SMART GROWTH PLAN

Smart Growth Development Plan

Transportation Improvement Study

Yellowknife, NWT

HDR | iTRANS

The City of Yellowknife

July 2010

The preparation of this sustainable community plan was carried out with the assistance from the Green Municipal Fund, a Fund financed by the Government of Canada and administered by the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the personal views of the authors and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them. Additional funding assistance was provided by the Canadian Mortgage and Housing Corporation, Indian and Northern Affairs Canada, the GNWT Department of Education, Culture and Employment and the City of Yellowknife.

City of Yellowknife

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EXECUTIVE SUMMARY

The Transportation Improvement Study (Study) provides a long-term view of the transportation needs for Yellowknife. It is a high level strategy and was developed within the context of the Smart Growth Development Plan, which is a planning initiative to facilitate the long-term growth and development of Yellowknife. The 50 year vision – "To create a safe, clean, green, and livable city with a strong 'northern' identity" – sets the scene for the long-term study.

The current population is 19,000 people with total households of close to 7,000 and jobs of 11,000. The proposed growth is 33,000 people for the Intermediate-term and 50,000 people for the Long-term. In the Long-term, the proposed households are expected to grow to approximately 17,100 with total jobs of approximately 28,000.

The study includes all modes: pedestrian, cycling, transit, trucks, and vehicles. The study scope includes: a review process to overview previous work; an extensive data collection process which included traffic counts and origin–destination data; assessment of the existing network; issue identification; development of a travel demand model and manual for City use; formulation of long-term strategies for three land use scenarios (hybrid, compact, and dispersed); review of parking in Downtown and Old Town; development of a preferred strategy and associated implementation plan and high level costs. The compact scenario was the preferred land use growth scenario. An example site concept was prepared together with other consultants.

There was an extensive public consultative program led by the City where the Project Team participated and received feedback. The Team also participated with and received feedback from the Smart Growth Committee.

The preferred long-term strategy is shown in **Exhibit E-1**. This was develop using the Smart Growth principles as context, making the best use of existing infrastructure, looking at implementation in a staged manner that could adjust as mode shift occurs; balancing the need for infrastructure upgrades with a view to providing options for active modes; and strengthening and emphasizing the relationship between land use planning and transportation.

The long-term strategy will not be implemented instantly – it will be an incremental investment that reflects Yellowknife's Smart Growth vision. A framework has been provided for Council and City staff to work within in pursuit of this vision in the Implementation section of this report.

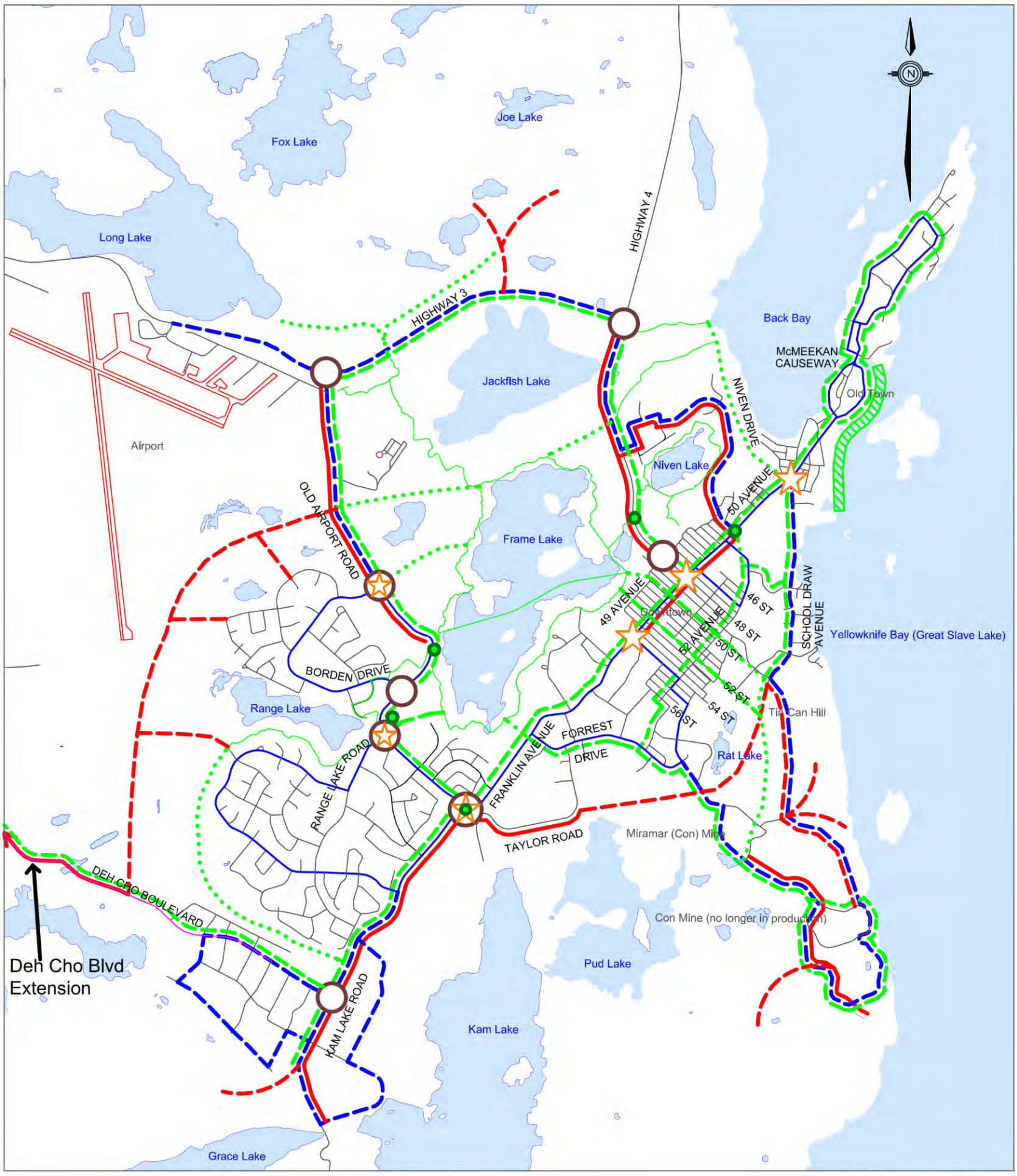

Exhibit E-1: Refined Long-Term, Compact Scenario – Proposed Improvements

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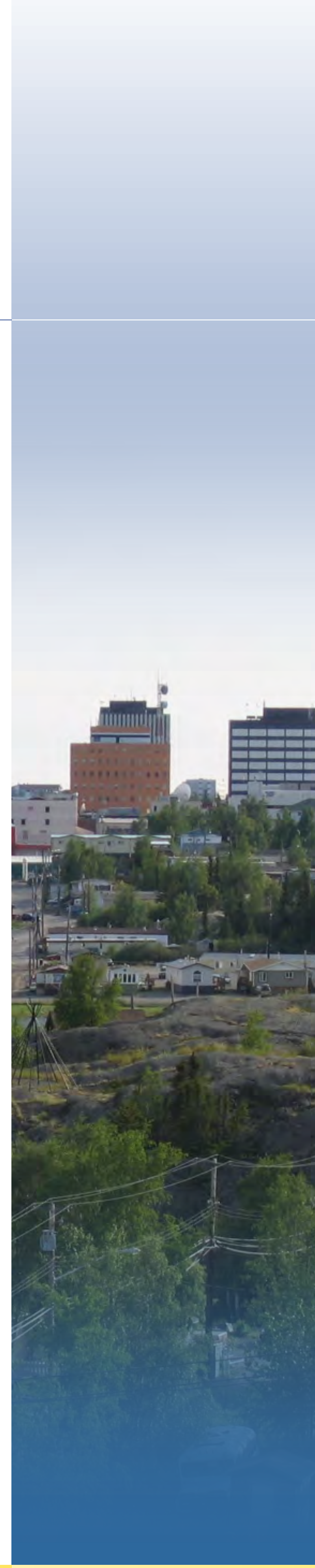


1. INTRODUCTION

Yellowknife ("city") is the capital of the Northwest Territories, situated on the north shore of the Great Slave Lake near the outlet of the Yellowknife River. With a population of 19,000 spread across a land area of 136 km^2, Yellowknife acts as the major economic, government, tourism, and transportation hub in the territory. As a leading northern community, the City of Yellowknife ("City") has identified a long-term sustainable growth strategy as a key planning tool to ensure short-term decisions are made in the context of a long-term sustainable growth model. This growth strategy will require land use, infrastructure, environmental, and transportation challenges to be identified and overcome throughout the next several decades. To proactively address these challenges, the City has developed a *Smart Growth Development Plan*, a planning initiative to facilitate long-term growth and development of the city.

HDR Corporation (HDR | iTRANS) was retained by the City to complete the *Transportation Improvement Study* ("*Study*") within the framework of the *Smart Growth Development Plan* ("*Plan*"). The *Study* focuses on primary areas that include Old Town, Downtown, Tin Can Hill, and Old Airport Road. Despite the focus on these specific areas, they must be reviewed within the context of Yellowknife as a whole. This includes other geographical areas such as the low-density residential neighbourhoods, industrial zoned lands, reclaimed mines, the airport, and recreational spaces. The *Study* is a high level planning study for Yellowknife's transportation network in the context of the *Plan* process. It is the type of study often referred to as a transportation master plan or strategy.

1.1 Vision

> ***"To create a safe, clean, green, and livable city with a strong 'northern' identity."***[1]

This 50-year vision, developed as part of the *Plan*, required the City to pursue a blend of objectives. Such objectives included environmental conservation programs, integrated land use, and transportation planning to address the priorities of growth while safeguarding the environment. The vision is integral in promoting a high quality of life for residents of all ages by increasing the diversity and quality of choice for housing, transportation, social programs, and green spaces. The following transportation related goals are central to the vision[1]:

- More compact development near key urban nodes in favour of a more efficient development pattern and transportation system;
- More friendly transit land use planning and development;
- Increasing opportunities for active and sustainable transportation;

[1] MetroQuest, Yellowknife: 50-Year Vision, January 2009

- More investment in active and sustainable transportation in favour of reducing private vehicle travel;
- Roadway expansion – not just for private automobiles but for more sustainable modes such as walking, cycling, and transit;
- Promotion of walkable neighbourhoods; and,
- Increasing and implementing policies and programs to encourage the use of active and more sustainable transportation modes.

Based on these goals, the priority for the City is the gradual creation of compact development in the Downtown, Old Airport Road, and Con Mine / Tin Can Hill areas while providing improved transit infrastructure and service, path enhancement programs, and supporting active transportation policies.

Yellowknife is a small city and most destinations are within 10 km. Average travel times are short, and residents are accustomed to small commutes. As the limits of development expand, commute times, congestion, and other *big city problems* may become apparent. Yellowknife needs to plan now to accommodate more residents and jobs while enhancing liveability.

1.2 Challenges

There are many challenges and obstacles that must be overcome to attain the ultimate vision of the City of Yellowknife. These challenges will have to be identified, studied, and ultimately resolved in working towards the long-term vision for the city. Some of the challenges identified to date that impact transportation include[1]:

- Ensuring the residents have convenient transportation options;
- Keeping up with aging infrastructure;
- Working to protect precious green space; and
- Meeting the needs of an aging population.

1.3 Current Initiatives

This *Study* as part of the *Plan* is a tool that will help future decision making, and guide the public and City staff towards their vision. However, the City has proactively undertaken some recent projects that support and demonstrate the vision described by the community:

- The construction of the extension of Deh Cho Boulevard to Highway 3 to create an alternative for truck traffic to bypass to Old Airport Road;
- The construction of the 50th Street Streetscaping Plan that provided for widened sidewalks, curb extensions, decorative street furniture, and tree planting (streetscaping has been on-going in the city for many years);
- The implementation of an anti-idling bylaw and education program; and,
- The extension of the multi-use trail network on the south side of Highway 3 east of Old Airport Road.

1.4 Global Context

A number of emerging issues have influenced the City's approach to the *Plan*. Central to these issues is the concept of sustainability. Originally defined in 1987 by the Brundtland commission, sustainable development is meeting the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development has taken on increasing importance in how cities in Canada and around the world approach their planning activities. Sustainability can be attained by balancing the needs of the economy, society, and the environment while enabling improvements and changes to be maintained over the long-term. Specific emerging issues in sustainable transportation include greenhouse gas emissions ("GHG"), energy and fuel sources, energy efficiency, health, and equity and access.

Fossil fuels consumed by transportation are a major source of GHG emissions. Globally, there has been a move to reduce greenhouse gas (GHG) emissions; at international negotiations in Kyoto and Copenhagen, the United Nations moved towards consensus on GHG reduction global. In Canada, British Columbia has legislated target emission reductions of 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050. This magnitude of target is in line with what is being done in other parts of the world.

Closely tied to GHG are energy and fuel sources. Most energy for transportation comes from oil; oil is a GHG producing non-renewable resource with increasing pressure on both supply and demand. Based on a 2009 assessment by the International Energy Agency (www.iea.org), the known reserves of conventional oil are limited, while demand for oil (or a suitable alterative) is rising. This disparity could be addressed by developing alternative energy sources (including non-conventional oil, undiscovered oil reserves, renewable sources, etc.); using energy more efficiently; or using less (or no) energy all together. All of these strategies will need to be employed to some degree.

Energy efficiency includes technological and planning changes that allow the same task to be done with less energy expended. Advancements in the automotive industry have reduced fuel consumption and provided alternatives, such as hybrids. Electric vehicles allow power to be generated in a central location, and may have fewer GHG emissions depending on the source of the electricity. Changes in planning also result in greater energy efficiency; shifting travel from drive alone to transit or walking accomplishes the same task (travelling from a to b) with much less energy expended. Micro-transportation (electric wheelchair, neighbourhood zero emissions vehicles, electric bicycles) can facilitate trips that would normally be made by more energy intensive private autos.

Transportation sustainability also has health impacts. Collisions, which generally increase per vehicle kilometre travelled, negatively impact both society and the economy, causing injuries, time off work, and increasing health care costs. Air

pollution is also linked to health care costs. Finally, active transportation (human-powered transportation, such as cycling or walking), has health benefits from time spent exercising.

Sustainable transportation must also consider impacts on society, especially transportation equity and access for all. A sustainable transportation network provides access for those that cannot drive, especially the elderly and children, and features infrastructure that can be used by all, such as wide sidewalks and accessible buses. People with disabilities may find it difficult or impossible to travel in areas with poor sidewalk connectivity or in any network where single occupancy vehicles have been the focus of investment.

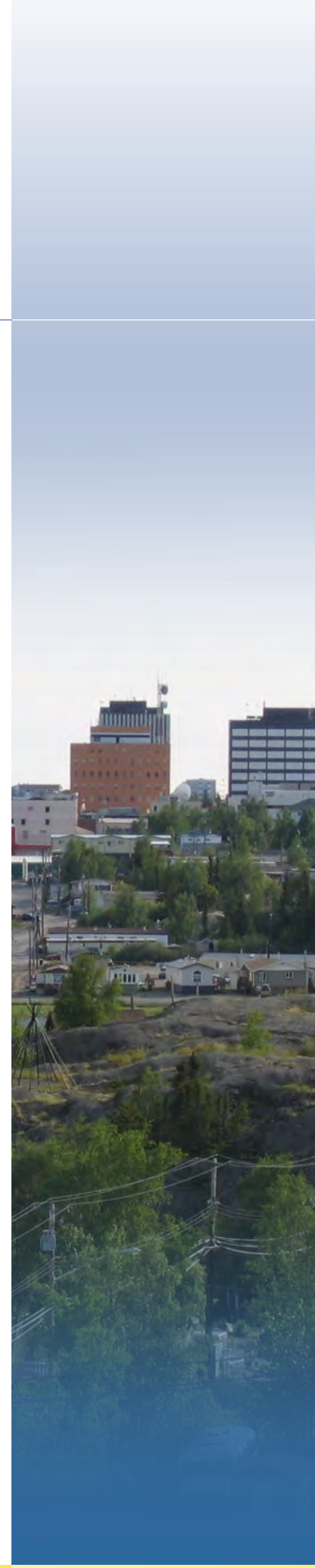
1.5 Report Organization

This *Study* describes the review of existing conditions, public consultation, model forecasting, transportation analysis, and implementation recommendations completed as part of the *Plan*.

The report is divided into 13 sections, as follows:

1. Introduction;
2. Study Process;
3. Data Collection;
4. Public Consultation Process;
5. Existing Transportation Network / Infrastructure;
6. Existing Traffic Conditions;
7. Existing Issues;
8. Future Land Use;
9. Future Traffic Conditions;
10. Preferred Long-Term Transportation Strategy;
11. Implementation Strategy;
12. Conclusions and Recommendations; and,
13. Glossary.

Study Process



2. STUDY PROCESS

This section describes the role of the Transportation Improvement Study in the larger planning process, the goals and objectives of the Study, and how the Study was undertaken by the City and consultant team.

2.1 Role of the Transportation Improvement Study

The *Study* is a high level strategy for the transportation network in Yellowknife. According to the *Best Practices for Technical Delivery of Long-Term Planning Studies in Canada*,[2] transportation master plans and strategies are, "the guiding documents that address the long-term transportation needs and programs of a municipality or region as a whole. A transportation master plan identifies the transportation goals of the community…"[3]. Transportation Master Plans typically set goals and objectives, identify challenges, assess the impact of changes to land use, develop strategies, and determine where more specific studies are required. In many cases, these studies include some level of transportation demand forecasting, network analysis, and stakeholder consultation. Master Plans do not typically include recommendations for small scale improvements; rather, they identify gaps and challenges, and point to projects to address these challenges through further study.

As discussed, the *Study* is part of the *Plan* which serves as an overall community plan. The environmental and land use concepts as well as the goals and policies developed inform the *Study*. The land use concepts directly impact the transportation demand forecasting, and resulting infrastructure needs and strategies. This *Study* incorporates and builds upon the transportation aspects of studies such as the Community Energy Plan (2007) and the Integrated Parks, Trails, and Open Space Development Study (2005).

The outcome of the *Study* will be strategies and a high level implementation plan, including direction for future, more specific studies. The relationship between these different levels of studies, as published by the Transportation Association of Canada ("TAC") is shown in **Exhibit 2-1**. Specifically, the Smart Growth Plan is at the same detailed level of planning as a community, official, or general plan. This exhibit demonstrates the concept that planning is an iterative process, with each plan acting as a catalyst for others. A transportation master plan may recommend further special or support studies, such as goods movement or travel demand management ("TDM") studies; studies focused on specific areas or facilities such as corridor plans or neighbourhood plans; or budgeting studies such as development charge studies.

[2] iTRANS Consulting, *Best Practices for Technical Delivery of Long-Term Planning Studies in Canada – Final Report*, Ottawa: Transportation Association of Canada, 2008
[3] iTRANS Consulting, *Best Practices,* 2008 p 28

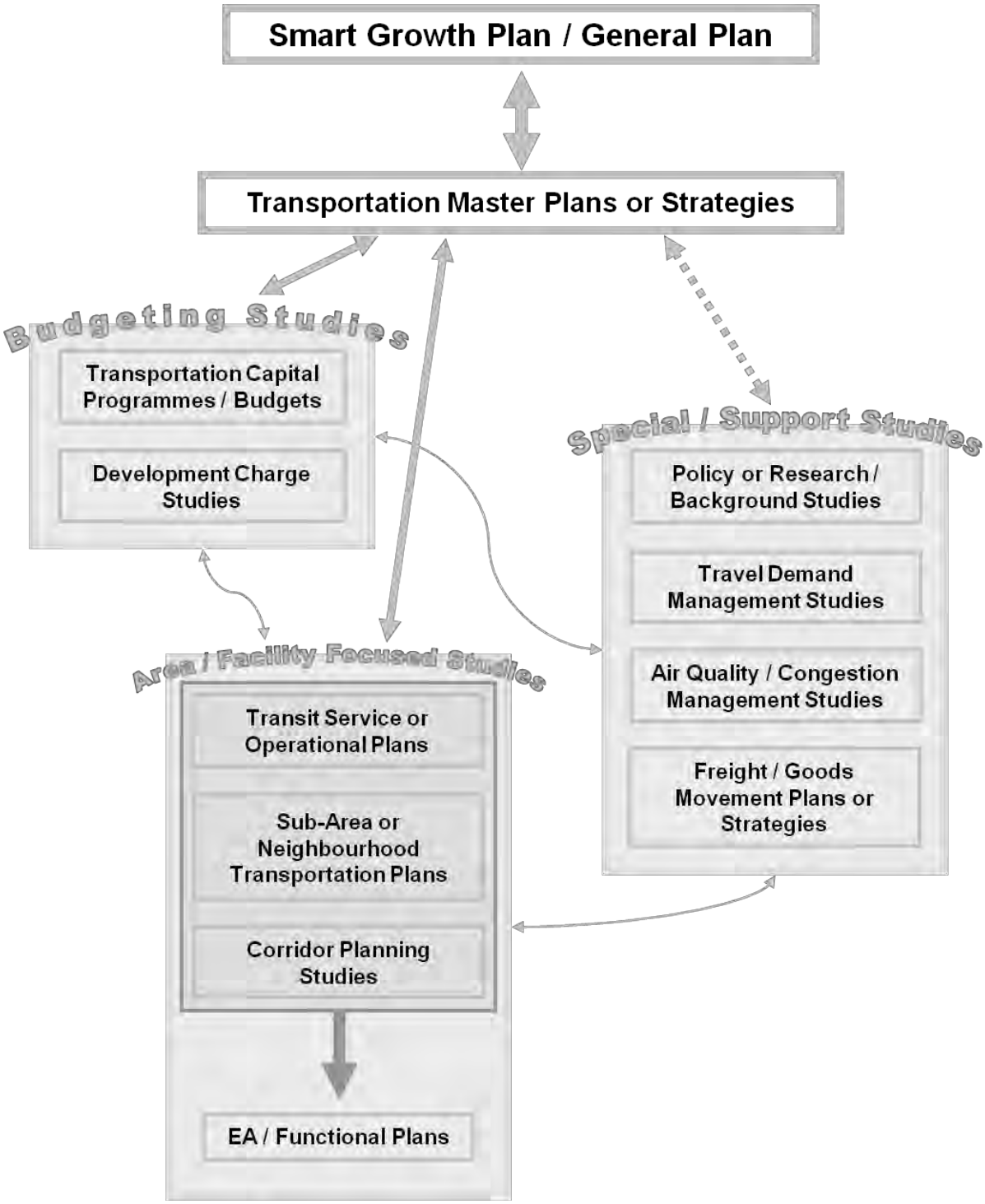


Exhibit 2-1: Relationship between Transportation Plan Types[4]

[4] iTRANS Consulting, *Best Practices,* 2008 p 33

2.2 Goals and Objectives

The overall goal of the project was to provide a transportation system improvement plan to accommodate city growth to a long-term population goal of 50,000. Within the context of the larger plan, there were a number of smaller goals:

- Review and analyze the existing transportation network;
- Understand the impacts of growth and changes to the projected land use on the transportation system;
- Assist in choosing appropriate growth scenarios for transportation analysis through expert opinion and public consultation;
- Understand the future traffic demand and transportation needs under these scenarios; and,
- Recommend future policies and transportation network improvements consistent with future needs and the preferred land use scenario.

2.3 Study Organization

The *Study* included the labours of three consultants working in the areas of Transportation, Urban Design, and Environmental. HDR | iTRANS led the transportation effort, EIDOS Consulting led the urban design effort, and Dillon Consulting led the environmental effort. Collaboration between the consultants was paramount to ensure a level of consistency in approach and vision for the future.

The transportation project team, led by HDR | iTRANS, was supported by ME2 Transportation Data and Malatest and Associates who conducted the data collection activities. The team roles and responsibilities for each member firm are described in **Table 2-1**.

Table 2-1: Study Roles and Responsibilities

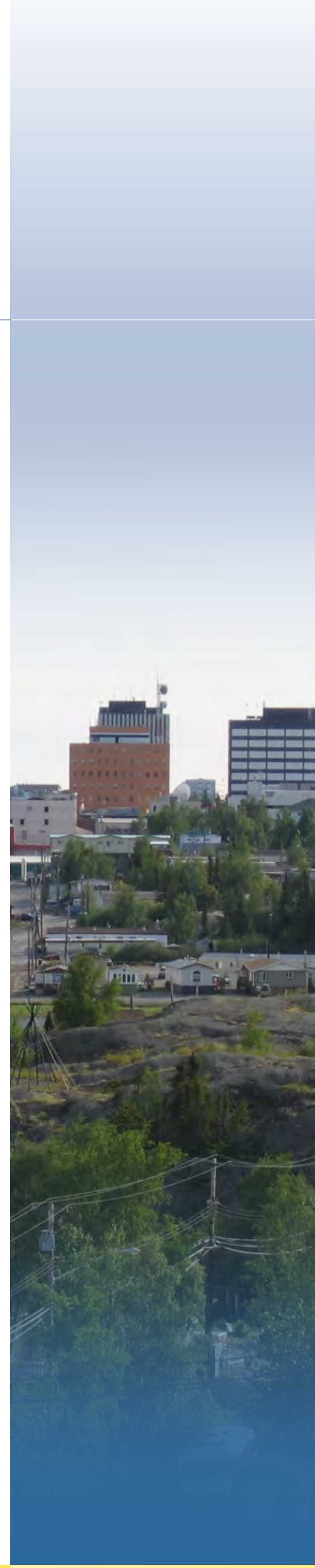
Firm	Role	Responsibilities
HDR | iTRANS	Prime Consultant (Lead Firm)	Strategic Transportation Plan: ▪ Existing Conditions Review; ▪ Model/Forecast; ▪ Future Transportation Strategy and Implementation; and, ▪ Public Consultation.
ME2 Transportation Data	Sub-consultant	Data Collection: ▪ Origin-Destination Survey; ▪ Manual Turning Movement Counts; ▪ Automated Traffic Recorder Counts; and, ▪ Parking Inventory and Utilization Survey.
Malatest and Associates	Sub-consultant	Data Collection: ▪ Supplemental Origin-Destination Survey.

2.4 Study Methodology

The *Study* methodology was as follows:

- Reviewing existing reports and recent work;
- Undertaking an extensive data collection program:
  - Intersection traffic counts;
  - 24-hour corridor counts; and,
  - Origin-Destination Survey.
- Assessing existing transportation network based on literature review of reports, desktop survey, site visits, and traffic analysis;
- Identifying issues based on existing conditions review;
- Developing a travel demand model based on land use estimates;
- Formulating preferred long-term transportation strategies based on the travel demand model forecast and goals of the Smart Growth vision;
- Developing an implementation strategy with high level costs;
- Producing an example site concept (RTL);
- Participating in Public Consultation:
  - Two open houses;
  - Design charrette;
  - Two Smart Growth Committee meetings; and,
- Preparing this final report.

Data Collection



3. DATA COLLECTION

The study began with a review of historical studies and data within the city of Yellowknife followed by an extensive data collection program:

- Review of background documents;
- Collection of field data:
  - Intersection turning movement counts (fall and winter);
  - Automated traffic recorder counts;
  - Parking inventory; and,
  - Traffic control and posted speed review.
- Household Origin-Destination Survey.

3.1 Background Documents

In order to provide context to this study, a comprehensive selection of documents dating back to 1990 was reviewed including studies on bicycling, transit, traffic impact, development and land use, and planning. The following list indicates the key documents that were reviewed:

- City of Yellowknife Smart Growth Plan, MetroQuest, 2009;
- 480 Range Lake Road Traffic Impact Study for Polar Developments, CTS 2009;
- Bicycle Routing for the City of Yellowknife, FSC Architects and Engineers, 2008;
- Yellowknife Transit: Route Analysis Study, 2008;
- Yellowknife Community Energy Plan, City of Yellowknife Administration, 2007;
- WAM Development Group North Shopper's Drug Mart Development Traffic Impact Assessment, Dillon Consulting Inc., 2007;
- Yellowknife Transit System Marketing Strategy, Entra Consultants, 2007;
- Integrated Park, Trails, and Open Space Development Study, Dillon Consulting Limited, 2005;
- Old Airport Road Traffic Study, FSC Architects and Engineers, 2005;
- Yellowknife Airport Development Plan, InterVISTAS Consulting Inc., 2004;
- Range Lake Road / Woolgar Avenue Traffic Study, FSC Architects and Engineers, 2000;
- Niven Lake Development Traffic Impact Assessment, MM Dillon Limited, 1995;
- Latham Island Transportation Study, MM Dillon Limited, 1994; and,
- Traffic Impact Assessment of the Yellowknife Direct Charge Co-op, Stephen MacRae Transportation Engineer Technologist, 1992.

3.2 Field Data

A variety of traffic and parking data was collected at strategically identified intersections and roadway links throughout the city. Traffic counts by day of week, and seasonal counts were undertaken to determine sensitivities of the traffic to these elements. Parking data was collected by way of a formalized count in the downtown core, and parking within Old Town and contained in the Old Airport Road corridor was observed and reviewed without a formalized traffic count.

The detailed traffic count information is provided in **Appendix A** and detailed parking count information is provided in **Appendix B**.

3.2.1 Traffic Counts

Two types of counts were undertaken in the fall of 2008 to obtain local traffic volumes and flows throughout the city:

1. Turning movement counts (TMC) were undertaken at 21 strategic intersection locations; and,
2. Automated traffic recorder (ATR) counts were undertaken on five strategic corridors.

Seasonal counts were also undertaken at specific intersections for the purpose of truck traffic analysis. These intersections and all other count locations are illustrated in **Exhibit 3-1**.

3.2.1.1 Intersection Turning Movement Counts

For planning purposes, and to be consistent with the methodology described earlier, PM peak period TMCs were conducted at the identified intersections. The counts took place over a 4 day period – Monday, September 29th, 2008 to Thursday, October 2nd, 2008. The TMC data included passenger vehicles, commercial vehicles, and pedestrian movement counts. The system wide peak hour, including all the intersections, was found to be from 4:45 PM to 5:45 PM.

Exhibit 3-1: Traffic Count Locations

As a sensitivity test, three select intersections were re-counted on a Friday to determine if any major traffic patterns or volume increases were present. The count was conducted on Friday, October 3rd, 2008 at the following three intersections:

1. Old Airport Road and Borden Drive (near Wal-Mart);
2. Old Airport Road and Range Lake Road; and,
3. Old Airport Road and Franklin Avenue.

The Friday counts show an overall increase in traffic volumes, ranging from 5% at Old Airport Road and Franklin Avenue to a 17% increase at Old Airport Road and Range Lake Road. The third count at the intersection of Old Airport Road and Borden Drive (near Wal-Mart) increased by approximately 7%. These increases in traffic volume are most likely attributed to typical Friday increases as a result of people leaving work more closely together due to it being the end of the work week, and more people making discretionary trips to the commercial and retail areas.

3.2.1.2 Seasonal Intersection Turning Movement Counts

To capture the seasonal variation in traffic, four intersections from the original 21 were chosen for winter TMCs. The winter counts show an overall decrease in traffic volumes, ranging from a 15% drop at Forrest Drive and Con Road to a 30% drop at Highway 3 and Highway 4. The two other counts along Highway 3, located at Old Airport Road and the road accessing the Shooting Club lease area, decreased by approximately 20%. These drops in traffic volumes are most likely directly attributable to the seasonal change and the associated deterioration of driving conditions. These intersection counts were also used in the truck traffic analysis described later in this report.

3.2.1.3 Automated Traffic Recorder Counts

The ATR counts captured the daily traffic volumes at five individual corridor locations to determine vehicle travel patterns and volumes at strategic locations around the city. The counts began on Monday, September 29th, 2008 and concluded on Saturday, October 4th, 2008. Full 24-hour data was collected on Tuesday, Wednesday, Thursday, and Friday. The locations of these counts were:

- Highway 3 west of Highway 4;
- Old Airport Road southwest of Borden Drive (near Wal-Mart);
- Old Airport Road south of Highway 3 (adjacent to Bristol Pit);
- Franklin Avenue between 51st and 52nd Street; and,
- Franklin Avenue southwest of Forrest Drive.

3.2.2 Parking Inventory

A parking inventory was conducted for both on-street and off-street parking in the downtown core during the same time frame as the traffic counts, between Monday, September 29th, 2008 and Thursday, October 2nd, 2008. The parking was surveyed at three specific times of the day: 10:00 AM, 12:00 PM, and 2:00 PM. The downtown parking meter locations are illustrated in **Exhibit 3-2**.

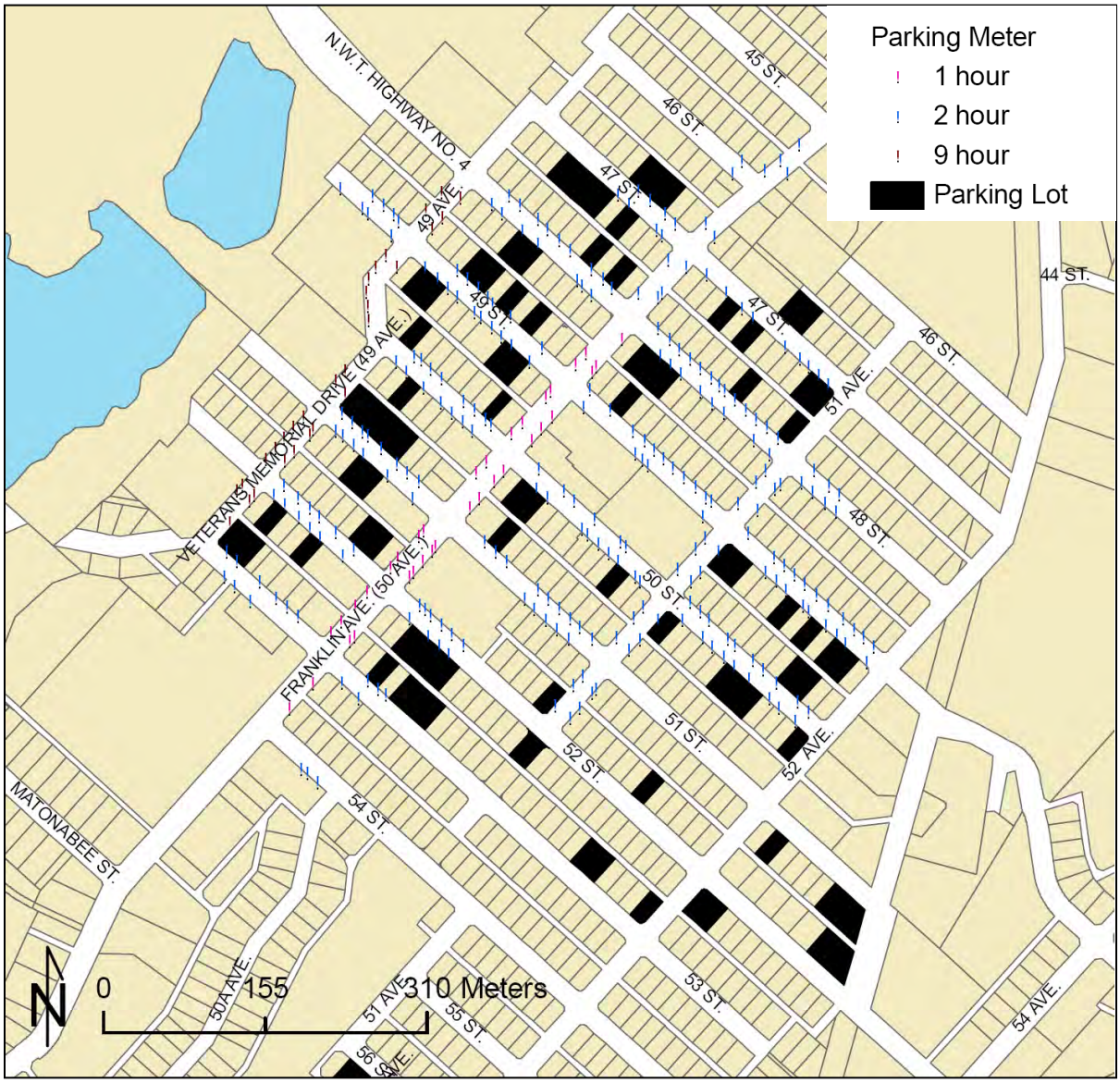


Exhibit 3-2: Parking Count Locations in Downtown Core

One hour parking is only provided along Franklin Avenue from 48th Street to 54th Street. Two hour parking is provided mainly along 49th Street and 50th Street from their north ends to 52nd Avenue. Supplemental two hour parking is available on 46th, 48th, 51st, 52nd, 53rd, and 54th Streets. Nine hour parking is provided along 49th Avenue from 48th Street to 54th Street. There are approximately 50 parking lots, distributed fairly evenly throughout the downtown core. The heaviest concentration of parking lots is bounded by 47th Street, 53rd Street, 49th Avenue, and Franklin Avenue with approximately 20 lots.

3.2.3 Traffic Control and Posted Speed Review

The City has a total of 17 traffic signals, the majority of which are located on Franklin Avenue. There is the possibility of traffic signal co-ordination along Old Airport Road but under existing conditions, the signals along Franklin Avenue turn green at the same time. This is often referred to as simultaneous green indications or identical signal offsets. While this allows traffic to flow for a few intersections, it does not allow traffic to run from one end of the corridor to the other as might be potentially achieved using signal progression.

After traffic signals, stop signs are the next level of traffic control in the hierarchy. There are many stop-controlled intersections in Yellowknife, but there are only a few four-way stop controlled intersections. The main four-way stop controlled intersection is located at 49th Avenue and 48th Street. There are also two main 3-legged intersections with stop control on the single leg; they are Highway 3 and Old Airport Road, and Highway 3 and Highway 4.

Throughout the city, the speed limit is 45 km/h with the exception of school zones which are 30 km/h and Old Town which is also 30 km/h. Highways 3 and 4 have the highest posted speed at 70 km/h. The exception is on Highway 4 between Niven Gate Drive and the city, where the posted speed is 45 km/h.

The locations of signalised intersections and major stop-controlled intersections are given in **Exhibit 3-3**.

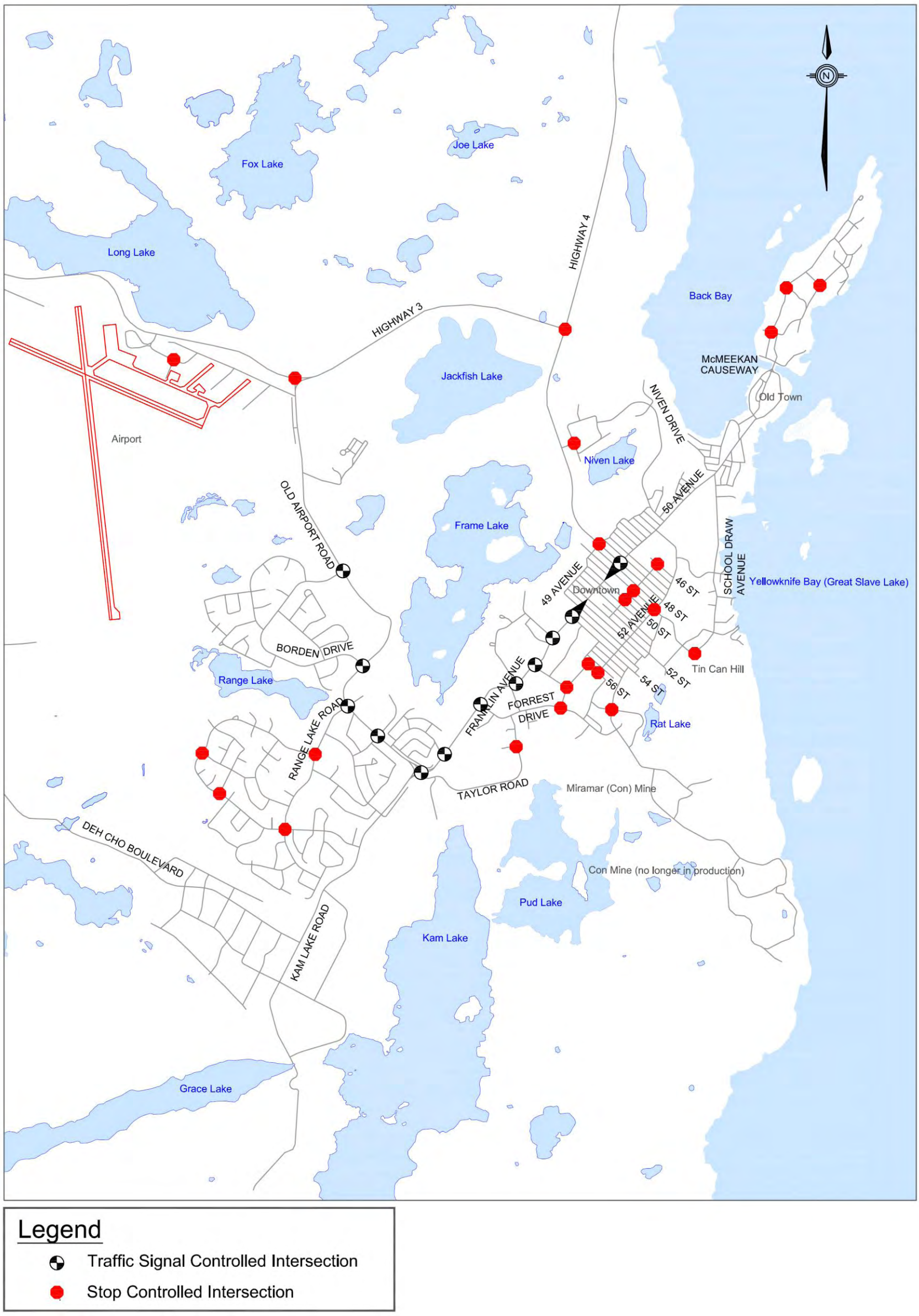


Exhibit 3-3: Traffic Signal and Stop Control Intersection Location

3.3 Household Origin Destination Survey

The purpose of the Origin-Destination (OD) survey was to determine travel patterns by mode in the city of Yellowknife. This information was essential input to the modelling process and was used to calibrate the travel patterns.

The main OD survey was undertaken in October 2008 and a supplemental OD survey was undertaken in December, 2008. The survey was by telephone interview using a random sample of households in various locations of the city and participants were asked to describe the trips they had made on the previous day. After data sorting, some households were eliminated because of invalid data. The two survey data sets were combined: the “ME” data set (surveys conducted by ME2 Transportation Data) collected valid entries from 277 households and a subsequent “Ma” data set (surveys conducted by R.A. Malatest & Associates) with valid entries from 103 households, for a total of 380 households surveyed.

Consistent with common OD survey practice, each trip was described in terms of its starting location (origin), ending location (destination), starting trip purpose (e.g., go to work, go to school, return home), mode(s) used (e.g., took transit, walked), start time and end time. Data were collected for trips that were made on a weekday between 7:00 AM and 7:00 PM (the times of greatest activity) and the sample was expanded to represent all households in the city. The OD survey results and subsequent development of the model is further explained in **Section 9**.

Public Consultation Process

4. PUBLIC CONSULTATION PROCESS

Forums were made available to the public for review of information as well as to provide feedback on the *Study*. Before this *Study*, the public involvement began with MetroQuest Report, which was a key component and driver of the *Plan*. Throughout this *Study*, two stakeholder meetings were held, followed by a public open house, a community design charrette, and a second public open house. Two Smart Growth Committee meetings followed.

The stakeholders meetings, public open houses, and the Charrette helped to develop a set of guiding principles and to direct the study in the desired direction of the residents of Yellowknife. The consultation process provided an opportunity for the consultants to present ideas and concepts to the public and for the public to provide their feedback, review the progress of the study, talk with the consultants, and comment on specific areas or general principles. The input and feedback the consultant received from the public at the meetings helped in shaping the study. A brief summary of each of the meetings and consultations is provided in this section. Notes and documented feedback from the public consultation process is provided in **Appendix C**.

4.1 Stakeholders Meetings

Two stakeholders meetings were held in October 2008, comprising different groups of stakeholders with a wide range of representation of various community groups within the city.

The first meeting consisted of two days of discussions on October 2 and 3, 2008. Specific stakeholders included representatives from the Dene First Nations, Yellowknife Chamber of Commerce, NWT Floatplane Association, Ecology North, Transport Canada, and the City of Yellowknife. The list of participants included:

- Shelagh Montgomery – Smart Growth Committee Chair;
- Hal Logsdon – Float Plane Association;
- Jeffrey Humble – Director of Planning, City of Yellowknife;
- Doug Ritchie – Ecology North;
- Blair Chapman – GNWT Transport Canada, Department of Highways;
- Leslie Valpy – City of Yellowknife;
- John Carter – CEO of Dene First Nations;
- Pat Thagard – Yellowknife Chamber of Commerce;
- Peter Neugebauer – City of Yellowknife;
- David McCann – City of Yellowknife; and,
- Stephan Folkers – Dene First Nations, GM of Housing Division.

A second meeting was held on October 21, 2008 with a new group of stakeholders including representatives from the Great Slave Lake Snowmobile Association, Council for Persons with Disabilities, Municipal Enforcement Division (MED),

Downtown Enhancement Committee, Association for Community Living, and the City of Yellowknife. The list of participants included:

- Bruce Hewelko – Great Slave Lake Snowmobile Association;
- Dennis Kefalas – Public Works, City of Yellowknife;
- Grant White – Community Services, City of Yellowknife;
- Shane White – Executive Director, Yellowknife Association for Community Living, Transportation Issues Committee;
- Heather Clark – Northwest Territories Council for Persons with Disabilities;
- Doug Gillard – MED, City of Yellowknife; and,
- Jennifer Marchant – Downtown Enhancement Committee.

All three of the consultant teams were present at both Stakeholders meetings in order to present their scope of work and solicit feedback to help guide and enhance the Smart Growth project.

4.2 Open House #1

A public open house was held in Yellowknife on December 4, 2008. The goal of the open house was to inform the public of the project goals and objectives, educate them on the existing transportation network and data, and provide them with the times where additional opportunities for public input were available.

Five display boards were presented at the open house. They included a key plan showing the exiting transportation network, intersection operations and traffic summary, a collision summary, a downtown parking utilization summary, and City of Yellowknife Origin-Destination and 2006 Census information.

The public asked questions and provided comments to the consultant throughout the open house.

4.3 Community Design Charrette

A four-day community planning event (***Design Yellowknife: Community Conversation and Charrette***) was held on Monday, April 27 to Thursday, April 30, 2009 at the Explorer Hotel.

The ***Design Yellowknife Charrette*** was the primary consultation component of the *Study*, providing citizens the opportunity to develop concepts, which will have a lasting impact on the future growth and development of Yellowknife. Four neighbourhoods were selected as the primary areas of study, including:

1. Old Town;
2. Downtown;
3. Tin Can Hill; and
4. Old Airport Road.

Participants worked in close collaboration with the three consultants as well as with local and national planning and design experts to detail design layouts and identify future strategies which integrate urban design, open space and ecological networks, land use and development density, revitalization opportunities, and transportation in four key neighbourhoods.

4.4 Smart Growth Committee Meetings

Two meetings were held with the Smart Growth Committee, the first on October 1, 2009, and the second on November 19, 2009. These meetings were attended by all three consultants, and provided the opportunity for the Committee to provide feedback into the Smart Growth process.

At the first meeting, the consultants presented the work undertaken to that point in time. The meeting was intended as an informative session where the Smart Growth Committee members could interact with the consultants, ask questions, and provide feedback on any of the material provided.

The second meeting was more of a planning meeting with a view towards the future. Presentations were again provided by all three consultants. These presentations were intended to portray the direction in which the *Study* was headed and to again allow feedback from the Committee in terms of the direction of the *Study*. A secondary objective of the meeting was to provide the Committee with the information that was to be presented to the public at the second open house.

4.5 Open House #2

A second public open house was held on December 3, 2009 at Yellowknife City Hall. The goal of the open house was to update the public on the progress of the study since the first open house and the design charrette.

Eight display boards were presented at the open house including topics on the existing transportation network, future land use, modelling, future transportation strategy, proposed transit improvements, proposed cycling improvements, proposed pedestrian improvements, and proposed roadway improvements.

The public asked questions and gave comments to the consultants throughout the open house. The general consensus was that the *Study* was moving in the right direction.

Existing Transportation Network / Infrastructure

5. EXISTING TRANSPORTATION NETWORK / INFRASTRUCTURE

The existing transportation network is comprised of an active and sustainable mode network, including transit, cycling, pedestrian, skiing as well as other recreational activities such as snowmobiling or canoeing. The road network includes the arterials, collectors, and local roads, which are supported by infrastructure such as parking.

5.1 Active and Sustainable Mode Network

The active and sustainable modes network for Yellowknife is categorized into transit, cycling, pedestrian, and to a lesser extent skiing. The active and sustainable modes network is illustrated in **Exhibit 5-1**. This is not meant to be an extensive map of all trails and paths throughout the city, but to represent the main commuter and recreational trails/paths.

5.1.1 Transit

Yellowknife's transit network has three existing transit bus lines. Two of the routes are regular service routes, and the third is in operation only in the summer months and on Saturdays. With a few exceptions, the third route covers the same service area as the other two routes combined. The routes are:

- Route 1 – Borden / Downtown / Range Lake;
- Route 2 – N'Dilo / Downtown / Forrest Drive; and,
- Route 3 – Saturday Summer.

A diagram of the routes is illustrated in **Exhibit 5-2**.

There are a total of five buses serving the community for the three routes with no service provided on Sundays or holidays. There are two express routes for the AM peak and PM peak hours.

From the OD survey, it was recorded that transit use was approximately 1% of the modal share over an entire day, meaning other choices of travel modes are being selected 99% of the time. According to a previous study[5], the modal share in the peak hours is 3-5%.

Two studies were conducted by Entra Consultants in 2007 and 2008. The first was a marketing study that found three key findings. The first finding was that changes to the bus service were necessary before any social marketing initiatives were undertaken. The second finding was that convenience was the most important factor influencing ridership. The third is that the majority of ridership is made up of work or school trips. The route analysis study reviewed existing service, routes, and fare structure and proposed several new servicing options to encourage ridership growth.

[5] Entra Consultants, Yellowknife Transit: Route Analysis Study, October 2008.

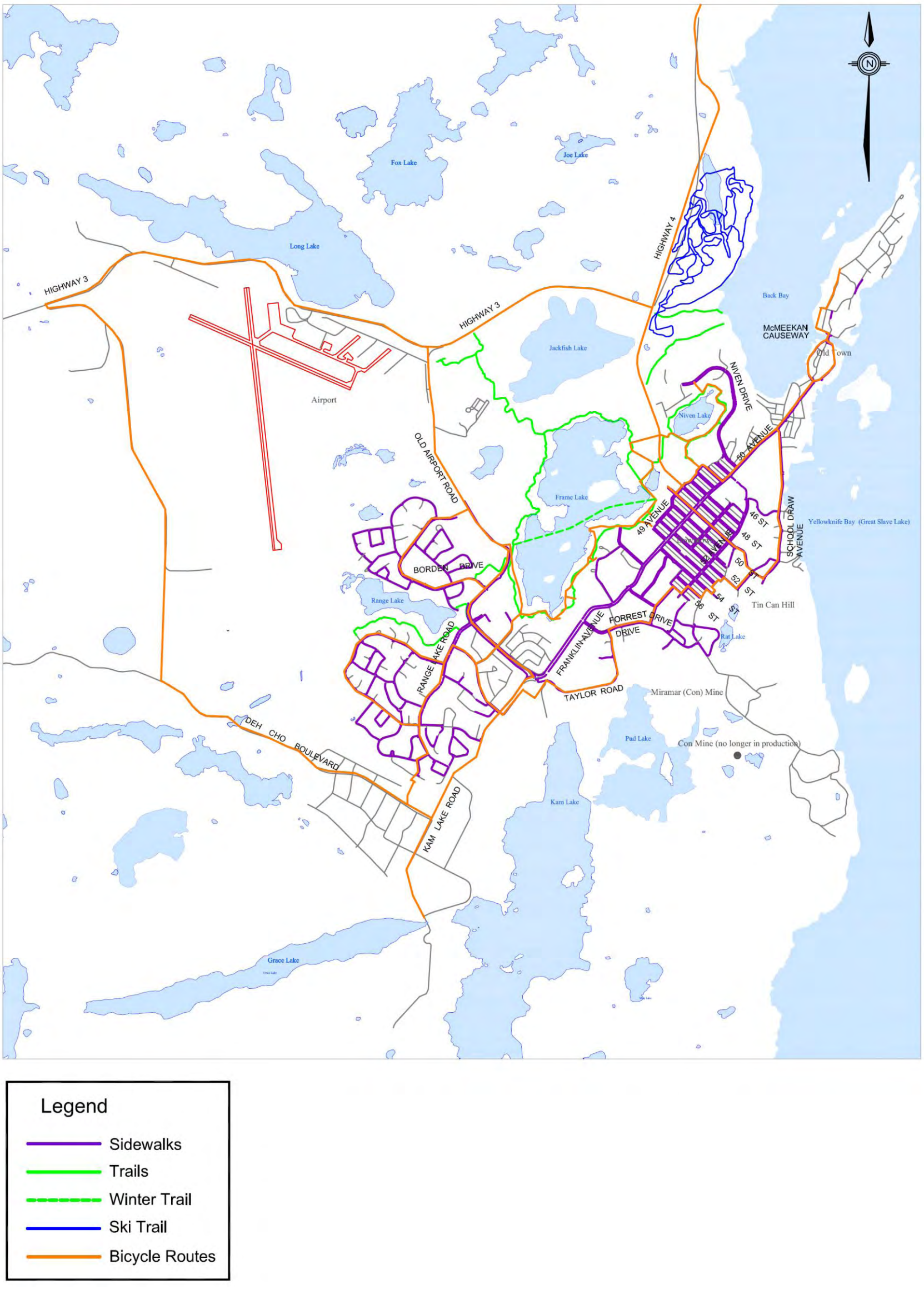


Exhibit 5-1: Active and Sustainable Modes Network

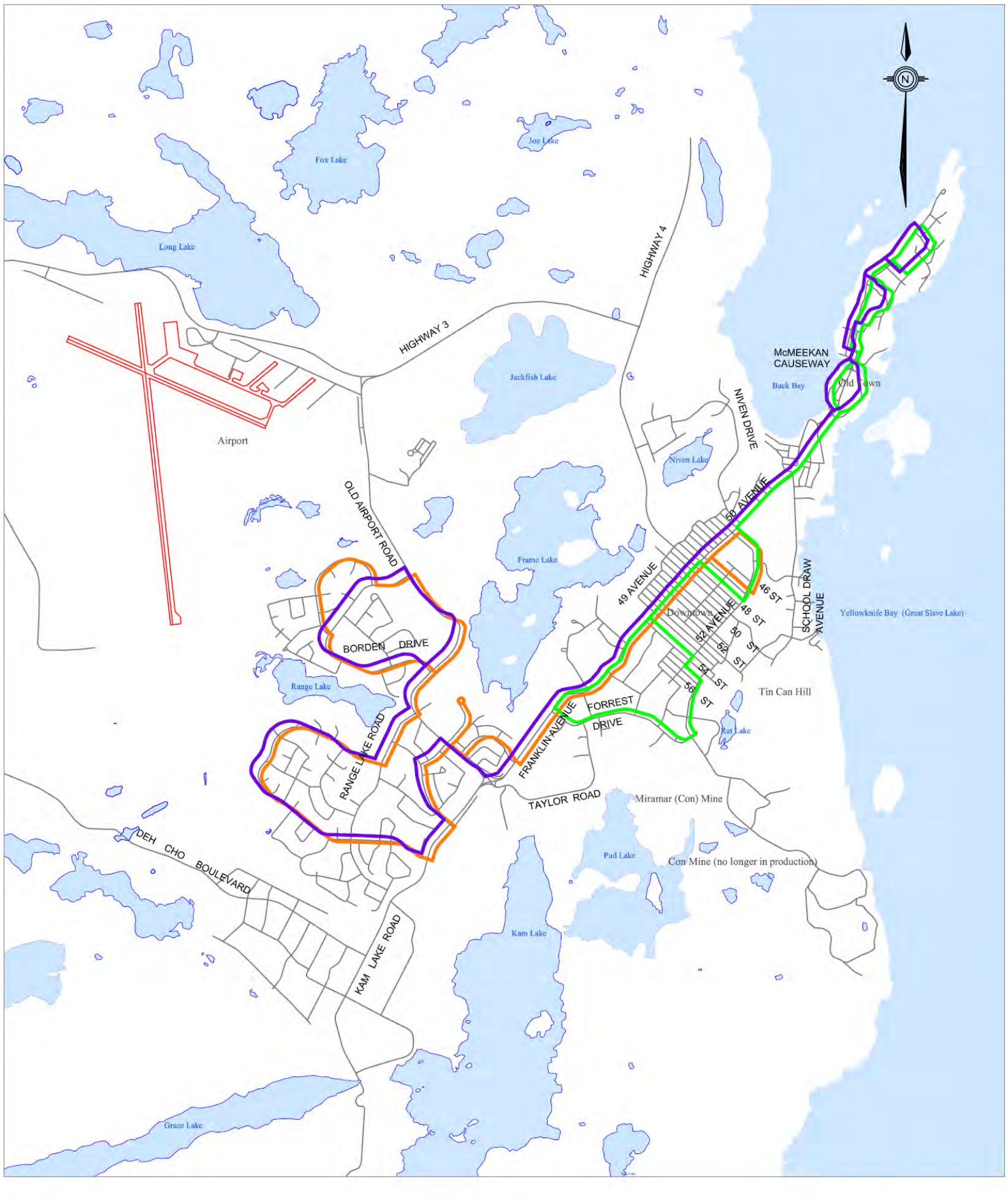


Exhibit 5-2: Existing Transit Routes

5.1.2 Cycling

From the OD survey, it was recorded that cycling was approximately 1% of the modal share over an entire day, meaning other choices of travel modes are being selected 99% of the time. However, cycling is a mode of transportation that is growing in popularity. Yellowknife's natural environment and characteristics make it ideal for cycling activities in spite of the long winter months.

Cyclists range in ability and comfort level and not all cyclists prefer the same types of facilities but Yellowknife is conducive to cycling as it is mostly flat with moderate grades in some area. It is a small city and the traffic volumes are relatively light, except on certain routes in peak hour conditions. Counter-intuitively, even the winter months contribute to cycling as the shortened summer fosters an environment of outdoors activity.

Cyclists can typically be divided into two groups: commuter cyclists, who use cycling as a means of transportation to get to work, school, or other destinations; and recreational cyclists. For example, commuter cyclists are more inclined to use roads to travel between their origin and destination as it is often the most direct route, whereas recreational cyclists are more inclined to cycle on trails and off-street due to a more relaxed environment and no conflict with vehicles.

Although cyclists do ride on the streets in Yellowknife, there are no on-road cycling facilities such as bike lanes or even signage to inform cyclists and motorists of the possibility of cyclists using the street. There are several kilometres of multi-use trails that are used by cyclists as well as pedestrians. For example, the Frame Lake trail is used for both commuting and recreational trips. The cycling routes are illustrated in **Exhibit 5-1**.

5.1.3 Pedestrian

Yellowknife's pedestrian infrastructure network, including sidewalks and trails is relatively well built and accessible. The majority of roads in the downtown core have sidewalks and Franklin Avenue is a good example of an arterial road downtown with sidewalks on both sides. The multi-use trails connect well with the sidewalk system to allow residents to recreational areas. From the OD survey, it was recorded that walking was approximately 15% of the modal share over an entire day, meaning other choices of travel modes are being selected 85% of the time. This is a relatively high proportion of walking trips for a city the size of Yellowknife.

The industrial areas and roads outside of the downtown core lack some sidewalk continuity or even a sidewalk. Old Town is one area in particular that has few sidewalks or pedestrian facilities.

A winter trail across Frame Lake from the Co-op corner to City Hall is also a well established route used in the winter season. This is not the only winter trail, but it is

a major commuter and recreational trail and therefore was noted as such. The pedestrian facilities are illustrated in **Exhibit 5-1**.

5.2 Road Network

The road network for Yellowknife is comprised of arterials, collectors, and local roads. There are two Highways leading out of the city, Highway 4 to / from the north and Highway 3 to / from the west. Old Airport Road and Franklin Avenue are the major arterials in the city, with Old Airport Road functioning as the gateway to the city from the airport.

The road network provides access to all areas of Yellowknife but there is a limited route choice for drivers. For example, if a person were travelling from the commercial area of Old Airport Road to Downtown, Franklin Avenue is the most viable option as north to Highway 3 to Highway 4 to Downtown is too circuitous. From the OD survey, it was recorded that driving was approximately 72% of the modal share over an entire day, meaning other choices of travel modes are being selected only 28% of the time. **Exhibit 5-3** illustrates the road network for the city including the road type classifications.

Exhibit 5-3: Existing Road Network

5.3 Parking

There are approximately 18 square blocks of on-street metered parking and non-metered parking in Downtown. There are one hour, two hour, and nine hour parking spaces. 9 hour is only available on 49th Avenue, the one hour is only available on Franklin Avenue, and the remainder of the parking in the downtown core is 2 hours. The City provides and maintains this parking in addition to the off-street parking lots associated with public and private developments. There are approximately 50 surface parking lots in the downtown. In addition, there is an enclosed parkade, which provides a significant amount of parking capacity. It is often underutilized due to perceived safety concerns. **Exhibit 5-4** is an aerial photograph of downtown and provides a bird's eye view of the on-street parking and surface lots.

Exhibit 5-4: Overview of Downtown and Parking

As displayed in **Exhibit 5-5** and **Exhibit 5-6**, on-street parking does not exist on Old Airport Road and the off-street parking is exclusively provided by private lots. These lots serve the strip malls, big box retail, and independent businesses located along the length of Old Airport Road. Internal circulation and accessibility, pedestrian compatibility, and aesthetic appearance are perceived issues in this corridor.

Exhibit 5-5: Wal-Mart and other developments along Old Airport Road

Exhibit 5-6: Pizza Hut and other developments along Old Airport Road

Parking capacity in the Old Town District is limited compared to the availability of downtown and Old Airport Road. The narrow roadways, existing developments, and the availability of off-street parking contribute to the low parking capacity. The unique nature of Old Town greatly contributes to the expectations of drivers and residents alike. There is no formal parking and it is not uncommon to find vehicles parked in the roadway right-of-way. This is particularly true at certain times of day or year, especially near the boat launch on Franklin Avenue or at the adjacent businesses on McDonald Drive as illustrated in **Exhibit 5-7**.

Exhibit 5-7: Overview of Old Town and Parking

5.4 Truck Traffic

Truck traffic is governed by Highway Traffic By-law No. 4063, Section 121, which prohibits the access of trucks larger than 4,500 kg on certain roads. However, road access for trucks is provided for on the following roadways as illustrated in **Exhibit 5-8**:

- Old Airport Road from Highway 3 to Franklin Avenue;
- Kam Lake Road;
- Franklin Avenue from Old Airport Road to 48th Street;
- 48th Street from Franklin Avenue to 52nd Avenue;
- Con Road from Forrest Drive to Yellowknife Bay; and,
- Forrest Drive from Franklin Avenue to Con Road.

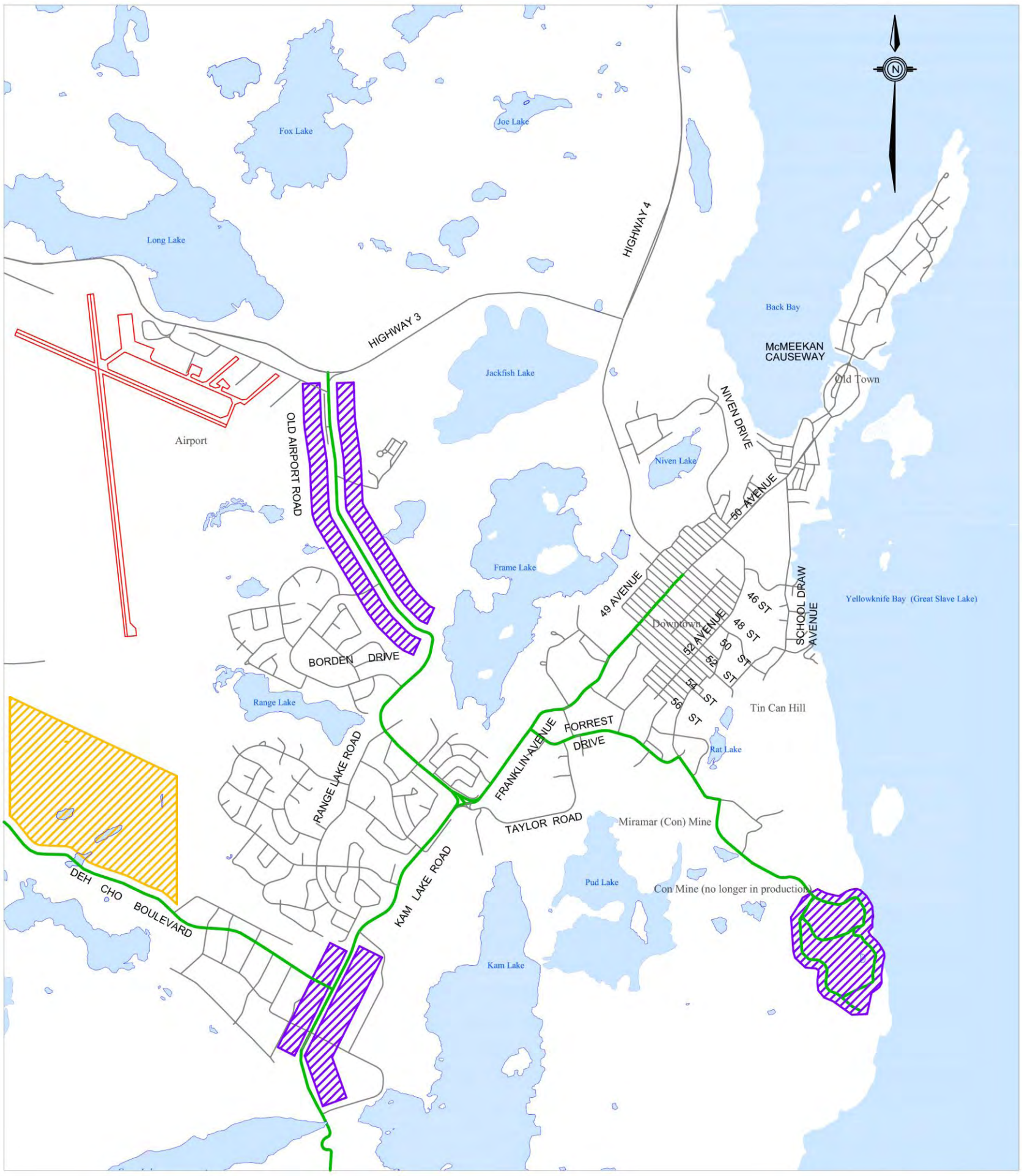


Exhibit 5-8: Existing Truck Routes

Highway Traffic Bylaw 4063, Section 122, states that departures from the truck routes are permitted when travelling the most direct route to a destination for the delivery or pick-up of goods; for moving a house with applicable permit; traveling to / from the truck owner's premises; accessing a servicing or repair centre; towing a disabled vehicle; or accessing the truck parking area on 51st Street between 50th Avenue and 51st Avenue.

Past industrial and land use development within the city has resulted in increased truck traffic in both commercial and residential areas. The existing truck traffic routes serve the lands that are already zoned to allow industrial uses, such as, Old Airport Road, Kam Lake, and the end of Con Road.

With a vision to the future, the City has more recently implemented a plan for industrial expansion west of the Airport, and a rezoning of Old Airport Road to remove industrial uses. In 2008, the Engle Business Park District was established and was followed in 2009 by the Deh Cho Boulevard extension, which connects Kam Lake Road to Highway 3 through the Engle Business Park District. This extension now provides the opportunity for truck traffic to bypass Old Airport Road completely to access the Engle Business Park.

According to City staff, certain roadways and intersections are not currently designed to facilitate truck traffic, despite the need to facilitate truck access to certain areas. For example, the intersection of Forrest Drive and Franklin Avenue is not designed to accommodate large B-train trailers. Further to comments provided by the City staff, truck drivers have identified concerns of the geometry of the Co-op corner on Old Airport Road.

5.5 Other Modes

Due to the city's unique blend of location, climate, and purpose as the capital of the Northwest Territories, it is recognized that there are a variety of other mode choices that are available to residents of Yellowknife. These include float plane, snowmobile, taxis, skiing, sledding, and water craft to name a few.

The float planes are represented by the Northwest Territories Float Plane Association and are currently served in Back Bay by the marina located in Old Town. Plans for a float plane marina on Kam Lake are in the process of being approved.

The snowmobilers are represented by the Great Slave Snowmobile Association (GSSA) Trial Riders. Snowmobiles operate on soft and hard snow conditions but operating on gravel or asphalt is not ideal but can occur. Snowmobiles are restricted to 30 km/h on City roads and 70 km/h on outside of the built-up area. To operate a snowmobile within city limits, the snowmobile must be licensed and insured.

There is a proportion of the population in Yellowknife that does not own or operate a licensed motor vehicle; therefore, taxis are an important part of the transportation

infrastructure. In the past, there has been debate on the number of taxis in Yellowknife and while these issues are not uncommon and certainly not unique to Yellowknife, the importance of taxis in the city should not be underestimated.

Due to the variety and the unique transportation needs of these modes as well as the low percentage of users, it is not practical to evaluate them in the same manner as the standard methods of transportation and therefore detailed analysis will not be included as part of this long-range planning *Study*. These modes are better served by small planning studies at a more detailed level. However, it is important to recognize these modes of travel within the *Study* to ensure they are not overlooked.

Existing Traffic Conditions

6. EXISTING TRAFFIC CONDITIONS

The existing traffic conditions are summarized by collected traffic data, safety analysis, and parking analysis. Truck traffic is addressed in the future conditions, **Section 9**.

[Note – For reference – it has been assumed that Old Airport Road runs north – south; Kam Lake Road and Franklin Ave run east- west].

6.1 Traffic Data Summary

The Turning Movement Count (TMC) data was summarized into link volumes to more easily determine on which roads major flows of traffic are occurring. The traffic volumes are summarized in **Exhibit 6-1**. The traffic volumes are PM peak hour volumes and represent a total number of vehicles during a one hour time period from 4:45 PM to 5:45 PM.

Automatic Traffic Recorder (ATR) count data was also collected and the average daily traffic volumes from those counts are summarized in **Table 6-1**.

Table 6-1: ATR Daily Traffic Volumes

Location	Average Daily Traffic Volumes			
	EB	WB	NB	SB
Highway 3 west of Highway 4	4,032	3,630	--	--
Old Airport Road southwest of Borden Drive (near Wal-Mart)	--	--	6,083	6,665
Old Airport Road south of Highway 3 (adjacent to Bristol Pit)	--	--	5,132	5,602
Franklin Avenue between 51st Street and 52nd Street	--	--	7,822	7,818
Franklin Avenue southwest of Forrest Drive	--	--	14,987	10,733

EB = eastbound direction of travel, WB = westbound, SB = southbound, and NB = northbound

South of Forrest Drive, Franklin Avenue had the highest volume of traffic by a significant margin with approximately 3,000 more than the second highest count. There were more vehicles that entered the city (from the southwest) than exited (to the southwest) using this route. In the downtown core on Franklin Avenue, there was a very even traffic distribution of approximately 7,800 vehicles in each direction. The lowest traffic volumes were recorded on Highway 3, west of Highway 4 with 4,032 vehicles travelling eastbound and 3,630 travelling westbound.

Exhibit 6-1: PM Peak Hour Traffic Volumes

6.2 Traffic Analysis

The existing intersections levels of service (LOS) were analyzed given the turning movement count (TMC) volumes and existing signal timings provided by the City.

LOS is defined by a letter grade as it relates to the average delay of drivers at an intersection. The grades could be compared to a letter grade of a classroom, where A is excellent, and F is poor. Generally, LOS A to C indicates uncongested traffic conditions and LOS D to F is more congested. The average delay ranges assigned to each letter are shown in **Table 6-2**. LOS can be calculated for each intersection as a whole (intersection LOS) or broken down by movement.

Table 6-2: Level of Service Delay Ranges

Level of Service	Delay Range (seconds)
A	Less than 10
B	11 to 15
C	16 to 25
D	26 to 35
E	36 to 50
F	Greater than 50

Source: Table 10-7. Highway Capacity Manual

Trafficware's Synchro 6 software package was used for the analysis as it employs the 2000 Highway Capacity Methodology, which analyzes both signalized and unsignalized intersections, taking into account the intersection spacing, interaction, queues, and operations at adjacent intersections. This software requires a number of inputs and provides LOS as an output. The intersection analysis results are displayed graphically in **Exhibit 6-2** and the individual turning movement counts follow directly.

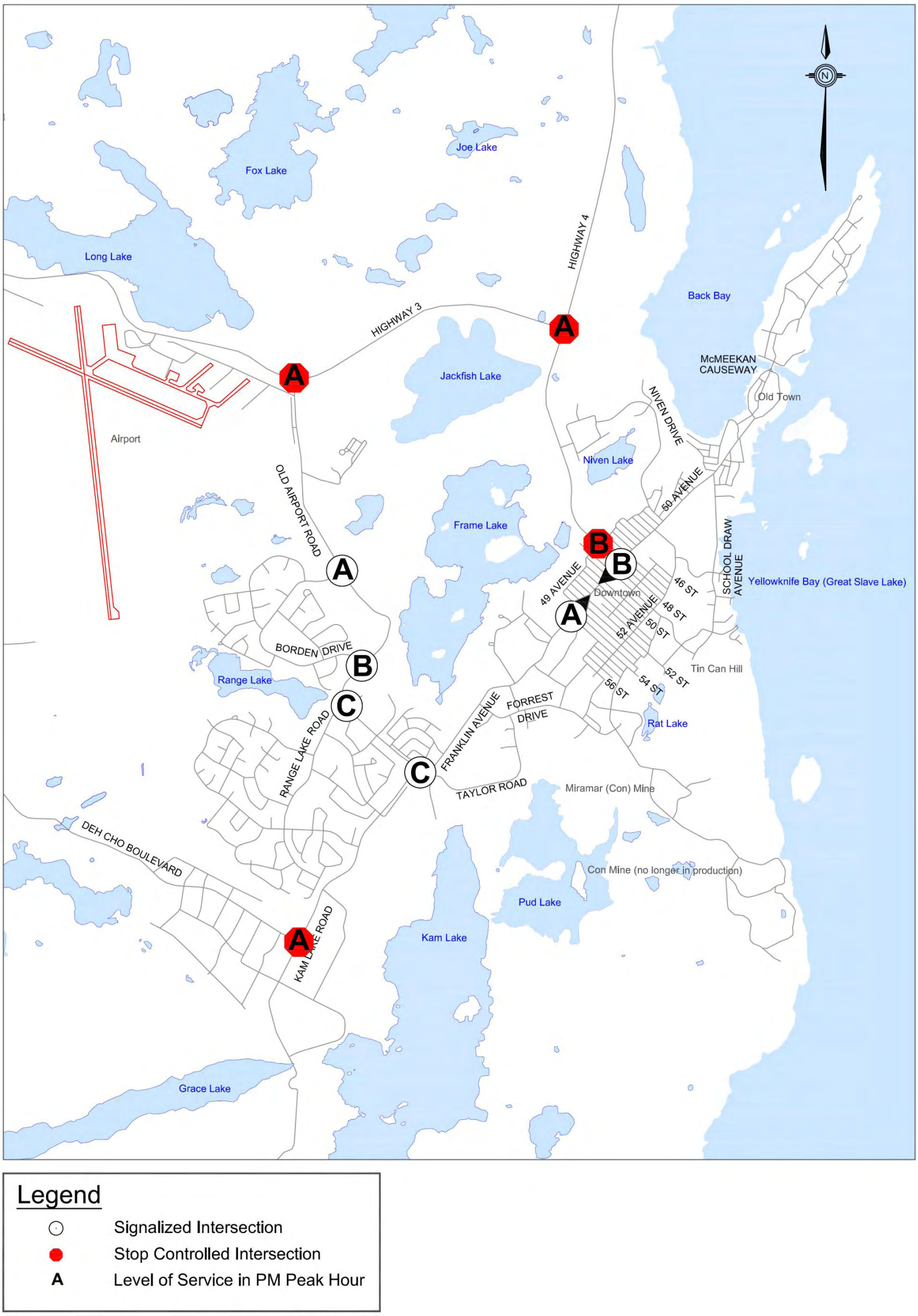


Exhibit 6-2: Traffic Operations – Intersection Level of Service

For the signalized intersections, the intersection LOS ranged from A to C throughout the city. In the downtown core along 50th Avenue, the signalized intersections at the northeast end operated at a LOS B and gradually the intersection performance improved to a LOS A at the southwest end of the corridor. The worst traffic operations were experienced at the intersections of Old Airport Road and Franklin Avenue and Old Airport Road and Range Lake Road. However, the intersections operated at LOS C, indicating that while busier than other intersections in Yellowknife, the operations were not considered to be congested to a point of poor operation.

For the unsignalized intersections, LOS A was generally consistent throughout the city. An exception was the four-way stop controlled intersection of 49th Avenue and 48th Street, which operated at LOS B. This indicates it is one of the busier unsignalized intersections in Yellowknife but that the traffic operations are not causing poor operation of the intersection.

In addition to the intersection LOS analysis, individual turning movements were also analyzed to provide a more detailed review of the intersection operations and potential constraints.

Table 6-3 provides a detailed breakdown of LOS by turning movement for the following eight key intersections that were analysed:

1. Highway 3 and Old Airport Road;
2. Highway 3 and Highway 4;
3. Old Airport Road and Borden Drive N (near the Home Building Centre);
4. Old Airport Road and Borden Drive W (near Wal-Mart);
5. Old Airport Road and Range Lake Road;
6. 48th Street and 49th Avenue;
7. Deh Cho Boulevard and Kam Lake Road; and,
8. Old Airport Road and Franklin Avenue.

Table 6-3: Existing Level of Service – Turning Movement Operations

Intersection and Movement	PM Peak Existing LOS
Highway 3 and Old Airport Road	
Eastbound Through	A
Eastbound Right	A
Westbound Left-Through	A
Northbound Left	B
Northbound Right	B
Highway 3 and Highway 4	
Eastbound Left	B
Eastbound Right	B
Northbound Left	--
Northbound Left-Through	A
Southbound Through	A
Southbound Right	A
Old Airport Road and Borden Drive (near the Home Building Centre)	
Eastbound Left-Right	B
Eastbound Left	--
Eastbound Right	--
Northbound Left	A
Northbound Through	B
Southbound Through	B
Southbound Right	A
Old Airport Road and Borden Drive (near Wal-Mart)	
Eastbound Left-Through	C
Eastbound Left	--
Eastbound Through	--
Eastbound Right	A
Westbound Left	C
Westbound Through-Right	C
Northbound Left	B
Northbound Through-Right	A
Southbound Left	B
Southbound Through-Right	B
Southbound Through	--
Southbound Right	--

Intersection and Movement	PM Peak Existing LOS
Old Airport Road and Range Lake Road	
Eastbound Left	C
Eastbound Through	C
Eastbound Right	A
Westbound Left	C
Westbound Through	D
Westbound Right	C
Northbound Left	C
Northbound Through-Right	B
Southbound Left	B
Southbound Through-Right	C
Southbound Through	--
Southbound Right	--
48th Street and 49th Avenue	
Eastbound Left-Through-Right	B
Eastbound Left	--
Eastbound Through-Right	--
Westbound Left-Through-Right	A
Westbound Left-Through	--
Westbound Right	--
Northbound Left-Through-Right	B
Southbound Left-Through	B
Southbound Left	--
Southbound Through-Right	--
Southbound Right	A
Deh Cho Boulevard and Kam Lake Road	
Eastbound Left-Through	A
Westbound Through-Right	A
Westbound Through	--
Westbound Right	--
Southbound Left-Right	B
Old Airport Road and Franklin Avenue	
Eastbound Left	A
Eastbound Through-Right	B
Westbound Left	A
Westbound Through	A
Westbound Right	A
Northbound Left	D
Northbound Through	C
Northbound Right	B
Northbound Through-Right	--
Southbound Left	E
Southbound Left-Through	E
Southbound Through	--
Southbound Right	A

The intersection of Old Airport Road and Franklin Avenue has two movements that operate at LOS E, which is an indication of traffic delay. The movements are in the southbound direction of travel and are caused by the high volume of left-turn vehicles onto Franklin Avenue. The northbound left-turn movement is operating at a LOS D, indicating that there is approximately 30 seconds of delay. All other movements operate a LOS C or better, indicating approximately 20 seconds of less of delay. This delay is considered reasonable for normal intersection operations. An updated signal timing plan could improve operations at this intersection for priority movements.

The westbound through movement at the intersection of Old Airport Road and Range Lake Road operates at a LOS D, indicating approximately 30 seconds of delay. The southbound through-right movement operates at a LOS C, and the volumes, while high have enough capacity with two through lanes. The cycle length is long for this intersection and the individual movement operations would benefit from an improved signal timing plan, which may reduce delay and increase capacity.

All other turning movements at the six remaining analyzed intersections operate at a LOS C or better, indicating approximately 20 seconds or less of delay. This delay is considered reasonable for normal intersection operations.

6.3 Safety Analysis

Traffic collision data for the city from 2004 to 2006 was provided by the Government of the Northwest Territories. Reported collision data included dates, times, severities, types of collisions, number of vehicles involved, potential contributing factors, and other secondary information. A review of all reported collisions from 2004 to 2006 was conducted in order to determine the amount of collisions on the key roads in and around Yellowknife. The data set did not include any collision information relating to Highway 3 or Highway 4 or any unreported collisions. **Table 6-4** displays the number of collisions reported on key roadways between 2004 and 2006 inclusive.

Table 6-4: Number of Collisions by Roadway from 2004 to 2006

Key Roadway	Collisions	Relative Percent	Overall Percent
Franklin Avenue	643	48%	20%
Old Airport Road	252	19%	8%
52nd Avenue	117	9%	2%
51st Avenue	78	6%	2%
50th Street	68	5%	2%
48th Street	66	5%	1%
Kam Lake Road	62	5%	2%
49th Avenue	44	3%	4%
Total	*1330*	*100%*	*41%*

There were a total of 3186 reported collisions from 2004 to 2006. The identified key roadways in **Table 6-4**, accounted for almost half the collisions in the city of Yellowknife (1330). The highest number of collisions reported on a single road was on Franklin Avenue, with 20% of the overall number and 48% relative to the other key roadways. Given that the majority of collisions were reported on or associated with Franklin Avenue, a further in-depth review was conducted on collisions related only to Franklin Avenue.

6.3.1 Franklin Avenue Collision Summary

The boundary of analysis on Franklin Avenue was from Old Airport Road to Weaver Drive. The analysis was separated into intersection related collisions, and segment related collisions. The differences in collision patterns and more importantly the reason for the collisions can be different between intersections and segments and therefore this methodology is more effective in identifying the appropriate collision patterns and trends. The collision summary details are provided in **Appendix D**.

A graphical overview of the corridor is provided in **Exhibit 6-3** with the number of collision identified by intersection and segment.

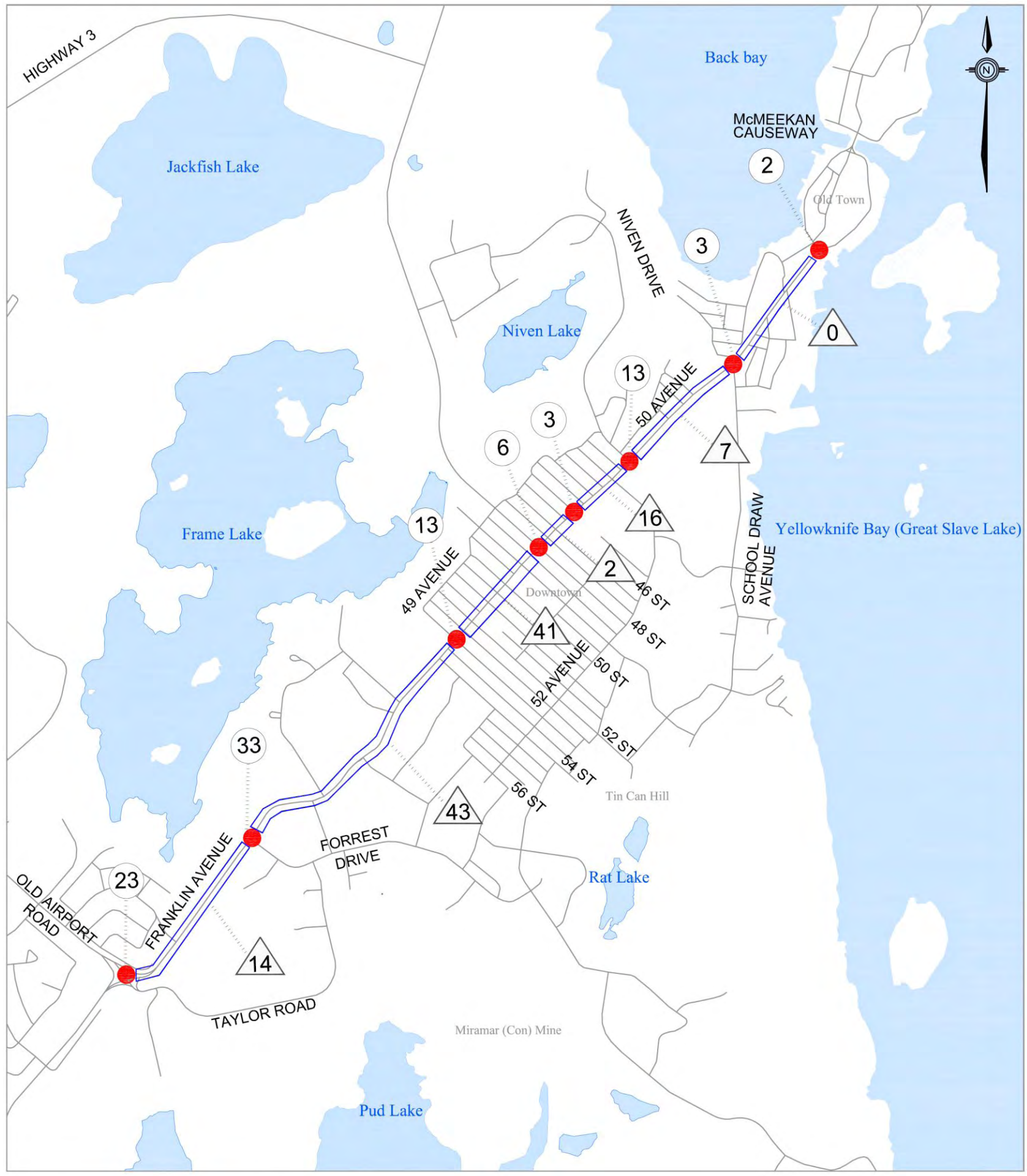


Exhibit 6-3: Franklin Avenue Collision Summary

6.3.1.1 Intersection Collisions

The raw collision data was reviewed for all the intersections along Franklin Avenue between Old Airport Road and Weaver Drive. The type and severity of the collisions are summarized in **Table 6-5** and **Table 6-6**, respectively.

Table 6-5: Intersection Collision Type Distribution along Franklin Avenue

Intersecting Street	Nature and Number of Collisions(2004 - 2006)				
	Rear End	Right Angle	Side Swipe (Same Direction)	Left Turn	Other
At Old Airport Road	23	--	--	--	--
At Forrest Drive	21	--	8	2	2
At 53rd Street	3	4	--	2	4
At 48th Street	--	2	4	--	--
At 46th Street	--	2	--	--	1
At 43rd Street	7	3	--	3	--
At School Draw Avenue	3	--	--	--	--
At Weaver Drive	--	2	--	--	--
Total	*57*	*13*	*12*	*7*	*7*

Table 6-6: Intersection Collision Severity along Franklin Avenue

Intersecting Street	Severity			*Total*
	Fatal	Injury	PDO	
At Old Airport Road	--	2	21	*23*
At Forrest Drive	--	4	29	*33*
At 53rd Street	--	2	11	*13*
At 48th Street	--	--	6	*6*
At 46th Street	--	--	3	*3*
At 43rd Street	--	--	13	*13*
At School Draw Avenue	--	--	3	*3*
At Weaver Drive	--	--	2	*2*
Total	*0*	*8*	*88*	*96*

PDO = Property Damage Only

Table 6-5 indicates that the majority of the collisions reported at the intersections were rear-end collisions. According to the potential contributing factors information, many of these collisions occurred on icy road conditions in the evening hours. This could be a result of vehicles speeding along Franklin Avenue that were unable to stop due to slippery road conditions when the signal changed to red.

In general, collisions were less frequent in central downtown and out towards Old Town. From downtown out towards Kam Lake, at the intersections of Franklin Avenue and Forrest Drive, Old Airport Road, collisions were much higher, with almost 3 times as many per intersection. Traffic in the downtown core travels more slowly than outside of downtown due to the close proximity of each traffic signal and the urbanized conditions such as pedestrian activity and on-street parking. These factors combine to provide a traffic calming effect, which leads to slower moving traffic, and ultimately less potential for collisions. The downtown core has a significantly different driving environment than areas outside of downtown, specifically out towards Kam Lake. From 54th Avenue to Old Airport Road, there is significantly more travel distance between signals, there are multiple horizontal curves, and there is also more traffic volume travelling than there is destined for Old Town. These factors combine to make for a faster driving environment and likely contribute to the higher number of reported collisions.

As summarized in **Table 6-6** for intersections, there were no reported fatalities, 8% of collisions resulted in injury and 92% were property damage only.

6.3.1.2 Segment Collisions

The raw collision data was reviewed for all the segments along Franklin Avenue between Old Airport Road and Weaver Drive. The type and severity of collisions are summarized in **Table 6-7** and **Table 6-8**, respectively.

Table 6-7: Segment Collision Type Distribution along Franklin Avenue

Segments	Nature and Number of Collisions (2004 - 2006)						
	Rear End	Side Swipe (Same Direction)	Hit Parked Vehicle	Right Angle	Side Swipe (Opposite Direction)	Head-On	Other
Old Airport Road to Forrest Drive	10	4	--	--	--	--	
Forrest Drive to 53rd Street	18	10	2	--	5	7	1
53rd Street to 48th Street	7	4	16	4	--	--	10
48th Street to 46th Street	--	--	2	--	--	--	--
46th Street to 43rd Street	2	--	2	12	--	--	--
43rd Street to School Draw Avenue	--	5	--	--	2	--	--
School Draw Avenue to Weaver Drive	--	--	--	--	--	--	--
Total	*37*	*23*	*22*	*16*	*7*	*7*	*11*

Table 6-8: Segment Collision Severity along Franklin Avenue

Segments	Severity			*Total*
	Fatal	Injury	PDO	
Old Airport Road to Forrest Drive	--	5	9	*14*
Forrest Drive to 53rd Street	--	6	37	*43*
53rd Street to 48th Street	--	4	37	*41*
48th Street to 46th Street	--	--	2	*2*
46th Street to 43rd Street	--	--	16	*16*
43rd Street to School Draw Avenue	--	--	7	*7*
School Draw Avenue to Weaver Drive	--	--	--	*0*
Total	*0*	*15*	*108*	*123*

PDO = Property Damage Only

Table 6-7 indicates that the majority of collisions reported along the segments were rear-end, sideswipe, hitting a parked vehicle, and right angle. This section of the collision analysis, again, suggests that vehicles travelling along Franklin Avenue may have been speeding and unable to stop in time.

Between 48th Street and 53rd Street along Franklin Avenue, approximately 39% of collisions were related to hitting parked vehicles. The on-street parking allowances and restrictions vary in the downtown core and the uncertainty it may create could be a contributing factor.

Approximately 75% of collisions between 43rd Street and 46th Street along Franklin Avenue were right angle collisions. This could be a result of obstructed sight lines for vehicles accessing from the side streets or driveways.

On the segment between 43rd Street and School Draw Avenue, approximately 71% of the total collisions were side swipe collisions between vehicles travelling in the same direction. This could be the result of the road narrowing from 2 lanes to 1 lane in this section.

As summarized in **Table 6-8** for segments, there were no reported fatalities, 12% of collisions resulted in injury and 88% were property damage only.

6.4 Parking Analysis

6.4.1 Downtown Parking Analysis

A parking assessment was undertaken of the Downtown core area to better understand the existing parking supply versus demand. This area is bounded by 49th Avenue to 52nd Avenue, 45th Street, and 54th Street. The existing parking data collection and existing infrastructure was previously outlined in **Section 3.2** and **Section 5.3**, respectively. This section focuses on the analysis.

The parking analysis was separated into on-street and off-street parking as each type of parking has different characteristics. For example, off-street lots have a different payment structure than on-street spaces and length of parking time can vary significantly. By separating the analysis, a better understanding of parking in downtown Yellowknife is attained.

6.4.1.1 On-Street

The total number of available on-street stalls in the downtown area is 731. The overall on-street parking demand was analyzed for all three time periods where data collection occurred. The purpose was to determine which of the three time periods had the highest utilization, or most parked vehicles. The results are illustrated in **Exhibit 6-4**.

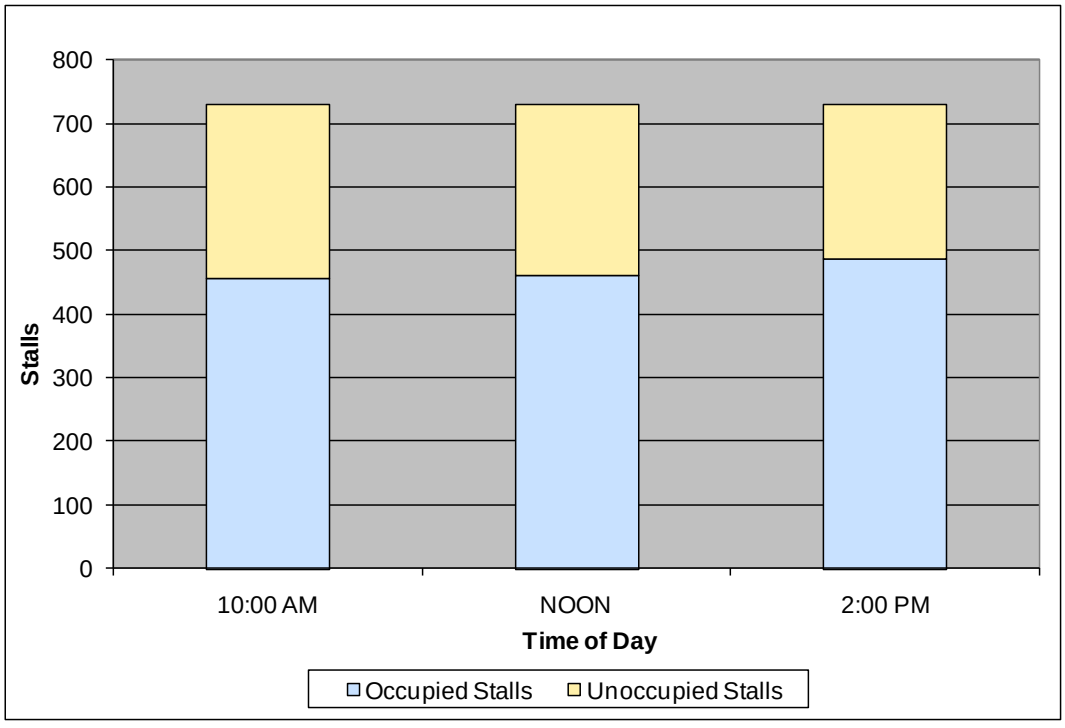


Exhibit 6-4: On-Street Parking Capacity in Downtown Yellowknife

While the three observed parking time periods had similar overall utilizations, the surveys indicated that the 2:00 PM counts had the highest utilization; therefore, the 2:00 PM data was the basis for the analysis.

The individual on-street parking locations were categorized into three specific geographical zones. These zones represent a combined parking area, intended to resemble and function as a large parking lot. On the street, driver behaviour is generally similar to if they were in a parking lot, meaning if the driver cannot find a parking space directly in front of their desired destination, they will choose the closest available space, which is likely to be in the defined zone. This methodology leads to a better analysis of the overall parking situation and a clearer understanding of where demand is highest or lowest.

Zones A1, A2, and A3 define on-street parking and are described in **Table 6-9**.

Table 6-9: Locations of the On-Street Counts by Zone

Zones	On-Street Locations
A1	▪ 49th Avenue between 48th Street and 51st Street ▪ 47th Street to 53rd Street between 49th Avenue and Franklin Avenue
A2	▪ Franklin Avenue between 47th Street and 53rd Street
A3	▪ 47th Street to 52nd Street between Franklin Avenue and 51st Avenue ▪ 51st Avenue between 47th Street and 52nd Street

Based on the parking inventory conducted in fall 2008, **Exhibit 6-5** outlines the 2:00 PM on-street parking utilization rates in downtown Yellowknife.

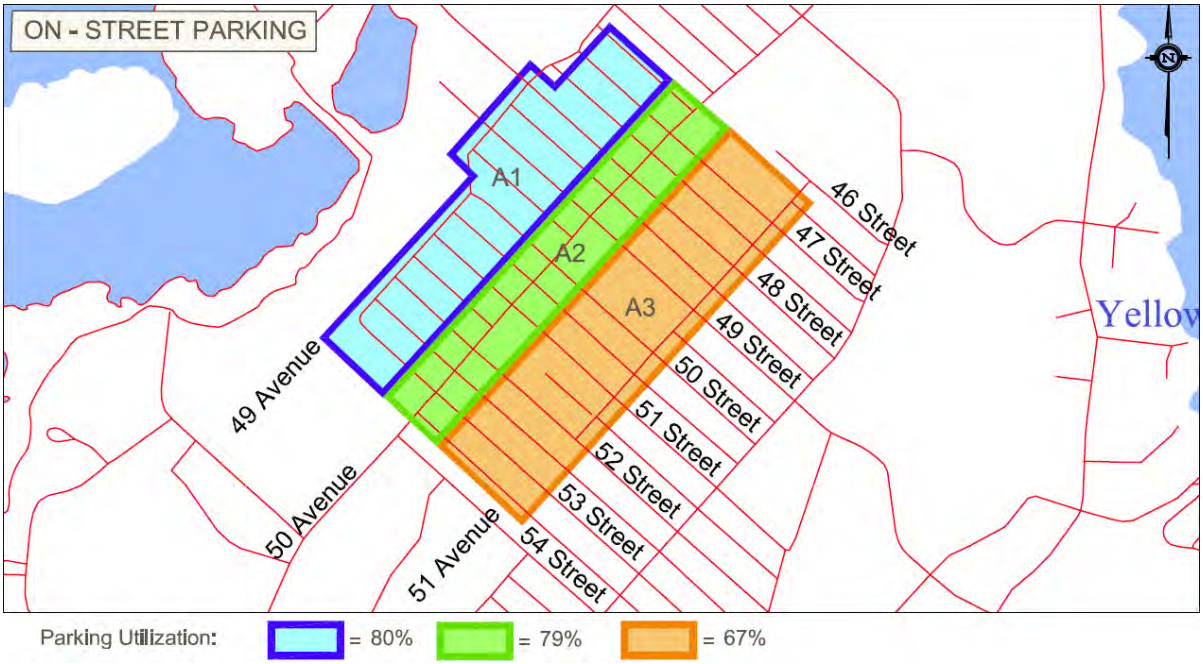


Exhibit 6-5: Utilization of On-Street Parking in Downtown Yellowknife

The supply and demand for each of the parking zone for the peak time (2:00 PM) was summarized and the utilization for each zone was calculated and reported in **Table 6-10**.

Table 6-10: Summary of the On-Street Parking Results

Zone	Demand	Supply	On-Street Utilization
A1	191	240	80%
A2	48	61	79%
A3	171	267	67%
System Wide	*410*	*568*	*72%*

There was a portion of the on-street parking spaces surveyed that were outside of the defined A1, A2, and A3 zones. For example, on-street parking data was collected on 49th Street and 50th Street between 51st Avenue and 52nd Avenue. However, this area was considered outside of the defined downtown core and in order to be consistent with the on-street and off-street analysis and to stay true to a defined area, it was not included in the results. A separate analysis of this outlying area reveals that 77 stalls were occupied out of 163 stalls, resulting in a utilization of 47%. Therefore, it is concluded that the parking demand is significantly less outside of the defined downtown core and only adds additional parking capacity.

6.4.1.2 Off-Street

The total number of available off-street stalls in the downtown area is 689. The overall off-street parking demand was analyzed for all three time periods where data collection occurred. The purpose was to determine which of the three time periods

had the highest utilization, or most parked vehicles. The results are illustrated in **Exhibit 6-6**.

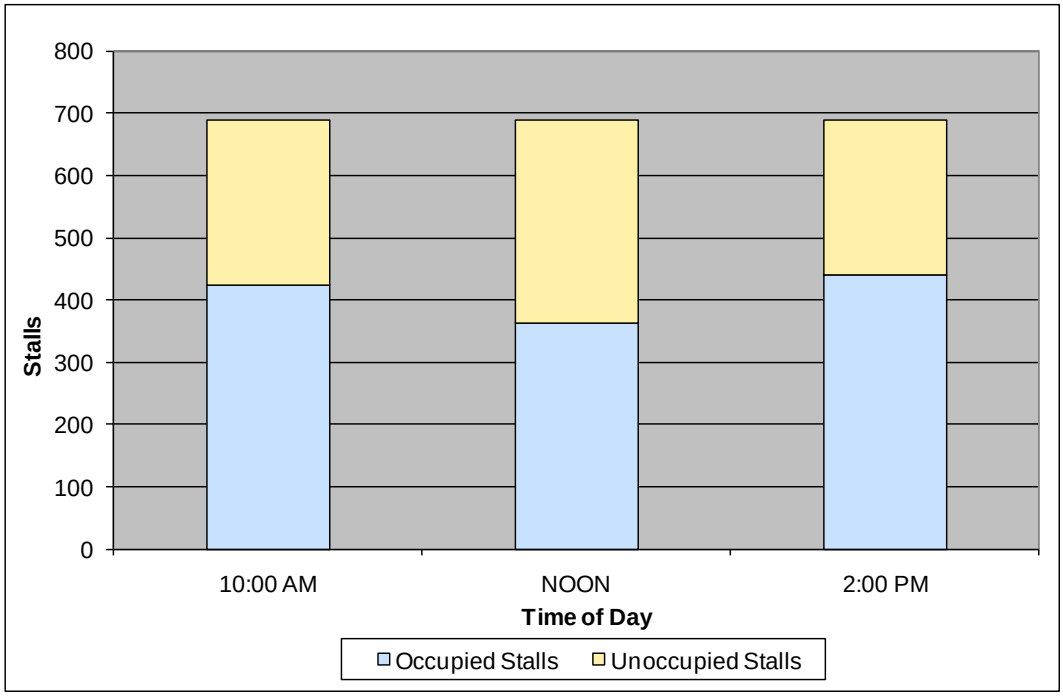


Exhibit 6-6: Off-Street Parking Capacity in Downtown Yellowknife

While the three observed parking time periods had similar overall utilizations, the surveys indicated that the 2:00 PM counts had the highest utilization; therefore, the 2:00 PM data was the base for the analysis.

Again, the individual off-street parking locations were categorized into the three specific geographical zones.

Zones A1, A2, and A3 define on-street parking and are described in **Table 6-11**.

Table 6-11: Locations of the Off-Street Counts by Zone

Zones	Off-Street Locations
B1	▪ 47th Street to 50th Street between 49th Avenue to Franklin Avenue
B2	▪ 50th Street to 53rd Street between 49th Avenue to Franklin Avenue
B3	▪ 48th Street to 51st Street between Franklin Avenue to 51st Avenue

Based on the parking inventory conducted in fall 2008, **Exhibit 6-7** outlines the 2:00 PM off-street parking utilization rates in downtown Yellowknife.

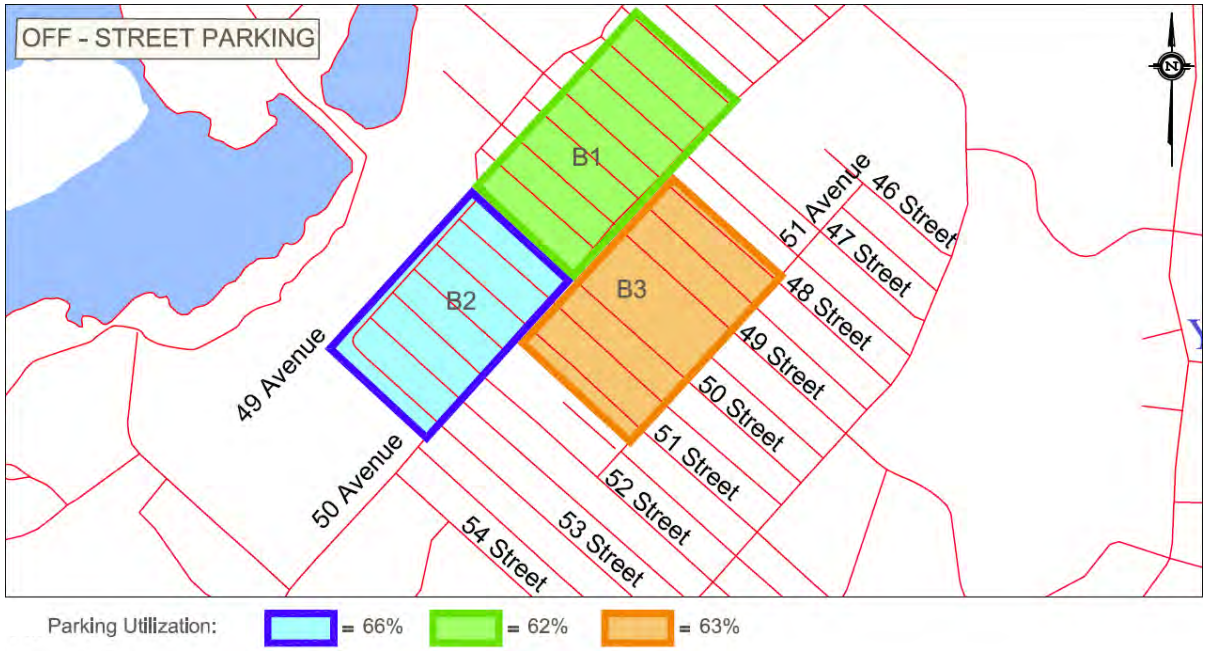


Exhibit 6-7: Utilization of Off-Street Parking in Downtown Yellowknife

The supply and demand for each of the parking zone for the peak time (2:00 PM) was summarized and the utilization for each zone was calculated and reported in **Table 6-12**.

Table 6-12: Summary of the Off-Street Parking Results

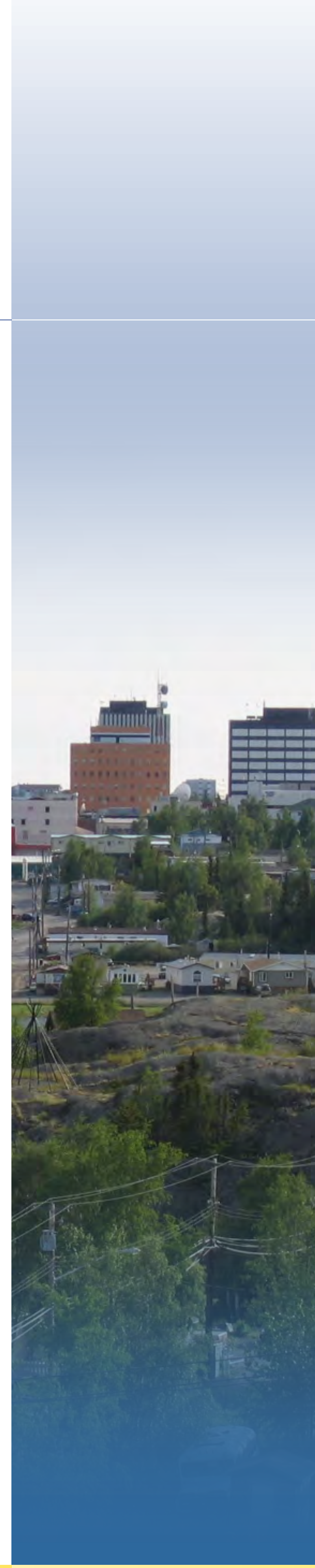
Zone	Demand	Supply	Utilization
B1	166	250	66%
B2	196	317	62%
B3	77	122	63%
System Wide	*439*	*689*	*64%*

There are approximately an additional 25 lots that were not counted and are not included in zones B1, B2, and B3. However, given the lower utilization in the defined downtown core and the results of the on-street demand, it is concluded that this parking would have similar or less utilization than the downtown core.

6.4.2 Summary

The downtown parking survey indicates that there is spare existing parking capacity in all of the zones for both on-street and off-street parking. For all zones, the off-street parking had more capacity than the on-street parking although this was less noticeable between zones A3 and B3.

Existing Issues



7. EXISTING ISSUES

The existing transportation issues have been identified by individual mode and are illustrated in **Exhibit 7-1**. Transit, cycling, pedestrian, and road infrastructure issues are described in more detail in the following sub-sections.

7.1 Transit Issues

Transit service was often referenced in previous reports and in discussions with the public as a key element of the transit network that needed improvement. Overcrowding at peak times, frequency of pick-up, and long travel times due to circuitous routes were brought forward as elements of transit that are not meeting user expectations. Peak periods in the morning and afternoon “rush hours” are over-crowded and conversely the off-peak service between the morning and afternoons is under utilized. Poor transferability between modes and bus routes and the lack of route coordination was highlighted as an ongoing concern. As identified through the Smart Growth consultation process, the lack of comfortable bus stops contributed to user dissatisfaction with the transit service. Indoor bus shelters were also highlighted as key improvements for consideration.

With respect to the bus routes themselves, the lack of service area coverage as well as limited weekend and evening service is problematic for residents travelling outside of the peak commuter travel times. Lack of transit service to the airport is identified as a major issue in terms of providing complete service area coverage and sustainable travel to and from the airport for the large number of employees.

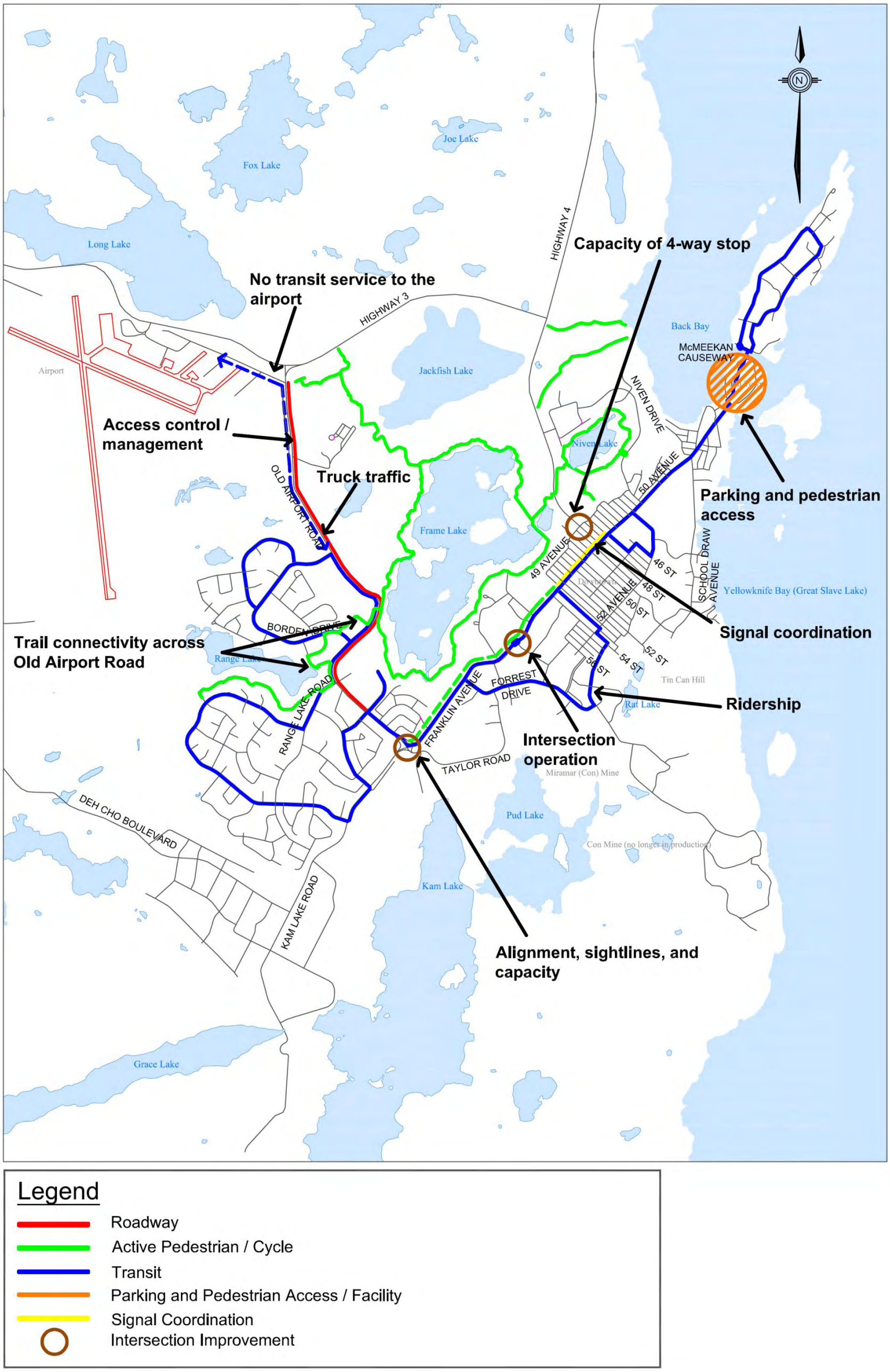


Exhibit 7-1: Existing Transportation Issues

7.2 Pedestrian Issues

There is a large mode share of pedestrian walking trips in the city of Yellowknife. This is a very positive sign as walking trips are the most sustainable form of travel. As a result, direct health benefits associated with the activity of walking are realized and indirect benefits are realized due to zero emissions and pollutants.

The issues with pedestrian infrastructure are similar to that of cyclists when it comes to recreational trails. There is a lack of inter-trail connectivity and safe crossing opportunities where the trail intersects the road network. It was noted at the Charrette, that there would be an interest in a proposed boardwalk in Old Town along the waterfront from Rotary Park to McMeekan Causeway.

Other issues include the lack of connectivity of pedestrian facilities such as sidewalks or trails, with transit or other multimodal transfer points, which limits the widespread promotion of walking as a mode that is safe and enjoyable to use for the entire community.

7.3 Road Infrastructure Issues

The existing road network is generally functioning well. There have been discussions with the public about the coordination of traffic signals in the downtown core area from 48th Street to 54th Street. While the main street traffic along 50th Avenue operates well, the side streets operations could be improved with better signal coordination and timing plans.

The PM peak hour traffic review and analysis suggested that there are some higher traffic flows at the following intersections:

- 49th Avenue and Highway 4 (unsignalized);
- Franklin Avenue and Old Airport Road; and,
- Old Airport Road between Borden Drive (near Wal-Mart) and Franklin Avenue.

Access Management along the majority of Old Airport Road, particularly between the Co-op corner and Highway 3, is identified as an issue. There are many local businesses along this section with uncontrolled access and egress from Old Airport road and the property.

The parking downtown is adequate to accommodate the demand; however, parking in Old Town is limited due to the unique nature of the area and its character. Access and commercial parking along Old Airport Road is also an issue as the multitude of driveways giving access to private lots creates stop and go conditions with peak flows.

Future Land Use

8. FUTURE LAND USE

Through the *Plan*, the City developed three potential growth scenarios to guide Yellowknife over the next fifty or more years. The three growth scenarios are: Compact, Hybrid, and Dispersed. Each represents a different approach to development and the *Study* assessed the impacts of each.

Each of the three growth scenarios is represented by two maps: one that identifies the number of ***households*** in each Smart Growth Zone and another that identifies the employment, by number of ***jobs*** in each Smart Growth Zone. The boundaries of the Smart Growth Zones are different in each scenario.

Households and jobs are related to each other by another factor, population. Generally, the population of a city increases over time due to a variety of reasons. For example, as population increases, more people begin living in the city, which results in the need for more households. Due to the increased population and new households, more jobs are necessary to support the community. Another possibility is that there is an increasing demand for jobs, perhaps as a result of growth in a specific industry or just overall economic growth. This increased employment demand drives an increase in population, which in turn leads to more households. In reality, these factors are never as simply related and can be either the cause or effect of each other or influenced by outside factors. However, for a planning study of this nature, the knowledge that if one increases the others increase, and vice versa, is sufficient.

Households and employment projections are important for creating a future transportation model because they represent growth in the region. Essentially, this means the overall number of trips grow because there are more jobs and more households in the city. Growth in jobs and households combine with existing trip information and other modeling factors to create the projected trips in the future transportation scenarios.

The *Plan* developed household and job projections for the three growth scenarios in three future horizons based on three population projections: 25,000 (short), 33,000 (intermediate), and 50,000 (long). In each horizon, the total households and job projections are the same for every scenario. For example, in the long-term horizon, the total number of number of households is approximately 17,100 for all scenarios. It is the distribution of these households within defined development areas of the city that changes between horizons. Because of the long-term nature of the *Study* only the intermediate-term and long-term population horizons were examined.

Intermediate-term

The long-term planning horizon it presented in the body of this report and a matching format of Tables and Exhibits for the intermediate-term analysis is provided in **Appendix E**.

Table 8-1 summarizes the total households and jobs in the long-term horizon.

Table 8-1: Total Households and Jobs (Long-Term Horizon)

Type	Existing	Compact / Hybrid / Dispersed
		Long-term
Households	6890	17140
Jobs	10840	27890

The Smart Growth Maps for households and jobs in each land use scenario are illustrated in **Exhibit 8-1** through **Exhibit 8-6**.

COMPACT GROWTH SCENARIO							
TARGET AREA		EXISTING DWELLING UNITS TO 19,000 POPULATION	STAGE 1 DWELLING UNITS TO 25,000 POPULATION	STAGE 2 DWELLING UNITS TO 33,000 POPULATION	STAGE 3 DWELLING UNITS TO 50,000 POPULATION	DWELLING UNITS BUILDOUT TO 50,000 POPULATION	TOTAL DENSITY (U/A)
CORE AREA (6713 UNITS)							
A	Downtown/City Centre	2634	440	700	850	4624	9.2
B	Old Airport Road	309	300	500	350	1459	4.1
C	Old Town	380	50	100	100	630	1.6
CITY SUBURBS (6621 UNITS)							
D	Niven Lake	204	700	500	100	1504	7.4
E	Range Lake North	760	25	25	25	835	2.9
F	Range Lake South	1846	25	25	25	1921	4.3
G	Taylor Road	374	175	300	0	849	3.7
H	Tin Can Hill	207	0	500	350	1057	3.5
I	Kam Lake	120	35	100	200	455	0.6
OUTLYING AREA (3756 UNITS)							
J	Negus Point	6	0	0	1200	1206	5.4
K	Highway 4 North	0	0	0	1950	1950	6.1
L	Grace Lake	0	0	0	600	600	1.8
TOTAL UNITS		6840	1750	2750	5750	10790	2.5

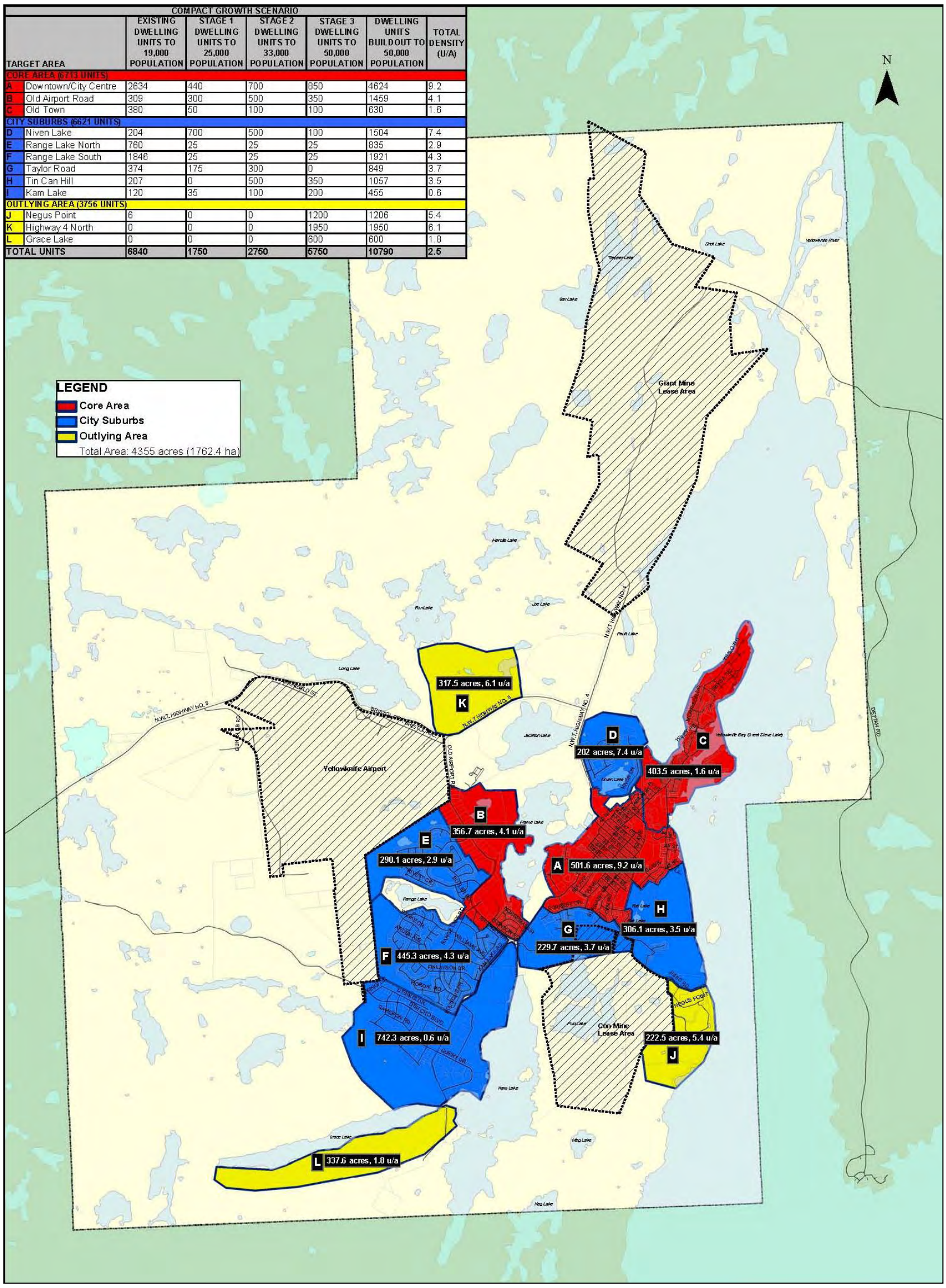


Exhibit 8-1: Households – Compact Scenario

EMPLOYMENT GROWTH - COMPACT SCENARIO				
	TARGET AREA	STAGE 1 NEW JOBS 25,000 POPULATION	STAGE 2 NEW JOBS 33,000 POPULATION	STAGE 3 NEW JOBS 50,000 POPULATION
CORE AREA (6800 JOBS)				
A	Downtown/City Centre	900	1150	1500
B	Old Town	200	300	300
C	Old Airport Road/Capital Area West	500	400	1400
CITY SUBURBS (3625 JOBS)				
D	Kam Lake	200	300	150
E	Range Lake North	25	125	125
F	Range Lake South	25	150	200
G	Niven Lake	25	100	200
H	Con Mine/Tin Can Hill/Negus Point	250	300	700
I	Airport	100	200	500
OUTLYING AREA (6825 JOBS)				
K	Engle Business District	500	900	300
L	Grace Lake/Engle West	0	100	1500
M	Kam Lake East	0	0	0
N	Highway 4 North	0	400	2200
O	Giant Mine	0	100	300
P	East Shore (Dettah)	25	100	300
Q	Long Lake North/West	0	0	0
TOTAL NEW JOBS		2750	4625	9675

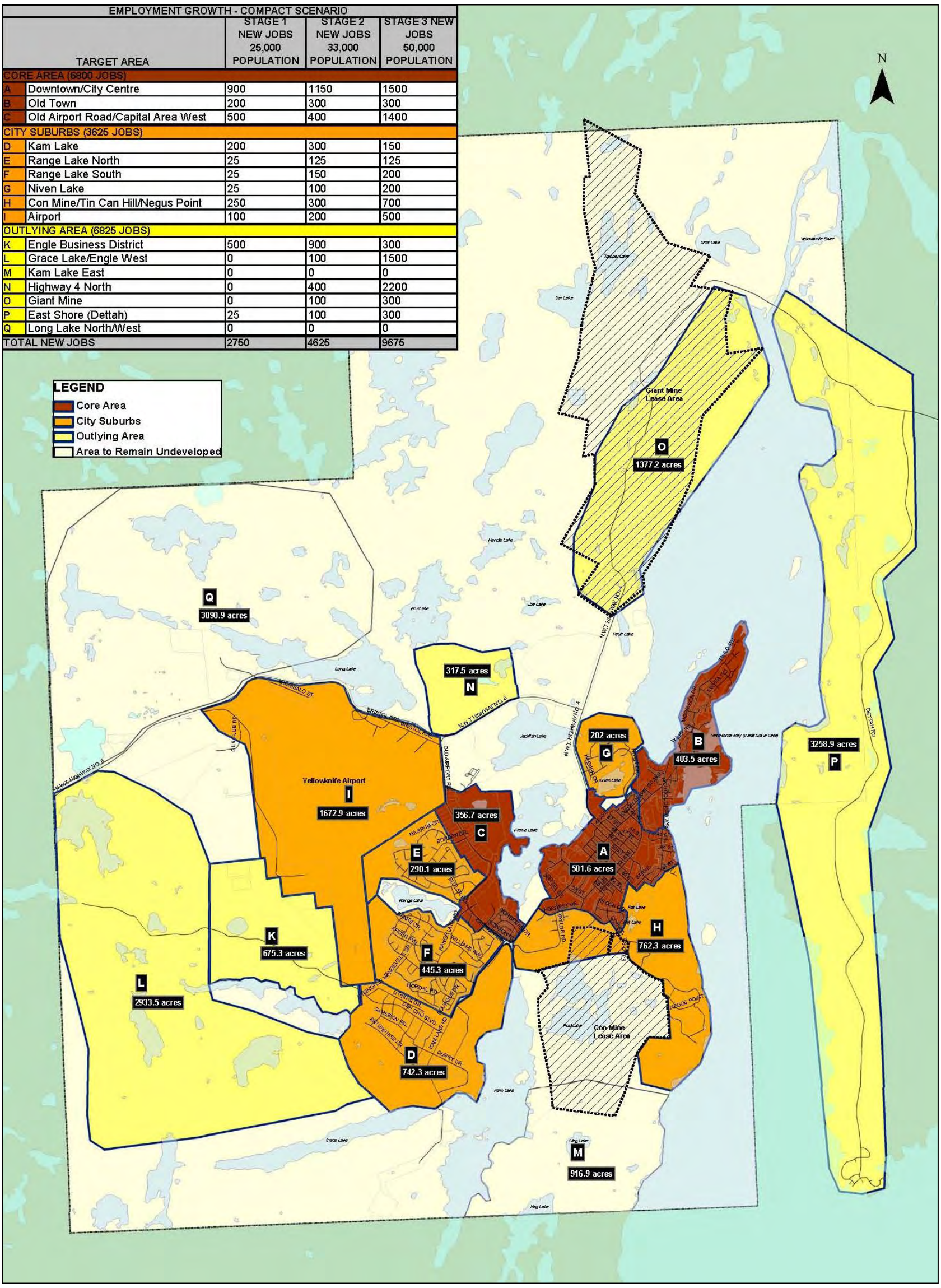


Exhibit 8-2: Jobs – Compact Scenario