the expansion of Laurentian University and the construction of the new Regional Hospital, these problems will become worse. There are two alternatives that could address this issue.

   Ramsey Lake Road could be widened from its present two lane configuration to a four lane road between the University and 0.6 kilometres east of Paris Street, or a new road could be constructed between the University and Regent Street. It is anticipated that this New University Link would be constructed as a two-lane parkway type facility that will facilitate auto, bicycle and pedestrian traffic.

7. MR 80 (Notre Dame Avenue) from north of LaSalle Boulevard to MR 15 (Main Street) in Valley East.

   Growth in Valley East over the past few years has resulted in a significant increase in traffic volumes on MR 80, between LaSalle Boulevard and Main Street. This growth has occurred faster than was forecasted during the 1992 Transportation Study. MR 80 is now operating at or near capacity during peak periods.

   As noted previously, population and employment forecasts prepared by the City, indicate that this growth trend is expected to continue throughout the planning horizon.

   MR 80 between LaSalle Boulevard and Valleyview Road primarily serves commuters traveling to and from work between Valley East and the former City of Sudbury. Although the AADT for this section of road would not seem to justify widening to six lanes, the peak hour, peak direction volumes make up a larger than usual share of the AADT. For MR 80, the northbound p.m. peak hour volumes comprise 7% of the AADT. In comparison with the Kingsway, which has a much higher AADT, the eastbound volume on the Kingsway in the p.m. peak hour is only 4% of the AADT. The Kingsway not only serves commuter traffic, it also serves commercial traffic generated by adjacent development.

   Two alternatives were identified that could address capacity deficiencies on MR 80. These included the extension of Barrydowne Road and the widening of MR 80.

The Barrydowne Road extension alternative would involve the extension of Barrydowne Road from Maley Drive to Bodson Road. For the purpose of the evaluation it was assumed to be a 4 lane controlled access facility with a rural cross section. It would extend through existing conservation lands and natural areas.

The MR 80 widening would involve widening to six lanes between LaSalle Boulevard and MR 15 (Main Street) in Valley East (adding two lanes of capacity, one in each direction).

8.1. Road Network Improvement Alternatives

During the development of road network improvement alternatives, it became apparent that a number of the improvements would be common to all of the alternatives. These common improvements are shown in Figure 8.1.1.

To address capacity problems on MR 80 (Notre Dame Avenue) north of LaSalle Boulevard to MR15 (Main Street) and on Ramsey Lake Road there was more than one reasonable solution. It is the solutions developed to address these capacity problems that constitute the differences between the Alternatives.

The road network improvement alternatives are described below.

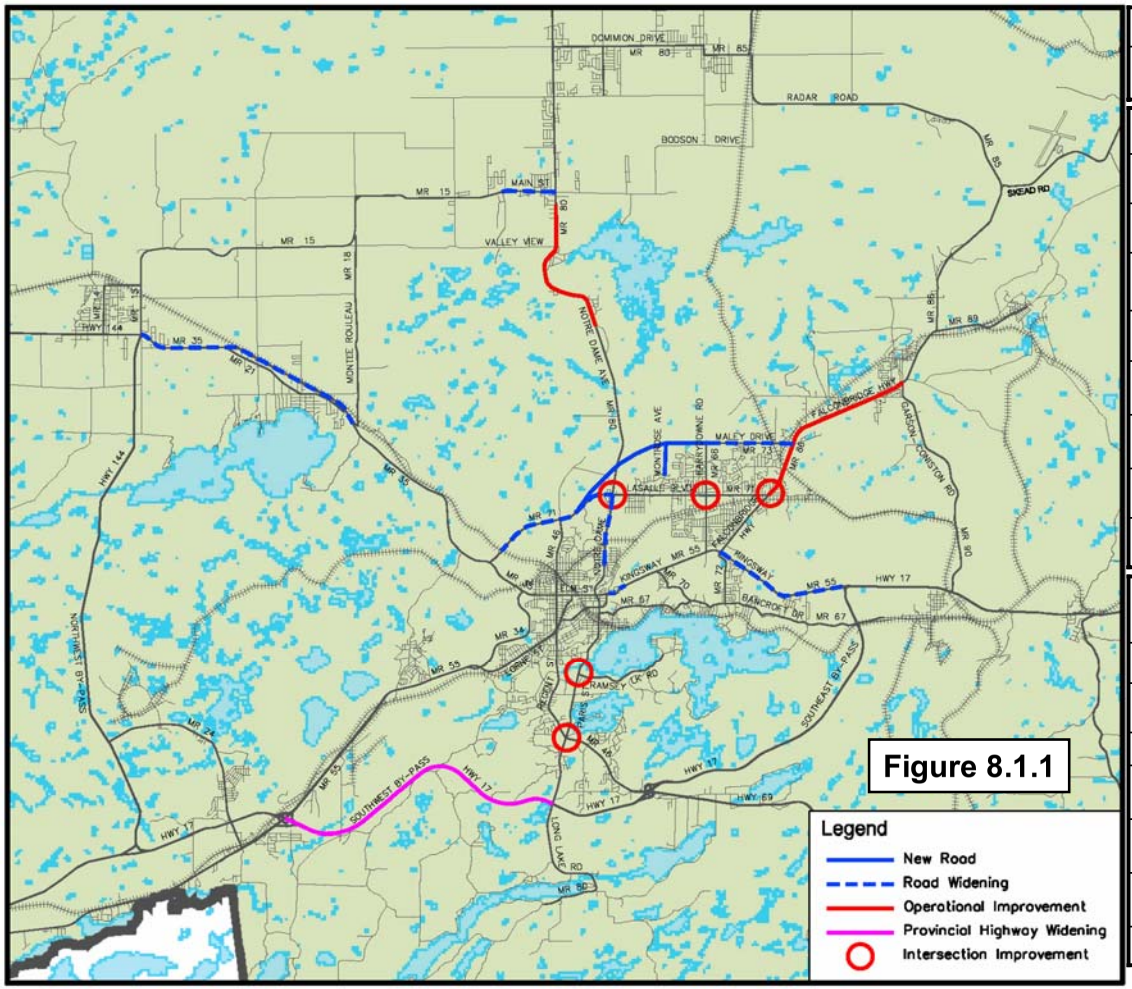
Alternative #1 -- Barrydowne Road Extension/Ramsey Lake Road Widening
Extend Barrydowne Road from Maley Drive to Bodson Drive (4 lanes).
Widen Ramsey Lake Road to 4 lanes from South Bay Road to 0.6 km east of Paris Street.
Widen Notre Dame Avenue to 6 lanes from Kathleen Street to LaSalle Boulevard.
Widen the Kingsway to 5 lanes from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.
Widen the Kingsway to 4 lanes from Falconbridge Highway to the Southeast Bypass.
Widen LaSalle Boulevard to 4 lanes between the CPR Overhead and 0.3 km west of Notre Dame Avenue.
Widen the Southwest Bypass to 4 lanes between MR 55 and Long Lake Road.
Widen MR 35 to 4 lanes between Azilda and Chelmsford.
Extend Maley Drive to LaSalle Boulevard (Maley Drive Extension).
Alternative #2 -- Barrydowne Road Extension/New University Link
Extend Barrydowne Road from Maley Drive to Bodson Drive (4 lanes).
Construct New University Link between the University and Regent Street (2 lanes).
Widen Notre Dame Avenue to 6 lanes from Kathleen Street to LaSalle Boulevard.
Widen the Kingsway to 5 lanes from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.
Widen the Kingsway to 4 lanes from Falconbridge Highway to the Southeast Bypass.
Widen LaSalle Boulevard to 4 lanes between the CPR Overhead and 0.3 km west of Notre Dame Avenue.
Widen the Southwest Bypass to 4 lanes between MR 55 and Long Lake Road.
Widen MR 35 to 4 lanes between Azilda and Chelmsford.
Extend Maley Drive to LaSalle Boulevard (Maley Drive Extension).

Alternative #3 - Notre Dame Widening/Ramsey Lake Road Widening
Widen Notre Dame Avenue to 6 lanes between LaSalle Boulevard and MR 15.
Widen Ramsey Lake Road to 4 lanes from South Bay Road to 0.6 km east of Paris Street.
Widen Notre Dame Avenue to 6 lanes from Kathleen Street to LaSalle Boulevard.
Widen the Kingsway to 5 lanes from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.
Widen the Kingsway to 4 lanes from Falconbridge Highway to the Southeast Bypass.
Widen LaSalle Boulevard to 4 lanes between the CPR Overhead and 0.3 km west of Notre Dame Avenue.
Widen the Southwest Bypass to 4 lanes between MR 55 and Long Lake Road.
Widen MR 35 to 4 lanes between Azilda and Chelmsford.
Extend Maley Drive to LaSalle Boulevard (Maley Drive Extension).
Alternative #4 - Notre Dame Widening/New University Link
Widen Notre Dame Avenue to 6 lanes between LaSalle Boulevard and MR 15.
Construct New University Link between the University and Regent Street (2 lanes).
Widen Notre Dame Avenue to 6 lanes from Kathleen Street to LaSalle Boulevard.
Widen the Kingsway to 5 lanes from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.
Widen the Kingsway to 4 lanes from Falconbridge Highway to the Southeast Bypass.
Widen LaSalle Boulevard to 4 lanes between the CPR Overhead and 0.3 km west of Notre Dame Avenue.
Widen the Southwest Bypass to 4 lanes between MR 55 and Long Lake Road.
Widen MR 35 to 4 lanes between Azilda and Chelmsford.
Extend Maley Drive to LaSalle Boulevard (Maley Drive Extension).

These four road network improvement alternatives are shown on Figure 8.1.2.

Model runs were undertaken for each road network improvement alternative. The model output included future volumes, volume to capacity ratios, and travel time information. The output was analyzed and used during the evaluation of the alternatives.

Road Improvements Common to All Alternative Networks



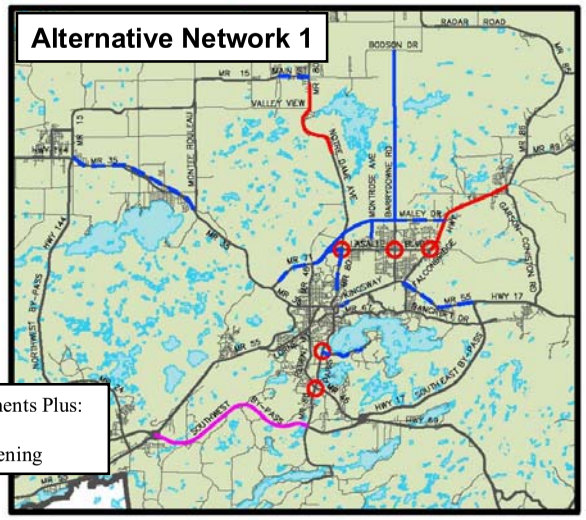
New Roads	Description
Maley Drive Extension	Extend Maley Drive to LaSalle Boulevard (4-lane basic cross section). Extend Montrose Ave. to Maley Drive Extension.

Road Widening	Description
Maley Drive Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from Barrydowne to Falconbridge Highway.
MR 15 Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from MR 80 to Belisle Drive.
MR 35 Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from Azilda to Chelmsford.
Notre Dame Ave. Widening	Widen the existing 4-lane cross section to a 6-lane basic cross section from Kathleen Street to LaSalle Boulevard.
LaSalle Boulevard Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from the CPR Overhead to 0.3 km west of Notre Dame Avenue.
Southwest Bypass 4-Laning*	Widen the existing 2-lane cross section to a 4-lane cross section from the interchange at MR 55 to Long Lake Road.
Kingsway Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from Falconbridge Highway to the Southeast Bypass.
Kingsway Widening	Widen the Kingsway from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.

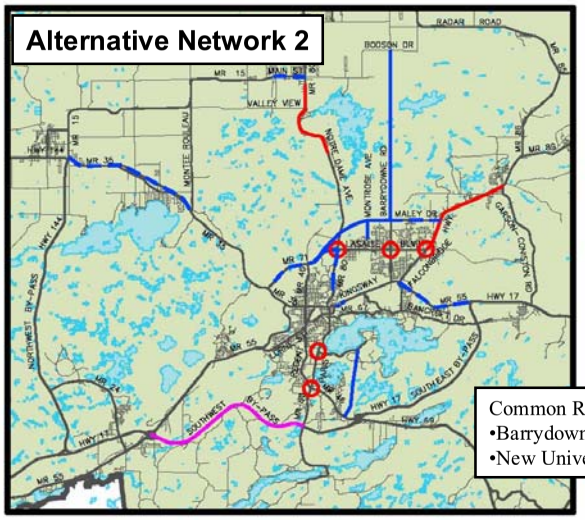
Operational Improvements	Description
Paris / Ramsey Lake Road	Add a northbound right turn channelization ramp.
Paris / Regent Street	Convert existing left turn through lanes on Paris Street and Long Lake Road to left turn lanes. Add through lanes on Paris Street and Long Lake Road.
Falconbridge Highway	Provide a continuous left turn lane from LaSalle Blvd. to Garson-Coniston Road.
LaSalle Blvd. / Notre Dame Ave. Intersection	Provide dual eastbound, westbound and southbound left turn lanes and one additional northbound and southbound through lanes.
LaSalle Blvd. / Barrydowne Intersection	Provide one additional westbound and one additional northbound left turn lanes as well as one additional northbound through lane.
LaSalle Blvd. / Falconbridge Highway	Provide left turn lane improvements and a right turn lane southbound along Falconbridge Highway.
MR 80 Widening	Provide a continuous left turn lane from Donaldson Crescent to Second Street.

*Provincial facility (if not widened, would require widening of MR 55)

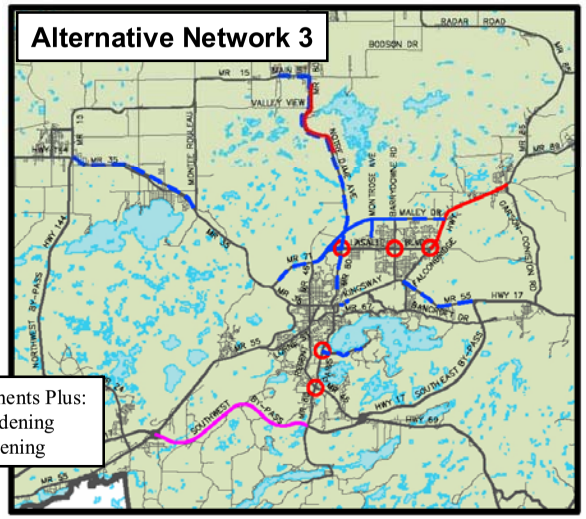
Alternative Networks



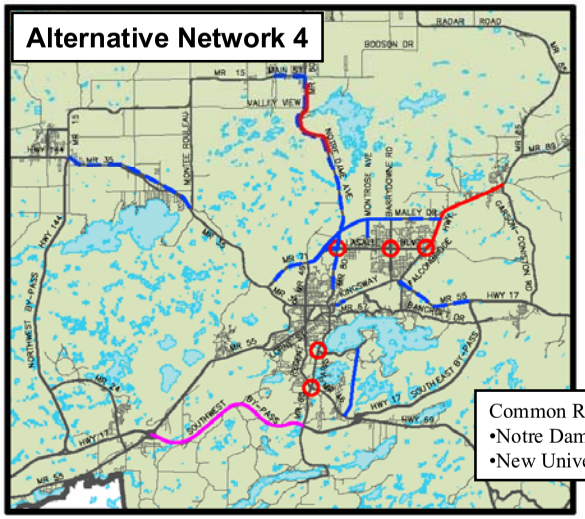
Common Road Improvements Plus:
•Barrydowne Extension
•Ramsey Lake Road Widening



Common Road Improvements Plus:
•Barrydowne Extension
•New University Link

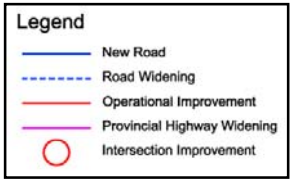


Common Road Improvements Plus:
•Notre Dame Avenue Widening
•Ramsey Lake Road Widening



Common Road Improvements Plus:
•Notre Dame Avenue Widening
•New University Link

Figure 8.1.2



8.2. Evaluation of the Road Network Improvement Alternatives

Evaluation of the preceding four road network improvement alternatives was carried out using the methodology described in Chapter 7.

The evaluation focused on the improvements that were unique to each alternative, because the common improvements would have the same impact upon all of the alternatives.

Table 8.2.1 presents the Road Network Improvement Evaluation.

Table 8.2.2 presents the Network Improvement Alternative Evaluation Summary.

Table 8.2.1 - Road Network Improvement Alternative Evaluation

Factor	Indicator	Comparative Rating				Rationale for Rating
		A1 Barrydowne Extension/Ramsey Lake Road Widening	A2 Barrydowne Extension/New University Link	A3 Notre Dame/Ramsey Lake Road Widening	A4 Notre Dame/New University Link	
Transportation						
	Safety	◑	●	◔	◕	• The Level of Service is similar for all alternatives • The Barrydowne Extension and New University Link would have less access points therefore potential conflicts would be reduce. • The New University Link would provide an alternative route to the University, therefore congestion on Paris Street at Ramsey Lake Road and at the Four Corners would be reduced. • The Barrydowne Extension would reduce traffic congestion on MR 80 and on Falconbridge Highway.
	Total Network Travel Time	◕	●	◑	◕	• The total travel time is similar for all alternatives. • The new University Link would reduce travel time for a larger number of people.
	Level of Transportation Service	◑	◕	◔	◑	• The Barrydowne Extension and New University Link would provide additional capacity and alternative routes. • The potential to add additional capacity would be less on MR 80 and Ramsey Lake Road due to direct accesses. • The Barrydowne Extension negatively impacts congestion along the Kingsway.
Social/Culvert Environment						
	Impact upon the "Existing Character" of Neighbourhoods	◑	○	◕	◑	• MR 80 and Ramsey Lake Road are existing roads; therefore widening would have less impact on the existing character of neighbourhoods. • The Barrydowne Extension would have a negative impact on the existing character of neighbourhoods in Valley East and at the existing north end of Barrydowne Road. • The widening of MR 80 would negatively impact the existing character of neighbourhoods in McCrea Heights / Guilletville.
	Potential to Reduce Residential Through Traffic	○	◔	◑	●	• The New University Link would improve operations on Paris Street. • The Barrydowne Extension would increase the potential of neighbourhood infiltration in Valley East and at the existing north end of Barrydowne Road.
Natural Environment						
	Terrestrial Ecosystems	◔	○	●	◔	• The Barrydowne Extension would affect approximately 10 km (within grading limits) and would pass through the Maley Conservation Area. • The New University Link would affect approximately 4 km (within grading limits) and would pass through a recreational area. • MR 80 and Ramsey Lake Road widening would have relatively little impact.
	Aquatic Ecosystems	◔	○	◕	◑	• The Barrydowne Extension would potentially impact 1 lake and 6 rivers. • The MR 80 and Ramsey Lake Road widenings would have less severe impacts.
	Environmentally Sensitive Areas	◑	◑	◑	◑	• No environmentally sensitive areas (National or Provincial) would be affected by any of the alternatives.
	Air Quality	◑	◑	◑	◑	• All of the alternatives would have similar impacts.

○ ◔ ◑ ◕ ●
Least Favourable — Most Favourable

Table 8.2.1 - Road Network Improvement Alternative Evaluation Continued…

Factor	Indicator	Comparative Rating				Rationale for Rating
		A1 Barrydowne Extension/Ramsey Lake Road Widening	A2 Barrydowne Extension/New University Link	A3 Notre Dame/Ramsey Lake Road Widening	A4 Notre Dame/New University Link	
Economic Environment						
	Network Improvement Costs	◔	○	◕	◑	• The Barrydowne Extension would have an extremely high cost and would be difficult to implement. • The Ramsey Lake Road widening and the New University Link are similar in cost. • The Ramsey Lake Road widening would be easier to implement than the New University Link. • The existing right of way (36m) along MR 80 will accommodate the widening.
	Improved Community Accessibility	◔	◕	◑	●	• The MR 80 widening and the New University Link would improve community accessibility. The MR 80 widening would provide direct access to major employment areas and into the downtown. • The New University Link would provide alternate access to the University and to the Paris/Ramsey Lake Road area. • The Barrydowne Extension is farther removed from the downtown but would provide better access to the Barrydowne / Kingsway area.
Land Use Planning						
	Capability to Influence Desirable Development Patters	◔	◑	◑	●	• The Barrydowne Extension would have lower influence on designated growth areas. • The MR 80 widening and the New University Link would provide the most support for major growth areas. • The New University Link would provide additional capacity and would support accessibility to major growth areas along Paris Street. • The Ramsey Lake Road widening would have lesser influence on development then the New University Link.
	Potential Impact on Existing Residences, Businesses, Institutions or Community Facilities	◔	◑	◑	●	• MR 80 would continue to provide direct access to hospitals, institutions and the community. • The New University Link would provide increased access to facilities. • The Barrydowne Extension and Ramsey Lake Road widening would marginally improve access to businesses.

○ ◔ ◑ ◕ ●
Least Favourable — Most Favourable

Table 8.2.2 - Road Network Improvement Alternative Evaluation Summary

Factor	Comparative Rating			
	A1 Barrydowne Extension / Ramsey Lake Road Widening	**A2** Barrydowne Extension / New University Link	**A3** Notre Dame / Ramsey Lake Road Widening	**A4** Notre Dame / New University Link
Transportation	◕	●	◔	◕
Social / Cultural Environment	◔	◔	◕	◕
Natural Environment	◑	○	◕	◑
Economic Environment	◔	◑	◑	◕
Land Use Planning	◔	◑	◑	●
Estimate Capital Cost*	**$154.1 M**	**$155.6 M**	**$139.8 M**	**$141.3 M**
Evaluation Summary	◑	◑	◕	●

*Includes $22.8 M to 4 lane the Southwest Bypass

○ ◔ ◑ ◕ ●

Least Favourable — Most Favourable

From a transportation perspective, Alternative #2, the combination of the Barrydowne Road Extension and the New University Link was the most favorable, followed closely by Alternative #4 and Alternative #1. Both the Barrydowne Road extension and the New University Link provided capacity in new corridors and had the potential to provide the greatest relief to existing corridors.

In terms of the social and cultural environment, Alternatives #3 and #4, scored the highest as these two alternatives included the widening of MR 80. It was concluded that the widening of an existing road would have less impact than the construction of a new road through a neighborhood that does not currently experience significant traffic volumes.

Alternative #3 was ranked the most favorable in terms of impact upon the natural environment because this alternative included the widening of existing roads rather than the construction of new roads through natural areas. The widening of MR 80 and Ramsey Lake Road are expected to have less impact on terrestrial and aquatic ecosystems, while new roads such as the Barrydowne Road Extension and the New University Link will extend through potentially sensitive natural areas.

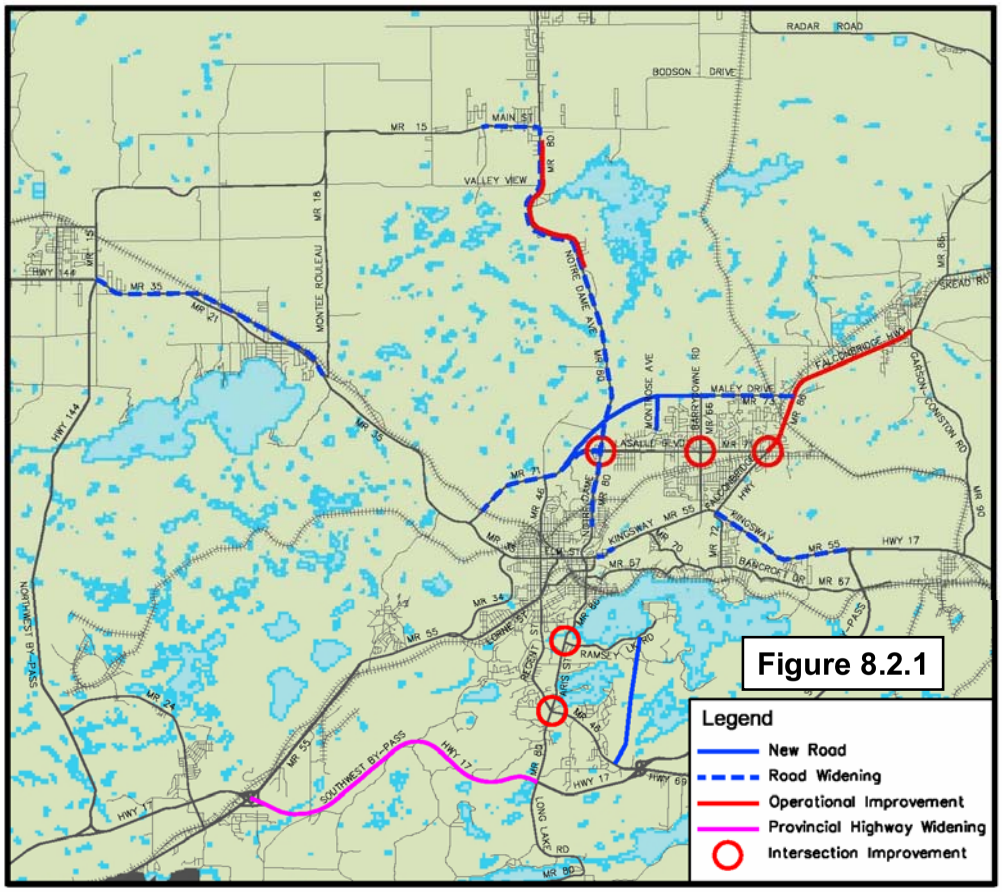
In terms of the economic environment, Alternative #4 was the most favorable of all of the alternatives. The improved accessibility provided by the New University Link combined with the improved access to major employment areas provided by the widening of MR 80 led to this conclusion. Through its ability to influence desirable development patterns and its impact upon existing land uses, Alternative #4 was the most favorable alternative.

The estimated capital cost of each alternative, excluding property and utility relocations has been included in the evaluation table and incorporated into the overall evaluation of each of the alternatives.

Based on the six factors, the most favorable alternative is Alternative #4, which involves the widening of MR 80 and the construction of a New University Link.

The recommended road network is shown on Figure 8.2.1.

Recommended Network



New Roads	Description	Estimated Cost*
Maley Drive Extension	Extend Maley Drive to LaSalle Boulevard (4-lane basic cross section). Extend Montrose Avenue to Maley Drive Extension.	$27.8 M
New University Link	Construct a new road connecting Regent street (close to Access Road) and the University Road.	$7.4 M

Road Widening	Description	Estimated Cost*
Maley Drive Widening	Widen the existing 2-lane basic cross section to a 4-Lane basic cross section from Barrydowne to Falconbridge Highway.	$3.4 M
MR 15 Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from MR 80 to Belisle Drive.	$3.5 M
MR 35 Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from Azilda to Chelmsford.	$9.5 M
MR 80 Widening	Widen the existing 4-lane basic cross section to a 6-lane basic cross section from LaSalle Boulevard to Main Street.	$18.1 M
Notre Dame Ave. Widening	Widen the existing 4-lane cross section to a 6-lane basic cross section from Kathleen Street to LaSalle Boulevard.	$5.0 M
LaSalle Blvd. Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from the CPR Overhead to 0.3 km west of Notre Dame Avenue.	$4.6M
Southwest Bypass 4-Laning**	Widen the existing 2-lane cross section to a 4-lane cross section from the interchange at MR 55 to Long Lake Road.	$22.8 M
Kingsway Widening	Widen the existing 2-lane cross section to a 4-lane basic cross section from Falconbridge Highway to the Southeast Bypass.	$6.0 M
Kingsway Widening	Widen the Kingsway from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.	$7.2 M

Operational Improvements	Description	Estimated Cost*
Paris / Regent Street	Convert the existing left turn through lanes on Paris Street and Long Lake Road to left turn lanes. Add through lanes on Paris Street and Long Lake Road.	$2.0 M
Paris / Ramsey Lake Road	Add a northbound right turn channelization ramp.	$0.5 M
Falconbridge Highway	Provide a continuous left turn lane from LaSalle Blvd. to Garson-Coniston Road.	$7.0 M
LaSalle Blvd. / Notre Dame Ave. Intersection	Provide dual eastbound, westbound and southbound left turn lanes and one additional northbound and southbound through lanes.	$3.5 M
LaSalle Blvd. / Barrydowne Intersection	Provide one additional westbound and one additional northbound left turn lanes as well as one additional northbound through lane.	$3.0 M
LaSalle Blvd. / Falconbridge Highway	Provide left turn lane improvements and a right turn lane southbound along Falconbridge Highway.	$2.0 M
MR 80 Widening	Provide a continuous left turn lane from Donaldson Crescent to Second Street.	$8.0 M

*Excludes Property ** Provincial facility (if not widened, would require widening of MR 55@ $13M)

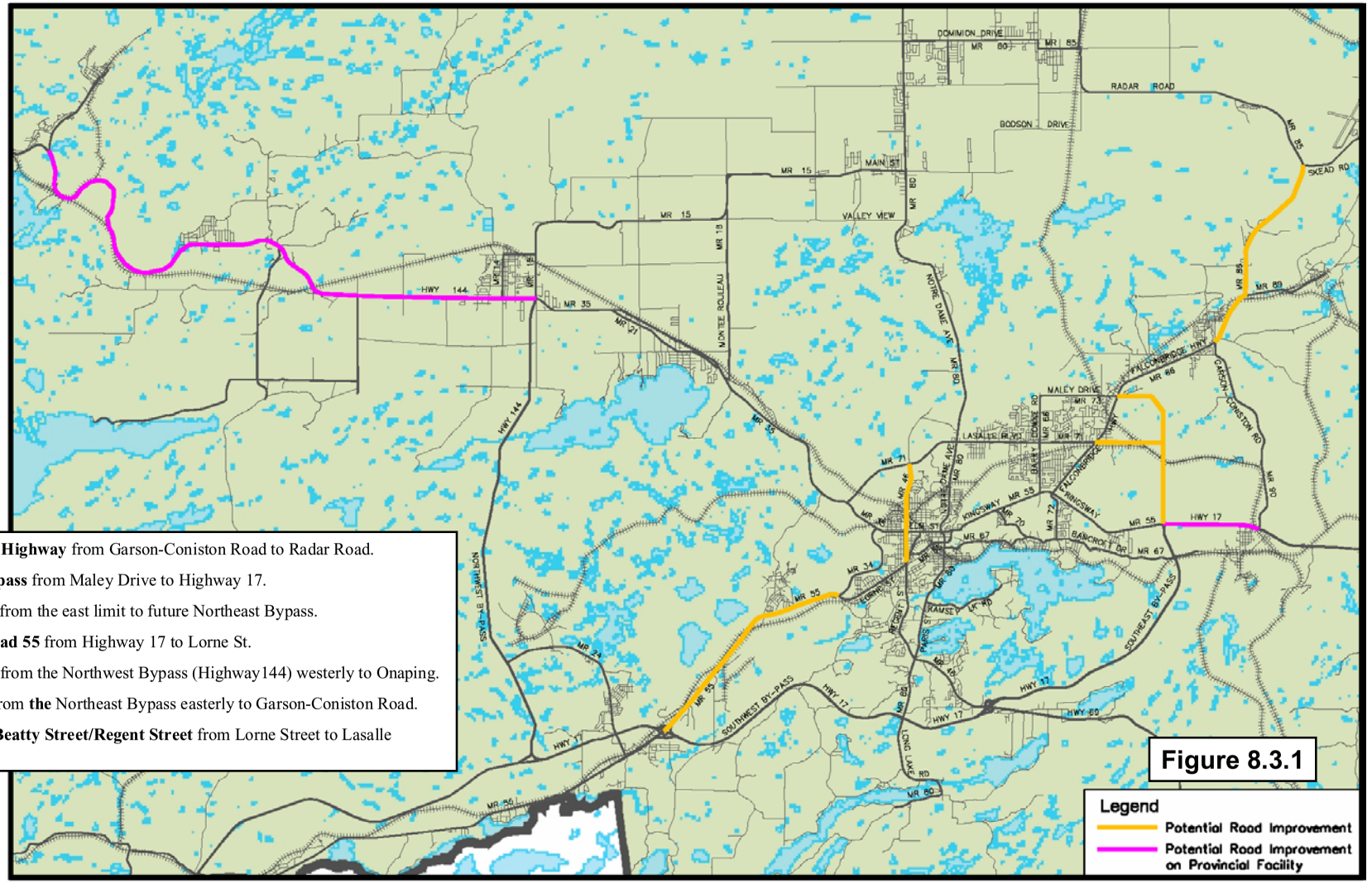
8.3. Potential Road Improvements Beyond 2021

Shortly after 2021, it is expected that additional road improvements will be necessary to mitigate future capacity problems. It is suggested that property be reserved for the following improvements.

- The widening of Falconbridge Highway to 4 lanes between Garson-Coniston Road and Radar Road.
- The construction of the Northeast Bypass from Maley Drive to Highway 17.
- The extension of LaSalle Boulevard from its east limit to the Northeast Bypass.
- The widening of MR 55 to 6 lanes from Highway 17 to Big Nickel Mine Drive.
- The widening of Highway 144 to 4 lanes between Chelmsford and Onaping Falls.
- The widening of Highway 17 to 4 lanes between the Southeast Bypass and Garson-Coniston Road.
- A future north-south arterial roadway along the Frood Road / Regent Street corridor.

Potential road improvements beyond 2021 are shown on Figure 8.3.1.

Potential Road Improvements Beyond 2021 (Planning Horizon)



- **Falconbridge Highway** from Garson-Coniston Road to Radar Road.
- **Northeast Bypass** from Maley Drive to Highway 17.
- **Lasalle Blvd.** from the east limit to future Northeast Bypass.
- **Municipal Road 55** from Highway 17 to Lorne St.
- **Highway 144** from the Northwest Bypass (Highway144) westerly to Onaping.
- **Highway 17** from **the** Northeast Bypass easterly to Garson-Coniston Road.
- **Frood Road/Beatty Street/Regent Street** from Lorne Street to Lasalle Boulevard.

9. LOCAL ROAD IMPROVEMENTS

9.1. Localized Network Improvements

In addition to the recommended network improvements presented in Chapter 8, there are a number of other local improvements that can be undertaken to provide relief to specific areas within the City.

These improvements (shown on Figure 9.1.1) are expected to address localized capacity and operational issues that currently exist and in so doing will marginally improve the overall network.

In this context, recommendations from the 1992 Transportation Study and additional proposals by City staff have been analyzed.

1. Hawthorne Drive / Montrose Avenue Extension

   The Hawthorne Drive extension was modeled as a four lane east-west arterial link between Notre Dame Avenue and Barrydowne Road. Montrose Avenue was extended southerly to connect with the Hawthorne Drive extension.

   Based on 2021 p.m. peak hour demands, in conjunction with the recommended network improvements noted previously, the Hawthorne extension attracted approximately 900 vehicles per hour (over 500 in the eastbound direction), with the majority diverting from the intersection of LaSalle Boulevard and Notre Dame Avenue. The Montrose Avenue extension did not attract a significant volume of traffic.

   The link v/c ratio on LaSalle Boulevard, between Montrose Avenue and Notre Dame Avenue improved to 0.67 (WB) versus 0.80 (WB) with no connection. The analysis revealed that the new connection did not attract significant volumes from the Kingsway (only 100 vehicles per hour in the eastbound direction) and a comparison of the assignment results illustrated the localized nature of the diversion.

   Diversion from Barrydowne Road between the Kingsway and LaSalle Boulevard was in the order of 150 vehicles per hour northbound and 120 vehicles per hour southbound.

   The 1992 Transportation Study recommended that this link be constructed in conjunction with development in this area. The analysis undertaken during this transportation study confirms these findings.

   Figure 9.1.2 illustrates the difference in traffic volumes on the surrounding road network with and without the Montrose Avenue Extension/Hawthorne Drive Connection.

2. Ste. Anne Road Extension

Ste. Anne Road is an east-west road that runs between Frood Road and Notre Dame Avenue just north of Elm Street. Consideration has been given to the extension of this road westerly under the railway tracks connecting to Pine Street or College Street. This would allow Ste. Anne Road to function as an alternative to Elm Street through the downtown area and could reduce traffic at the intersection of Elm Street and Notre Dame Avenue. It has been modeled as per the recommended scheme outlined in the 1992 Transportation Study.

To test this scenario the road network and zone connectors in the travel demand model had to be upgraded in this area to better reflect actual conditions. Analysis of the travel demand forecasts indicated that this link attracted +/- 1200 vehicles in the p.m. peak hour between Elm Street and Frood Road, with demand dropping to 850 vehicles per hour between Frood Road and Mackenzie Street. The primary relief is provided on Elm Street between Lorne Street and Frood Road due to reduced left turns at the Elm Street / Frood Road intersection.

Elm Street through the downtown experienced a moderate reduction of approximately 100 vehicles in the p.m. peak hour, as did Paris Street in the southbound direction and Brady Street in the westbound direction. With this improvement, Ste. Anne Road attracted an additional 170 eastbound trips in the p.m. peak per hour, although the westbound volume remained essentially unchanged.

The 1992 Transportation Study recommended Implementation of this improvement prior to the Low Development Scenario citing benefits to Elm Street and the potential to support new downtown development. The analysis as described above confirms that the benefits of the connection will be localized in nature although the link will generate a significant demand.

Figure 9.1.3 illustrates the change in traffic volumes on the surrounding roads with and without the Ste. Anne Road extension.

3. Frood Road / Regent Street Improvements

Operational improvements on Frood Road and Regent Street would be completed so that north-south traffic from Paris Street and Notre Dame Avenue would be diverted.

An examination of the model output for 2021 indicates that operational improvements alone on these two roads would have minimal impact on Paris Street and Notre Dame Avenue. To have meaningful impact, the Frood Road / Regent Street corridor would have to be significantly upgraded from the Frood Road / LaSalle Boulevard intersection to the Regent Street / Paris Street intersection. In the future, it may be necessary to re-examine the role and function of the Frood Road / Regent Street corridor in the overall road network and its ability to relieve future capacity deficiencies.

4. Kathleen Street Improvements

Kathleen Street runs parallel to and is north of Elm Street in the downtown area. Operational improvements were modeled to determine if traffic volumes on Elm Street through the downtown area and on Notre Dame Avenue between Elm Street and Kathleen Street were could be reduced.

Based on travel demand forecasts, these operational improvements would lead to diversion of less than 100 vehicles per hour in the p.m. peak hour from Elm Street and Notre Dame Avenue.

Although this improvement is parallel to the Ste. Anne Road extension, it is not expected to have as significant impact on the surrounding road network and therefore, is not considered viable.

5. Martilla Drive Extension

Martilla Drive currently extends easterly from the Regent Street / Bouchard Street intersection.

The proposal was tested as a two lane east-west arterial link between Regent Street and Paris Street. This could provide relief to southbound traffic on Paris Street wishing to turn right onto Regent Street at the Four Corners, which is currently problematic. With the Martilla Drive connection between Paris Street and Regent Street, it is possible for southbound traffic on Paris Street to travel westerly to Regent Street then southerly on Regent Street straight through the Four Corners. This connection would provide a parallel route to Walford Road.

An examination of the model results from this transportation study and the previous traffic study reveals that Martilla Drive would attract +/- 150 vehicles per hour in the p.m. peak hour in each direction, which was largely diverted from Walford Road. The new connection did not result in significant change in volumes on Paris Street or Regent Street either north or south of the new link.

The 1998 Martilla Drive Study recommended that this link be constructed to coincide with development in this area. The recommendation was justified based on some relief provided to Walford Road, and enhanced local access / connectivity benefits. This analysis confirms that the benefits of the connection will be localized in nature and the improvements should be considered in conjunction with proposed development of the lands in the immediate area.

The difference in traffic volumes on the surrounding road network with and without the Martilla Drive Extension is illustrated in Figure 9.1.4.

6. Treeview Gateway Drive Extension to Regent Street

   This would be a new mid-block, east-west collector road located between the Southwest Bypass and the Four Corners. This link will reduce the number of southbound left turn movements at the Four Corners because trips destined to the Algonquin Road Area will divert to this new road. This road would also be a convenient route for vehicles traveling northbound on Long Lake Road destined to commercial areas on Algonquin Road, similar to routing currently used by vehicles traveling on Countryside Drive. Analysis of the model results indicates that this road could attract approximately half of the vehicles currently making the southbound left turn onto Regent Street from Paris Street. Based on this assessment, the option needs to be further reviewed in terms of its feasibility.

7. East-West Road south of Four Corners from Long Lake Road to Regent Street

   This alternative was tested as a two lane east-west arterial link between Long Lake Road and Regent Street, just to the south of the existing Mall. Inclusion of this road link to test its feasibility in the current travel demand forecasting model required upgrading the road network and zone connectors in this area to better reflect actual conditions. The model did not assign a significant amount of traffic to this road link, although it is recognized that the model, as it is built and calibrated, is particularly sensitive to left turn delays at signals. This connection will best serve local traffic circulation and access, particularly if the Mall expands to the South. The results of the analysis confirmed that the benefits of the connection will be localized in nature and the improvements should only be considered in conjunction with any proposed development of the lands in the immediate area. Figure 9.1.5 shows that there is very little impact to the surrounding road network with this connection.

8. MR 15 from Belisle Drive to MR 80

   MR 15 is a two lane arterial road west of MR 80. Modeling reveals 700 eastbound bound vehicles on MR 15 approaching MR 80 in the p.m. peak hour. On the surface, these volumes do not warrant widening, however, because of the number of accesses likely causing operational problems, consideration should be given to widening to four lanes or construction of a continuous left turn lane. An examination of the east-west forecasts on MR 15 and on Valleyview Road has revealed that traffic volumes will continue to grow. Therefore, due to existing operational problems and expected growth in traffic volumes, it is recommended that MR 15 be widened to four lanes between MR 80 and Belisle Drive.

9. Barrydowne South Connection

   This proposal involves the extension of Barrydowne Road south of the Kingsway. It was tested in the travel demand model as a two lane north-south arterial link between the Kingsway and Bancroft Drive, through the existing development area. Connections to 2nd Avenue and the Kingsway were also provided as per the proposed site plan provided by the City for the Millennium Centre Development.

   The analysis indicated that the Barrydowne South connection attracted between 150 and 300 vehicles per hour in the p.m. peak hour although this was largely traffic generated by or attracted to the neighboring development site. The new connection did not encourage significant diversion from the Kingsway and due to the low speed and capacity assumed

for Bancroft Drive, minimal traffic was attracted to this route. A comparison of the assignment results shown in Figure 9.1.6 illustrates the localized nature of the diversion. The 1992 Transportation Study recommended this link be constructed to coincide with development in this area. Analysis with the updated travel demand model confirms that the benefits of the connection will be localized in nature and the improvements should be considered in conjunction with development of the lands in the immediate area. It should be noted that this connection may result in an increase in traffic infiltration through neighborhoods along Bancroft Drive / Howey Drive.

10. Falconbridge Highway from LaSalle Boulevard to Garson-Coniston Road

The provision of a continuous left turn lane on Falconbridge Highway has been recommended to address future capacity deficiencies identified along this corridor. The recommendation is limited to areas with a significant number of existing entrances (such as the section to the north of Maley Drive). A centre left turn lane can increase the through capacity by 10-15% depending on the nature and density of the entrances and the volume of turning traffic. Usage of Falconbridge Highway is expected to grow significantly and the additional capacity provided by the left turn lane would ensure that an acceptable v/c ratio can be maintained throughout the planning horizon. While the capacity deficiency by 2021 has been identified for this corridor, the problem is local in nature and the improvement will provide the most benefit in the immediate area.

11. MR 80 Widening

MR 80 through McCrea Heights is a 4-lane road with a significant number of residential developments that have direct access. There are also several side streets intersecting with MR 80 between Donaldson Crescent and Simon Street. City staff indicated that turning movements associated with these direct accesses and side streets have created significant operational and safety problems on MR 80. To address this deficiency, it is recommended that a continuous left turn lane be constructed on MR 80 through McCrea Heights as a short-term improvement. A continuous left turn lane can reduce potential collisions with left turning vehicles, and can provide a refuge for pedestrians crossing MR 80 and also for vehicles accessing MR 80 from driveways and side streets. The recommendation to provide a continuous left turn lane is consistent with the recommendations made by the Region of Sudbury's Traffic Operations Study – (McCrea Heights/Guilletville Area) Town of Valley East. The continuous left turn lane should be constructed from south of the north intersection with Donaldson Crescent to Second Street. In addition, consideration should be given to re-aligning MR 80 north of Neal Street using a design speed of 90 kilometres per hour. This would require a partial shifting of MR 80 to the west through this section but has the effect of straightening out the problematic curve north of Neal Street.

12. Big Nickel Mine Drive (MR34) Extension

The extension of Big Nickel Mine Drive from MR55 to Southview Drive was investigated utilizing results from the model. While some vehicles may divert from Kelly Lake Road to this new connection, it is anticipated that it would attract small volumes of traffic, have minimal impact on adjacent roads and have significant impact on the natural environment. This does not appear to be a viable solution, as the cost of constructing the road would not likely be substantiated through use.

Potential Local Improvements

1. Montrose Avenue Extension to Hawthorne Drive Connection
2. Ste. Anne Road Extension
3. Frood Road-Regent Street Corridor
4. Kathleen Street Improvement
5. Martilla Drive Extension
6. Treeview Gateway Drive Extension to Regent Street
7. East-West Road South of Four Corners
8. MR 15 (Main Street) west of MR 80
9. Barrydowne Road South Connection
10. Falconbridge Highway from Lasalle Boulevard to Garson-Coniston Road
11. MR 80 through McCrea Heights
12. Big Nickel Mine Drive (MR 34) Extension

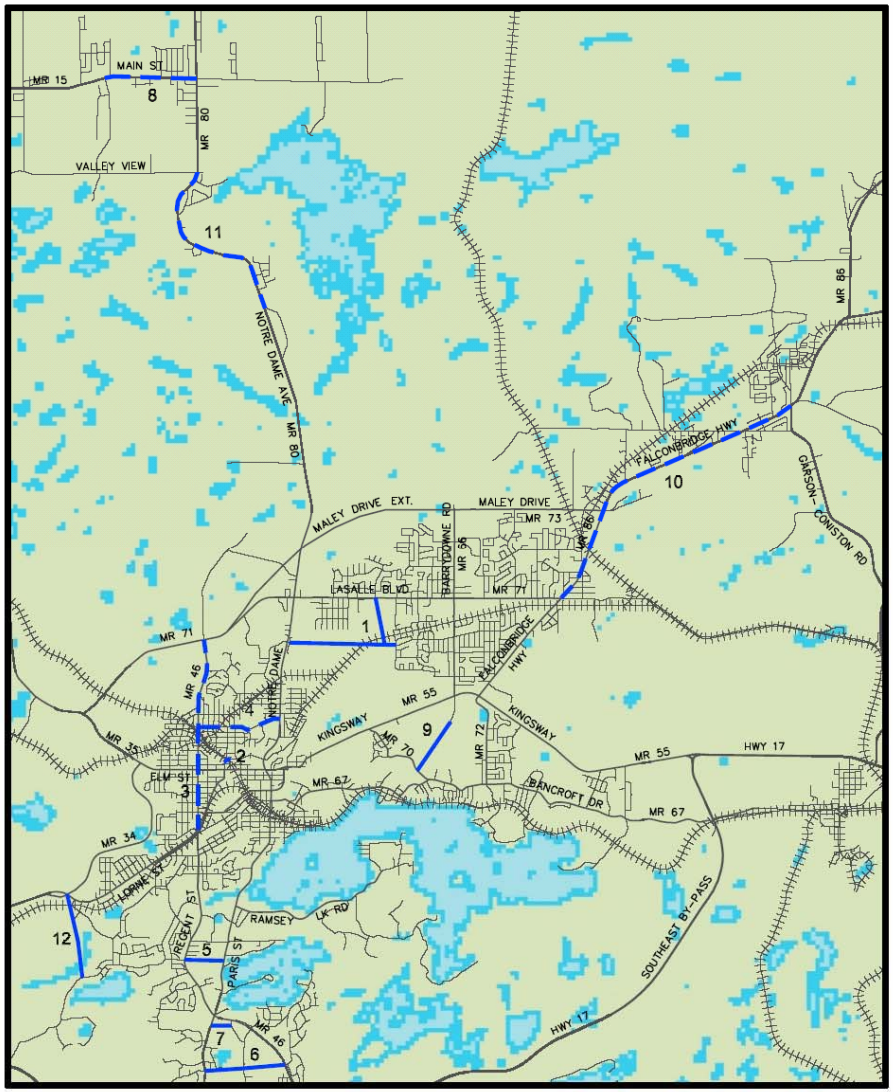


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Figure 9.1.1

Legend
- New Road
- Road Widening / Operational Improvement

Figure 9.1.2 - Montrose Road Extension/Hawthorne Connection

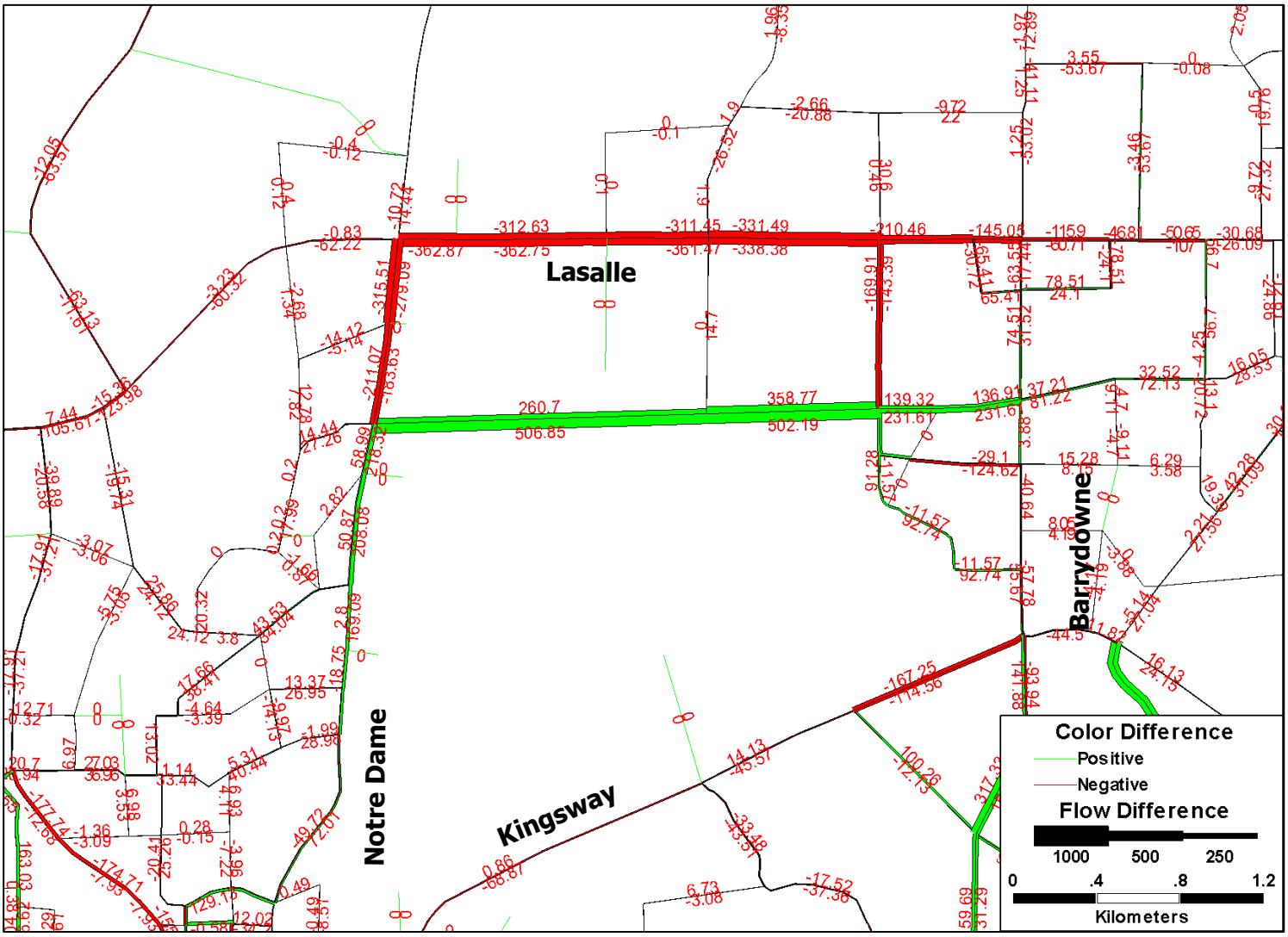


Figure 9.1.3 - Ste. Anne Road Extension

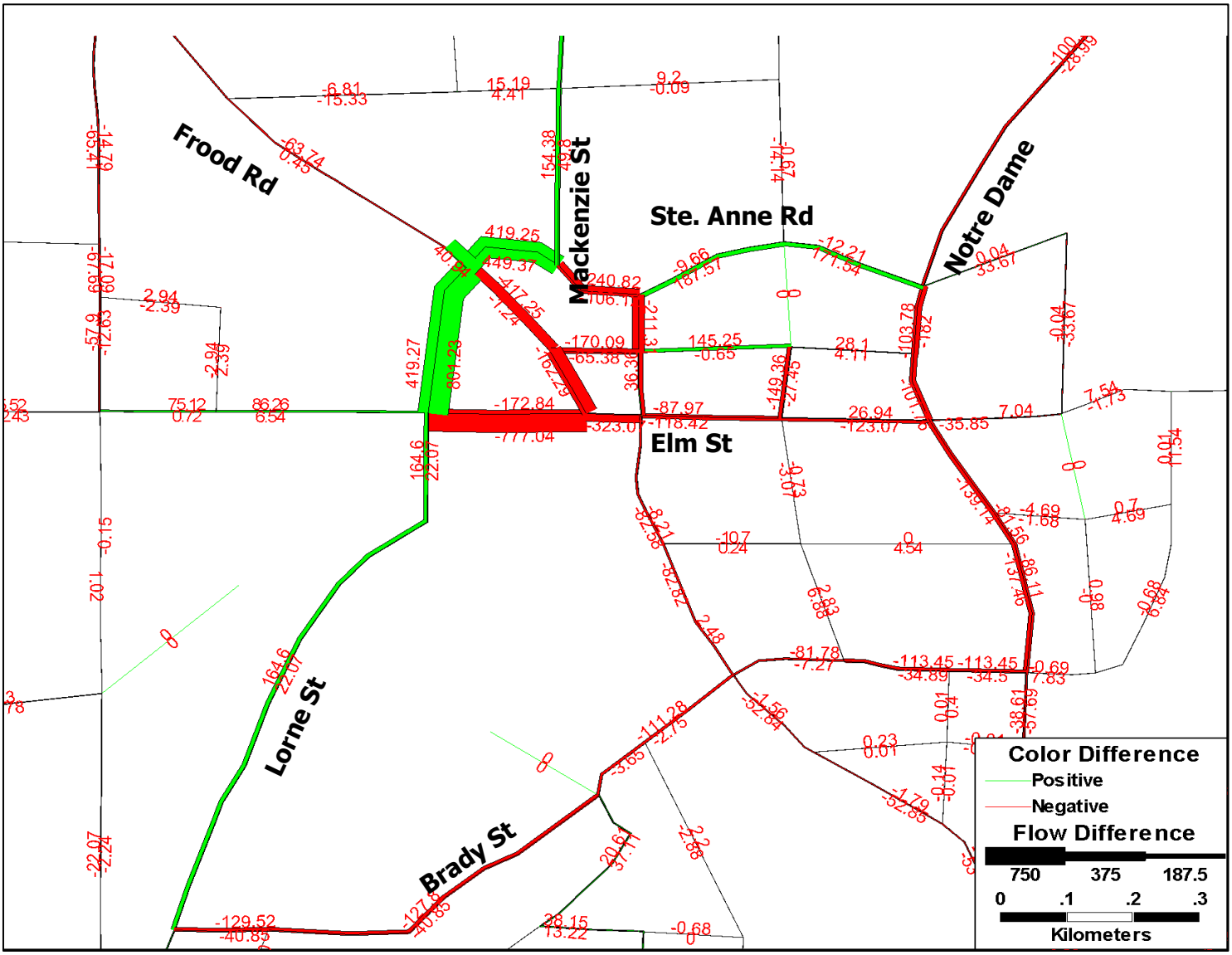


Figure 9.1.4 - Martilla Drive Extension

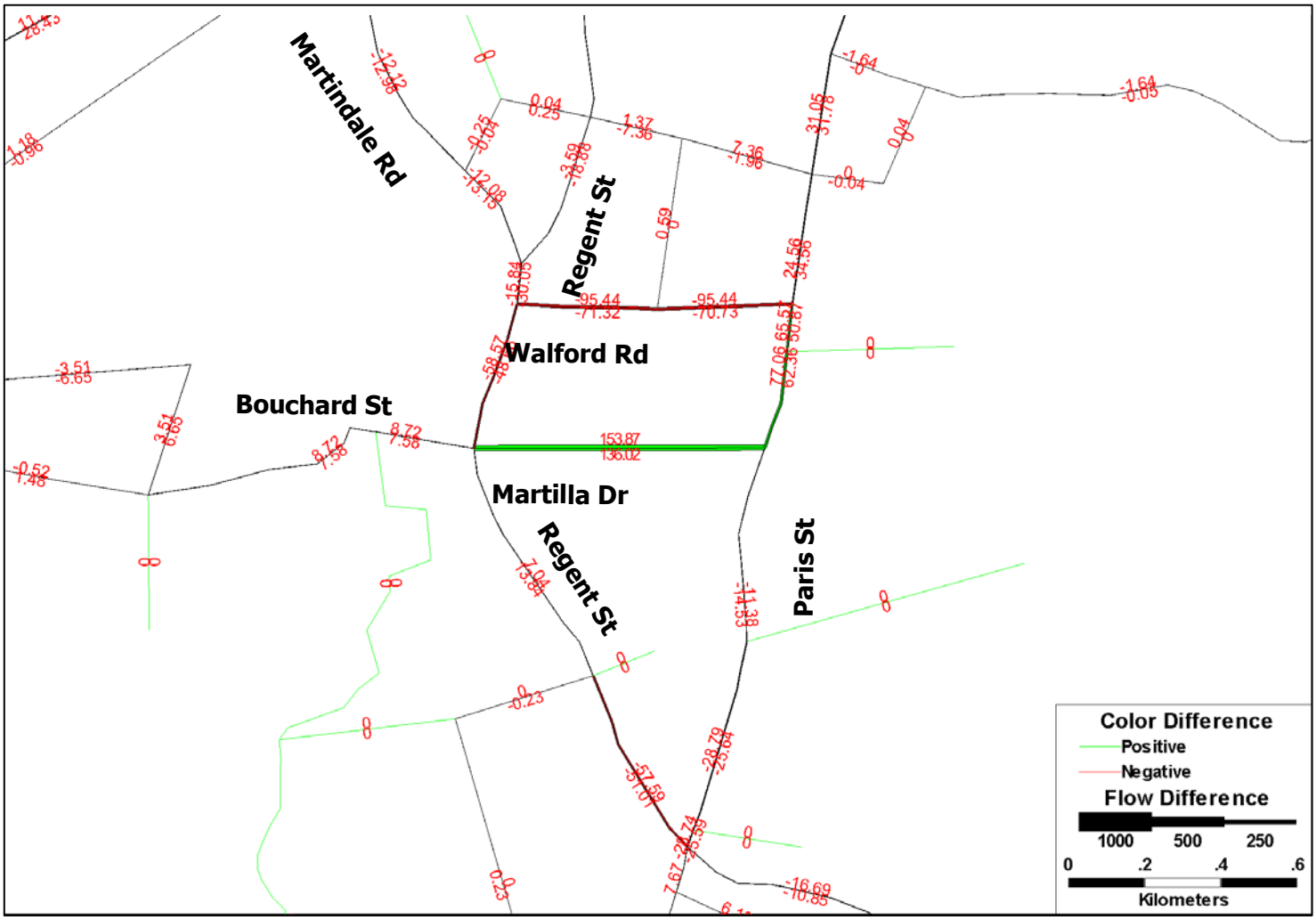


Figure 9.1.5 - New E-W Link South of Four Corners

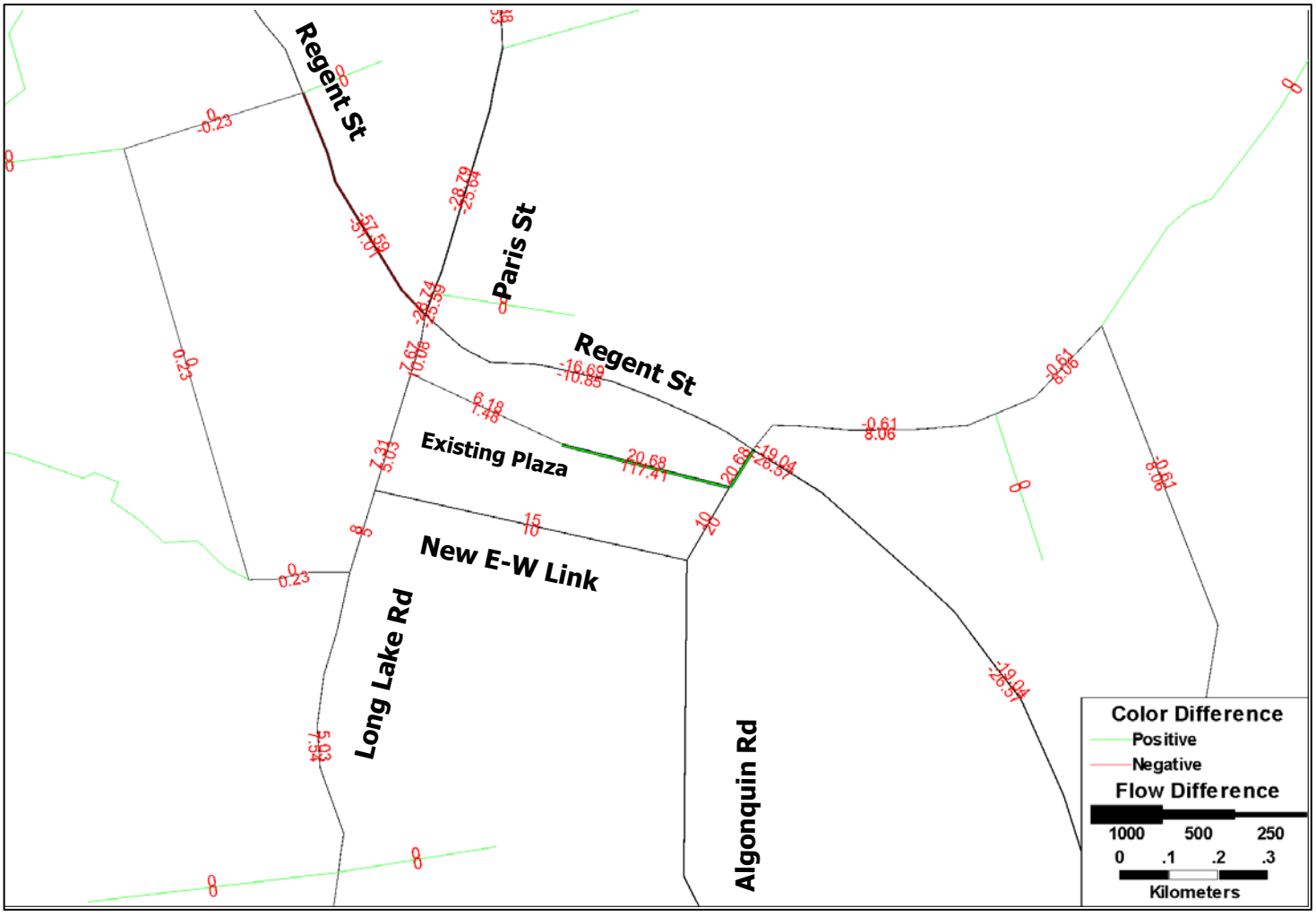
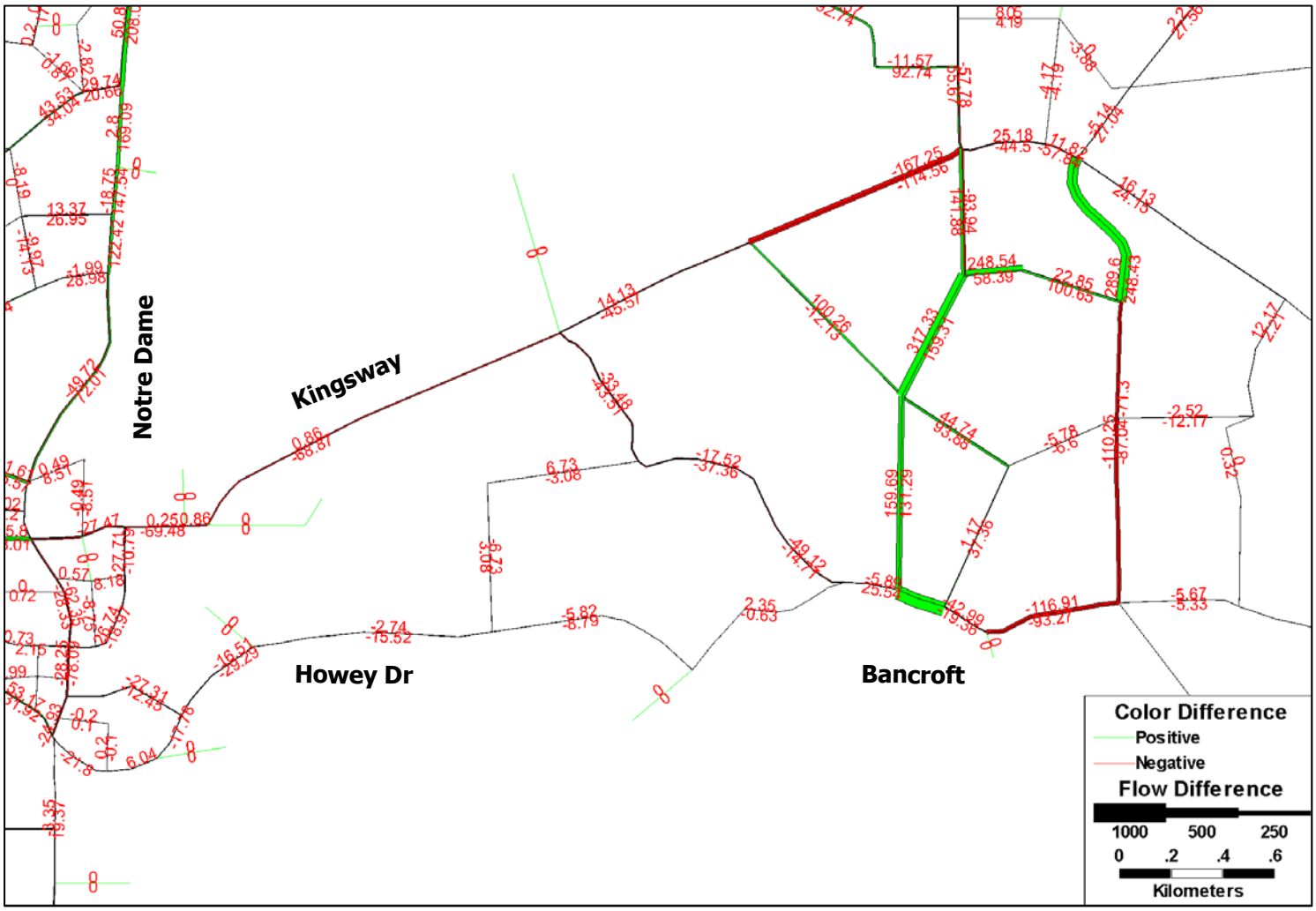


Figure 9.1.6 - Barrydowne South Connection



9.2. Intersection Improvements

Discussions with Greater Sudbury staff and technical analysis have identified a number of intersections that are currently experiencing either capacity or operational problems. As traffic volumes increase, these problems will only get worse. Accordingly, recommended improvements including supporting rationale are presented in the following sections.

1. Paris Street/Ramsey Lake Road

   2003 turning movement counts at this intersection indicated a traffic demand in the order of 475 right turning vehicles during the a.m. peak hour. Analysis revealed that traffic in the right turn lane was spilling back and blocking the through lanes on some cycles. The installation of a northbound right turn channelization, combined with an increased storage length for this lane will reduce the occurrences of queue spill over into the through lanes thereby improving operations at the intersection. Therefore, it is recommended a northbound right turn channelization be constructed at this intersection.

2. Paris Street/Regent Street

   The most recent counts available (summer 2000) indicate a demand of 437 northbound left turns and 467 southbound left turns at the intersection during the p.m. peak hour on Long Lake Road and Paris Street respectively. The current operating condition at the intersection under these conditions results in a v/c ratios of 0.82 and 0.91 for the northbound and southbound left turns respectively. The current lane configuration requires split phasing creating longer delays to other movements. Providing separate dual left turn lanes on Long Lake Road and Paris Street will allow for more efficient signal timing operations at the intersection.

   Road improvements required at this intersection to help alleviate existing and potential future capacity problems include conversion of the existing left turn through lanes on Paris Street and Long Lake Road to left turn lanes and addition of through lanes on Paris Street and Long Lake Road.

3. The Kingsway at Barrydowne Road and Falconbridge Highway

   A traffic impact study for the proposed 405,000 sq.ft. Millennium Centre development was completed by BA Group in 2004. Existing and future traffic volumes were assessed and analyzed to determine existing deficiencies and future deficiencies anticipated for the year 2008. The BA Group study recommended a number of intersection improvements and road connections needed to service the proposed development that have been approved by the City.

   Improvements at the Kingsway and Barrydowne Road intersection include:

   - Extend southbound right turn lane storage.

   - Extend southbound left turn lane storage.

- Provide dual northbound left turn lanes.
- Provide an additional southbound through lane.

Improvements at the Kingsway and Falconbridge Highway intersection include:

- Extend the eastbound right turn lane.
- Provide eastbound dual left turn lanes.
- Extend the westbound right turn lane and provide standard lane transition between 2 and 4 lane section (short term improvement).
- Provide standard lane transition for eastbound receiving lanes from 4 lane to 2 lane section (short term improvement).
- Provide dual southbound left turn lanes.
- Extend the westbound left turn storage.

4. LaSalle Boulevard/Notre Dame Avenue (MR 80)

Analysis of 2002 turning movement traffic counts indicated that the intersection is currently operating at capacity during the PM peak hour. The eastbound left, westbound left, through and right, northbound through and right movements and the southbound left turn movements are all operating at capacity.

Improvements that will alleviate the existing capacity problems and will accommodate the anticipated future traffic volumes in this corridor include the addition of a northbound and southbound through lane on Notre Dame Avenue (MR 80), and the construction of dual eastbound, westbound and southbound left turn lanes. The analysis also reviewed the potential impacts with the construction of Maley Drive extension and it was determined that the improvements recommended will be capable of accommodating the future traffic before and after the Maley Drive extension is constructed.

5. LaSalle Boulevard/Barrydowne Road

Analysis of 2001 turning movement traffic counts indicated that the intersection is currently operating at acceptable levels of service during the PM peak hour. An analysis was also undertaken for future 2021 conditions with and without Maley Drive Extension. The results of the analysis indicates that the intersection will operate at an acceptable level of service with the addition of dual westbound left turn lanes, dual northbound left turn lanes and an additional northbound through lane.

It is recommended that one additional left turn lane be constructed in the westbound and northbound directions at this intersection as well as one additional northbound through lane.

6. LaSalle Boulevard/Falconbridge Highway

Intersection capacity calculations were completed for the Lasalle Boulevard / Falconbridge intersection for existing and future traffic conditions. Results of the analysis indicated that the current lane configuration has sufficient capacity to accommodate anticipate traffic volumes with and without the extension of Maley Drive. However, operational problems are currently being experienced at this intersection due to inadequate turning radii. Therefore, it is recommended that left turn lane improvements and a right turn lane southbound along Falconbridge Highway be constructed.

10. ROAD DESIGNATIONS

10.1. Existing Road Classification

The roads within Greater Sudbury are classified based on function. Road classifications along with road right-of-way widths are identified in previous Official Plans and Secondary Plans for the former municipalities. Illustrated on Figure 10.1.1 is the current road classifications for Greater Sudbury extracted from the Secondary Plan documents prepared for the former municipalities. Provincial highways have been identified separately from the Municipal Road system as they are under the Provincial jurisdiction. Figure 10.1.2 illustrates current road right-of-way widths.

Greater Sudbury currently has five road classifications. These include three tiers of arterial roads, i.e., primary, secondary and tertiary.

Road classification criteria for arterial roads, collector roads and local roads are summarized in Table 10.1.1. The criteria are based on three main elements; the function of the road and its role in facilitating travel between points of origin and destination (roadway service function), land access, and traffic flow characteristics. Of the 3500-lane kilometres of roads within Greater Sudbury, approximately 50% are designated as local roads. Of the remaining 50%, roughly half are designated as arterial roads and the other half are designated as collector roads.

Under the existing classification system, primary arterial roads connect Greater Sudbury with other major centers outside of Greater Sudbury and/or provide inter-connection between communities within Greater Sudbury. Their function is to facilitate the longer distance movement of people or goods. Arterial roads are expected to have uninterrupted traffic flow characteristics which is typically facilitated by limited or restricted land access. In accordance with existing policies, access is limited to intersections with other arterial roads, intersections with collector roads and driveways to major regional activity centers.

Secondary arterial roads provide a connection between two primary arterial roads; connect two or more communities or major activity centers within Greater Sudbury. Access from adjacent property is strictly regulated and kept to a minimum.

Existing Road Classification

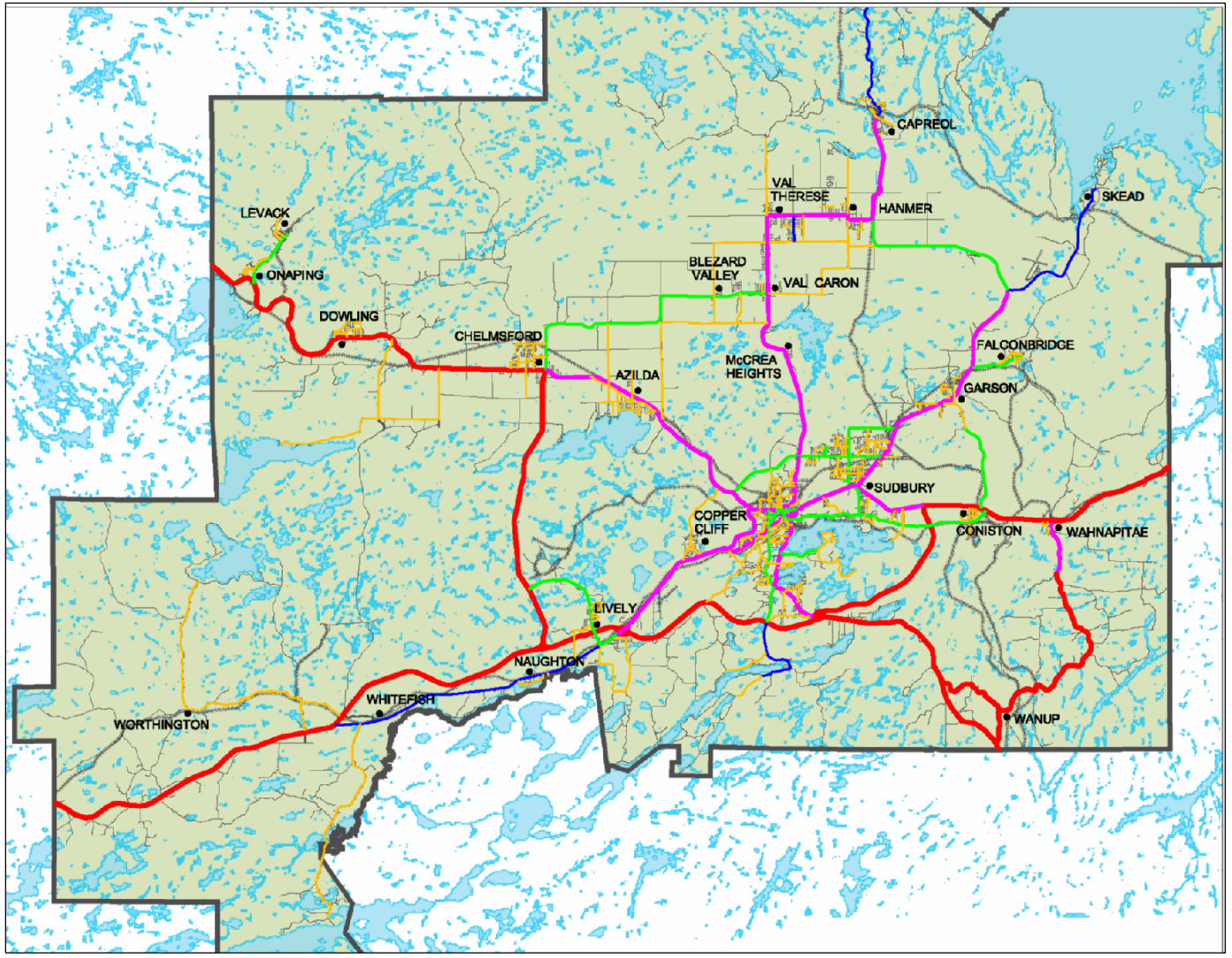


Figure 10.1.1

TABLE 10.1.1 - ROAD CLASSIFICATION

Class of Road	Jurisdiction	Function	Access	Daily Traffic Volume	Design Speed	Minimum intersection spacing (m)	Other Regulation
Primary Arterial (Major Highway)	Province or City	▪ Connecting City with other major centers outside the City and/or inter-connecting settlements. ▪ Long distance person or goods movement travel through the City between major activity areas within the City. Traffic movement primary consideration.	▪ Intersections with other arterial roads and with collector roads. ▪ Access from adjacent property strictly regulated and kept to a minimum (rigid access control).	10,000 – 30,000	60 – 100 km/h	400 m	▪ No on-street parking. ▪ Buffers between the roadway and adjacent urban and rural areas.
Secondary Arterial	Province or City	▪ Connecting two or more settlements or major activity centers within the City; ▪ Connecting between two primary arterial roads; or ▪ Connecting a settlement or activity center 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.	▪ Intersections with other roads. ▪ Access from adjacent property **strictly** regulated and kept to a minimum.	5,000 – 20,000	50 – 70 km/h	200 m	▪ No on-street parking. ▪ Buffers between roadway and adjacent uses.
Tertiary Arterial	City	▪ Connecting small settlements; or ▪ Connecting settlement to primary or secondary arterial leading to a recreational area. ▪ Trip origin and/or destination along it, along an intersecting collector or along 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.	5,000 – 20,000	50 – 70 km/h	200 m	▪ No on-street parking. ▪ Buffers between roadway and adjacent uses.
Collector	City	▪ 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.	1,000 – 12,000	50 – 80 km/h	60 m	▪ On-street parking may be permitted. ▪ Greater setbacks from roadway of adjacent uses.
Local	City	▪ 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.	< 1,000	30 – 50 km/h	60 m	▪ On-street parking generally permitted except in un-usual circumstances. ▪ Goods movement restricted except for that having origin or destination along road.

Collector roads connect neighborhoods and carry trips that originate and/or are destined along the collector road or are fed through an intersection with a local road. The traffic flow characteristic typically displayed by a collector road is "interrupted", which gives equal importance to movement of people or goods and access to land. According to existing polices, access from adjacent properties is regulated.

While the existing road system has been designated with certain road classifications, field observations and technical analysis has revealed that some roads are not functioning according to their classification. For example, the Kingsway is classified as a primary arterial road. While its location within the road network lends itself to provide a connection between major centers and facilitate the movement of people or goods, it appears to function as a secondary arterial or a collector road. The large number of accesses along the Kingsway restricts the mobility of through traffic therefore degrading the function of the roadway.

Similarly, Regent Street, north of Paris Street is classified as a secondary arterial road. However, the high frequency of accesses along this road facilitating both commercial and residential development impedes the traffic flow and decreases the overall level of service.

It is not recommended that the classification of these roads be changed, however, road access policies and by-laws need to be more stringently enforced in order to uphold the intended function of the specific road segment. When the opportunity arises, entrances on primary or secondary arterials must be reviewed more closely and consideration given to consolidation of accesses or provision of access from a lower classified road in an effort to maintain the integrity of the roadway.

Minimum intersection spacing as identified by the Transportation Association of Canada (TAC) should be considered when reviewing the spacing of intersections and has been included in Table 10.1.1.

10.2. Future Road Classification

In the recommended plan, there are two new road links that will require classification according to Greater Sudbury's road classification system. These two new roads include the Maley Drive Extension and the New University Link.

Maley Drive will be a new route and bypass that provides an attractive alternative to LaSalle Boulevard and the Kingsway. It will provide a direct and efficient transportation link for industrial activities in the northwest and east areas of Greater Sudbury. It is recommended that this new roadway be designated at a Primary Arterial road with very strict access controls.

The existing section of Maley Drive between Falconbridge Highway and Barrydowne Road is currently classified as a secondary arterial road. The classification of this section of Maley Drive will require a change in designation to a primary arterial with the future extension of Maley Drive to LaSalle Boulevard. The function of this section of Maley Drive will play an important role in the overall road network of Greater Sudbury and it will facilitate the long distance movement of people or goods through Greater Sudbury. Similar to the Maley Drive extension, strict access controls are required in order to provide an efficient transportation link.

Under future conditions, the section of LaSalle Boulevard, between MR35 and Maley Drive / LaSalle Boulevard interchange, will function as the western extension of Maley Drive to MR 35 and will contribute to the movement of people or goods through Greater Sudbury. As a result, this portion of LaSalle Boulevard should be redesignated from its current classification of a secondary arterial to a primary arterial, which is consistent with the classification of Maley Drive.

Montrose Avenue will be extended northerly to the Maley Drive. The current classification of Montrose Avenue is secondary arterial and this should be maintained for the entire length of the road, as the function of this road is to connect an activity centre with a primary arterial road. For the new section of Montrose Avenue, access controls should be enforced so that the roadway can function as designated and facilitate the movement of people and goods between LaSalle Boulevard and Maley Drive. It is recognized that additional traffic along this road will have a social/environmental impact on the existing residential neighbourhood. However, from a transportation perspective, the extension of Montrose Avenue to Maley Drive fulfils an important role in the overall road network and provides a parallel route to both MR 80 and Barrydowne Road. In the future, the City may be required to contemplate changes to the existing land uses along the existing section of Maley Drive to take into consideration the higher traffic volumes generated by this roadway connection.

The New University Link should be designated as a Tertiary Arterial. It is intended to be developed as a parkway with limited access and developed with parallel recreational facilities.

The future road classification for the City of Greater Sudbury including the recommended road network is illustrated on Figure 10.2.1.

Future Road Classification

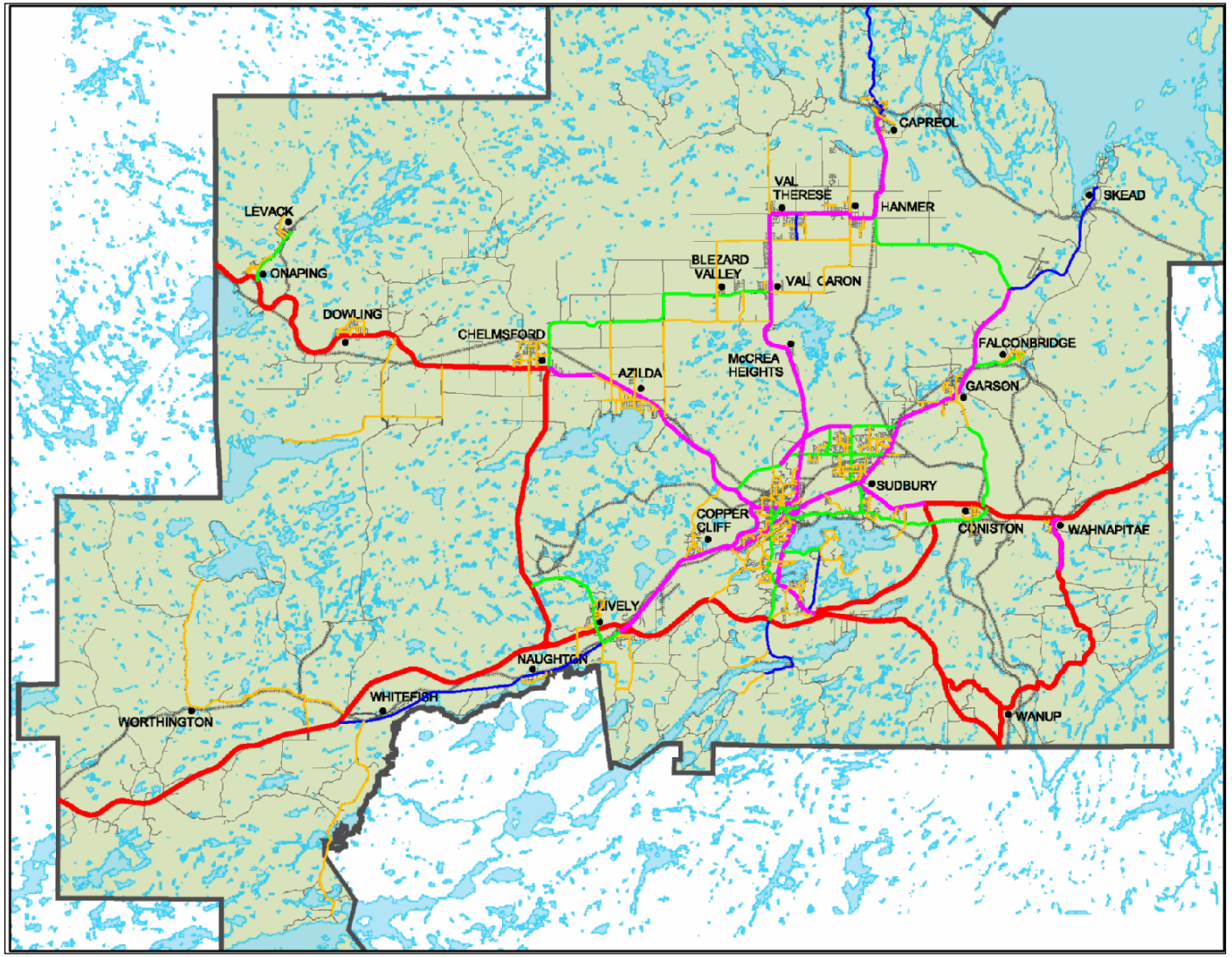


Figure 10.2.1

10.3. Road Access Policies

Policies for access management are required in order to provide safe and orderly access to lands consistent with the function of a road.

The degree of access control is directly related to the classification of the road as identified in Table 10.1.1. This road classification system recognizes that unregulated access may compromise safety and may reduce the capacity of the road.

The City of Greater Sudbury has an access control policy that allows the City's Engineer to determine what new accesses should be approved and to determine what accesses should be provided during road reconstruction. The intent of the policy is to permit access that does not impact the safety or reduce the capacity of the road. This policy identifies the number of accesses by type of arterial road, location, design, construction and allocation of costs.

The access control policy for arterial roads should be reviewed to ensure that it supports the intended function of the road. The existing policy indicates that accesses to primary arterial roads should generally be only by other arterial or collector roads and from major regional activity centres. However, it also states that existing parcels of land with less than 200 metres of street line on a primary arterial, but with street lines only on primary arterials, shall be permitted one access. While it is recognized that access cannot be denied in these situations, a high density of accesses along a primary, and even a secondary arterial road will likely compromise the function of the road.

In areas where multiple accesses will create concerns regarding safety and compromise the function of the road, shared access or service roads should be investigated.

10.4. Right of Way and Typical Cross Sections

Table 10.4.1 summarizes right-of way width requirements for all classes of roads in Greater Sudbury. Road right-of-way is illustrated in Figure 10.4.1.

Table 10.4.1 - Road Right-of-Way Widths

Class of Road	Right-of-Way Width	Number of Lanes
Primary Arterial (Major Highway)	35 - 45 metres in urbanized area 45 - 90 meters in rural area	4 to 7
Secondary Arterial	26 - 35 metres in urbanized area 30 - 45 meters in rural area	2 to 5
Tertiary Arterial	26 - 35 metres in urbanized area 30 - 45 meters in rural area	2 to 5
Collector	20 - 30 metres	2 to 4
Local	20 metres	2

Road Right-of-Way

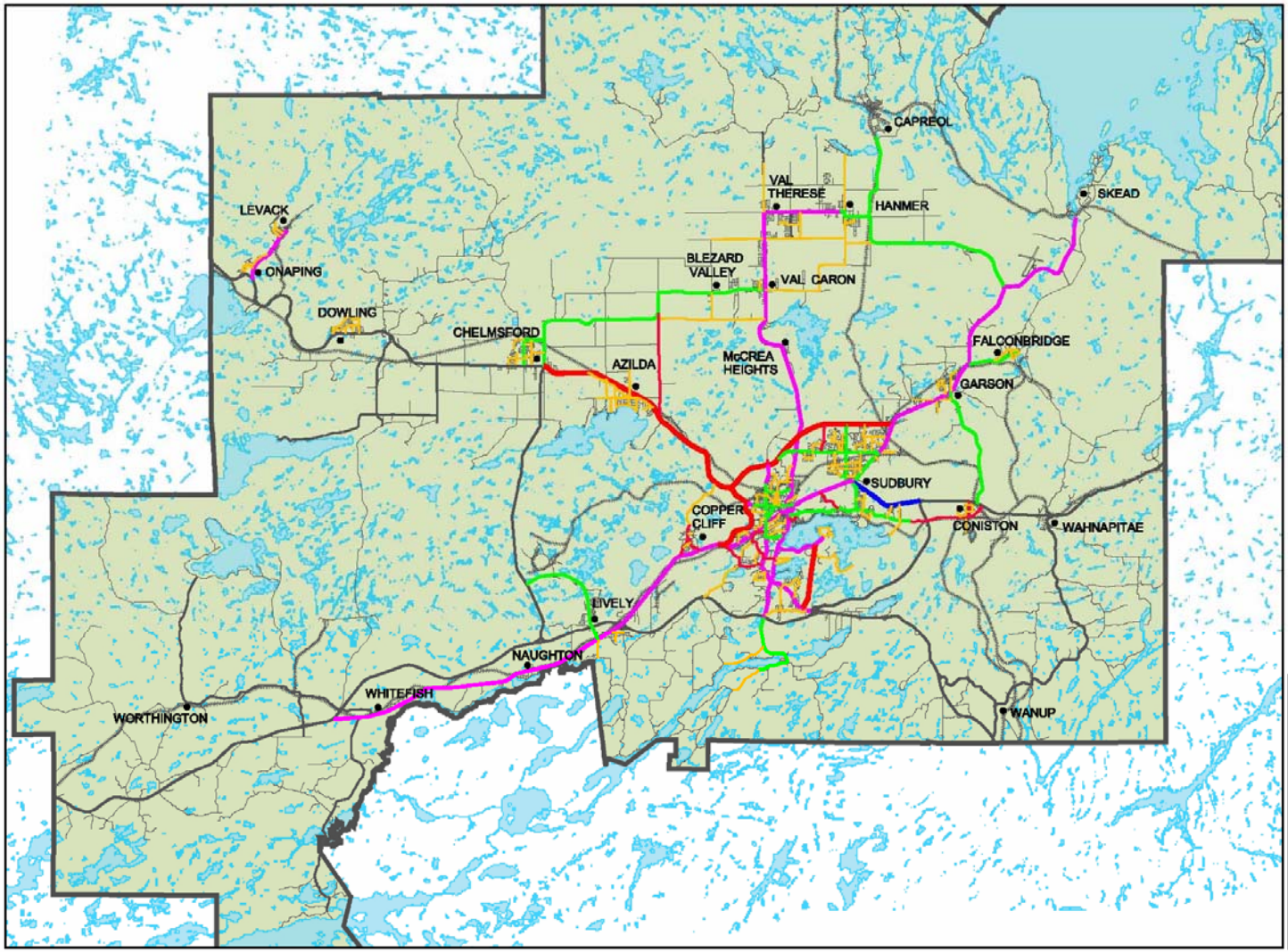


Figure 10.4.1

Greater Sudbury staff should encourage the inclusion of features such as landscaping, buffers, sidewalks, transit stops, bicycle paths, median strips and boulevards during the design of roads where appropriate and feasible. And in doing so, ensure that sufficient right-of-way width is available to implement the design features.

Sidewalks should be provided on both sides of urban arterial roads and collector roads adjacent to developed lands, and on at least one side of all local roads.

Truck climbing lanes should be provided on roads with steep grades and a large volume of truck traffic.

Greater Sudbury Standard Drawings for the design of roads should be used and supplemented with design standards contained in the Ministry of Transportation (MTO) Geometric Design Manual and Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads.

For the design of bikeways in Greater Sudbury, the Bicycle Advisory Committee Reference Manual dated August 1997 should be used as a guideline until such time an updated version of the manual is complete. Consideration should also be given to Planning and Design Guidelines for Shared Road Bikeways, Shoulder Bikeways, Bike Lanes and Bike Paths published by the Ministry of Transportation.

11. IMPLEMENTATION PRIORITIES AND FUNDING

11.1. Overall Priorities

All of the road improvements were assessed to determine implementation priorities. The factors used during the assessment included the following:

- The degree to which the improvement addressed an existing problem, indicating the relative urgency of the required improvement.

- The extent to which the improvement contributed in terms of a transportation benefit to the individual user and the business community.

11.2. Capital Funding Requirements

Based on the results of the preceding assessment, the following table summarizes capital funding requirements in terms of short, medium, and long-term.

Short-term Roadway Improvements	Estimated Cost
Extend Maley Drive to LaSalle Boulevard (4-Lanes). Extend Montrose Avenue to the Maley Drive extension.	$27.8 M
Widen Maley Drive from 2-lanes to 4-lanes from Barrydowne to Falconbridge Highway.	$3.4 M
Construct the New University Link between the University and Regent Street.	$7.4 M
Widen MR 15 to 4-lanes from MR 80 to Belisle Drive.	$3.5 M
Widen MR 35 to 4-lanes from Azilda to Chelmsford.	$9.5 M
Widen LaSalle Boulevard to 4-lanes between the CPR Overhead and 0.3 km west of Notre Dame Avenue.	$4.6 M
Widen the Kingsway to 4 lanes from Falconbridge Highway to the Southeast Bypass.	$6.0 M
Widen the Kingsway to 5 lanes from the intersection of Lloyd Street and Brady Street to 430 m east of Kitchener Avenue.	$7.2 M
Convert the existing left turn through lanes on Paris Street and Long Lake Road to left turn lanes. Add through lanes on Paris Street and Long Lake Road.	$2.0 M
Provide a northbound right turn channelization at the Paris Street/Ramsey Lake Road intersection	$0.5 M
Provide dual eastbound, westbound and southbound left turn lanes and additional northbound and southbound through lanes at the LaSalle Boulevard/Notre Dame Avenue intersection.	$3.5 M
Provide additional westbound and northbound left turn lanes at the LaSalle Boulevard/Barrydowne Road intersection as well as one additional north bound through lane.	$3.0 M
Provide left turn lane improvements and a right turn lane southbound along Falconbridge Highway.	$2.0 M

Widen MR 80. Provide a continuous left turn lane from Donaldson Crescent to Second Street.	$8.0 M
Total	**$88.4 M**

Mid-term Roadway Improvements	**Estimated Cost**
Widen Notre Dame Avenue to 6 lanes from Kathleen Street to LaSalle Boulevard.	$5.0 M
Total	**$5.0 M**

Long-term Roadway Improvements	**Estimated Cost**
Widen MR80 to 6 lanes between LaSalle Boulevard and MR 15.	$18.1 M
Provide a continuous left turn lane on Falconbridge Highway from LaSalle Boulevard to Garson-Coniston Road.	$7.0 M
Total	**$25.1 M**

Figure 11.1.1 illustrates the short, medium and long-term roadway improvements.

Roadway Improvement Priorities

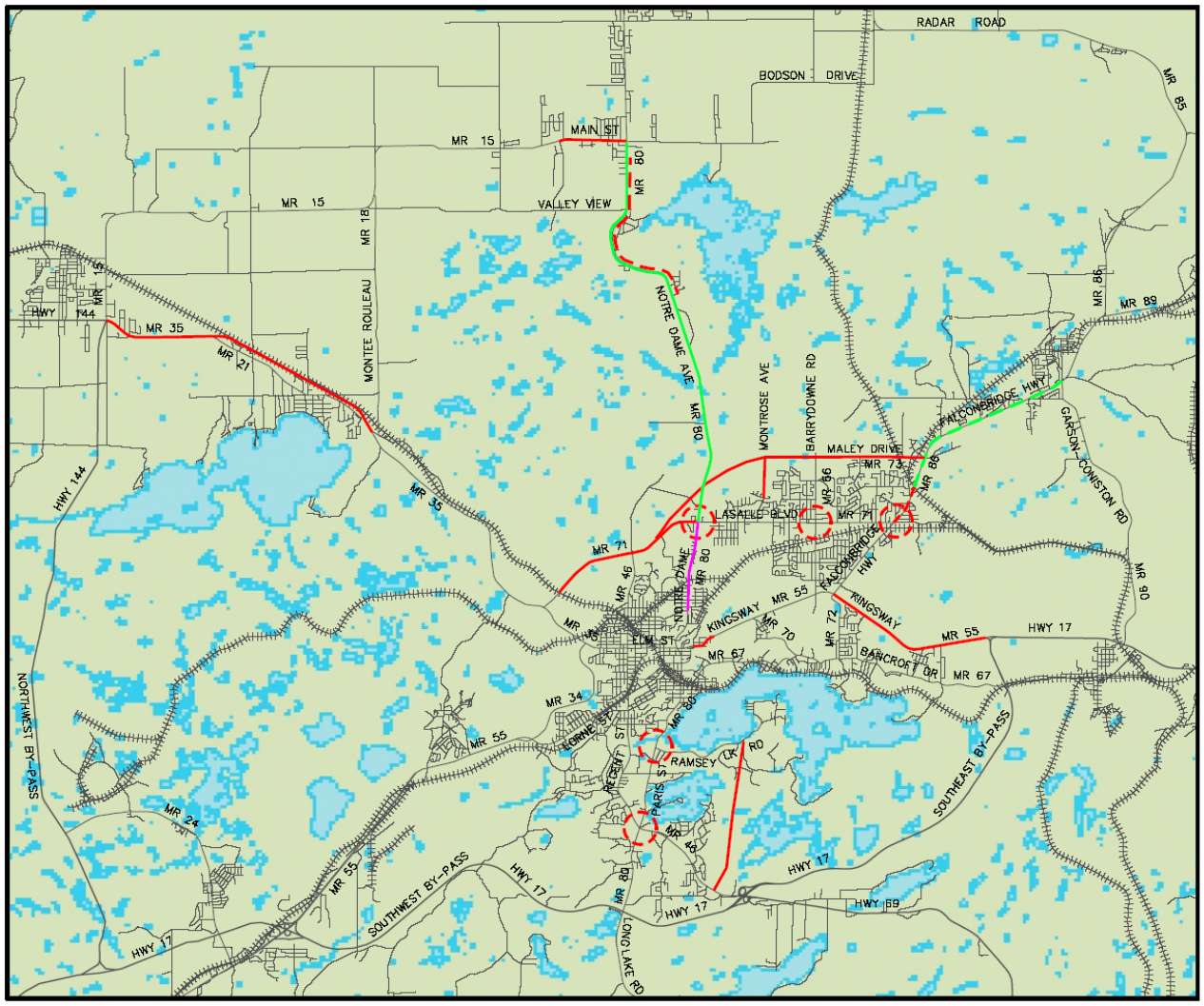


Figure 11.1.1

Legend

- Short-term New Road / Road Widening
- Short-term Operational Improvement
- Mid-term New Road / Road Widening
- Long-term New Road / Road Widening
- Long-term Operational Improvement

11.3. Funding Options

Capital outlays required to address the recommended improvements will put significant pressures on Greater Sudbury's limited budget. Assuming that the expenditures associated with the short-term improvements would occur from 2 to 7 years from now (years 2006 through 2010), it would mean that these improvements would cost Greater Sudbury an average of about $18 Million annually. The recommended improvements that do not involve major road widening or new roads would be addressed under the "Road Reconstruction & Resurfacing" budget item. According to the City's 2004 Budget document, the proposed capital expenditures for Road Reconstruction & Resurfacing already falls significantly short of the identified needs through Greater Sudbury's Road Needs Study. The review of the City's 2004 budget clearly indicates a substantial funding gap in Greater Sudbury's ability to maintain the existing infrastructure and construct the improvements identified in this plan. Greater Sudbury therefore faces a considerable challenge to meet ongoing capital needs and those associated with the recommended improvements. Listed below are some of the options that may assist Greater Sudbury in coping with this situation.

The option with the most potential would be to seek funding support from senior levels of government. In this context, there have been a number of recent announcements by both the Federal and Provincial Governments regarding assistance to municipalities for infrastructure renewal.

Another option would be to enter into partnership arrangements with the mining companies as the Municipal Road infrastructure greatly benefits these companies. The option follows the "user-pay" principle where Greater Sudbury is seeking to generate new revenues from those that benefit most directly. The option increases awareness of the full costs of the infrastructure, and also has the benefit of reducing public costs. The concept can be applied to new roads, road widenings, or to reconstruction and maintenance activities.

Greater Sudbury does not collect development charges for non-residential development (ICI lands), that permits the collection of funds for roads, and other capital cost items related to growth. It is understood that there has been some debate as to the pros and cons of imposing a development charge for non-residential development in light of past growth patterns and the economic objectives of Greater Sudbury. The City currently has City-wide Development Charges for residential development and may want to review the application of area specific Development Charges depending on the City's land use and broader socio-economic objectives. For example, area specific Development Charges could be applied in areas where expensive road upgrades are required to support development. By implementing this, Greater Sudbury would be not only directing growth in a manner that is consistent with its Official Plan policies, but also would be able to tap another source of revenue.

11.4. Monitoring Plan

The Transportation Plan is not a static document. It must be regularly reviewed to ensure that it continues to address the transportation needs of Greater Sudbury. There are a number of variables that could change the individual elements and their implementation timing within the Plan, the most significant being the location, timing and extent of development. Given the growth and economic patterns of Greater Sudbury in the past, it may be desirable to undertake this review every five years.

The success of any long-range plan depends on the ongoing monitoring of actions and the resulting impacts. Greater Sudbury needs to be aware of its progress in achieving its key transportation objectives, in order for it to modify, add or delete specific initiatives or change priorities as needed. It is important that appropriate performance measures are developed that reflect the City's broader socio-economic goals, and transportation objectives. It is equally important that Greater Sudbury be able to collect and synthesize the required data sets on an ongoing basis to quantify these performance measures.

12. RECOMMENDATIONS

Recommendations are based on technical analysis, evaluation of alternatives, and are also reflective of the input and comments received from the general public and key stakeholders. This Transportation Study has identified a number of specific infrastructure improvements, and policies that require implementation over the life of the plan. It is important to note that the success of the plan will depend on implementation of all or most of its elements, since many of these elements work together within the overall transportation system. It is also important to ensure that these are included in Greater Sudbury's new Official Plan.

The following is a listing of specific recommendations relating to each transportation element.

Road Rehabilitation

1. Give priority to the preservation of existing infrastructure before adding new roadway sections.

2. Develop and implement an Asset Management Strategy that considers life cycle costing, desirable pavement condition indices, and the availability of funding.

3. Give higher priority to roads with higher classification, and with heavier traffic volumes.

4. Maintain roads that are predominantly used by trucks at a higher standard.

Road Improvements

5. Initiate the following within the next five years:

    a. Environmental Assessment Studies (update previous EA studies) for the following:

        i. Maley Drive extension and widening.

        ii. Alternate Access to Laurentian University and South Shore of Ramsey Lake.

        iii. MR 15 widening.

        iv. MR 35 widening.

        v. LaSalle Boulevard widening.

        vi. The Kingsway widenings.

        vii. MR 80 widening.

    b. Construction of the Maley Drive extension and widening.

    c. Construction of the New University Link.

d. Construction of the MR 15 widening.

e. Construction of the MR 35 widening.

f. Construction of the LaSalle Boulevard widening.

g. Construction of the Kingsway widenings.

h. Construction of MR 80 widening.

i. Conversion of the existing left turn through lanes on Paris Street and Long Lake Road to left turn lanes and the construction of additional through lanes on Paris Street and Long Lake Road at the Four Corners.

j. Construction of a northbound right turn channelization at the Paris Street/Ramsey Lake Road intersection.

k. Construction of dual eastbound, westbound and southbound left turn lanes and additional northbound and southbound through lanes at the LaSalle Boulevard/Notre Dame Avenue intersection.

l. Construction of one additional westbound and one additional northbound left turn lanes at the LaSalle Boulevard/Barrydowne Road intersection as well as one additional northbound through lane.

m. Construction of southbound left turn lane improvements and a right turn lane at the LaSalle Boulevard/Falconbridge Highway intersection.

6. Continue to monitor traffic growth and service levels along MR 80.

   A future Class EA study of the widening of MR 80 should consider the Barrydowne Road extension and the potential by-pass of the McCrea Heights area as viable alternatives. At the time of this future study, updated growth forecasts should be prepared for Valley East, based on observed growth trends and known development activity or planning applications in the area. The Class EA study should reconfirm the need and justification for the improvements and include a detailed evaluation of social, cultural, and environmental impacts, which was beyond the scope of this Transportation Study, to confirm the recommended planning alternative. Greater Sudbury should ensure that any planning applications received in this area do not preclude the option of the Barrydowne Road extension, until such time as a future Class EA and route planning study can be completed.

7. Initiate the remaining road improvements identified in Chapter 11 after the above short-term improvements have been implemented.

8. Undertake detailed feasibility / operational studies for the following localized improvements that may be required to address area growth or other localized operational deficiencies:

a. The Hawthorne Drive Connection between Notre Dame Avenue and Barrydowne Road and the Montrose Avenue Extension southerly to the Hawthorne Drive Connection.

b. Operational improvements and the westerly extension of Ste. Anne Road under the railway tracks to Pine Street/College Street.

c. The extension of Treeview Gateway Drive from Long Lake Road to Regent Street.

9. Recognize and protect for the following long-term road improvement needs that may be required beyond the planning horizon.

   a. The widening of Falconbridge Highway from Garson-Coniston Road to Radar Road.

   b. The construction of the Northeast Bypass from Maley Drive to Highway 17.

   c. The extension of LaSalle Boulevard easterly to the future Northeast Bypass.

   d. The widening of MR 55 from Highway 17 to Big Nickel Mine Drive.

   e. Improvement of the Frood Road/Regent Street corridor to create an alternative north-south arterial route.

10. Communicate with the Ontario Ministry of Transportation the following:

    a. The need to widen the Southwest Bypass (Provincial facility) to 4 lanes.

    b. The importance of four-laning Highway 69 from Sudbury southerly to Parry Sound which will promote Greater Sudbury's economic growth.

    c. The need to widen sections of Highway 17 east of the Southeast bypass, and Highway 144 west of Chelmsford in the long-term (beyond the planning horizon).

    d. The need for a Northeast Bypass from Maley Drive to Highway 17 in the long-term (beyond the planning horizon).

<u>Funding</u>

11. Seek funding support from the Federal and Provincial Governments for the transportation system through grants and/or additional revenue streams such as a portion of the gasoline tax.

12. Negotiate cost sharing agreements with major industries when these industries will benefit from the transportation improvement being proposed.

13. Explore means to generate new sources of revenues such as applying selective charges (area specific development charges) to new developments in areas where growth is not desirable and expensive to serve.

14. Seek ways to reduce costs for both capital and operating activities through operational efficiencies, technology application, and innovation.

Road Designations/Access Policies

15. Provide an integrated road network consisting of arterial and collector roadway grids as shown in Figure 10.2.1 to ensure adequate access and mobility for all areas in Greater Sudbury.

16. Develop, maintain, update, and apply Right-of-Way Classification Guidelines for all classes of roads under Greater Sudbury's jurisdiction.

17. Designate the Maley Drive extension, the existing section of Maley Drive between Barrydowne Road and Falconbridge Highway and the section of LaSalle Boulevard between MR 35 and the new Maley Drive interchange as Primary Arterial Roads, the Montrose Avenue extension as a Secondary Arterial Road and the New University Link as a Tertiary Arterial Road.

18. Continue to require the preparation of Transportation Impact Studies in support of planning applications for new developments. As a condition of approval, such studies shall identify all transportation system modifications required to accommodate the new developments, and will clearly demonstrate that these modifications do not compromise Greater Sudbury's transportation network objectives.

19. Conduct a review of Greater Sudbury's Access Control policy for Municipal Roads and undertake an Access Management Review of key arterial corridors in Greater Sudbury.

Pedestrian/Bicycle

20. Provide the following on new and reconstructed roads, when feasible:

    a. Sidewalks on both sides of urban arterial roads and collector roads adjacent to developed lands;

    b. Sidewalks on at least one side of local roads;

    c. High quality pedestrian connections to transit;

    d. Pedestrian connections between neighbourhoods; and

    e. Pedestrian linkages to major attractions/generators.

21. Require landowners, as a condition of Site Plan Approval, to provide direct, safe, secure, and well-delineated access routes for pedestrians between main building entrances and adjacent public sidewalks.

22. Consider providing bicycle facilities on all new road links and road widening projects. Assess feasibility in terms of safety, usage, cost, and connection with major educational / institutional / cultural centres.

23. Provide a bicycle/pedestrian facility along the new road link to Laurentian University.

24. Emphasis enforcement and education to promote safe bicycle/pedestrian travel.

25. Continue to improve coverage through improvement of the current bicycle network, with special emphasis given to major generators (e.g., community centres, educational institutions, and recreation centres).

26. Update the Bicycle Advisory Committee Reference Manual and undertake a bicycle network study.

27. Give full consideration to Greater Sudbury's Accessibility Plan for all transportation matters.

Transit

28. Upgrade the fare collection system through acquisition of electronic fare boxes.

29. Develop transportation solutions and fare systems that entice students.

30. Institute a program of bus bay construction in view of the new legislation giving right-of-way to buses at intersections. The program needs to be given a higher priority to roads with a large number of buses.

31. Provide adequate funding to maintain the current service level (quantity and quality), and to keep fare increases below the cost-of-living index.

32. Address bus breakdown incidents within the large service area through such measures as provision of satellite garages or mobile repair units, or entering into agreements with private maintenance operators.

33. Improve integration with the VIA rail station.

34. Continue to review the service to ensure that the service is meeting community needs.

35. Give full consideration to the City's Transit Accessibility Plan.

Trucks

36. Designate the Maley Drive extension as a major east-west truck route, thereby reducing heavy truck traffic on other roads including LaSalle Boulevard.

37. Improve liaison with industry to address such issues as operational problems and future infrastructure needs in a timely manner.

38. Improve enforcement of weight restrictions.

Land Use Policies

39. Focus on compact, mixed-use development at strategic locations to reduce reliance on the automobile.

40. Review development proposals to ensure that there are adequate bicycle/walking links, and adequate road network to facilitate efficient transit routing so that all dwellings in the development are within 400 metres walking distance of a bus stop.

41. Use TransCAD combined with other techniques to review and approve all major developments when traffic impacts extend beyond the localized area.

42. For new road corridors and existing corridors that have been identified for future widening, Greater Sudbury should consider the ultimate property requirements for the recommended projects when reviewing and approving development plans affecting these projects.

Data Collection and Monitoring

43. Develop and implement a cordon count program to be undertaken at least every 5 years.

44. Undertake a home interview survey every 5 years at the same time as the cordon count.

45. Update the travel demand-forecasting model every 5 years after completion of the cordon count and home interview survey.

46. Develop a set of transportation performance monitoring statistics based on available data (e.g. vehicle-kilometre traveled) to ensure that the transportation policies and objectives outlined in the Official Plan are meeting their goals.