City of Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN



City of Lethbridge
Transportation Master Plan
Final Report

Associated Engineering

Adopted by City Council - April 2, 2013

REPORT

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1 Introduction

The City of Lethbridge (City) is family-oriented, with safe streets, parks and recreational facilities. It is the largest city in southern Alberta, is Alberta's fourth-largest city by population and the third-largest by area. The City is split into three geographical areas: north, south and west. The Oldman River separates West Lethbridge from the other two, while the Crowsnest Highway and the Canadian Pacific (CP) rail line separate North and South Lethbridge.

Lethbridge is the commercial, financial, transportation and industrial centre of southern Alberta. The City's economy developed from drift mining for coal in the late 19th century and agriculture in the early 20th century. Around 50 percent of the residents are employed in the health, education, retail and hospitality sectors. The only university in Alberta south of Calgary is the University of Lethbridge, which is located on the west side of the City. In addition, two of the three colleges in southern Alberta have campuses in Lethbridge. Cultural venues in the City include performing art theatres, museums and sports centres.

The City has experienced noticeable growth in recent years. In its 2012 municipal census, the City reported a population of 89,074, a 1.36 percent increase over its 2011 municipal census population of 87,882. This also represents an 11.8 percent change from its 2006 adjusted population of 74,685. The City's population continues to grow because of its vibrancy and community enthusiasm. Current transportation improvements within the City have been based on the previous transportation study completed in 2004 and is no longer considered representative of the actual transportation network required to address current and future transportation needs.

In light of the continuing accelerated pace of development in the region and the need to rationalize and identify the future transportation network requirements for the City, including surrounding rural municipalities and counties, the existing transportation plan required a comprehensive update.

1.1 STUDY PURPOSE/BACKGROUND

The original Transportation Master Plan (TMP) was completed in 1984 and was subsequently updated in 2004. The Circulation Road Study, completed in 2009, has provided the possibility of planning a new circulation road across the Oldman River and connections from the City road network to the proposed provincial North-South Trade Corridor (NSTC). In addition, the City has recently completed an update to its Integrated Community Sustainability Plan/Municipal Development Plan (ICSP/MDP) through a comprehensive public consultation process. This creates an opportunity to ensure an alignment in the directions of the land use policies provided in the ICSP/MDP and the transportation goals of the newly developed TMP.

Associated Engineering (AE) with a team of sub-consultants was retained by the City of Lethbridge to update the existing Transportation Master Plan study. The purpose of the TMP study was to provide a comprehensive long-range plan that aligns the land use policies with the transportation infrastructure requirements for the 100,000 and 130,000 population horizons. The TMP study will provide the City with a

blueprint on which to plan and implement specific transportation network improvement projects over the next 20 years, in 8-year (100,000 population) and 30-year (130,000 population) planning horizons.

This report compiles the major findings from the different phases of the TMP study and detailed technical information regarding the analysis and results can be referenced in the attached appendices.

1.2 GOALS AND OBJECTIVES

The TMP study will develop an integrated multi-modal transportation system that will build upon the existing roadway infrastructure to promote economic vitality and serve the requirements of the recently adopted ICSP/MDP land use policies.

TMP Study goals included:

- Effective access and mobility for people and goods
- A safe, secure and integrated transportation system
- Effective public involvement in the TMP development process
- Recently updated ICSP/MDP driven TMP development process
- Sustainable transportation initiatives
- Transportation infrastructure investment rationale

Specific objectives of the TMP study include:

- Evaluate existing transportation system and identify areas with physical and/or operational deficiencies
- Identify transportation infrastructure requirements for personal and goods mobility, transit and other modes of transportation
- Identify future upgrades required to the existing transportation system to accommodate the future traffic growth
- Identify the areas where new goals should be established to encourage multi-modal systems
- Engage community in developing the future transportation system so that the majority of the population can be served
- Develop an action plan illustrating the programs needed to successfully implement the recommendations mentioned in the plan including the program costs, staging and prioritization

The following vision for the TMP was established at a partnering session on April 19, 2011 between the City of Lethbridge and AE:

“We, the TMP Partners, commit to creating an integrated multi modal plan that encourages a sustainable transportation system that is safe, affordable, effective, and environmentally responsible.”

This will be achieved through:

- Respecting each other's expertise
- Mutual cooperation, collaboration and learning
- Trust, respect and openness
- Using a balanced multi-disciplinary approach
- Considering all stakeholder interests
- Challenging assumptions

1.3 TRANSPORTATION MASTER PLAN PROJECT PHASES

The TMP Project Phases are:

- Transportation and land use planning context
- Goals and possible strategies to support the plan
- Existing conditions
- Options development (100,000 and 130,000 population)
- Community engagement and consultation
- Recommended transportation master plan

2 Transportation and Land Use Planning Context

The relationship between land use patterns and transportation infrastructure is complex, with each factor influencing the other. Land use factors such as density, mix of uses, accessibility, connectivity, parking supply and management, walking and cycling conditions, transit accessibility and site design can affect the travel behaviour and ultimately the transportation infrastructure requirements.

Integrated smart growth land use policies have been shown in some municipalities to reduce vehicle ownership and travel and significantly increase walking, cycling, and public transit ridership. Larger impacts may be realized if integrated with other goal changes such as increased investments in alternative modes and more efficient transportation infrastructure staging and pricing.

2.1 INTEGRATED COMMUNITY SUSTAINABILITY PLAN / MUNICIPAL DEVELOPMENT PLAN

The City has recently adopted its Integrated Community Sustainability Plan/Municipal Development Plan (ICSP/MDP) to provide Council and the City with a framework that will guide the future development over the next 40 years. The ICSP states “An Integrated Community Sustainability Plan (ICSP) is a community based planning document that is built upon its resident’s vision for the future of their municipality”. The ICSP planning process involves in-depth public engagement in order to develop outcomes (or long-term goals) that are based upon six dimensions: economics, social needs, culture, the built and natural environments and governance.

The general principles inherent to the Plan Your City Process ensure that the City of Lethbridge ICSP/MDP will be:

- **Based on Community Values** - That is a “Made in Lethbridge Plan” based on what is important locally
- **Inclusive** - Involving all residents, businesses and other groups which comprise the community and wish to be involved
- **Built on Past Success** - Recognizing the high quality of life that is found in Lethbridge as a medium-sized city that is recognized as being innovative
- **Comprehensive** - In addressing all aspects of future life, work and play in the City
- **Transparent** - To the extent that future planning decisions and their rationale can be understood
- **Flexible** - Acknowledging that describing the future accurately can be difficult and therefore creating policy that will allow the City to adapt to changing circumstances
- **Sustainable** - In terms of balancing environmental, social, cultural and economic objectives.

The ICSP/MDP generally identified the future land uses within the City, developed land use polices to encourage coordination between future growth patterns and infrastructure requirements and developed transportation system policies required to be responsive to the nature of future land uses.

2.1.1 ICSP/MDP Vision Statement

The vision statement in the ICSP/MDP states **"We will continue to work together to ensure that Lethbridge is a leader in environmental stewardship, innovation and active leadership. We are recognized as being safe, healthy, vibrant and prosperous and a place where all people can fully participate in community life."**

2.1.2 ICSP/MDP Policies

The transportation, land use and transit policy areas in the ICSP/MDP that are relevant to the TMP are as follows:

- Lethbridge is a compact city
- Lethbridge has an efficient and effective integrated transportation network
- Lethbridge is a walkable, bicycle friendly city
- Lethbridge is expanding in a responsible manner
- Lethbridge is a planned city that exhibits quality urban design
- Lethbridge has a diverse parks and open space system
- Lethbridge has a strong and vibrant Downtown

2.2 DATA COLLECTION PROGRAM

The Lethbridge Transportation Master Plan (TMP) Data Collection Report was prepared to summarize the existing data, new data collection and the results of the overall data collection program. The report is provided in Appendix A and key information from the report is provided in this section.

2.2.1 Population Data

The City of Lethbridge continues to grow with the official 2012 census results at 89,074, an increase of 1.36 percent over the 2011 municipal census numbers. The strongest growth continues to be in West Lethbridge with an additional 784 residents. There was a slight increase in the population of North and South Lethbridge as well. Table 2-1 summarizes the population data by each quadrant for different census years.

Table 2-1
Population Data by Quadrant for Different Census Years

Year	South Lethbridge	Percentage Increase / Decrease	West Lethbridge	Percentage Increase / Decrease	North Lethbridge	Percentage Increase / Decrease	Total	Percentage Increase / Decrease
2012	30,795	0.95%	32,847	2.45%	25,432	0.46%	89,074	1.36%
2011	30,504	1.20%	32,063	2.11%	25,315	0.78%	87,882	1.41%
2010	30,142	-0.09%	31,399	2.98%	25,118	1.14%	86,659	1.37%
2009	30,168	1.33%	30,489	2.75%	24,835	1.31%	85,492	1.82%
2008	29,773	1.88%	29,673	4.32%	24,514	2.04%	83,960	2.78%
2007	29,225	3.20%	28,443	4.75%	24,024	3.37%	81,692	3.78%
2006	28,318	1.56%	27,154	2.83%	23,241	1.44%	78,713	1.96%
2005	27,884	-0.20%	26,407	17.74%	22,911	2.52%	77,202	6.17%

The City's 2011 occupancy rate and dwelling summary is included in the Lethbridge TMP Data Collection Report.

2.2.2 Land Use Data

The existing and future land use data provided by the City is included in the Lethbridge TMP Data Collection Report and is provided in Appendix A. The data was utilized by the travel demand model to forecast the future traffic volumes as well as the roadway improvements. The proposed land use map for the Area Structure Plans (ASPS) that are under development is also included in the report.

2.2.3 Existing Roadway Inventory and Traffic Counts

Existing roadway inventory obtained from the City, as well as the 2010 turning movement counts obtained from Alberta Transportation, is presented in the Lethbridge TMP Data Collection Report and provided in Appendix A.

2.2.4 Transit Data

Transit ridership data along 12 routes was gathered by the City in February, July and August 2010. The detailed existing transit ridership counts are included in the data collection report and are provided in Appendix A. As the data was not accurate enough to be used in the travel demand model, AE conducted a comprehensive transit ridership survey.

2.2.5 Data Collection (2010 - 2011)

Intersection Turning Movement Counts (TMCs): TMCs were carried out from September to November 2010 at major intersections. A total of 40 intersection counts were conducted and data was collected such that passenger vehicles, bus and truck traffic were reported separately for each movement. The data collection results were included in the Data Collection Report and are included in Appendix A.

Automatic Traffic Recorders (ATRs): A total of 20 ATRs were installed for three consecutive days to record directional mid-block traffic volumes at key locations within the City. The detailed TMCs and automatic directional traffic counts data were included in the Data Collection Report and are included in Appendix A.

Travel Diaries: As part of the AE team, Synovate, a global market research company, conducted the City of Lethbridge Travel Diary. Survey starting on September 17th through to October 18th, 2010, 22,554 telephonic interviews were conducted to recruit the local households for a travel survey. The survey provided information on 24-hour travel characteristics from a random sample of 2,166 local households. The purpose of the household travel survey was to:

- Collect data on local residents and their regional travel patterns
- Provide data for the development of the travel demand model (EMME)
- Build a travel behaviour database for goal research and planning.

The collection and recording of travel characterisations for a random sample of study area residents included two surveys as follows:

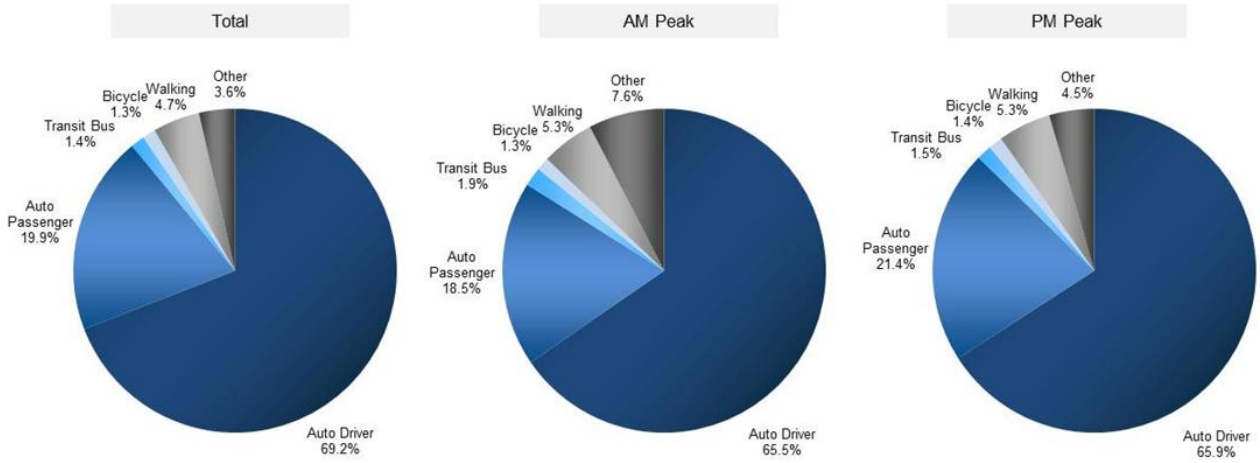
- The telephonic recruitment survey was used to engage the respondent to participate in the online diary survey
- Online travel diary survey was used to record the travel characteristics of residents.

The online diary survey structure and a copy of the survey are illustrated in the “City of Lethbridge Travel Study” report prepared by Synovate, which is included in Appendix B.

Table 2-2 provides a summary of the travel survey.

Table 2-2
Travel Survey Results

Travel Mode	Travel Mode Percentages							
	Night 0000-0559	AM Peak 0600-0859	Midday 0900-1459	PM Peak 1500-1759	Evening 1800-2359	Time Unspec.	Total (%)	Total Trips
Auto Driver	87.4%	65.5%	75.0%	65.9%	67.0%	70.6%	69.2%	247,331
Auto Passenger	7.1%	18.5%	15.4%	21.4%	27.2%	19.2%	19.9%	71,021
Commercial Vehicle Driver	-	0.7%	1.3%	0.5%	0.4%	0.5%	0.8%	2,749
Transit Bus	-	1.9%	1.3%	1.5%	0.8%	0.5%	1.4%	4,949
School Bus	-	6.6%	0.5%	3.8%	0.1%	1.5%	2.5%	9,017
Bicycle	1.8%	1.3%	1.2%	1.4%	1.2%	0.5%	1.3%	4,592
Rollerblade/Skateboard	-	-	-	-	-	-	-	81
Walking	2.7%	5.3%	4.8%	5.3%	3.2%	7.2%	4.7%	16,982
Taxi/Airport Shuttle	1.0%	0.1%	0.1%	-	0.1%	-	0.1%	203
Motorcycle/Moped	-	0.2%	0.3%	0.2%	0.2%	-	0.2%	742
Trip Totals	**2,201**	**68,908**	**116,346**	**100,955**	**66,119**	**3,138**	**100.00%**	**357,667**



Transit Ridership Survey: A transit ridership survey was conducted in February 2011 to record the boarding and alighting along the transit routes. The boarding and alighting were recorded by staff while riding the buses for a continuous period of 12 hours between 7:00 a.m. and 7:00 p.m. The collected data was utilized to establish and validate the transit screen lines for the travel demand model. Refer to Section 4.3 for detailed findings from the transit ridership survey.

2.3 PREVIOUS TRANSPORTATION AND TRANSIT STUDIES

This section examines previous transportation studies that are important references in the development of the current TMP. These studies help establish the baseline conditions and allows for an understanding of current goals. Furthermore, the current TMP builds on the conclusions and orientations of these studies.

2004 Transportation Master Plan for Roadways: The 2004 TMP for Roadways is an update to the roadway component of the 1984 Lethbridge Transportation Study. This plan is a high-level assessment of roadway network needs under the 83,200 and 95,000 population thresholds; 25 key intersections within the City were assessed under the 2004 TMP. This study concluded the road network in Lethbridge is adequate to accommodate the future growth in traffic; however, it will require some improvements to support the projected growth to maintain a high level of safety.

Circulation Road Study: The City of Lethbridge Circulation Road Study (July 2010) examined two potential river crossing locations; Chinook Trail, Popson Park Crossing and a 'No River Crossing'. The Road Study concluded that the Chinook Trail crossing is the best option to cross the Oldman River south of Whoop Up Drive for the future. This study also examined two alternatives, Scenic Drive and 43rd Street for connections from North Lethbridge to the future north-south Trade Corridor. It concluded that two connections to the Trade Corridor provide better access to north Lethbridge and the downtown core. The recommendation provided in the report is still in a draft phase and has not been approved by City Council, County Council or the Province.

CUTA Vision 2040: The Canadian Urban Transit Association (CUTA) has developed a vision for public transportation in Canada, this vision entitled Vision 2040 aims to improve public transportation for all communities throughout Canada regardless of location and size.

Access-A-Ride Service Operations Review 2009: In 2009 the Access-A-Ride service released an operations review of its services. This review provided comparative statistics relative to annual trips per capital, passenger trips per vehicle hour, operating expenses per vehicle hour and operating expenses per trip.

Transit Facility Functional Audit 2010: The City of Lethbridge undertook an functional audit of its transit facility in 2010. This audit examined the requirements of the transit facility currently and up to 2025 for LA Transit, this audit also examined the financial implications of these requirements.

Lethbridge Service Standards 2007: In 2007 the City of Lethbridge adopted service standards for public transportation within the City. These standards address access to public transportation and coverage of the transit network.

2.4 CURRENT CAPITAL IMPROVEMENT PLAN

The 10 year Capital Improvement Program (2011 - 2020) was reviewed to identify the transportation design and construction projects planned between years 2013 and 2020. A brief description and timeline is provided below:

Project Title	**Scenic Drive North (5th Avenue N to 26th Avenue N)**
Timeline	Contract 1 - Earthworks will be completed by November 30, 2012 Contract 2 - Surface works will be completed by October 1, 2013
Description **(C-16)**	The preliminary design was completed in 2010 and the construction of 2 lanes of the ultimate 4 lane arterial will maintain/restore acceptable levels of service for adjacent roadways and complete the planned arterial loop around East Lethbridge. The construction of this arterial will restore levels of service, enhance safety, reduce traffic congestion, traffic delays and road user costs.
Project Title	**43rd Street N (Highway 3 to 9th Avenue N) detailed design and construction** 43rd Street N (9th Avenue N to 62nd Avenue) Preliminary Design
Timeline	Design to be completed by early 2013 and construction by October 31, 2013. Preliminary design was completed in 2011.
Description **(C-17)**	43rd Street North serves not only as a truck route arterial roadway but a major commuter route as well. This project will include new turn lanes, signalization and construction of two additional lanes on 43rd Street North to develop the full 4-lane divided cross section for this arterial roadway.

Project Title	**26th Avenue N (Scenic Drive to 28th Street)**
Timeline	Design to be completed by early 2013 and construction by October 31, 2013.
Description **(C-18)**	26th Avenue is a major east/west arterial roadway in North Lethbridge and increased traffic volumes have resulted from significant general community growth and commercial and residential developments in North Lethbridge. Significant commercial developments are anticipated to continue in attracting increased traffic volumes. The construction of these additional lanes and intersection improvements will restore levels of service, enhance safety and reduce traffic congestion, traffic delays, vehicle emissions and driver frustration.
Project Title	**Mayor Magrath Drive (40th Avenue S to City Limits)**
Timeline	4 lane upgrades will be completed by November 30, 2012 and final paving lift, concrete median and pathways will be constructed by September 30, 2014.
Description **(C-19)**	As commercial and residential development occur in Southeast Lethbridge and industrial and passenger traffic generated from the Lethbridge County Airport continue to increase, roadway capacity improvements are anticipated to be required. Detailed design and construction of the ultimate four lane arterial roadway will involve widening the embankment across the Six Mile Coulee to accommodate two additional traffic lanes and a pathway. The reconstruction of this road will provide needed access, enhance levels of service and reduce traffic congestion, road user costs, travel times, vehicle emissions and driver frustration.
Project Title	**Whoop Up Drive (McMaster to Aquitania Boulevard W)**
Timeline	Design and Construction by year 2016
Description **(C-27)**	Whoop Up Drive is a major east-west arterial roadway connecting West Lethbridge to East Lethbridge and this roadway upgrade will increase to 4 lanes to provide necessary capacity to developments like The Crossings, Copperwood and other new developments in the west.
Project Title	**University Drive (Community Stadium to Sun Ridge Boulevard W)**
Timeline	Design and Construction by year 2018
Description **(C-28)**	University Drive is a major north/south arterial roadway in West Lethbridge and increased traffic volumes have resulted from significant general community growth in RiverStone, Mountain Heights, Sun Ridge and the Canyons. The construction of these additional lanes and intersection improvements will restore levels of service, enhance safety and reduce traffic congestion, traffic delays, vehicle emissions and driver frustration.
Project Title	**26th Avenue N (31st Street to 41st Street N)**
Timeline	Design and Construction by year 2020
Description **(C-29)**	26th Avenue is a major east/west arterial roadway in north Lethbridge and increased traffic volumes have resulted from significant general community growth and commercial and residential development in North Lethbridge. The construction of these additional lanes and intersection improvements will restore levels of service, enhance safety and reduce traffic congestion, traffic delays, vehicle emissions and driver frustration.

Project Title	**28th Street N (Mayor Magrath Drive to 26th Avenue N)**
Timeline	Complete stage 1 construction by October 31, 2013 and Stage 2 construction by year 2024 or when it is warranted.
Description **(C-30)**	28th Street North is planned as an Arterial roadway carrying major north/south arterial traffic. The intent of this project is to plan, design and construct a route, which will handle increased volumes of traffic generated by Sherring commercial and industrial development as well as residential traffic from Uplands and Blackwolf.
Project Title	**Metis Trail (Simon Fraser Boulevard to Garry Drive)**
Timeline	Metis Trail from Temple Boulevard to Whoop-up Drive and from Walsh Drive West to County Meadows Boulevard will be constructed by October 31, 2013. Metis Trail from Jerry Potts Boulevard to Gary Drive will be constructed by October 31, 2014.
Description **(C-31)**	Metis Trail will become a major north/south arterial roadway (similar to University Drive) and will provide the necessary access to the proposed developments west of Metis Trail as well as assisting with traffic calming in existing West Lethbridge neighbourhoods and reduce traffic demands on University Drive. The construction of this road will provide needed access to Copperwood and the Crossing's subdivision via Caledonia Boulevard and restore levels of service. It will reduce traffic congestion, road user costs, travel times, vehicle emissions and driver frustration.
Project Title	**Garry Drive (to 600 m west of Metis Trail)**
Timeline	Design and Construction by year 2012.
Description **(C-32)**	Development west of Metis Trail has begun and further development is anticipated. This arterial will provide the access required for these developments to start and continue to grow as required by development which is 100% offsite levy funded.
Project Title	**Scenic Drive North (Uplands Drive N to 62nd Avenue N)**
Timeline	Design by year 2013, Construction by year 2019.
Description **(C-33)**	Upland/Legacy Ridge/Hardieville Area Structure Plan has identified significant residential and commercial development potential north of 26th Avenue North. Construction of Scenic Drive North will provide access needed for new growth areas as well as access to the future realigned Trade/National Highway north of the City.
Project Title	**43rd Street S (Highway 4 to Highway 5)**
Timeline	Design by year 2010, Construction by year 2018.
Description **(C-37)**	This arterial roadway link was identified in the Southeast Urbanization Plan adopted by Council. The development contemplated in the Southeast Lethbridge Urbanization Plan will require preliminary and detailed design for construction of 43rd Street South.

Project Title	**Mayor Magrath Drive (3rd Avenue S to 3rd Avenue N) Preliminary Design**
Timeline	Preliminary Design by year 2012.
Description (C-20)	Mayor Magrath Drive is a major north/south arterial connecting the residential and the industrial areas of north Lethbridge with South Lethbridge. The existing road between 3rd Avenue S and 3rd Avenue N has major congestion and safety issues, specifically at MMD and 2nd Avenue North. The preliminary design will identify the improvements needed to this roadway and pathway, and provide cost estimates for future construction.
Project Title	**6th Avenue S (Mayor Magrath Drive to Scenic Drive S) Preliminary Design**
Timeline	Preliminary Design by year 2012.
Description (C-21)	6th Avenue S is an important arterial providing connection between the West Lethbridge to the rest of the City via the Whoop Up Drive river crossing. With City Council deciding to delay the third river crossing, it is expected that major congestion issues will arise on 6th Avenue S in the absence of a third river crossing on Oldman River. Preliminary design information is needed to for the overall strategic road network planning.
Project Title	**5th Avenue N (Stafford Drive to Mayor Magrath Drive) Preliminary Design**
Timeline	Preliminary Design by year 2014.
Description (C-22)	5th Avenue N is an important arterial providing access to the north side residential areas with Scenic Drive, Stafford Drive Mayor Magrath Drive and 13th Street. With growth in traffic, it is expected that 5th Avenue N will need upgrades. Preliminary design information is needed for the overall planning process in the City.
Project Title	**Interchanges - Whoop Up Drive/University Drive and Scenic Drive Preliminary Design**
Timeline	Preliminary Design by year 2014.
Description (C-23)	With the growth in traffic on Whoop Up Drive river crossing, it is expected that major capacity issues will arise on the two interchanges at the east and west end of the river crossing. With growth in traffic, these two interchanges will need upgrades to improve capacity and level of service. Preliminary design information is needed for the overall planning process in the City.
Project Title	**13th Street N (Crowsnest Trail to 26th Avenue N) Preliminary Design**
Timeline	Preliminary Design by year 2014.
Description (C-24)	13th Street N is an important north/south Arterial. It connects the residential areas in north Lethbridge with Downtown and the Hospital. With growth in traffic, it is expected that 13th Street N will need upgrades. Preliminary design information is needed for the overall planning process in the City.

Project Title	**University Drive north of Railway Tracks to Highway 3 Upgrade Design**
Timeline	Design by year 2015.
Description (C-25)	With the overall growth in west Lethbridge, particularly with the new ASP for the employment areas and in the absence of a 3rd river crossing it is expected that traffic will increase on University Drive. With growth in traffic, the University Drive will need its capacity to be increased by twinning north of the railway tracks up to Highway 3. Preliminary design information is needed for the overall planning process in the City.
Project Title	**Transportation Master Plan Update**
Timeline	Initiated by year 2017.
Description (C-26)	There is a need to regularly update the Transportation Master Plan (TMP) to confirm the long-term vision of the City's major roadway network and confirm future transportation needs and improvements. The TMP is a key component to establishing and revising the Capital Improvement Program. Updates to the Master Plan will assist the City's roadway network, transit and transportation goals remain up to date, efficient and cost effective, and guide community funds so that they are invested for the greatest return.

Note: (C-26) refers to page number in the Infrastructure Transportation Capital Improvement Project 2011-2020 document.

2.5 MODEL DEVELOPMENT & FORECASTING

The Lethbridge Transportation Model update project is a staged component of the TMP study. The model is intended as a tool for use in the development and evaluation of future transportation goals and plans.

A detailed report illustrating model inputs, model development and calibration, model operation, and project evaluation is provided in Appendix C.

A traditional 4 step modelling procedure was used to estimate travel between 245 traffic zones within the study area and are shown in Figure E00 in Appendix E. The travel demand functions have three steps known as trip generation, trip distribution, and modal split. In these steps, the volumes of trips by journey purpose from every origin zone to every destination zone by mode were calculated based on the land use, travel times, and travel costs between zones. The travel supply functions were computed in the 4th step, which assigns the trips to the network based on the volumes assigned and the capacities of the networks.

2.5.1 Model Inputs

2.5.1.1 Traffic Zone & Land Use Inputs

The traffic zone system was significantly revised for this project primarily to simplify the input and reporting of information. The new system has 245 zones including external zones, compared to 220 zones in the previous model.

The study area was divided into 7 urban districts and 2 rural districts:

1. West North
2. West South
3. North West
4. North East
5. Centre
6. South West
7. South East
8. Rural District 8 CA North
9. Rural District 9 CA South

The internal traffic zones are grouped according to 7 city districts and 2 rural districts which make up the Lethbridge Census Agglomeration Area. Twenty-five external traffic zones were introduced to analyze the travel patterns between the City and the Town of Coalhurst, Town of Coaldale, County of Lethbridge and the Town of Picture Butte.

For the model, the land development was expressed in terms of several land use and demographic variables. The residential and non-residential variables were then used in trip generation and trip attraction equations to estimate the numbers of trips starting or ending in the zones. A detailed explanation is provided in section 2.2 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.2 Network Inputs

The Lethbridge road network was significantly modified from the previous model in terms of both the numbering system and the detail of refinement. The base network is defined by a system of nodes that represent intersections or turn points on the network and links that connect the nodes. In addition, the network was refined to include new roads, roads used by transit, and more densification in the downtown plus general additions to include most of the through road network and more explicit coding of interchanges. A detailed explanation including the volume-delay function, as well as turn penalty function is provided in section 2.3 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.3 Transit Network Inputs

There are two transit services operated in Lethbridge, the School bus System and the Public Scheduled Transit Service (PSTS). School bus travel is included in the modal split analysis based on shares of school travel and trip distances, but no network is explicitly coded or assigned in the model. The PSTS network in the transportation model is a reflection of the scheduled transit services available in Lethbridge; therefore, all available transit services during the peak period are coded into the Lethbridge transportation model. A detailed explanation, including the stopping procedures and the transit time functions, is provided in section 2.3 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.4 Monetary Inputs

In addition to the relationship to land development, network capacity, and travel time, travel volumes are also influenced by 4 monetary considerations; i.e. the price of gas, parking charges, transit fare, and average income of traveller. The updated model incorporated these monetary factors to forecast the travel demand in future. A detailed explanation is provided in section 2.4 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.5 Household Survey

The household survey was successful in obtaining complete travel records for 2,040 households, 5,231 persons, and 17,438 trips in the Lethbridge Census Metropolitan Area (CMA). The survey was comprehensive, covering travel over a 24-hour day, with detailed information on household structures, person characteristics such as age and employment status, and travel including geographic start and end survey zone locations, land use at trip ends, modes, and travel purposes. The databases were combined into a single master trip database including model relevant information from the household and person databases. Survey location data provided by latitude and longitude were converted into 3TM coordinates, and then assigned to traffic zones in Arcview. A detailed explanation is provided in section 2.5 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.6 External Trip Survey

There was no external survey conducted for this project comparable to the external survey that was done for the 2006 model (completed in the Circulation Road Study). Therefore, inbound and outbound traffic counts were taken from Provincial counts at the study area boundaries of the Census Agglomeration. These counts were then combined with the OD Survey trips to deduce a set of external trips. A detailed explanation is provided in section 2.6 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.7 Screenline Traffic Count Survey

The screenline count program used for this study is based on the same comprehensive set of screenlines and survey stations used in the previous model. For comparison, a pattern of daily travel by ½ hour period was taken from the new 24 hour counts and then normalized to the control totals for the Household Travel Survey auto driver trips for all day. The patterns of travel for the two surveys are generally similar throughout the day, with some differences that are adjusted for in the final model calibration. A detailed explanation is provided in section 2.7 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.1.8 Transit Passenger Survey

An On-Board transit passenger survey was conducted on all routes covering the day from 7:00 a.m. to 7:00 p.m. The data was summarized by ½ hour time periods, and then aggregated according to the corresponding model nodes on the routes. As with auto driver surveys, these two transit surveys indicate a similar pattern of trips throughout the day. A detailed explanation is provided in section 2.8 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.2 Model Development and Calibration

The model development process involves using the observed input data to develop simple relationships between the survey travel data with the monetary, land use, and network data. The calibration process involves testing to see how well these relatively simple equations are able to reproduce the more complex travel reality over the whole region.

2.5.2.1 Trip Generation and Attraction

The trip generation and attraction rates were calculated by dividing the total number of survey trips by journey purpose starting or ending at the various land uses, by the total number of units for each of the land use variables. A detailed explanation is provided in section 3.1 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.2.2 Trip Distribution

The trip distribution sub-model is used to estimate person trips between zones for each of the trip purposes, using a balancing process described as a gravity or entropy model. The inputs for each purpose are the trip generations and attractions for that purpose, and a set of travel friction factors. The model calibration involves adjusting the travel friction factors until the survey trip length is comparable to the model trip length. A detailed explanation is provided in section 3.2 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.2.3 Mode Split

The total person trips between zones by purpose are divided among the various modes based on characteristics of the trip purpose and the relative time and money costs of the modes. For each mode and zone pair, time and money costs are converted to a single measure called impedance that is expressed in minutes. Similarly, the transit impedance was calculated based on the transit time, the time value of money for a single passenger, and the adult fare. The number of walk trips and bike trips are calculated as a negative exponential function of the trip distance in kilometres (km). The transit mode share of the remaining trips, after subtracting walk and bike for each of the trip purposes, is expressed as a function of the difference between the transit and auto impedance. A detailed explanation is provided in section 3.3 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.2.4 Trip Assignment

The trip assignment process assigns trips between origins and destinations to the best specific routes then adjust link times based on the volume delay functions and re-assigns trips using these new times. The process continues through several iterations until the volumes and times are in equilibrium.

The transit assignment is a multipath assignment based on the concept of optimal strategies. Trips are assigned to routes based on minimizing perceived time from door to door. This includes walking from the home zone to a route, waiting for the first transit vehicle, riding in the bus, waiting at any transfer points necessary between bus routes, and

walking to the final destination zone. A detailed explanation is provided in section 3.4 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.2.5 Trip Assignment Calibration

The results of assigning AM and PM trips to the road and transit networks are compared with link counts. In the AM peak hour, the overall volumes are similar, but there are some significant differences on individual screenlines from the OD Survey volumes. In the PM peak hour, the overall OD Survey volume is 20 percent less than the Counts. A detailed explanation is provided in section 3.5 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.2.6 Trip Demand Adjustment Calibration

The overall model calibration, requires the additional, and still more detailed, condition that model trip volumes at screenlines from assignments on the network compare favorably with the traffic and transit survey counts on the same screenlines. The process involved 4 model runs or assignments for each of the AM and PM models. The model runs help in establishing the adjustment factors. The adjustment factors then were applied to the District level trips. A detailed explanation is provided in section 3.6 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.3 Model Operation

The procedure for conducting a model run involves preparation of the appropriate model inputs for the scenario to be tested and then executing the run macro with a single command. A detailed explanation is provided in section 4.0 of the Lethbridge Transportation Model Upgrade and Calibration report provided in Appendix C.

2.5.4 Model Forecasting

The calibrated model was used as the foundation to build traffic forecasts for two land use horizons and three network scenarios for each horizon. The City of Lethbridge provided the data for the land use forecasts for a 100,000 population and a 130,000-population horizon. A summary of the data for these horizons is provided in Table 2-3.

Table 2-3
Summary of Population for Existing and Forecast Land Uses

Population Horizon	Time Frame	City of Lethbridge Population	Rural Population	Total Population
Existing	2010	86,830	20,476	107,306
100,000	2020	101,067	23,395	124,462
130,000	2040	129,752	30,571	160,323

The corresponding non-residential data in the model is provided in Table 2-4.

Table 2-4
Summary of Employment for Existing and Forecast Land Uses

Time Frame	Primary School Enrollment	Secondary and Post-Secondary School Enrollment	Hospital Beds	Office Space ('000 sq. ft.)	Retail ('000 sq. ft.)	Industrial ('000 sq. ft.)
2010	11,567	15,059	270	12,565	12,347	11,320
2020	13,100	18,274	313	13,857	13,652	14,020
2040	18,000	26,373	405	15,792	17,250	20,496

For the external trips growth factors of 1.17 for the 2020 timeframe and 1.5 for the 2040 timeframe were applied based on historic growth rates provided by Alberta Transportation. The total trips are the internal trips generated from the land use data plus the external trips. Table 2-5 summarizes the resulting trips in the model. Overall, the increase in trips was in the same order of magnitude as the population and employment increases, suggesting the land use forecast is well balanced. It is important to continue to provide alternative transportation choices for residents of Lethbridge. These choices allow for environmental stewardship. However, alternative modes of travel will not divert enough traffic away from the transportation network to make a significant impact to the number of automobile trips within the study horizons.

Table 2-5
Summary of Trips from Land Uses and External Data

Timeframe	AM Auto Trips	% Increase from Existing	PM Auto Trips	% Increase from Existing
2010	28,643	n/a	33,014	n/a
2020	33,439	17%	37,844	15%
2040	42,866	50%	48,099	46%

3 Goals and Possible Strategies to Support the Plan

In order to develop a comprehensive multi-modal transportation plan various land use planning, development, and transportation goals are required. The goals developed should protect the City's interest, public health and safety, and the quality of the natural environment and support improved interaction between the land-use development patterns and various transportation choices. For example, a land use goal might promote land use patterns comprised of a mix of housing, employment, parks and open spaces, and transportation choices that facilitate pedestrian mobility and other modes of travel.

The transportation goal framework to support the TMP study was developed from the recommendations from the stakeholder workshop held on January 16, 2012 as well as the follow up discussions with the Technical Advisory Committee and the Consulting Team. Additional resources used to develop the framework include the ICSP / MDP, the Transportation Association of Canada (TAC) briefing document on Strategies for Sustainable Transportation Planning, Canadian Urban Transit Association (CUTA) Transit Vision 2040 and the City of Lethbridge Bikeways & Pathways Master Plan 2007.

3.1 TRANSPORTATION AND LAND USE PLANNING

The transportation goals developed under this section will encourage all modes of transportation in the development and redevelopment of land.

Goal #1: Higher densities than only single detached dwellings are necessary to support all modes

The pattern of land use and development in the City directly affects the quality and cost of transportation facilities and services. A range of density development patterns in a neighbourhood support the development of a transportation infrastructure that provides various mode choices reducing auto dependency.

Many action items were identified to integrate the land use and transportation planning in the future while developing new lands. Some of the possible action items may include:

- Complete neighbourhoods with a range of land uses, densities, services, grid and modified grid street pattern in the future ASPs
- Increased densities in the future ASPs
- Pedestrian and cycling connections to major activity centers and transit stops, and transit routes to serve activity centers that include a clustering of residential development at higher than single detached dwelling densities

Goal #2: Focus development in targeted nodes and corridors serviced by transit, and intensify uses and activities in these areas (transit-oriented developments).

Transit supportive land uses increase the transportation network efficiency by reducing the single occupant vehicular trips and increasing the transit ridership. A mixed use activity node and/or corridors where high employee land uses and clusters of residential development encourage high levels of transit use and provide benefits to the local community, as well as the city wide transportation system.

Possible action items identified to develop the targeted mixed use activity nodes within the City may include:

- The identification of nodes and corridors for intensification
- Inclusion of office, retail, and entertainment land uses at major transit hubs

Goal #3: Develop opportunities for mixed-use developments in the areas with existing infrastructure capacity, which will result in an increase in the potential for shorter trips.

The mixed use development of areas with road capacity issues and traffic congestion can revitalize the community while utilizing the existing infrastructure servicing capacity. Reduced travel and shorter trips will balance the transportation needs, and protect the environment. Infill developments in convenient, accessible locations make walking, biking, and public transit more appealing options and help more people meet their everyday needs with less driving.

Possible action items identified to provide opportunities for mixed use developments in the areas with traffic congestion may include:

- Infill and redevelopment in existing built-up areas, and ground level retail in high-density residential buildings

The redevelopment of existing commercial and public uses in older areas that could benefit from infill development should be carefully evaluated and the neighbourhood context taken into account before rendering a decision.

3.2 CONSIDER ALL MODES

The transportation goals developed under this area will encourage a more balanced approach to street design to create better pedestrian, cycling, and transit supportive environments.

Goal #1: Design streets to create better pedestrian, cycling, and transit supportive environments. Streets should provide mobility to all modes concurrently, including personal vehicles with emphasis on accessibility, active transportation modes, and transit, while accommodating the needs of personal vehicles.

Street design can increase walking, cycling, and public transit use and reduce potential conflicts with vehicles that are related to traffic volume and speeds. Factors such as ease of street crossing, sidewalk continuity, street connectivity, and topography influence the pedestrian and cyclist volumes. Therefore, creating positive pedestrian and cyclist environments along any street is utmost important. This can be achieved by responsive street design.

Possible action items identified may include:

- Update the pathways and bikeways master plan to include planning for commuter bicycle facilities
- Provide amenities to support the existing and future pedestrian, cycling, and transit networks
- Provide flexibility in design standards by including a greater range of roadway cross sections

Goal #2: Build awareness and promote the benefits of walking and cycling.

For a healthy and vibrant city, walking, cycling, and other non-motorized transportation are a normal part of daily life. These active modes provide alternate options for getting around and are important elements of the integrated transportation solution. Building awareness about the health benefits, such as encouraging walking and cycling through the provision of facilities and programs, helps build active communities and reduces automobile dependency and associated infrastructure costs, air quality, safety, and congestion problems.

Possible action items identified may include:

- Amend the existing City of Lethbridge Cycling Bylaw to reduce restrictions to cycling, investigate a land use bylaw amendment to include bicycle facilities requirements for large developments
- Provide bicycle parking at all municipal facilities, and providing information on personal benefits of walking and cycling via various activities

Goal #3: Use planning and development approval processes to provide for and enhance cycling and walking.

A strong leadership and commitment is required to promote development practices that improve walking and cycling environments. During the development approval process, City administration will continue to work together to ensure pedestrian connections from private to public property are functional and appropriate.

Possible action items may include:

- Ensure all new developments provide safe and convenient pedestrian and cycling environments
- Investigate a land use bylaw amendment to provide secure bicycle parking for all new multi-family residential buildings

3.3 PROMOTE PUBLIC TRANSIT

The transportation goals developed under this area will encourage the use of public transit in Lethbridge. This will help in achieving the TMP goal of sustainable transportation initiatives by producing modal shift towards transit and other alternative modes.

Goal #1: Increase transit service levels on an incremental basis, to improve the viability of transit, and with a goal of increasing annual transit ridership per capita by 2 percent per year.

Public transit provides people with an alternative mode to travel from one point to another and is an important element of the integrated transportation solution.

Possible action items may include:

- Ensure per capita spending on transit services is increased each year

Goal #2: Focus service level increases to corridors and routes that have the potential to generate the greatest increases in transit ridership in a cost effective manner.

To generate a meaningful increase in transit ridership, a mix of land uses should be encouraged along the major corridors and/or node points. Service levels to these areas should be increased to entice ridership by making transit more attractive, affordable, reliable, and convenient. New programs and incentives should be introduced to attract greater ridership. Future ridership should be targeted through partnerships. Various educational programs as well as transportation demand management strategies should be introduced to attract various groups.

Possible action items may include:

- Complete a detailed transit service strategy to identify corridors and routes that would benefit from increased service levels
- Increase service on routes with growing ridership, and providing multi modal hubs such as “park and ride” centers in the outlying areas of the City

Goal #3: Increase opportunities for City of Lethbridge residents to have access to the transit system

If accessible to the residents, transit can provide direct benefits to the users in terms of increased access to services and activities, economic benefits and employment, and ability to attend social and recreational activities.

Possible action items may include:

- Provide transit services to at least 95% of residents within a 400-metre walk to a bus stop, as previously adopted in the Lethbridge Service Standards in 2007.
- Provide service to and from new communities and activity centers where there is a sufficient demand.
- Encourage access to public transportation using active modes, which in turn has public health benefits by promoting physical activity.
- Extend hours of service to communities where only peak period service is provided.
- Improve comfort and quality of transit travel by providing rider amenities.

3.4 MANAGE TRANSPORTATION DEMAND

The transportation goals developed under this section will encourage the application of travel demand management (TDM) strategies to achieve a sustainable transportation system.

Goal #1: Apply travel demand management strategies in pursuit of a sustainable transportation system.

Travel demand management is the implementation of a number of activities individually or in a group to maximize the people moving capability of a transportation system. The primary purpose of TDM is to reduce the number of vehicles using the transportation system while providing a wide variety of mobility options to those who wish to travel. TDM strategies, if implemented accurately, increase access to transportation systems, improve mobility, and minimize traffic congestion, air pollution, and an auto-dominated physical environment.

Possible action items may include:

- Fill the position of TDM Coordinator within the City for leading and managing the City's implementation of TDM strategies
- Develop a comprehensive TDM implementation plan that will confirm key objectives and set priorities for short-term actions
- Promote sustainable transportation choices through communication and community outreach methods

Goal #2: Consider traffic calming as an effective means of reducing the negative impacts of traffic on the quality of life for Lethbridge residents in the existing and future neighbourhoods and built-up areas.

Traffic calming includes various design features and strategies collaboratively used to reduce vehicle speeds and volumes on a given roadway. Some of the strategies include curb extensions, raised crosswalks, mini circles, median-island, tighter corner radii, speed bumps, road dieting, speed reductions and street trees. Some of the benefits that can be achieved by implementing traffic calming strategies include increased road safety, increased comfort and mobility for non-motorized travel, increased community liveability, and reduced automobile impacts.

Possible action items may include:

- Incorporate traffic management plans into the future outline plans and area redevelopment plans
- Establish traffic calming goals to prioritize traffic calming implementations
- Develop a goal framework based on the Canadian Guide to Neighbourhood Traffic Calming

3.5 MANAGE TRANSPORTATION SUPPLY

The transportation goals developed under this area will encourage maximization of the current infrastructure multi modal capacity.

Goal #1: Maximize the multi modal capacity of current infrastructure (e.g. transit priority, access management).

Multi modal capacity of any transportation system can be optimized by implementing a wide range of applications that would integrate the transportation infrastructure with the vehicles that use it. The transit management system includes technological applications such as advanced traffic control systems, used for signal prioritization, automated vehicle location system, electronic transit fare system, and collision avoidance systems. The applications enable transit agencies to improve their operational efficiency, safety, and security. Similarly, the existing transportation system can be utilized efficiently by implementing an arterial management system, a freeway management system, an incident management system, an emergency management system, and a roadway operations and maintenance management system.

Possible action items may include:

- Accept reduced level of service for individual turning movements at intersections, provided the overall LOS for the intersection is LOS “D” or better
- Establish key criteria and factors that impact or define level of service for each major mode including walking, cycling, transit, and vehicles in all planning and design projects
- Review site development applications in terms of their impacts on the level of service for all modes and goods movement, including walking, cycling, transit, and vehicles

Goal #2: Consider the life cycle benefits and costs when planning, maintaining and operating the transportation system.

To make the best decisions, the life cycle benefits and costs analysis should be completed for each phase of the program. The analysis may include future expenditure evaluation, alternative solutions comparison, existing budget management, and options for procurement and evaluation of cost reduction opportunities.

Possible action items may include:

- Consider the auto to be the main mode of travel currently in the foreseeable future
- Use the City's roadway classification system to define the degree of access control applied to the arterial roadway network
- Develop access management goals and associated warrants
- Amend design standards as necessary

3.6 MANAGE PARKING

The transportation goals developed under this area will balance the parking demand and supply to support residents and businesses.

Goal #1: Review the land use bylaw for required parking ratios. An attempt shall be made to balance the need to supply sufficient parking to support residents and businesses while avoiding excess parking supply that can discourage alternative modes.

Parking management includes various programs and goals that would result in more efficient use of parking resources, including the review of parking ratios described in the City's land use bylaw. Parking management strategies can help the City develop appropriate parking ratios based on various land uses and would eventually help in reducing the development costs, planning a more compact multi modal community, encouraging the use of alternative modes, reducing traffic congestion, improving user options and quality of service, introducing design flexibilities, and creating more functional and attractive communities.

Possible action items may include:

- Ensure that the land use parking standards accurately represent the parking needs by specific land use
- Establish shared parking use for multi facility developments
- Reduce the amount of required parking along major transit routes by creating parking maximums or reducing parking minimums

Goal #2: Improve on street parking operations

On street parking operations are critical to a growing downtown and therefore programs and goals should be developed to improve on street parking operations. Some of the strategies include increased enforcement, reduced on street time limits to increase turnover, shared parking within the downtown, alternative modes, residential permit program, and convenience pricing methods.

Possible action items may include:

- Investigate alternative payment methods for on street parking
- Review on street parking rates to encourage parking turnover
- Review the residential parking program to help address parking concerns in residential areas

3.7 MEASURE PERFORMANCE

The transportation goals developed under this area will develop the implementation and performance measurement programs to monitor progress towards planning goals.

Goal #1: Develop implementation and performance measurement programs to monitor progress towards master plan goals.

A monitoring and analysis process should be developed to determine how well the transportation goals and programs illustrated above perform with regard to their intended goals and objectives.

Possible action items may include:

- Develop short term and long term implementation plans
- Establish modal split goals
- Develop representative performance indicators
- Undertake household travel surveys to monitor household travel characteristics
- Produce a performance “report card” and report

Goal #2: Monitor traffic safety

Traffic safety comprised of programs and goals targeted to reduce the risk of collisions resulting in fatalities, injuries and property damage occurrences.

Possible action items may include:

- Establish traffic safety goals
- Perform quarterly collision and safety analysis
- Initiate a safety audit program at high collision intersections, on high volume pedestrian and cycling routes, and school crossing areas

4 Existing Conditions

4.1 EXISTING ROAD NETWORK

The existing road network is shown in Figure 4-1. The road network uses a system of arterial, collector, and local roadways. Two major east-west corridors traverse the Oldman River Valley;

Highway 3 is a Provincial corridor and Whoop Up Drive is a City operated roadway. The major north-south corridors include University Drive on the west side of the Oldman River Valley and Scenic Drive, Mayor Magrath Drive and 43rd Street on the east side of Lethbridge. Portions of 43 Street S from Highway 3 to Southeast City Limits are under provincial jurisdiction.

4.2 EXISTING AND FUTURE LAND USES

The existing and future land uses are shown in Figure 4-2. The majority of the City is located on the east side of Lethbridge, which includes the downtown, government offices, Lethbridge College, the Regional Hospital, major commercial nodes, industrial parks and historic and newer residential neighbourhoods. The west side of Lethbridge contains the University of Lethbridge, many newer residential neighbourhoods and associated commercial areas. The west side is slated to house the majority of new residential growth in the foreseeable future with the north side and some pockets in the south side also experiencing growth. Figure 4-3 shows the areas where an Area Structure Plan is adopted and in place with specific details related to land use framework and proposed road layout within the areas.

4.3 LETHBRIDGE TRANSIT

4.3.1 Service Characteristics

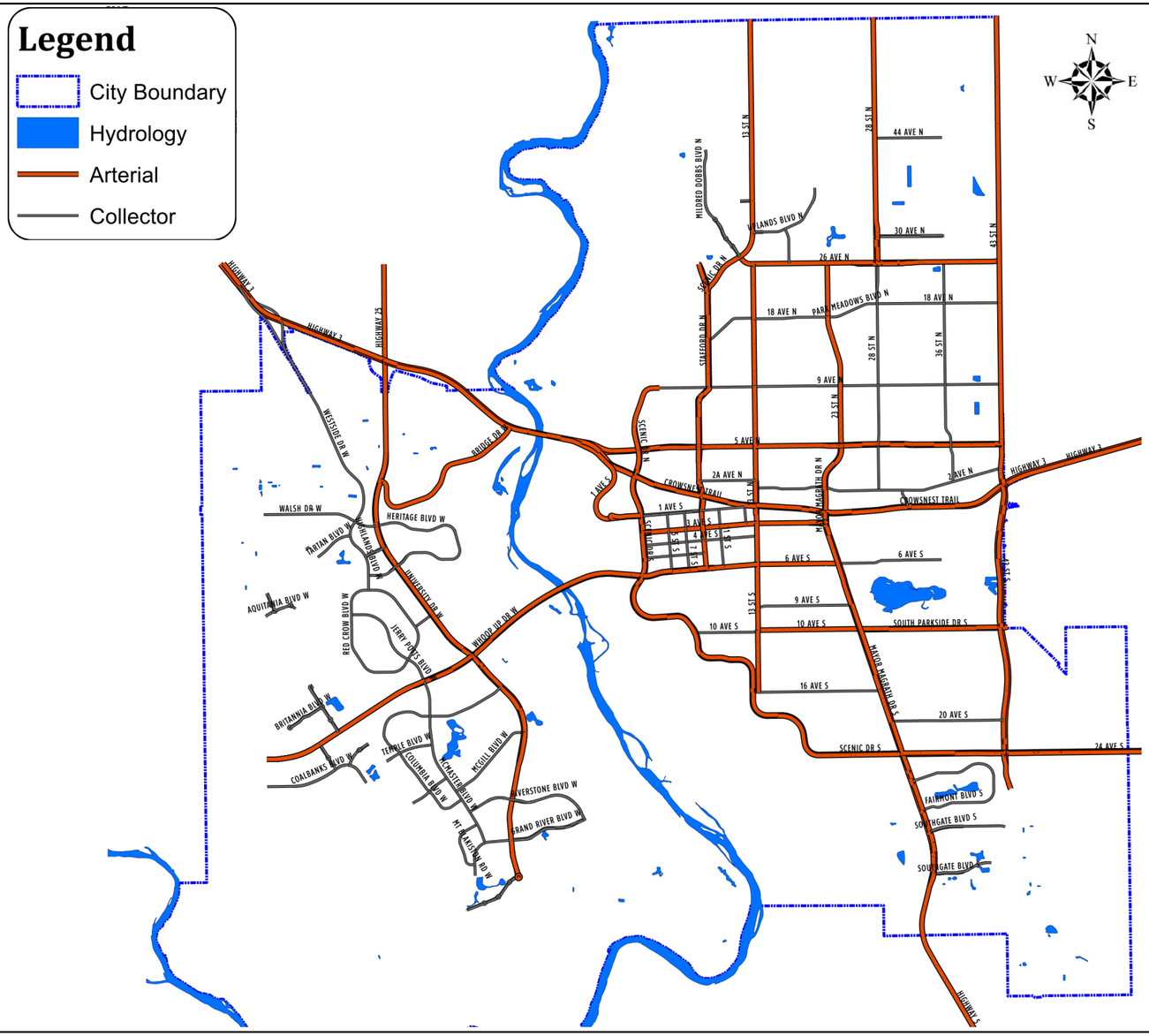
Lethbridge Transit currently operates 12 routes and has a system service span from approximately 6:00 a.m. to 12:00 a.m. on weekdays, 7:00 a.m. to 12:00 a.m. on Saturdays, and 8:00 a.m. to 7:00 p.m. on Sundays. Service frequencies range between every 15 and 60 minutes on weekdays, and every 30 and 60 minutes on Saturdays and Sundays.

Table 4-1 summarizes the span of service and frequencies for each route in the system and Figure 4-4 illustrates a map of the current system.

CITY OF Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN



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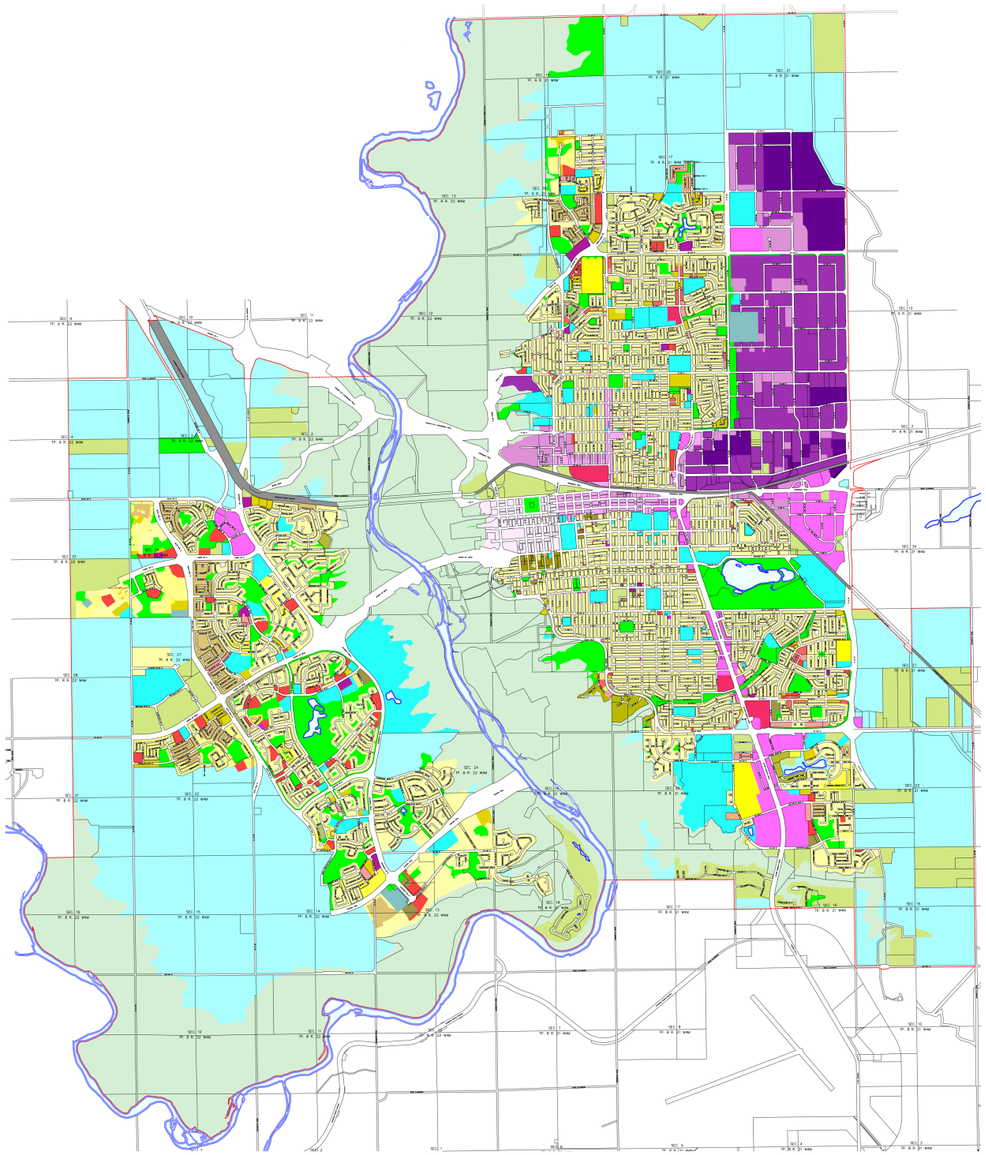
EXISTING ROADWAY NETWORK

FIGURE 4-1

CITY OF Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN



C-D	Downtown Commercial	R-L	Low Density Residential
C-G	General Commercial	R-Lb	Low Density Residential
C-H	Highway Commercial	R-Lz	Low Density Residential
C-L	Local Commercial	R-CL	Comprehensively Planned Low Density Residential
C-N	Neighbourhood Commercial	R-CM	Comprehensively Planned Medium Density Residential
C-S	Shopping Mall Commercial	R-CM-20	Comprehensively Planned Medium Density Residential
DC	Direct Control	R-M	Mixed Density Residential
I-B	Industrial Business	R-MH	Mobile Home
I-G	General Industrial	R-RL	Restricted Low Density Residential
I-H	Heavy Industrial	R-SL	Small Parcel Low Density Residential
P-B	Public Building	R-37	Medium Density Residential
P-R	Parks and Recreation	R-37L	London Road Neighbourhood Higher Density
P-SO	Specialist Office	R-50	Medium Density Residential
P-T	Public Transportation	R-60	Medium Density Residential
		R-75	Medium Density Residential
		R-100	High Density Residential
		R-150	High Density Residential
		R-200	High Density Residential
		U-I	Urban Innovation
		FUD	Future Urban Development
		V	Valley

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FIGURE 4-2

EXISTING AND FUTURE LAND USES

CITY OF Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN

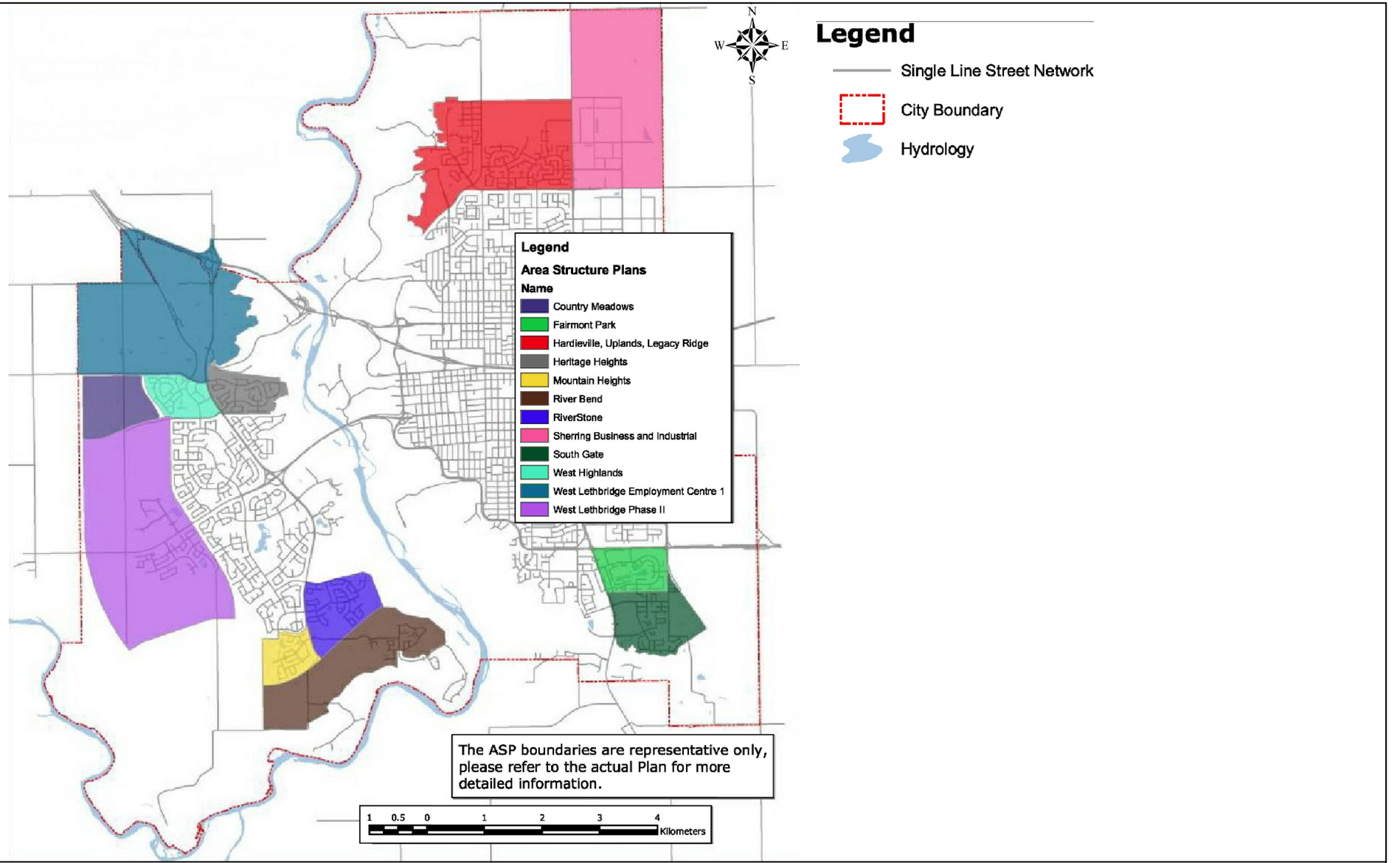

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FIGURE 4-3

EXISTING AREA STRUCTURE PLANS

Table 4-1
System Service Summary

Route	Weekday		Saturday		Sunday	
	Span	Freq. (mins)	Span	Freq. (mins)	Span	Freq. (mins)
Route 12 University / City Centre / College	5:45 a.m.–12:00 a.m.	15	7:00 a.m.–12:00 a.m.	30	8:00 a.m.–7:00 p.m.	60
Route 20 Winston Churchill / Lakeview	6:00 a.m.–12:00 a.m.	30	7:00 a.m.–12:00 a.m.	30	8:00 a.m.–7:00 p.m.	60
Route 21 Nordbridge / Henderson Lake	6:00 a.m.–12:00 a.m.	30	7:30 a.m.–12:00 a.m.	30	8:30 a.m.–7:00 p.m.	60
Route 22 North Terminal Southgate	6:00 a.m.–12:00 a.m.	30	7:00 a.m.–12:00 a.m.	30	8:00 a.m.–7:00 p.m.	60
Route 23 / 24 13th Street / Mayor Magrath	6:00 a.m.–7:30 p.m.	30				
Route 31 Hardieville / Uplands	6:00 a.m.–7:00 p.m.	30				
Route 32 Jerry Potts Boulevard / Indian Battle Heights	5:45 a.m.–12:00 am	15	7:00 a.m.–12:00 a.m.	30	8:00 a.m.–7:00 p.m.	30
Route 33 Heritage Heights	6:00 a.m.–12:00 am	30	7:00 a.m.–12:00 a.m.	30	8:00 a.m.–7:00 p.m.	30
Route 34 Industrial Park	6:00 a.m.–9:00 a.m. 3:30 p.m.–6:00 p.m.	30				
Route 35 Copperwood	6:00 a.m.–12:00 a.m.	60	7:00 a.m.–12:00 a.m.	60	8:00 a.m.–7:00 p.m.	60
Route 36 Sunridge	5:45 a.m.–11:30 p.m.	60	7:00 a.m.–12:00 a.m.	60	8:00 a.m.–7:00 p.m.	60

CITY OF Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN

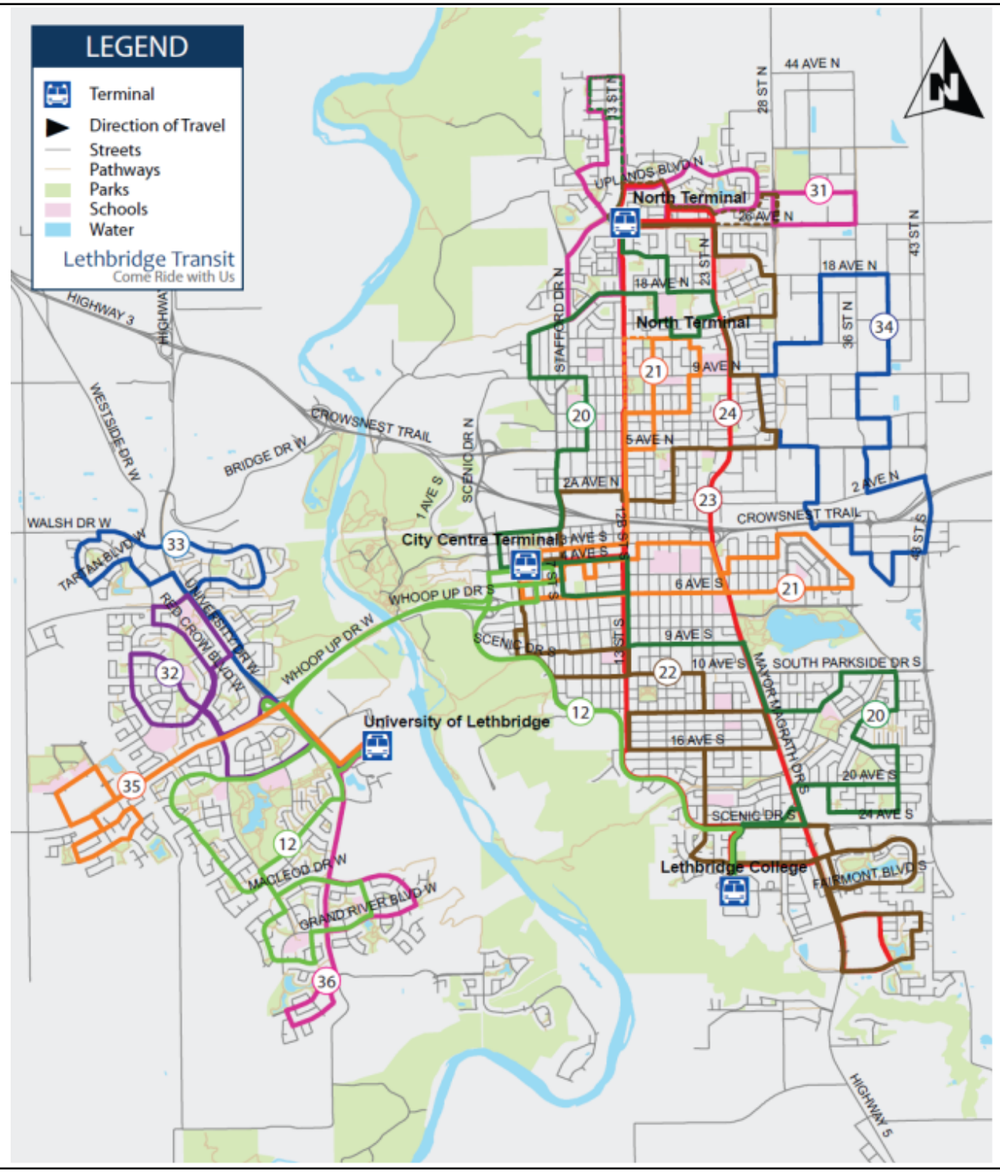

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FIGURE 4-4

CURRENT SYSTEM MAP

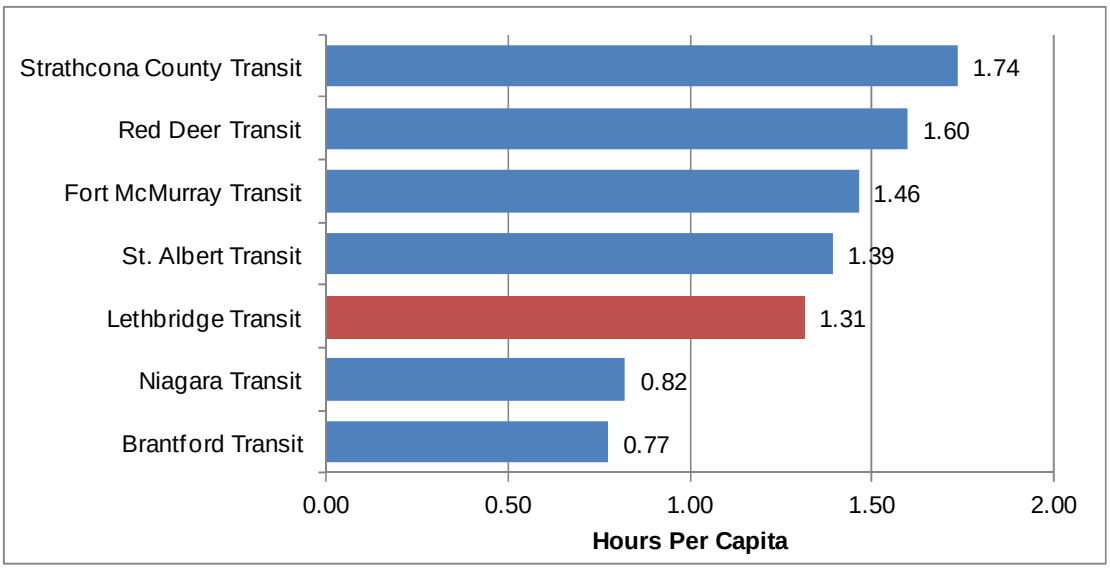
4.3.2 System Performance

A number of Canadian agencies with similar population sizes, fleet sizes, and urban characteristics as Lethbridge were selected to understand how the Lethbridge system compares to its peers. The selected systems include: Brantford, Fort McMurray, Niagara Falls, Red Deer, St. Albert, and Strathcona County.

Generally, the system performs moderately well when compared against key performance indicators, including service hours operated per capita, trips carried per capita, and revenue-to-cost ratio.

4.3.2.1 Vehicle Hours Per Capita

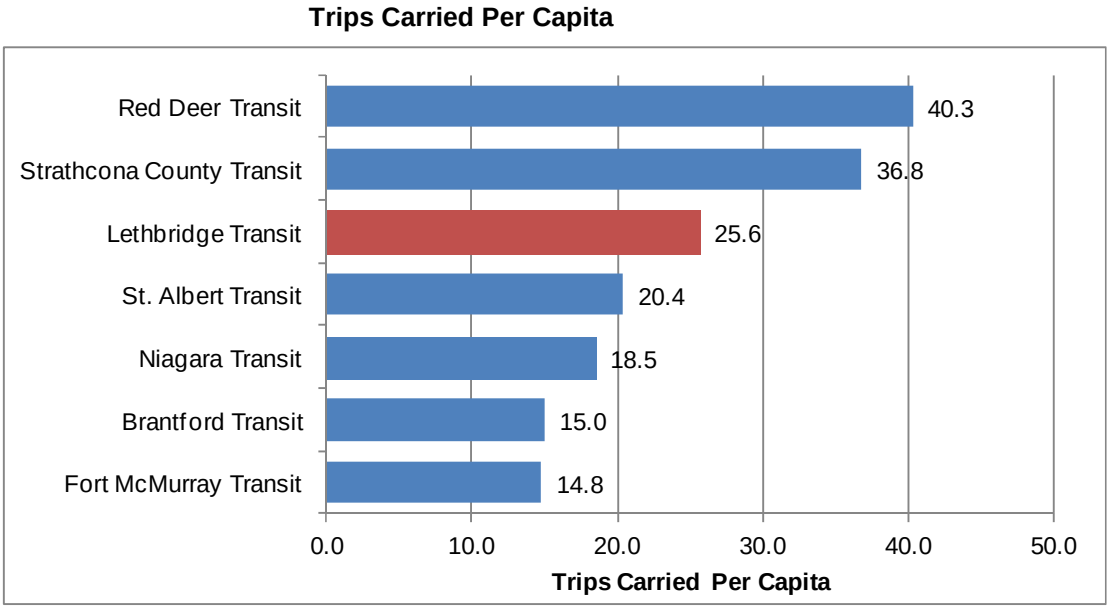
Operating vehicle hours per capita is one metric used to observe the degree to which a transit system provides services to riders. Lethbridge Transit placed near the middle of the peer group in terms of the number of vehicle hours operated per capita at 1.31. The following bar chart illustrates the extent of operating hours operated per capita in Lethbridge compared to other agencies in the peer group.



Source: Canadian Transit Fact Book (2010)

4.3.2.2 Trips Carried Per Capita

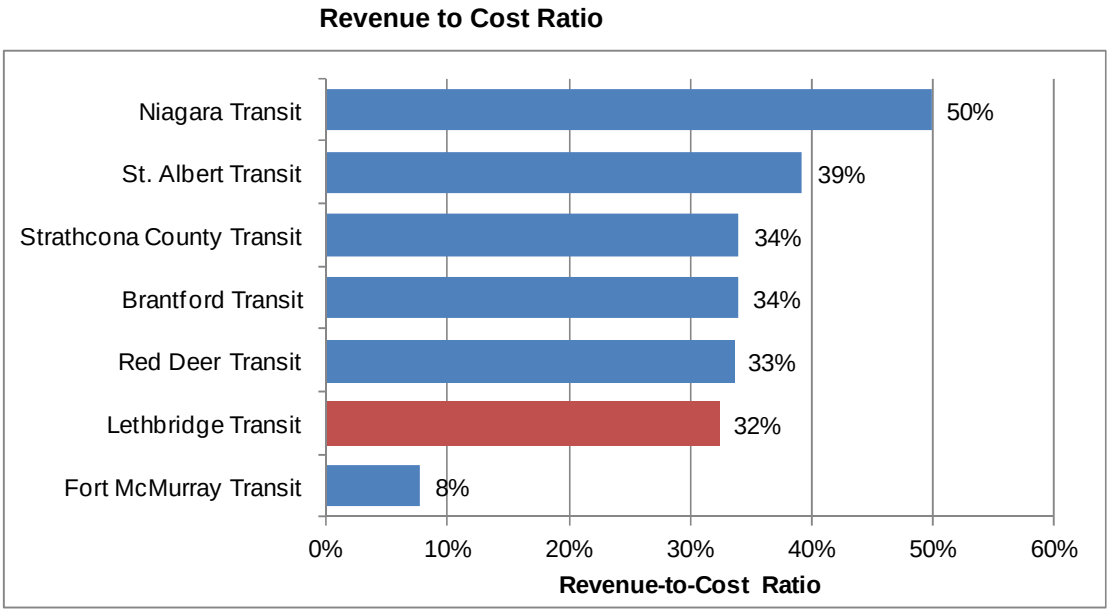
Trips carried per capita are a reflection of the degree to which a transit system is capable of attracting ridership. The following bar chart shows that Lethbridge carried 25.6 trips per capita, placing third among the peer group.



Source: Canadian Transit Fact Book (2010)

4.3.2.3 Revenue to Cost Ratio

Cost recovery is a reflection of the rate of return in a transit system. The revenue-to-cost (R / C) ratio is the amount of money spent to operate the system versus the amount of revenue received. As illustrated in the following bar chart, Lethbridge demonstrated an R / C ratio of 32 percent, placing second last to Fort McMurray Transit. However, a number of transit systems demonstrate ratios very similar to Lethbridge. Strathcona County, Brantford, and Red Deer have ratios within two percentage points of Lethbridge.



Source: Canadian Transit Fact Book (2010)

4.3.3 Route Performance

The 2011 on-off passenger counts were analysed and Table 4-2 summarizes performance of each route by weekday time period sorted by the highest to the lowest passengers per hour. The study team notes that the transit network has changed since this analysis, and thus does not correspond exactly to the service characteristics summarized in Table 4-1 and Figure 4-4

Table 4-2
Route Performance by Route and Weekday Time Period

Route	Total Number of daily operating hours	Passengers Per Hour				
		All Day Weekday Average	AM Peak	Midday	PM Peak	Evenings
12	63.8	37.0	30.9	51.4	33.3	27.2
32	23.0	25.9	24.0	39.3	23.8	13.6
20	67.8	22.7	22.5	28.5	30.9	11.4
33	18.3	20.8	18.4	24.2	29.6	11.6
22	68.0	20.6	21.7	24.0	24.9	10.8
21	34.0	19.8	23.6	23.8	23.7	7.1
14	24.8	15.4	16.2	15.5	14.8	
23	26.0	14.4	16.6	14.7	12.3	
24	26.0	14.0	16.2	15.8	9.3	
34	4.5	14.0	15.2		12.5	
31	13.0	11.8	8.9	11.2	15.7	
35	13.5	10.2	9.3	9.8	11.7	
30	12.8	8.7	8.0	9.3	8.0	
	395.3	**21.6**	**21.1**	**24.9**	**23.0**	**13.0**

Routes 12, 32, and 20 were the top performing routes in the system. Route 12 provided good connections between the Lethbridge College, downtown, and the communities in the west including the University of Lethbridge. Route 32 shuttled many passengers between the residential communities and the University of Lethbridge. Finally, Route 20 provided good connections from the Lakeview / Parkview communities to downtown and to Lethbridge College.

4.4 NETWORK EVALUATION

The 2011 origin-destination data for all trips, as provided from the results of the Household Travel Survey, was analysed to assess how the current route network aligns with the general travel patterns in the city and provide insight as to how to improve the network to promote increased transit ridership.

One of the strengths of the network is that the system is very well anchored at the major destinations in the city. The city's major destination points have been the locations where routes strategically converge. These major destination points, which include the downtown, Lethbridge College, University of Lethbridge and the North Terminal, will continue to be the major anchors of the improved transit system.

Through the origin-destination data analysis, a number of gaps in the current network have been identified. The study team found that the current network has service coverage gaps and requires passengers to bear a high level of route transfers.

4.4.1 Service Coverage

Our spatial analysis determined that more than 10 percent of the existing urban area must walk more than 400 metres to access transit services in the weekday daytime periods. In the off peak periods, the urban area requiring more than a 400 metre walk grows to 20 percent. As identified in the City Council adopted Service Standards document in September 2007, one of the goals in the Transportation Master Plan is to ensure that 95% residents are within a 400-metre walk to a transit service for residential areas. Therefore, current service coverage is just below the Service Standard adopted in 2007.

4.4.2 High Level of Route Transfers

The City's current travel patterns were compared with its existing transit network and determined that the system's ridership must undergo a high level of route transfers to reach their destination.

Our analysis identified that almost 40 percent of the trips within the current system must transfer to complete their trip. Figure 4-5 illustrates some of the examples of travel links that require route transfers. Route transfers are a major hindrance to the perceived transit trip experience and the improved transit network should minimize transfers where possible.

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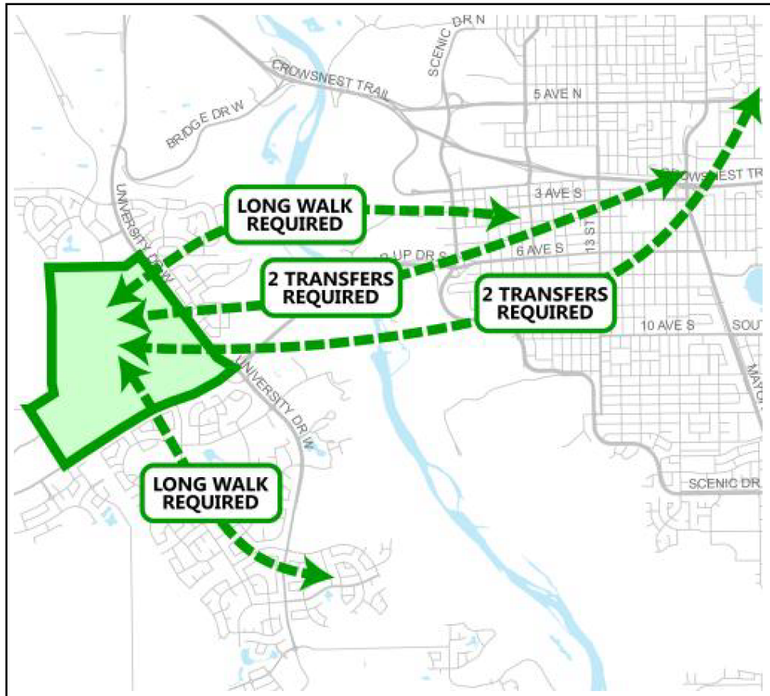

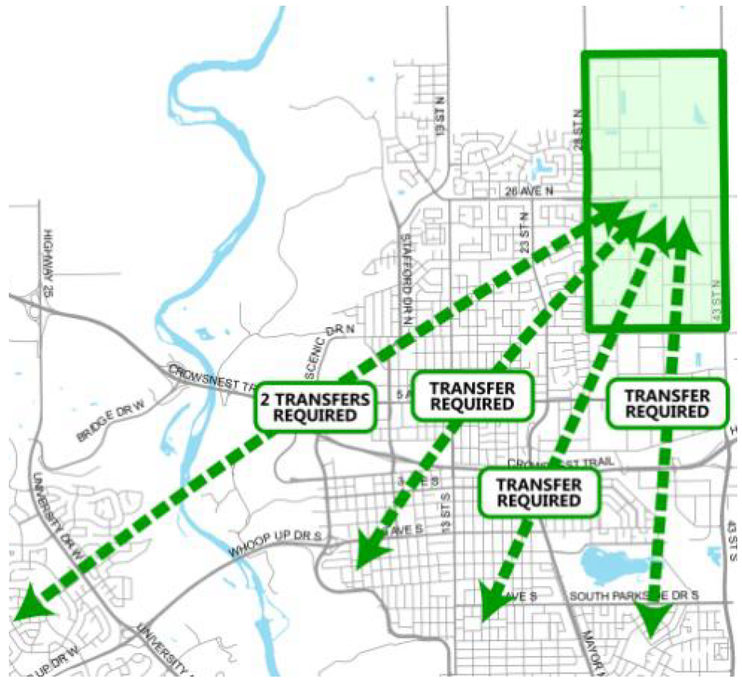

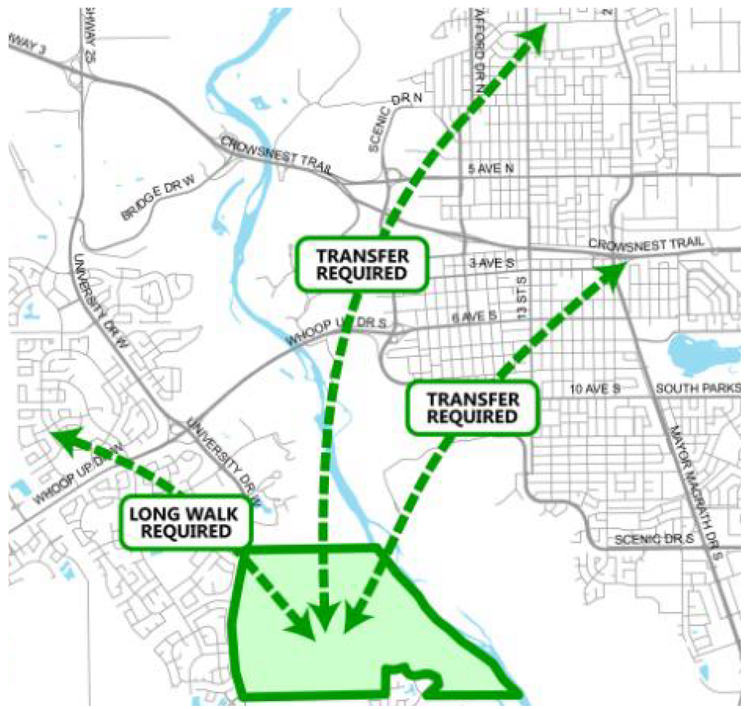

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EXAMPLES OF TRAVEL LINKS REQUIRING ROUTE TRANSFERS

FIGURE 4-5

5 Options Development (100,000 and 130,000 Population)

5.1 ROAD NETWORK OPTIONS

Road network options were developed for both the 100,000 and the 130,000 population horizons. For each of them the following was made:

- A do nothing scenario to indicate the need for roadways based on capacity constraints
- A basic road network showing committed roads to serve new development areas
- An optional road network with additional roads based on rate of growth, level of service, funding availability and level of support.

These options were evaluated using EMME to determine the benefit of each scenario. The EMME plots for each of the scenarios are presented in Appendix E. Each of the "do nothing" scenarios is illustrated for both the am and pm times. The 100,000 population do nothing scenario indicates portions of University Drive and Whoop-Up drive as well as a few roadways section in the north experience congestion in both the am and pm horizons. The 130,000 population do nothing scenario illustrates congestion throughout the west Lethbridge arterials as well as on major north/south arterials in the north of the City and Scenic Drive south of downtown. The results of the analysis are described in this section.

5.1.1 100,000 Population Preferred Scenario

Figure 5-1 shows the base and optional roads for the 100,000 population horizon, which is expected to occur in the year 2020. The roads that are included in the Basic road network include:

- 26th Avenue N (23rd Street N to 28th Street N) - 700 m improve 2 lanes to 4 lanes
- 28th Street N (Mayor Magrath Drive to 26th Avenue N) - 2.8 km redevelop to divided arterial
- Scenic Drive North (5th Avenue N to Stafford) - 1.8 km initial 2 lane arterial
- 43rd Street N (Highway 3 to 9th Avenue N) - 1.4 km improve 2 lanes to 4 lanes
- Mayor Magrath Drive (City Limits to the Airport Access) - 900 m improve 2 lanes to 4 lanes
- 43rd St S (Highway 4 to South Gate) - 900 m initial 2 lane arterial
- University Drive (Sun Ridge Boulevard W to Paradise Canyon) 900 m initial 2 lane arterial
- Metis Trail (Simon Fraser Boulevard to Blackfoot Boulevard) - 1.9 km initial 2 lane arterial
- Metis Trail (Jerry Potts Boulevard to Garry Drive) - 600 m initial 2 lane arterial
- Metis Trail (West Highlands to N of Walsh Drive) - 600 m initial 2 lane arterial
- Garry Drive (to 600 m west of Metis Trail) - 1.2 km initial 2 lane arterial
- Whoop Up Drive (Coalbanks Gate W to 200 m west) - 200 m initial 2 lane arterial
- Mayor Magrath Drive & Scenic Drive intersection improvements - 3rd southbound lane.

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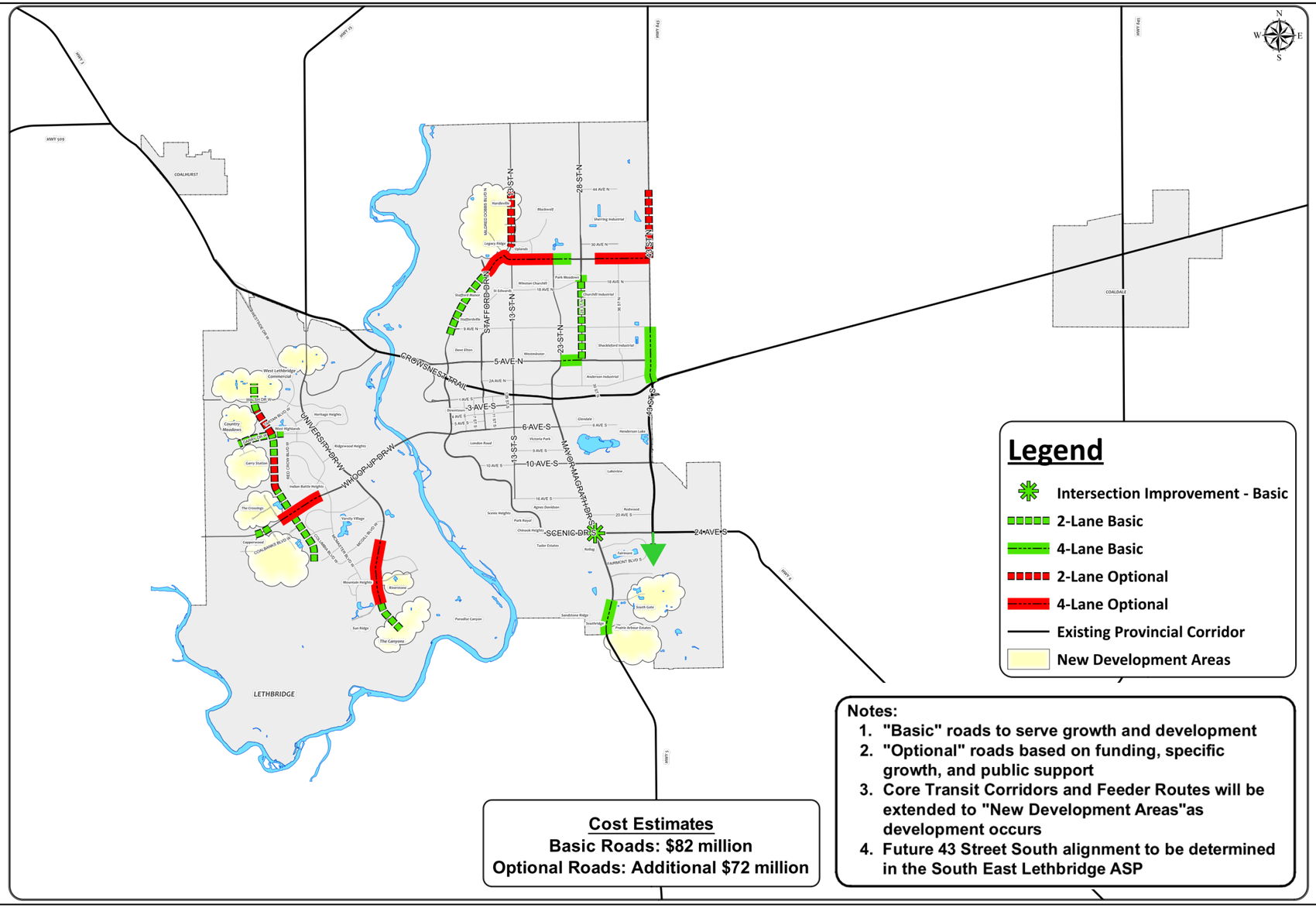

Legend

- Intersection Improvement - Basic
- 2-Lane Basic
- 4-Lane Basic
- 2-Lane Optional
- 4-Lane Optional
- Existing Provincial Corridor
- New Development Areas

Cost Estimates
Basic Roads: $82 million
Optional Roads: Additional $72 million

Notes:
1. "Basic" roads to serve growth and development
2. "Optional" roads based on funding, specific growth, and public support
3. Core Transit Corridors and Feeder Routes will be extended to "New Development Areas"as development occurs
4. Future 43 Street South alignment to be determined in the South East Lethbridge ASP

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2020 ARTERIAL ROAD NETWORK SCENARIOS

FIGURE 5-1

The roads that are included in the 100,000 population optional road network include:

- 26th Avenue N (Scenic Drive to 23rd Street N) - 1.2 km improve 2 lane to 4 lanes
- 26th Avenue N (31st Street to 41st Street N) - 900 m improve 2 lanes to 4 lanes
- Scenic Drive North (Stafford to 26th Avenue N) - 800 m 2 lanes to 4 lanes
- Scenic Drive North (Uplands Boulevard N to 44 Avenue N) - 1.4 km 2 new
- 43rd Street N (26th Avenue N to 44th Avenue N) - 1.8 km 2 new
- 43rd Street S (South Gate to Highway 5) - 3.5 km initial 2 lane arterial
- Whoop Up Drive (McMaster Boulevard to Aquitania Boulevard W) - 2.1 km lanes to 4 lanes
- University Drive (Community Stadium to Sun Ridge Boulevard W) - 1.6 km
- Metis Trail (Blackfoot Boulevard to Jerry Potts Boulevard) - 1.2 km 2 new
- Metis Trail (Garry Drive to West Highlands) - 600 m initial 2 lane arterial.

5.1.2 130,000 Population Preferred Scenario

Figure 5-2 shows the base and optional roads for the 130,000 population horizon, which is expected to occur in the year 2040. The roads that are included in the Basic road network include everything in the 100,000 population option scenario plus the following:

- Metis Trail (N of Walsh Drive to Highway 3) – 2.6km preliminary 2 lane arterial
- Garry Drive to west development limits – 100m 2 lane arterial
- MacLeod Drive West (McMaster Boulevard to Metis Trail) – 700m 2 lane arterial
- Mayor Magrath Drive (City Limits to 43rd Street S) – 1.5km 4 lane arterial
- 43rd Street N (9th Avenue N to 26th Avenue N) – 1.7km upgrade 2 lane arterial
- 44th Avenue N (43rd Street N to Scenic Drive North) – 3.3km 2 lane arterial

The roads that are included in the 130,000 optional road network include:

- Metis Trail (Chinook Trail to Simon Fraser Boulevard) – 2.7km 2 lane arterial
- Garry Drive (4 lane University Drive to W of Squamish Boulevard – 450km upgrade 2 lane to 4-lane
- Walsh Drive to development limits – 1.3km 2 lane arterial
- Walsh Drive (4 lane University Drive to Metis Trail) – 1.2km upgrade 2 lane to 4 lane
- University Drive north of Railway Tracks to Highway 3 Upgrade – 1.2km upgrade 2 lane to 4 lane
- 43rd Street N (44th Avenue N to 62nd Avenue N) – 1.7km 2 lane arterial
- Scenic Drive North (44th Avenue N to 62nd Avenue N) – 2.0km 2 lane arterial
- 28th Street N (30th Avenue N to 44th Avenue N) – 1.5km 2 lane arterial
- 62nd Avenue N (43rd Street N to Scenic Drive North) – 3.3km 2 lane arterial. This roadway (62 Avenue North) currently resides in the County and is under control of the County of Lethbridge.

In addition to the road network mentioned above, the North/South Trade Corridor (NSTC), also

known as CANAMEX highway has also been identified under the 2040 horizon. The NSTC links Canada with the United States and Mexico by a north/south transportation corridor via Highway 4 and Highway 3 through the north and east of Lethbridge. The future roadway is intended to be a high capacity, limited access, multi-laned facility, thereby improving the operational characteristics of Highway 3 and 4. The NSTC does not have a designated time horizon for the implementation as it would need special funding and will likely involve staging.

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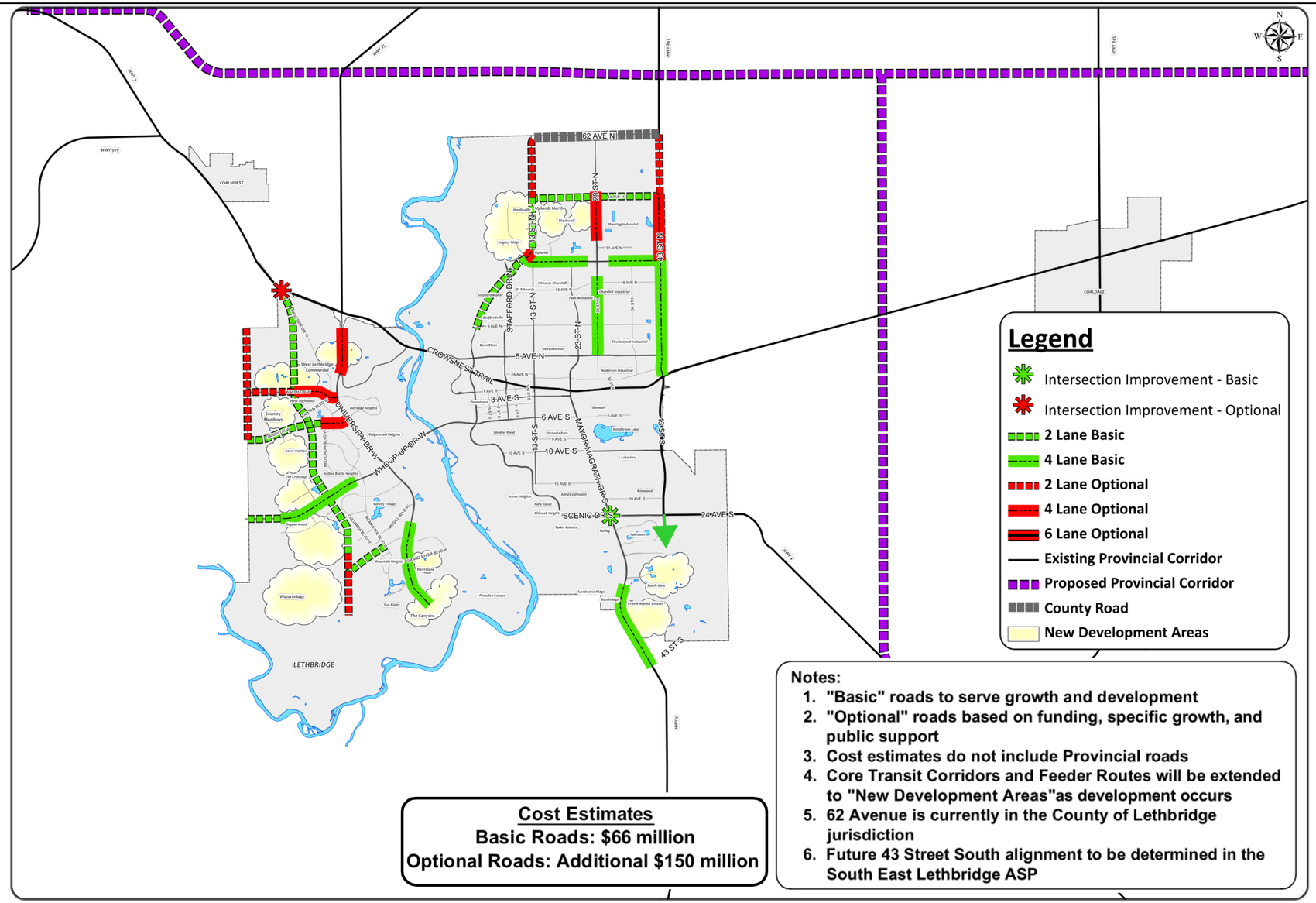

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2040 ARTERIAL ROAD NETWORK SCENARIOS

FIGURE 5-2

5.1.3 Evaluation of Road Network Options

All of the options were run in EMME to determine the impact the road network changes would have on the model. These were determined by plotting the volume capacity ratio (vcr), comparing how traffic volume changes from one scenario to another and looking at the travel time savings. The EMME plots are provided in Appendix E and summarized below.

The number of trips that are made for each time horizon is summarized in Table 5-1. The population in the model is not intended to match the population horizon name because the model includes population within the region not just the City of Lethbridge population. The increase in trips is generally proportionate to the increase in population.

Table 5-1
Number of Trips per Time Horizon

Population Horizon	Regional Population	Time Horizon	AM Trips	PM Trips	% Increase PM Trips
Existing	107,306	2010	28,643	33,014	N/A
100,000	124,462	2020	33,439	37,844	15
130,000	160,323	2040	42,866	48,099	46

The vcr plots show any roads where the vcr is 0.6 or greater. The typical capacity threshold to consider upgrades is 0.85 although the benefit of the improvements has to be significant enough to justify the cost. The vcr threshold of 0.60 is used in the plots to show roadways that are nearing or exceeding capacity and to account for the level of accuracy of EMME which is plus/minus 20 percent.

Generally speaking the vcr plots indicate that the City currently has very few locations with capacity constraints, and they are mostly where neighbourhood streets intersect with arterial roadways. As population increases to 100,000 more roadways are nearing the capacity threshold, and a few intersections start to exceed capacity under the do nothing scenario as follows:

- Portions of University Drive; and
- Entrances to Indian Battle Heights Neighbourhood

Several corridors exceed the capacity threshold under the 130,000 population Do Nothing Scenario as follows:

- Significant portions of University Drive.
- Portions of Whoop Up Drive west of University Drive.
- 30th Street West. (This is not a roadway in the future. It is absorbed by development)
- 28th St North

Most of the capacity constraints for the 100,000 population horizon are resolved with the Basic Road Network scenario. The one area where significant improvement is noticed with the Optional Road Network Scenario is the construction of Metis Trail between Whoop Up Drive and Garry Drive. The construction of Metis Trail causes a small reduction in traffic on the four lane sections of University Drive adjacent to Indian Battle Heights Neighbourhood.

5.1.4 Safety Audit

D.A. Watt Consulting has completed a roadway safety audit project recently and identified five critical intersections through network screening of the collision data. The "Network Screening Analysis Results" memorandum is included in Appendix F. Average crash frequency, crash rate, and equivalent property damage only average crash frequency were used as network screening performance measures for safety assessment. The screening process identified the following 5 top ranked intersections:

	Status Update
• Mayor Magrath Drive/24th Avenue	Detailed design & construction 2013
• 13th Street N./5th Avenue N	Detailed design & construction 2013
• Highway 3/43rd Street	Provincially controlled intersection – results forwarded
• University Drive/Garry Drive	2011: Red light camera, 2012: signal modification
• Mayor Magrath Drive/22nd Avenue S.	2011: Protected only N-S left turn signal modification

Mayor Magrath Drive/24th Avenue and 13th Street N/5th Avenue N intersections were recommended for an in-service safety review. Highway 3/43rd Street, University Drive/Garry Drive, and Mayor Magrath Drive/22nd Avenue S intersections were recommended for further monitoring and some geometric and signal phasing improvements. For the future horizons, the identified intersections should be monitored as far as traffic safety is concerned so that a preferred improvement plan is developed. In addition, the City should review the collision history of the identified intersections in 3 years time and conduct an in-service safety review as the need arises.

5.2 LETHBRIDGE TRANSIT

Transit alternatives were developed based on two approaches reflecting opposite ends of the spectrum of transit intervention in the transportation network. The two transit alternatives are as follows:

- **Conservative (or base):** The conservative approach is based on maintaining the status quo in terms of modal split and key indicators such as amount of service per capita (currently 1.2 annual vehicle-hours of service)
- **Aggressive (or target):** The aggressive approach is based on making sufficient progress towards the Vision 2040 targets in terms of ridership, with supporting increases in amount of service and other key performance indicators

These two approaches were characterized to both the 2040 mature-state scenario (with a population of 130,000) and the 2020 shorter-term horizon scenario (with a population of 100,000).

Based on the assessment of existing conditions, a base route network concept was developed that aims to improve existing passenger needs and accommodate future transit travel. We propose the development of three core transit corridor services.

The route network concept consists of three core corridors demonstrated by the three colours shown in Figure 5-3:

- **Red:** Provides service between the Northwest and Southeast, making connections at Lethbridge College, downtown, and the University of Lethbridge
- **Blue:** Provides service between the Southwest and Northeast, making connections at the North Terminal, downtown and the University of Lethbridge
- **Green:** Provides service between the Northeast to Southeast, making connections at the North Terminal, downtown and Lethbridge College

Feeder routes would complement these core routes by providing coverage with connections at major transfer points.

Since the proposed transit network is designed to address the gaps identified in the existing system and associated with the anticipated growth patterns throughout the City, the same base network is applied for both of the alternatives as much as possible. With the base route structure providing effective service throughout the City, the aggressive network would then add some additional service density in key areas and higher frequencies of service, especially in the peak period. Table 5-2 shows the characteristics of the two approaches over the two planning horizons.

Furthermore, in order to reduce travel times and improve reliability it is proposed that Transit Signal Priority (TSP) be examined in the medium to long term. TSP permits buses to have more probability of catching green signals thereby reducing the lost time at traffic signals. There are numerous types of TSP and also several ways to go about implementing such a system. The principal types of TSP measures that are applied in most Canadian cities are:

- Early Green (Red Truncation) – Ending the conflicting phase early to let transit vehicles get an early green
- Green Extension – Extending the green to allow a transit vehicle to get through before the red
- Phase Suppression/Skipping – Skipping some phases in order to service the transit vehicle more quickly
- Phase Rotation – Changing the order of the phases within the cycle to service the transit vehicle more quickly

Experience in most communities that have installed TSP have shown that the systems help improve reliability and reduce travel times from transit vehicles while having little to no impact on traffic. In fact,

some communities have found that overall traffic signal operations have improved due to the more sophisticated traffic signal algorithms many of the new TSP traffic signal controllers use. Before any TSP is installed within the City of Lethbridge more detailed study is required to determine its benefits and impacts. In the longer term, more physical transit priority measures may be required, but this should be studied as the need emerges in the future.

The proposed base transit network concept identifies the existing transfer points in Downtown, North Terminal, the University of Lethbridge, and Lethbridge College. The proposed base transit network concept also identifies four potential transfer points near the city's periphery. These future transfer points are identified at the terminus of core transit corridors and serve a minor function compared to the existing transfer points. The future transfer points are areas where buses on core routes would terminate and layover, while also allowing for transfers to feeder routes where appropriate. Figure 5-3 shows network concept only and does not illustrate exact routing alignments and future transfer point locations.

Table 5-2
Conservative versus Aggressive Alternative Targets

		Shorter-term Scenario (2020) 100,000 Population		Mature-State Scenario (2040) 130,000 Population	
	Existing	Conservative	Aggressive	Conservative	Aggressive
Rides per capita and related ridership	25 2,125,000	25 2,500,000	33 3,300,000	25 3,250,000	42 5,460,000
Hours of service per capita and annual hours	1.25 110,000	1.25 125,000	1.5 150,000	1.25 162,500	1.7 220,000
Passengers per vehicle-hour	Peak: 25 Off peak: 15 Average: 20	Peak: 25 Off peak: 15 Average: 20	Peak: 28 Off peak: 16 Average: 22	Peak: 25 Off peak: 15 Average: 20	Peak: 30 Off peak: 18 Average: 25

Table 5-2 shows the initial targets for the conservative and aggressive alternatives. The conservative option was initially developed to reflect a status quo approach by only increasing transit service at the rate of population growth (thus keeping the number of hours per capita at 1.25). Under this initial conservative alternative, we assume that service would be extended to maintain service coverage in the urban expansion areas.

The aggressive option calls for maintaining system performance relative to population growth and step-wise increase in service levels to 2020 and to 2040. For example, core route service levels are increased from 15-minutes to 10-minute service from 2020 to 2040, off-peak services are increased from 60-minutes to 30-minutes or from 30-minutes to 20-minutes on core and local services. These improvements result in increases in service hours to 1.7 hours per capita by 2040.

The proposed levels of service increases in the network and the implementation of a more direct route network concept is projected to result in an increase in ridership at a rate slightly higher than the rate of service increase. By 2040, the number of passengers per vehicle hour operated is expected to grow from 20 to 25 passengers and riders per capita will increase from 25 to 42.

Since the development of the initial targets outlined in Table 5-2, the proposed service hours and ridership were refined for the conservative scenario to incorporate the proposed route network structure, as a means to address the noted gaps identified in the existing system. This resulted in a modest increase in the hours of service operated per capita from 1.25 to 1.4 and 1.5 in 2020 and 2040 respectively. Table 5-3 shows the performance of the resulting system versus the targets depicted in Table 5-2.

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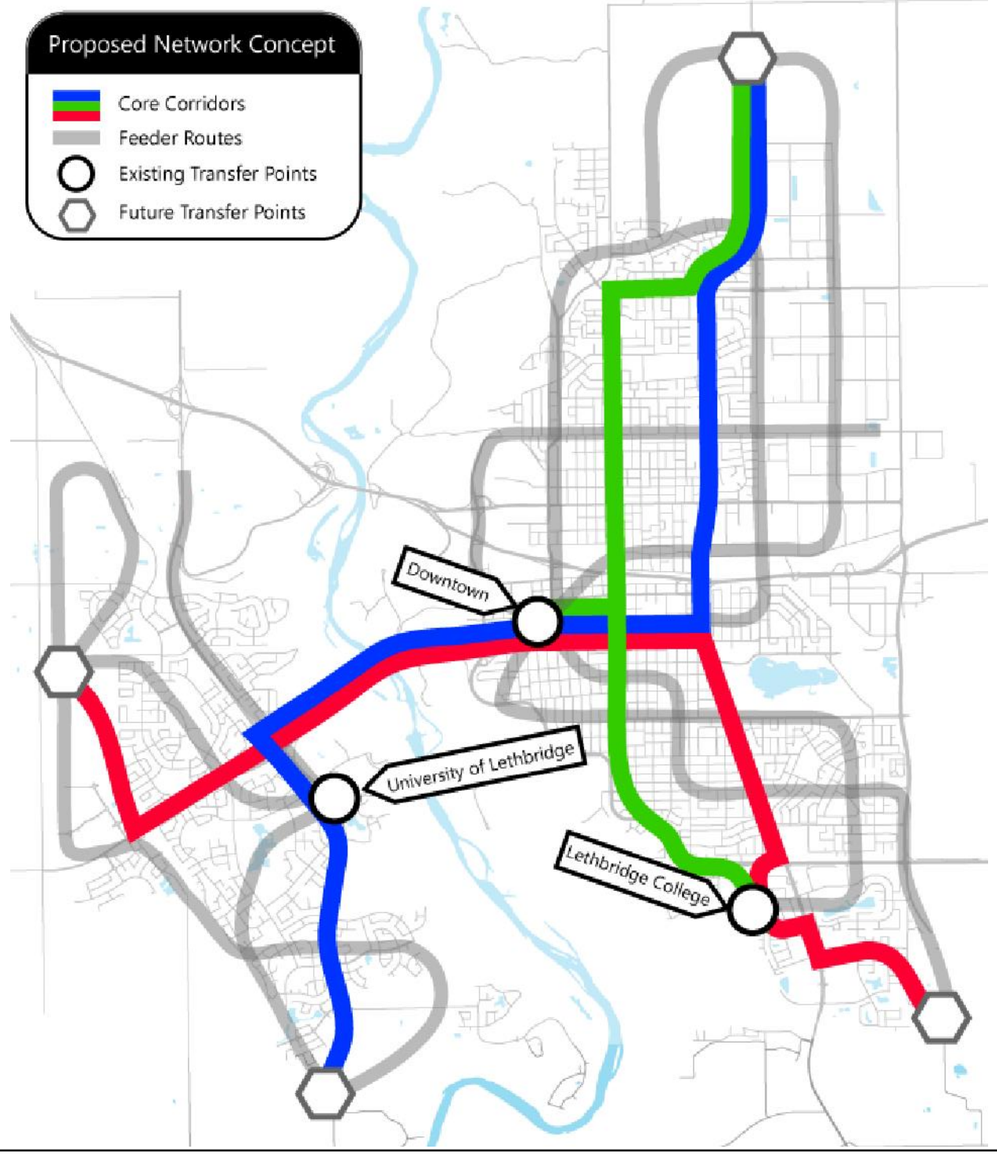

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PROPOSED BASE NETWORK CONCEPT

FIGURE 5-3

Table 5-3
Performance Results for Alternative Service Scenarios

	Shorter-term Scenario (2020) 100,000 Population		Mature-State Scenario (2040) 130,000 Population	
	Conservative	**Aggressive**	**Conservative**	**Aggressive**
Rides per capita and related ridership	25 2,500,000	33 3,300,000	25 3,250,000	42 5,460,000
Hours of service per capita and annual hours	1.4 140,000	1.5 150,000	1.5 195,000	1.7 220,000
Passengers per vehicle-hour	Peak: 23 Off peak: 15 Average: 18	Peak: 28 Off peak: 16 Average: 22	Peak: 23 Off peak: 15 Average: 17	Peak: 30 Off peak: 18 Average: 25

5.2.1 Options Evaluation

With this approach of developing similar route plans with differing levels of service and coverage, the evaluation of the options relied mostly on issues of compliance and consistency with stated policies and adopted plans. These include:

- Consistency with ICSP/MDP
- Compliance with existing service standards, with consideration for higher future level targets, as described in the service standards workshop
- Fiscal sustainability
- Consistency with goals developed for the plan
- Consistency with council-endorsed Vision 2040 objectives

Reviewing against these criteria, the conservative service approach falls short of meeting the objective of several of the key policy documents, particularly the ICSP/MDP and CUTA's Vision 2040 plan. With respect to service standards, the conservative approach falls somewhat short of the intended objective of increasing the levels of service and the annual amount of service.

The aggressive approach is more consistent with the key goals, and meets or exceeds the performance targets and stated objectives in all areas.

After review of the options, City Council has adopted the conservative approach option for Lethbridge Transit.

5.2.2 Access-A-Ride

ACCESS-A-Ride is a City of Lethbridge service for people who are unable to use the regular public transit service.

ACCESS-A-Ride is a shared ride public transportation service for the population of the City of

Lethbridge, it is not a direct ride service. Booking and scheduling is optimized in order to allow as many riders as possible to use the system while maintaining reasonable operating costs.

The service started in 1975 under the name of the Lethbridge Handi-Bus Association. Since 1975, the system has grown to a fleet of 20 buses that serves roughly 1500 registered clients.

Service is provided during the following periods:

Monday thru Saturday 7:00am - 10:30pm
Sunday 8:00am - 10:30pm
Holidays 7:00am - 7:00pm

As Lethbridge continues to grow the demand for this service will also continue to increase. Furthermore, current demographic trends show that the population is aging and this will further put pressure on this type of service. In order to meet the needs for this type of service into the future additional funding and service will be required. It is recommended to follow the demand for this service and adjust it as necessary as population both grows and ages.

6 Community Engagement and Consultation

A public consultation program was conducted to inform the stakeholders and public about the City's current and future transportation issues and requirements. In addition to the public consultation program, the draft report was reviewed with and presented to the City's project team.

6.1 WORKSHOPS

6.1.1 Transit Service Standards Workshop

In fall 2011, the team convened a Transit Service Workshop designed to review, and confirm or refine the existing service standards to be suitable for the future planning as part of the TMP. Lethbridge Transit incorporated their initial formalized service standards as a result of the 2006 Service Standards Review.

Participants in the workshop were recruited from the public at large through written invitations sent to a random sample of area residents. In addition to those invited in this manner, specific stakeholders representing social service agencies, ratepayers, disability advocates and others were also specifically invited. Key representatives from the City's TMP team were also involved.

The workshop comprised a review of the purpose of service standards and their application in transit service, and a review of the existing standards and current performance against those standards and key performance indicators.

Following this review, participants were divided into small groups and assigned specific sets of questions designed to explore different perspective of the level and quality of service expected by the community, along with measures of the related costs. Participants debated these issues in their groups, and then reported back to the plenary group for an opportunity for further comment, debate and consensus building.

As a result of this process, there was a general consensus on the following:

- the existing standards are generally reasonable and appropriate for Lethbridge today;
- future planning conducted as part of the TMP should be more aggressive than the current performance expectations to be consistent with the policy direction of the ICSP/MDP and the CUTA Vision 2040 document;
- amount of service (currently about 1.25 annual hours per capita, should increase to 1.5 in 2020 and further to 1.7 in 2040);
- targets for passenger hours should increase, in a context of continuous quality improvement;
- new service standards might be considered over time to help ensure the progress and development of the transit system; and

- financial performance standards still need to be strictly adhered to, with route planning considerations addressing any deficiencies in financial performance.

Planning of future transit services, described in Section 5.2 and Section 7.2, was completed to account for these considerations.

6.1.2 Workshop – Transportation Goals

On January 16, 2012, the project team conducted a policy workshop for the City's Transportation Master Plan to discuss and develop the transportation goals that can influence the travel behavior throughout the City; to understand the City's business community growth plans as it pertains to transportation for the next 10 to 30 years.

Two sessions were organized at the Galt Museum, one for the external stakeholders and another for the internal stakeholders. Participants for the external stakeholder policy workshop were selected from the list of stakeholders from the ICSP/MDP. In addition, the administration ensured that special interest groups (environmental, seniors, cycling groups) as well as major employers within the City should also be included. In addition to the business community policy workshop held in the afternoon, specific stakeholders representing various departments within the City and others were also specifically invited through written invitations for a morning session. Key representatives from the City's TMP team were involved in both sessions.

The workshop comprised a review of developing various goals and their application in implementing a multi-modal transportation master plan. In addition, a review of the existing policies and their performance were measured against the proposed transportation master plan objectives and new goals were introduced to address the current transportation issues.

Following this review, participants were encouraged to explore different perspective of implementing various goals, along with key performance indicators. The detailed process is included in Appendix D. Three groups rated potential Transportation Goals during the Transportation Master Plan Process: city staff, stakeholders, and general public. Table 6-1 provides the Goal Workshop comparison.

Table 6-1
Goal Workshop Comparison

	City Staff	Stakeholders	General Public	Overall Goal Evaluation Rank
Goal 1: Integrate transportation and land use planning	1 (tied)	1	2	1 (tied)
Goal 2: Consider all modes	1 (tied)	2 (tied)	1	1 (tied)
Goal 3: Promote Public Transit	N/A	N/A	3	4
Goal 4: Manage Transportation Demand	5	2 (tied)	4	6
Goal 5: Manage Transportation Supply	4	4	6	5
Goal 6: Manage Parking	N/A	N/A	7	7
Goal 7: Measure Performance	3	3	5	3

6.2 PUBLIC OPEN HOUSES

Two public information sessions were conducted for the City's Transportation Master Plan. The open houses were held at the University Drive Alliance Church on June 20, 2012 and at the Fritz Sick Senior Centre on June 21, 2012. The information sessions were drop-in style format.

Public notification of the open houses was made through advertisements in the local newspaper, by street side signs near City Hall, and through the City's website. Advertisements were placed well in advance of the open house so that all residents had an opportunity to attend. AE and the City's project team members were present to inform the public and stakeholders about the City's current and future transportation infrastructure issues and requirements.

The open house boards are included in Appendix F. The display boards included:

- Open house objectives
- Transportation master plan objectives
- Transportation master plan steps
- The ISCP / MDP
- The ISCP / MDP directions for the transportation master plan
- Lethbridge travel survey
- Transportation goals
- Transportation planning between 2020 and 2040
- 2020 road network scenarios

- 2040 road network scenarios
- 2020 transit network scenarios
- 2040 transit network scenarios

Table 6-2 shows the number of people who attended the open houses by area.

Table 6-2
Open House Attendance by Area

West	29
South	35
North	6
Outside	1
	71

Table 6-3 summarizes participants' mode of travel indicated on the comment sheets.

Table 6-3
Primary and Secondary Modes of Travel

Primary Mode of Travel		Secondary Mode of Travel	
Personal Vehicle	31	Personal Vehicle	2
Transit	1	Transit	2
Bicycle	0	Bicycle	6
Walk	2	Walk	8

No major concerns or comments were received from the general public about the City's current transportation challenges and future transportation. A detailed open house process is included in Appendix G. Table 6-4 provides the key transportation issues identified by the general public.

Table 6-4
Key Transportation Issues

The list below lets you know the top topics mentioned and their relative importance:	
1. Traffic signal coordination	8 mentions
2. Mayor Magrath Drive. / Scenic Drive.	7 mentions
3. Cyclist safety	6 mentions
4. Shared use pathways	5 mentions
5. Third river crossing	5 mentions
6. Transit service	2 mentions

At the open house participants were asked to indicate the four goals that are most important to them. Table 6-5 shows the results. Goal 2 followed by Goal 1 were two most important goals for respondents.

Table 6-5
Open Houses Goal Voting Results

Goals	University Drive. Alliance Church	Fritz Sick Seniors Centre
Goal 1 – Integrate transportation and land use planning	22	25
Goal 2 – Consider all modes	23	42
Goal 3 – Promote public transit	8	28
Goal 4 – Manage transportation demand	15	19
Goal 5 – Manage transportation supply	8	13
Goal 6 – Manage parking	4	14
Goal 7 – Measure Performance	14	10

6.3 COUNCIL PRESENTATIONS

Transportation Master Plan process highlights will be presented to the City Council in November 2012 and the final report will be approved by the Lethbridge City Council.

7 Recommended Transportation Master Plan

7.1 RECOMMENDED ROAD NETWORK PLAN

The recommended road improvement plan was developed based on the capacity assessment of various corridors within the study area and do not include the roadways improvements required to improve the traffic safety as well as other improvements required to accommodate aging infrastructure.

7.1.1 Road Network Plan to Serve 100,000 and 130,000 Population

The Road Network plan to serve 100,000 and 130,000 population is shown in Figure 7-1. The recommended plan for the 100,000 population horizon includes all roadways that were in the Basic Road Network as well as 26th Avenue North. Portions of Metis Trail and portions of Whoop-Up Drive. The complete list of Projects are described as follows:

- 26th Avenue N (23rd Street N to 28th Street N) - 700 m improve 2 lanes to 4 lanes
- 28th Street N (Mayor Magrath Drive to 26th Avenue N) - 2.8 km redevelop to divided arterial
- Scenic Drive North (5th Avenue N to Stafford) - 1.8 km initial 2 lane arterial
- 43rd Street N (Highway 3 to 9th Avenue N) - 1.4 km improve 2 lanes to 4 lanes
- Mayor Magrath Drive (City Limits to the Airport Access) - 900 m improve 2 lanes to 4 lanes
- 43rd St S (Highway 4 to South Gate) - 900 m initial 2 lane arterial
- University Drive (Sun Ridge Boulevard W to Paradise Canyon) 900 m initial 2 lane arterial
- Metis Trail (Simon Fraser Boulevard to Blackfoot Boulevard) - 1.9 km initial 2 lane arterial
- Metis Trail (Jerry Potts Boulevard to Garry Drive) - 600 m initial 2 lane arterial
- Metis Trail (West Highlands to N of Walsh Drive) - 600 m initial 2 lane arterial
- Garry Drive (to 600 m west of Metis Trail) - 1.2 km initial 2 lane arterial
- Whoop Up Drive (Coalbanks Gate W to 200 m west) - 200 m initial 2 lane arterial
- Mayor Magrath Drive & Scenic Drive intersection improvements - 3rd southbound lane.
- 26th Avenue N (Scenic Drive to 23rd St N) to provide connectivity in North Lethbridge;
- Scenic Drive North (Stafford Drive to 26th Avenue N) to provide connectivity in North Lethbridge;
- The remainder of Metis Trail from Simon Fraser Boulevard to Walsh Drive to provide connectivity and relief for neighbourhood connections;
- Whoop Up Drive from McMaster Boulevard to Aquitania Boulevard W to address capacity issues related to growth in the area.

The recommended plan for the 130,000 population horizon includes everything in the Optional Network, as most of the optional roads are needed to address forecast capacity issues. University Drive and Whoop Up Drive will be key corridors to monitor in the future to ensure effective traffic flow. A detailed list of the recommended plan for the 130,000 population is described as follows:

- Metis Trail (Chinook Trail to Simon Fraser Boulevard) – 2.7km 2 lane arterial

- Garry Drive (4 lane University Drive to W of Squamish Boulevard) – 450km upgrade 2 lane to 4-lane
- Walsh Drive to development limits – 1.3km 2 lane arterial
- Walsh Drive (4 lane University Drive to Metis Trail) – 1.2km upgrade 2 lane to 4 lane
- University Drive (north of Railway Tracks to Highway 3 Upgrade) – 1.2km upgrade 2 lane to 4 lane
- 43rd Street N (44th Avenue N to 62nd Avenue N) – 1.7km 2 lane arterial
- Scenic Drive North (44th Avenue N to 62nd Avenue N) – 2.0km 2 lane arterial
- 28th Street N (30th Avenue N to 44th Avenue N) – 1.5km 2 lane arterial
- 62nd Avenue N (43rd Street N to Scenic Drive North) – 3.3km 2 lane arterial. This roadway (62 Avenue North) currently resides in the County and is under control of the County of Lethbridge.

7.1.2 Long Term Road Network Plan

The Long Term Road Network Plan is shown in Figure 7-2. These are roads that will be required beyond 30 years from now but the right-of-way (ROW) should still be protected for future construction. The model shows a nominal effect on traffic in the 2040 scenario.
In addition to the roads identified with in the City, the NSTC is intended to be a high capacity, limited access, and a multi-laned facility. The corridor would provide for the long-term best interests of the Province, the City, the County of Lethbridge, Town of Coaldale and the Town of Coalhurst.

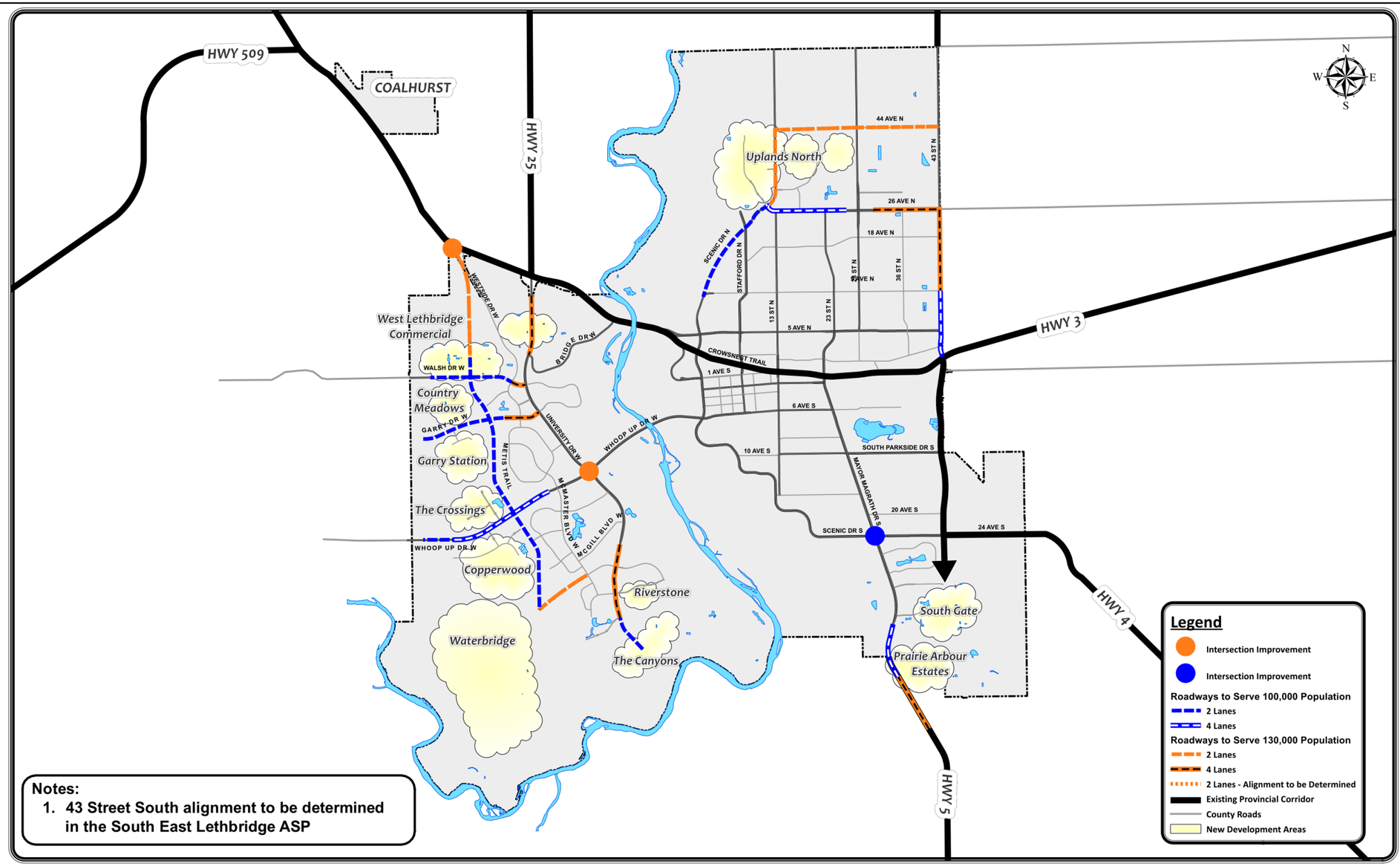
7.1.3 10 Year Capital Improvement Program (CIP)

The 10 Year Capital Improvement Program is shown in Table 7-1.

CITY OF Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN



Notes:

1. 43 Street South alignment to be determined in the South East Lethbridge ASP

Associated Engineering

LETHBRIDGE ROAD NETWORK IMPLEMENTATION PLAN TO SERVE 130,000 POPULATION

FIGURE 7-1

CITY OF Lethbridge

KEEPING LETHBRIDGE ON THE MOVE

TRANSPORTATION MASTER PLAN

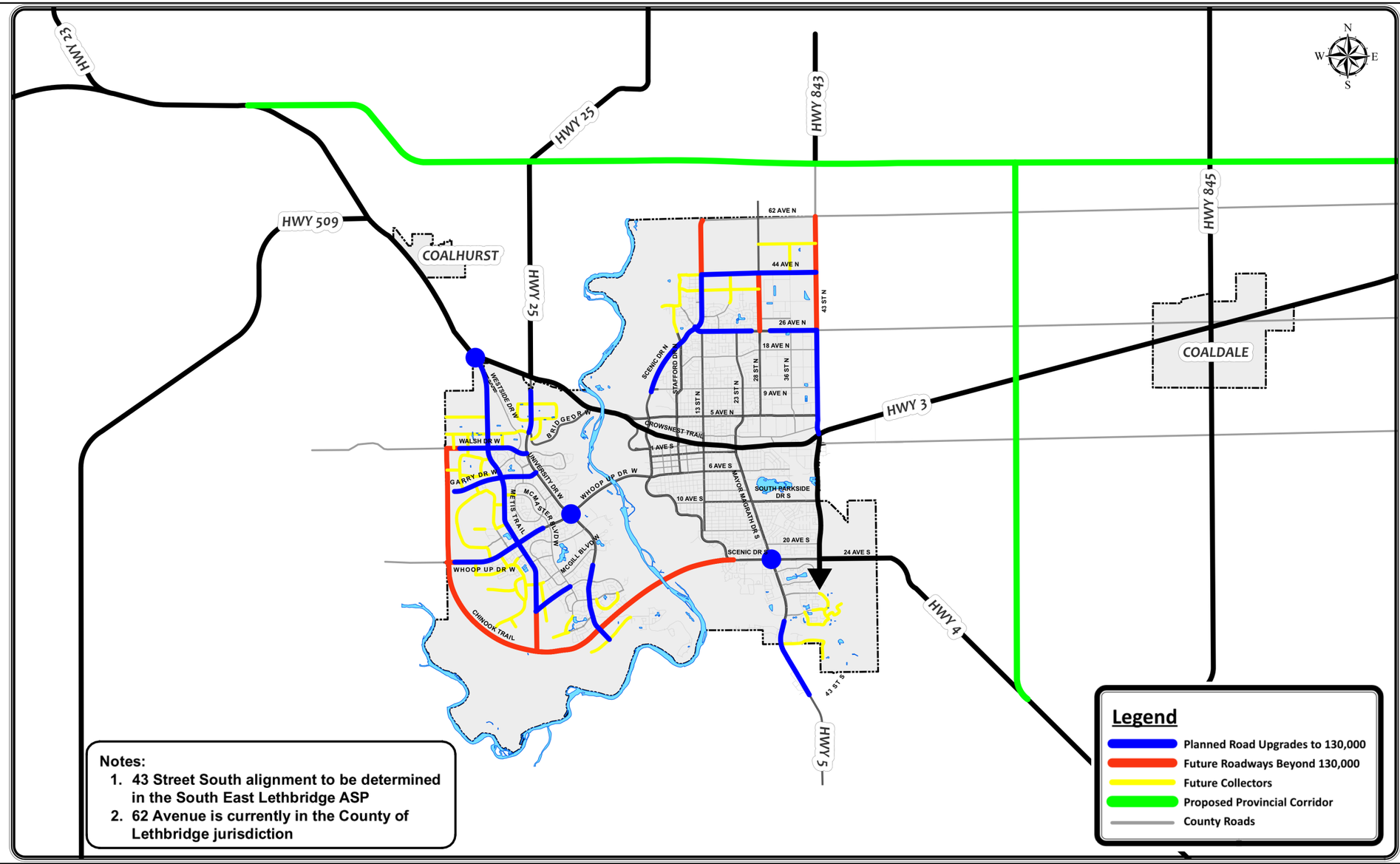


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FIGURE 7-2

LETHBRIDGE LONG TERM ROAD NETWORK PLAN

Table 7-1
10 Year Capital Improvement Plan - Transportation

Project	Roadway Improvement	Total*
Projects Currently Under Construction		
Mayor Magrath Drive (40th Avenue S to City Limits)	Identified as 4 lane basic 2012	
Whoop Up Drive (Coalbanks Gate W to Mauritania Road W)	First 2 Lanes of the ultimate 4 lane arterial 2012	
Garry Drive (to 600 m west of Metis Trail)	Identified as 2 Lane basic in 2020 TMP 2012	
Scenic Drive North (5th Avenue N to 26th Avenue N.)	Identified as 2 Lane basic to Stafford Drive in 2020 TMP 2013	
28th Street North (Mayor Magrath Drive to 26th Avenue N.)	Identified as 4 Lane arterial in 2020	
Subtotal		**n/a**
Roadways Required to Support Growth		
Metis Trail (Country Meadows to Walsh Drive)	First 2 Lanes of the ultimate 4 lane arterial 2012	$2,300
University Drive (Sun Ridge Boulevard W to Paradise Canyon)	First 2 Lanes of the ultimate 4 lane arterial 2013	$6,000
Metis Trail (Temple Boulevard to Caledonia Road)	First 2 Lanes of the ultimate 4 lane arterial 2013/2016	$9,000
Metis Trail (Jerry Potts Boulevard to Garry Drive)	First 2 Lanes of the ultimate 4 lane arterial 2014	$3,600
****44 Avenue (Scenic Drive North to 43rd Street)**	Preliminary Design 2015	$400
Metis Trail (Caledonia Road to Jerry Potts Boulevard)	First 2 Lanes of the ultimate 4 lane arterial 2017	$5,400
43rd Street S (Highway 4 to 40th Avenue South)	First 2 Lanes of ultimate 4 lane arterial 2018	$9,000
Metis Trail (Garry Drive to Country Meadows)	First 2 Lanes of the ultimate 4 lane arterial 2019	$3,900
****Metis Trail North of Walsh Drive**	Functional Design 2019	$600
Subtotal		**$40,200**
Roadway Network Improvements		
43rd Street N (Highway 3 to 9th Avenue N)	4 Lane Arterial 2013	$6,900
Mayor Magrath Drive & Scenic Drive intersection Improvements	Develop 3rd lane Southbound at Scenic Drive 2013	$900
26th Avenue N (23rd Street N to 28th Street N)	4 Lane Arterial 2013	$3,000
****Whoop Up Drive/University Drive and Scenic Drive Interchanges**	Functional/Preliminary Design 2014	$750
Scenic Drive North (Stafford Drive to 26th Avenue N)	4 Lane Arterial 2014	$3,000
26th Avenue N (Scenic Drive to 23rd Street N)	4 Lane Arterial 2015	$5,200
****University Drive North of CP Rail**	Preliminary Design 2015	$650
Whoop Up Drive (McMaster Boulevard. to Aquitania Boulevard W.)	4 Lane Arterial 2016	$5,600
Subtotal		**$26,000**
Total Estimated Investment		**$66,200**

*All amounts listed above are in thousands of 2012 dollars.
**Functional or preliminary design only.

7.2 RECOMMENDED TRANSIT PLAN

As described in Section 5.2, the recommended transit network will be structured around three core corridors, complemented by a number of local feeder routes as identified in Figure 5.3

7.3 GOAL RECOMMENDATION AND IMPLEMENTATION PLAN

Section 3 of this report describes several recommended goals and example actions that could be taken to implement the goals. The following summarizes the recommended goals that should be adopted as part of the Transportation Master Plan.

- Transportation planning and land use
- Consider all modes
- Promote public transit
- Manage transportation demand
- Manage transportation supply
- Manage parking
- Measure performance

These goals were developed in support of the ICSP/MDP, which provides the over-arching direction for goal implementation. More work is needed to develop a comprehensive action plan to implement the goals. Some of the key steps that could be taken initially are as follows:

1. Establish a mandate and dedicated staff resource responsible for developing and implementing the action plan.
2. Develop an education program for City staff, community leaders, business community and land development community to foster knowledge of the goals and collaboratively identify ways they can support the goals.
3. Establish an operating program to regularly monitor traffic flows, transit ridership and other transportation benchmarks.
4. Establish an internal “Sustainable Transportation Committee” including transportation planners, land use planners, transit planners, and roadway operations and maintenance supervisors to collaboratively identify ways to better serve all modes of transportation.
5. Update the pathways and bikeways master plan to include planning for commuter bicycle facilities (on-street bikeways, bicycle parking facilities)
6. Review relevant City of Lethbridge transportation design standards and provide flexibility in design to create pedestrian, cycling and transit supportive environments.

7.4 IN-SERVICE ROAD SAFETY REVIEWS RECOMMENDATIONS

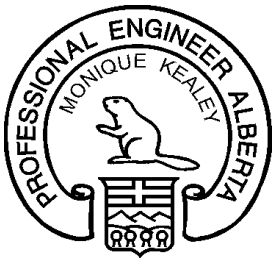
In-service road safety review is a formal safety performance examination of an existing or future roadway or an intersection by an independent review team. The scope of the safety review is to qualitatively estimates and reports on potential road safety issues and identifies improvements in safety for all road users.

Road safety reviews should be carried out during the stages listed below:

- Preliminary and detailed design stage
- Pre-opening stage
- Post-opening stage
- Facility operation stage

There was recently an evaluation of the top 25 intersections with the highest incidents and collision rates. From this evaluation, 10 intersections were selected for a concept design for improvements. These improvements will be funded from the current Capital Improvement Plan within "Intersection Improvements" and are not addressed in this TMP. Recently completed Road Safety Audit report recommended that Mayor Magrath Drive/24th Avenue and 13th Street N/5th Avenue N intersections should be considered for an in-service safety review. Highway 3/43rd Street, University Drive/Garry Drive and Mayor Magrath Drive/22nd Avenue S intersections were recommended for further monitoring and some geometric and signal phasing improvements.

Certification Page



ASSOCIATED ENGINEERING

QUALITY MANAGEMENT SIGN-OFF

Signature: _____

Date: _____

APEGA Permit to Practice P 3979