City of Leduc
2018 Transportation Master Plan

Presented to: City of Leduc
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ACKNOWLEDGMENTS

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EXECUTIVE SUMMARY

The City of Leduc is located in Leduc County south of the City of Edmonton. According to the 2016 City of Leduc Census, the population of the City is 29,993 residents. The City exhibited over the last decade the 3rd fasted growth characteristics in the Province. The current City of Leduc population is forecast to grow from 32,448 (2018 City of Leduc Census data) today to more than 54,000 in the next three decades. The need for updating the previous Transportation Master Plan (TMP) was triggered by the population and employment growth, as well as the City's desire to determine its transportation needs over a longer horizon population. With a growing population, the transportation system becomes increasingly vital to create an accessible City.

The purpose of the City of Leduc's 2018 TMP is to prepare a long-term transportation infrastructure plan that is suitable to meet the growing development needs of the City. The 2018 TMP would be used to adopt a sustainable approach to all modes of transportation, as a guide to future developments, and as a long-term plan for funding the recommended improvements. The TMP also ensures the City remains compliant to off-site levy requirements in terms of updating and validating future planning projects within the municipality. The timeframe of the TMP represents a 30 year horizon and is intended to fully integrate with the vision and principles of the City's Municipal Development Plan (MDP).

The transportation vision within the TMP is intended to plan for a more walkable, more transit supportive community, while assuring residents of a high quality of life.

The key objectives of the TMP are to:

- support the overall MDP;
- develop and define a roadway implementation strategy to address today's and future transportation needs;
- guide and coordinate future urban growth decisions;
- address facilities for all transportation modes;
- improve the efficient movement of goods;
- provide an integrated transportation network; and
- update and develop policy statements that best lead towards an accessible City of Leduc.

The TMP methodology was structured so as to:

- develop a blueprint for the future transportation network;
- develop strategic transportation policy statements;
    - Identify and improve the transportation network, multi-way system, heavy vehicle

routes and rapid transit corridors.

- Enhance the City's pedestrian connectivity, roadway connectivity and inter-regional transportation network.

The 2018 TMP also undertook functional corridor analysis throughout the City of Leduc to establish the ultimate cross-sections of the major corridors.

The functional corridor analysis served to establish ultimate requirements for the roadway width, the roadway alignment, the ultimate number of lanes, the type of intersection control and future access provisions.

Further to the functional plans produced, the 2018 TMP undertook a noise evaluation along the Grant MacEwan corridor. The noise evaluation completed a survey along the current Grant MacEwan corridor, from the new Blackstone community in the south to Bridgeport Gate in the north. The evaluation conducted forecast modelling to estimate future noise levels along the corridor in a long-term scenario.

Existing Roadway Network

The City of Leduc currently maintains a roadway network comprised of 120 lane-km of arterial roadways, 55 lane-km of collector roadways and a system of local roadways. Highway 2, the Queen Elizabeth II, corridor bisects the City of Leduc that traverses in the north-south direction. Approximately 6.0 km of the Highway 2 corridor is within the City's boundary. In addition, a short 2.7 km of Highway 2A is also located within the City boundary in the south-east section of the City.

Existing Traffic Trends

Existing traffic trends of peak hour traffic volumes, origin-destination and heavy vehicle volumes within the City of Leduc were determined and evaluated to provide for a baseline of the current traffic network.

The current traffic trends indicate:

- heavy east-west traffic movements across Highway 2 along the 50th Avenue corridor; and
- a significant draw to the northbound Highway 2 corridor in the morning peak hour and heavy traffic coming from the southbound Highway 2 corridor in the afternoon peak hour.

Origin-Destination Survey

An origin-destination survey was undertaken as part of the TMP in an effort to identify current vehicular trends. Travel trends within the City indicate heavy movements between:

- the south-east and south-west sectors linking the residential and downtown sectors; and
- the south-east and north-east sectors linking the downtown and industrial sectors.

Overall travel trends travelling to/from the City indicate that:

- there is a large draw for traffic travelling to and from Edmonton; and
- approximately one third of traffic remains within the City of Leduc.

Heavy Vehicle Routes

Heavy vehicles are restricted to the designated routes and to limit travel on major roadways and reduce impacts to local and collector roads.

Leduc Transit

Leduc Transit is an inter-municipal partnership between the City of Leduc and Leduc County. As of May 1, 2018, Leduc Transit operates 6 routes. Routes 1-5 operate on a 30-minute frequency Monday to Friday peak periods. Route 10 operates on a 60-minute frequency, 13.5 hours per day Monday to Saturday and 9.5 hours per day on Sundays and Stats. Leduc Transit boardings have almost tripled from 33,106 in 2011 to 90,500 in 2017, which emphasizes the extent of which the City has made the transit system a priority within its transportation network. The City also operates Leduc Assisted Transportation Services (LATS), which provides services within the City of Leduc for seniors and adults with cognitive and/or physical disabilities. In comparison with other small Canadian specialized transit services, LATS has good ridership per operating hours and operates close to average in terms of service provided per registrant and revenue to operating cost ratio. Leduc has one of the highest levels of registrants per capita.

Active Transportation

The municipality's size and flat topography would serve to encourage active transport modes for many journeys in the area. The multiway system network is an extensive network of pathways and trails that provides a transportation and recreational function for its residents. The multiway path network also forms part of Canada's Trans Canada Trail (The Great Trail).

Sidewalks are located throughout residential neighbourhoods and alongside central streets within the City of Leduc, which are in addition to the primary and secondary multiway paths. However, there are limited sidewalk provisions in the industrial part of Leduc with several roads in the area having no sidewalks at all on either side of the roadway.

CP Rail

The City is bisected by two CP Rail lines that provide for the movement of freight and goods across the Province.

- CP's Leduc subdivision track travels in the north-south direction on the east side of the Highway 2.
- CP's Breton subdivision travels in the east-west direction and connects Sunnybrook to Leduc.

Noise Survey

An environmental noise survey was undertaken within the City of Leduc to measure the current noise levels at various residential locations most affected by major roadways. Overall, no noise mitigation is required for the noise monitoring locations within the City of Leduc for 8 of the 10 locations surveyed. The two noise monitoring locations, which were higher than the City's Surface Transportation Noise Guideline threshold are adjacent to the Highway 2 under the Provincial jurisdiction. In these cases, Alberta Transportation (AT) would be responsible for noise attenuation as described by the Provincial Policy Guidelines.

Travel Demand Forecasts

The City of Leduc has experienced sustained growth and would continue to do so in the next 30-years. In coordination with the City and the development community, the population and employment growth were developed for each horizon year. The City of Leduc is anticipated to experience a 15.2%, 23.1% and 22.6-to-29.9% increase in population, in the short-, medium- and long-term horizon years, respectively.

In terms of growth areas, the south and west areas are predominately residential developments and the north and east areas are designated business/industrial developments.

The Inter-Municipal Transportation Network

The TMP has identified several inter-municipal transporation initiatives which, some falling outside of the City's roadway jurisdiction, represent critical corridors required to assure overall local network integrity and accessibility:

- Highway 2 realignment, widening and core lanes initiative;
- Improved Highway 2 / Airport Road interchange;
- New Highway 2 / 65th Avenue interchange (Phases 1 and 2);
- Upgrade of the Highway 2 / 50th Avenue interchange;
- Relocated Highway 2 / Highway 2A interchange;
- 65th Avenue West (Highway 2 to 74th Street), which borders the Edmonton International Airport (EIA) lands;
- Spine Road (Airport Road to SE Boundary Road);
- SW Boundary Road (Highway 2 to 74th Street); and
- 74th Street (SW Boundary Road to 65th Avenue W).

In addition to these somewhat defined projects the TMP has identified several regional-level projects that remained to be addressed through future functional planning exercises, which are certain to have an impact upon the municipality. While the Highway 2 corridor represents the current backbone to regional transportation, major planning initiatives are required to support north-south connectivity. The following list of planning projects are recommended

to be considered, in order of priority, for the City of Leduc:

- Spine Road South Extension to Highway 2A / Highway 2 Planning Study to investigate potential alignments south of Rollyview Road (Highway 623);
- The Terwillegar (170th Street) South Extension (from 41st Ave to 50th Ave [14.5km]) and further south to the Highway 2 corridor (8km);
- Inter-Municipal Regional Plan to address continuous north-south arterials to the west of Leduc;
- A Leduc-Edmonton Comprehensive Transit Strategy to determine long-term transit corridor and infrastructure requirements to connect the City of Edmonton, the City of Leduc, the EIA and surrounding muncipalities;
- Highway 2A Interchange Update plan to assess potential of the existing Highway 2A bridge as a "fly-over" and to assure planning efforts protect for an 8-lane Highway 2 corridor;
- Highway 2 Core Lane alignment and staging from Ellerslie to 65th Avenue; and
- 50th Avenue interchange functional plan update to address the Highway 2 corridor between Highway 2A and 65th Avenue.

Transportation Model Development

A Visum™ Transportation Demand Model was developed for the City of Leduc for the short-term, medium-term and long-term time horizons. The model roadway network extended from Anthony Henday Drive south to Township Road 490 (Kavanagh Road). The zone system of the model was developed such that the detailed boundaries align with the larger Regional Transportation Model zone system. The roadway network of the model includes all arterial, collector and key local roadways.

- *Short-Term Model Results*: Congestion is anticipated at the following locations:
  - Highway 2 in the vicinity of Highway 2A, 50th Avenue and north/south of Airport Road;
  - 50th Street bridge;
  - 50th Avenue northbound on-ramp;
  - the south leg of 50th Street / 65th Avenue intersection; and
  - sections of Airport Road.
- *Medium-Term Model Results*: High traffic volumes during both peak hours of travel demand are forecast to effect the following locations:
  - 50th Street bridge; and
  - Sections of Airport Road.
- *Long-Term Model Results:* Congestion and delays are forecast to occur at the following locations:
  - the 50th Street bridge during both peak hours of travel demand;

- 65th Ave East in and out of the industrial lands of north Leduc;
- Along Airport Road; and
- 50th Avenue in the peak direction of travel in the vicinity of the Highway 2 corridor.

TMP Policy Statements Supporting MDP

The previous TMP Policy Statements prepared in 2013 were reviewed and refined. The MDP policies focused on:

- Environmental sustainabiliy, clean air, greenhouse gas emissions and energy efficiency;
- Economy and Tourism that include regional and local economic development;
- Growth management, land use planning (residential and commercial);
- Social wellness; and
- Recreation and culture that include active and healthy communities, as well as high-quality, safe and accessible public open spaces.

Identification and Evaluation of Transportation Improvements

Transit Initiatives

The TMP calls for transit planning to be emphasized within the planning of new communities and employment areas. The TMP explored the possible development of a transit corridor to/from Leduc's west side that would extend to transit infrastructure, planned within the EIA lands.

The benefit of this infrastructure is to develop a stonger synergy between transit and land use by encouraging transit oriented developments for the proposed expanding western communities.

As such, the following transit initiatives were recommended to respond to Leduc's growing west community:

- a transit corridor is to be developed that would connect with the EIA's future transit corridor in the vicinity of the Airport Perimeter Road corridor;
- east-west transit infrastructure would be developed that would service the 65th Avenue West lands and the northern portion of the West Area lands; and
- north-south transit infrastructure would be developed in the vicinity of the 74th Street corridor.

The functional plans for the Grant MacEwan Boulevard corridor provide for the widening of the corridor to a 4-lane cross-section. The functional plans and cross sections provide for the new outside lanes to function as dedicated bus lanes (until such a time that a transit facility is constructed along 74th Street).

The Future Roadway Network

The proposed future roadway network is intended to satisfy the needs of the residents and businesses of the City of Leduc and would see:

- 75 lane-km of new arterial roadways; (120 lane-km currently exist.)
- 70 lane-km of new collector roadways; (55 lane-km currently exist.);
- 15 new traffic signals. (31 traffic signals currently exist.)

Multiway Network

The multiway network forms an integral part of the City's active transportation network. The TMP encourages consideration of the following concepts with regard to the multiway network:

- Planning of multiway facilities should coincide with the development of new areas;
- Multiways are to be planned in concert with new or upgraded east-west crossings of Highway 2;

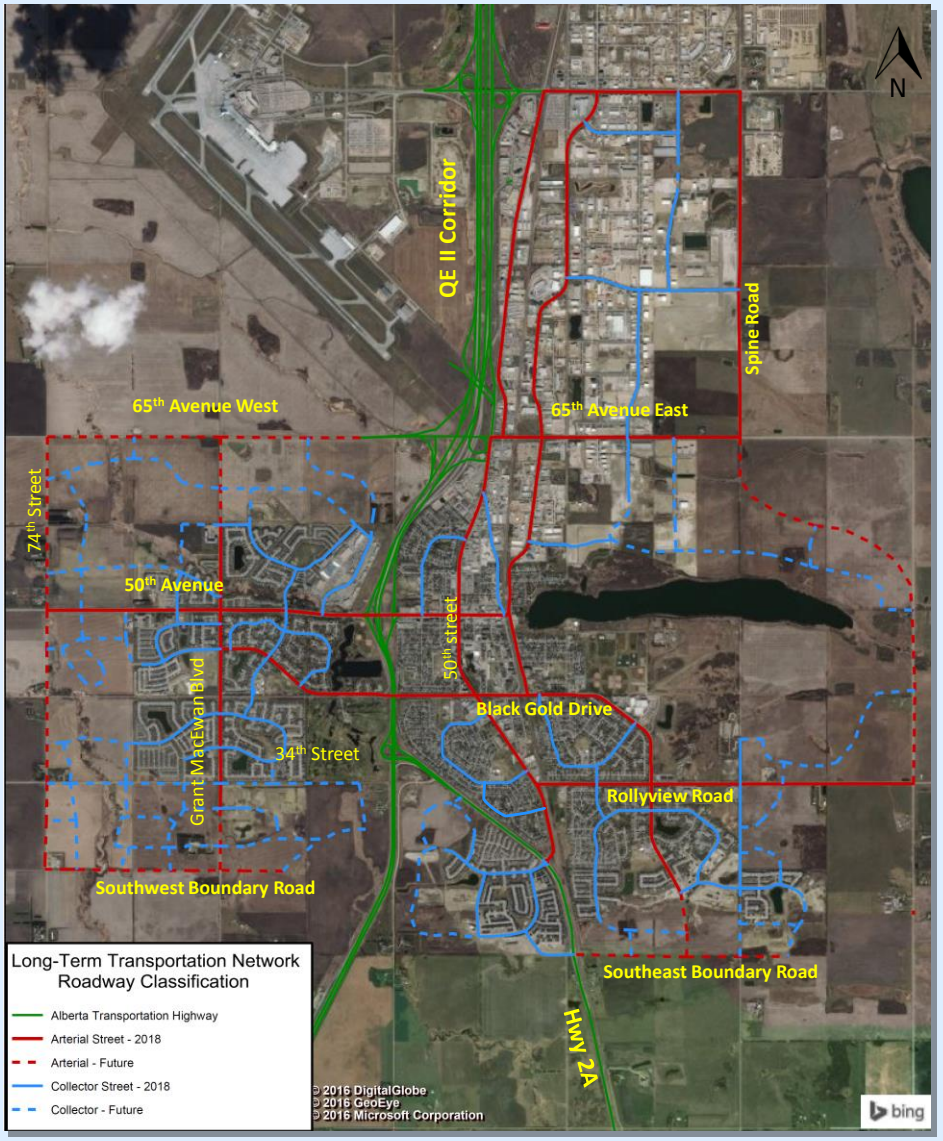

Exhibit ES-1: Proposed Long Term City of Leduc Roadway Network

- Crosswalk markings or similar devices should be adopted to highlight the presence of multiway links where the multiway crosses side streets at intersections;
- Assure that the multiway network interconnects with neighboring municipal initiatives; and
- The sections of multiway along back lanes in the Corinthia Park and Linsford Park neighbourhoods should be reviewed further to ascertain to what extent the City may wish to upgrade to a higher standard.

CP Rail Crossings

The long-term costs associated with grade-separation of the CP Rail crossings merits consideration at a time when capacity, congestion and safety concerns arise. Annual monitoring of these crossing points where two-way traffic volumes exceed 15,000-to-20,000 AADT is encouraged.

Heavy Vehicle Routing

Heavy vehicle routes serve to connect the City of Leduc to the rest of the Province of Alberta and support the economic prosperity of the greater region. The TMP encourages proposed modifications to the network of heavy vehicle routes to account for the advent of new arterial roadways and to provide safe and operationally efficient connections that promote connectivity to local community centers.

The Functional Plans

As a component of the TMP functional plans have been prepared that serve to establish the short-term, medium-term and long-term requirements for the City of Leduc's roadway system. The functional plans provide roadway width, alignment, number of lanes, the type of intersection control, future access provisions and where applicable provide for multi-ways. The plans conform to municipal design standards and account for environmental, policy, socio-economic and financial impacts. The functional plans assure:

- that the future *Transportation Network* can safely and efficiently move both people and goods, while enhancing connectivity within the City to-and-from surrounding areas while promoting a variety of travel choices;
- that the imact to the *Natural Environment* is minimized;
- compatibility with municipal and related *Policies* such as Provincial plans and policies, Edmonton Metropolitan Regional Board (EMRB), County plans and policies and Municipal growth plans.
- that *Socio-Economic* factors have been considered including minimizing property impacts, support the existing and potential business community, maximizing development potential while providing opportunities for planned future growth.

The Implementation Plan

The implementation plan outlines improvements necessary in the short-term, medium-term and long-term time horizons.

The implementation plan as presented is dependent upon growth within the City's boundary from forecast development. The proposed improvements are important to maintain adequate traffic operations for each time horizon.

It is recommended that the City of Leduc monitor their transportation system performance and update their transportation network model as projects are completed, as development occurs, and/or as changes in development plans arise.

Its emphasized that the need for municipal transportation infrastructure improvements are a direct responjse to the level of development growth that is to occur within the City of Leduc.

Short-Term Plan (0-10 years)

The short-term improvements, subject to adjustment and based on the pace of development and funding available, include:

- 50th Avenue widening (from Deer Valley Drive to east of the fire hall access);
- New 74th Street (from 800m North of 50th Avenue to 400m South of 50th Avenue);
- Grant MacEwan Dr. widening (from 50th Avenue to Black Gold Drive and new traffic signal at Suntree Promenade);
- Intersection improvements to the SB-RT at 50th Street & Highway 2A;
- Extend 65th Ave East to Spine Road (Range Road 250);
- New SE Boundary Road (from Highway 2A to Coady Blvd) and upgraded traffic signal at Highway 2A;
- Spine Road Extension (from Allard Avenue to south of 65th Ave East [Lakeside Access]);
- Widen 43rd Street (from 82nd Ave to south of Allard); and
- New traffic signal at 42nd/43rd Street;
- Coady Blvd Extension (to new SE Boundary Road);
- New trafic signal at 50th Street and Bella Coola; and
- New traffic signal at Airport Road and Spine Road.

Medium-Term Plan (10-20 years)

Medium-term improvements include:

- 65th Avenue West widening to Grant MacEwan, extension to 74th Street and new traffic signal at Grant MacEwan;
- Black Gold Drive and 50th Street intersection improvements;
- New 74th Street (from 65th Ave to 800m south) and new traffic signal at 50th Avenue;
- Widen Grant MacEwan (from 65th Avenue West to Bridgeport Gate) and new traffic signals at Bridgeport Gate and 400m north of Bridgeport Gate;
- 50th Avenue widening (from Highway 2 West ramp terminal to Discovery Way);
- 65th Avenue East widening (east of CP Rail to Spine Road) and new traffic signal at Spine Road;
- New SE Boundary Road connection (from Coady Blvd to Robinson Entrance) and new traffic signal at Coady Blvd;

- 50th Street widening (from 64th Avenue to 61st Avenue);
- Extend Spine Road south to Rollyview Road and widen (from Airport Road to 82nd Avenue); and
- New traffic signal at Rollyview Rd & C.W Gaetz Rd intersection.

Long-Term Plan (20-30 years)

The long-term improvements include:

- New 74th Street extension to SW Boundary Road;
- New SW Boundary Road (between 74th Street and Blackstone);
- 50th Avenue widening (from Bridgeport Crossing to 74th Street);
- Widen Grant MacEwan Blvd (from Bridgeport Gate to 50th Avenue and from Black Gold Drive to Spruce Blvd.), New corridor from Blackstone Blvd to SW Boundary Road and new traffic signal at Spruce Blvd;
- New traffic signal at 65th Avenue West and Grayson Access;
- Spine Road widening (from Airport Road to 65th Avenue East);
- Rollyview Road corridor widening (from C.W. Gaetz to Spine Road);
- 50th Street widening (from Bella Coola to Highway 2A); and
- New traffic signal at SE Boundary Road and Caledonia Drive.

Inter-Municipal Projects

A collection of inter-municipal projects was included for consideration over the three horizon periods. These include:

- Short Term:
  - Phase 1-65th Avenue interchange (which includes twinning the 50th Street bridge, extending 65th Avenue West to Grant MacEwan and paving Grant MacEwan to Bridgeport Gate).
- Medium-Term:
  - Phase 2-65th Avenue interchange (which includes the new 65th Avenue overpass and improvements at the CP Rail crossing); and
  - Airport Road improvements;
  - Highway 2 widening (core and collector lanes).
- Long-Term:
  - 50th Avenue interchange; and
  - Airport Road improvements.

Funding Sources

The TMP has highlighted numerous inter-municipal projects that, although being critical to meeting forecast travel demand requirements of the municipality, fall outside of the City's jurisdiction or border with the municipality. The formation of partnerships involving public agencies, including: Leduc County, AT, City of Edmonton, and authorities such as the EIA, local business associations and private developers must be formed to increase the potential for advancing these initiatives.

Transportation Facilities Management

The City of Leduc in addition to providing for the financing of new infrastructure is responsible for investments required to manage, operate and maintain all of its assets related to transportation infrastructure.

Transportaton infrastructure must be maintained throughout the entire life-cycle inclusive of its eventual replacement/reconstruction.

The following initiatives have been identified as contibuting to the processes already in place within the City.

- Traffic: Enhancement of the City's traffic data collection program through the use of permanent or temporary traffic counting devices.
- Transit: Passenger boardings and alightings should continue to be collected on each transit route served by Leduc Transit along with estimates of the costs associated with operating, and maintaining each route.
- Multiway: The multiway trail and pathway system continues to expand througout the City promoting walkability, with links to residential subdivisions, recreation destinations, cultural destinations, commerce hubs and high activity areas.
- Travel Trends: As both the City of Leduc and the areas that surround it continue to experience growth, it becomes essential to fully understand travel trends to recalibrate the City's travel demand model. To this end the City should plan for an origin-destination travel survey to be undertaken sometime within the next five years which would include sampling both residents and employees to determine current travel trends.

The TMP recommends adoption of the Transportation Impact Assessment guidelines to be applicable to all development or re-development initiatives that are proposed within the City of Leduc's municipal boundaries. The TIA guidelines should include established standards in relation to the minimum acceptable planning level of service to be adopted for its collector and arterial roadways and associated intersections in terms of level-of-service to be provided to each travel mode inclusive of accommodating heavy vehicle operations.

The TMP recognizes the future need to enhance traffic operational management measures in concert with other sister agency initiatives to assure City's residents benefit from maximizing available roadway infrastructure. Such areas include traffic signal coordination and management, cooperation with other agency operational initiatives.

PUBLIC INVOLVEMENT

As part of the preparation of the 2018 TMP, a public involvement process was developed and numerous sessions were held throughout the study to ensure the community and various stakeholders were informed and had the opportunity to contribute. The meetings allowed for individuals, groups and neighboring jurisdictions to gain an

understanding of the study, its policy and design requirements, and provide input into the plans. At all phases, the consulting team ensured that the information related to the development of the 2018 TMP and its associated impacts were conveyed in a clear, consice manner.

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1 INTRODUCTION

The City of Leduc is located in Leduc County south of the City of Edmonton. According to the 2016 Federal Census, the population of the City was 29,993, however, the more recent City of Leduc Census reported a 2018 population of 32,448 persons, representing an 8.1% growth over the two-year period. Although representing the 10th largest city in the Province in terms of population, the municipality exhibited over the last decade the 3rd fasted growth characteristics in the Province.

The purpose of the City of Leduc's 2018 Transportation Master Plan (TMP) is to prepare a long-term transportation infrastructure plan that is suitable to meet the growing development needs of the City. An efficient, well-connected, and fully integrated transportation system is critical to the quality of life of the community, and to maintain economic sustainability for the City. The urban form of the City influences the choice of every resident of whether to drive, walk, cycle, or take public transit.

The 2018 TMP provides, and builds upon, the 2013 TMP to provide a blueprint for planning, development, and operations of the multi-modal transportation network.

This 2018 update documents and analyzes current travel trends, forecasts future travel conditions, and develops a long-term transportation strategy for the City.

The 2018 TMP is to be used to adopt a sustainable approach to all modes of transportation, as a guide to future development, and as a long-term plan for prioritizing the recommended improvements and ensuring the City remains compliant to off-site levy requirements in terms of updating and validating future planning projects within the municipality.

1.1 BACKGROUND

The City of Leduc's 2018 TMP is intended to guide the implementation of transportation infrastructure throughout the City of Leduc.

The need for updating the previous TMP was triggered by the population and employment growth, as City of Leduc Census data indicated a growth of more than 85% over the last decade.

The current City of Leduc population is forecast to grow from 32,448 today (2018), to more than 54,000 (a 66% growth rate) in the next three decades. With a growing population, the transportation system becomes increasingly vital to create an accessible City.

The City of Leduc is characterized by a concentration of industrial development on the north end of the City, and is adjacent to the economic hub of the Edmonton International Airport (EIA).

Given the intensification of the industrial development coupled with the proximity to the Highway 2 (Queen Elizabeth II) corridor, allows the City of Leduc a unique connection to the north central Alberta region.

To address future growth, the new 2018 TMP provides direction for transportation planning to enhance the quality of life and economic vitality through a provision of a transportation system that offers choices. This TMP has laid out guidelines for achieving the long-term vision in a shared manner between the City, the development community, and the residents of the City of Leduc.

1.2 VISION

The timeframe of the TMP represents a 30-year horizon and is intended to fully integrate with the vision and principles of the City's "*Municipal Development Plan*" (approved in August, 2017).

Within the next three decades the TMP envisions growth of between 23,100-to 26,300 new residents and 6,600-to-14,900 additional employees; these projections remain consistent with the Edmonton Metropolitan Region Board (EMRB) forecasts.

The transportation vision within the TMP is intended to facilitate these objectives by planning for a more walkable and more transit supportive community, while assuring residents of a high quality of life.

Within the next three decades, the City is envisioned to have an integrated, balanced and efficient municipal transportation system that:

- moves people and goods with a range of modal options inclusive of:

  - an expanded multiway trail network beyond the existing 68 km, with additional multiways being constructed as development progresses that would promote walking and cycling activities;
  - an expanded Leduc Transit Services to provide regular local and commuter transit service between Leduc, Nisku and Edmonton; and
  - driver-assisted transportation services that provides adult seniors (65+) and adults with cognitive and/or physical disabilities door-to-door service, through Leduc Assisted Transportation Service (LATS).
- provides modal choices for residents that encourage less reliance on gasoline powered vehicles and contributes to Provincial objectives of climate change mitigation and adaptation;
- provides for automobile and commercial vehicle traffic within and around the community;
- provides a connected and seamlessly integrated transportation system with partner jurisdictions such as Leduc County, the City of Edmonton, the EIA and Alberta Transportation (AT) that leverage opportunities for trade and travel;
- supports economic and social growth of the City of Leduc in part through a transportation system intended to move people and goods to the benefit of the wide range of businesses and industries located within the municipality;
- moves people and goods locally, regionally, provincially, nationally and internationally that minimizes delays and congestion and accommodates, through planning and traffic operations, the freight rail services that currently travel through the community;
- contributes to the quality of life in the City of Leduc;
- is characterized by infrastructure and services for all travel modes within and through the City of Leduc that manage congestion while promoting public health and safety;
- encourages public transit through transit-supportive land use patterns and transit-oriented development forms that compete effectively with private automobile use;
- serves to integrate the multiway network with new neighbourhood developments;
- accommodates residents with mobility and physical limitations; and
- is supported by a well-informed public and local transportation policies, plans and management achieved through effective communications and active public participation within a transparent transportation planning process.

Supporting Studies

The forecast growth within Leduc is to be based upon the strength of the numerous plans and studies that have been developed by the City, such as the: "*Downtown Master Plan*", "*Strategic Plan*", "*City of Leduc-Leduc County Inter-municipal Development Plan*", "*Neighbourhood Design Guidelines*", "*Neighbourhood Design Strategy*", "*Land Use By-Laws*" and numerous approved Area Structure Plans (ASP).

Many of these plans emphasize visions that require the City to…

build upon its position as a transportation hub while offering multiple and effective modes of travel, including internal and regional transit, and build infrastructure that promotes accessibility within the City and wider region.

In addition, the City has led and participated within numerous functional planning studies coordinated with its adjoining jurisdictions in recognition of the extensive growth.

All of the supporting studies recognize that the City of Leduc is primarily served by the Highway 2 north-south freeway corridor which is part of the National Highway System that connects the City of Calgary to the City of Edmonton and northern communities.

Over the last few years the lands on the west side of Highway 2 corridor within the EIA and within the City of Leduc have experienced significant development pressure for transportation facility upgrades. The completion of Anthony Henday Drive (ring road) within the City of Edmonton combined with the recent annexation initiatives by the City of Edmonton and the City of Beaumont to the north of the City of Leduc, is forecast to result in increased use of the Highway 2 corridor and underscore the necessity of developing parallel continuous north-south arterial corridors that would further integrate the transportation networks of the City of Leduc with the City of Edmonton.

The City of Leduc[1] in concert with AT[2], and the EIA[3] have undertaken a significant amount of planning to identify the future transportation/transit and related infrastructure requirements necessary to address the future development of the City's communities. The TMP is intended to fully incorporate these planning considerations and provide a path forward to assure that the City's transportation objectives are achieved on behalf of the City's residents.

1.3 OBJECTIVES

The key objectives of the 2018 TMP are to:

- support the overall Municipal Development Plan (MDP) in regards to its goals, objectives and high level policies;
- develop and define a roadway

1 "*City of Leduc Aerotropolis Integrated Land Use Compatibility Plan*", InterVISTAS Consulting 28 June, 2011. "City of Leduc Transportation Study Update 2006-to-2016" (June 2009)
2 "*Highway 2 Upgrades S of Leduc to N of Ellerslie Road 2010 Functional Planning Study*", Focus Group (May, 2010); "Queen Elizabeth II and 65th Avenue [Leduc] Interchange Functional Planning Study" (Oct. 2016)
3 "*Draft Edmonton International Airport 2010-2035 Master Plan Update (2010)*"

implementation strategy to address today's and future transportation needs in the short term, medium term, and long term time horizons;

- guide and coordinate future urban growth decisions to fully integrate sustainable communities with affordable transportation choices;
- address facilities for all transportation modes, establish roadway planning initiatives, provide for contingencies and establish target thresholds for roadway improvemnts;
- improve the efficient movement of goods by recommending improvements to the future truck route that would provide a balance between traffic safety, regional commerce, roadway capacity and community protection;
- provide an integrated transportation network that emphasizes the potential for furthering the City's economic development potential; and
- update and develop policy statements that best lead towards an accessible City of Leduc.

A detailed study process was carried out that incorporated both technical aspects and public consultation components.

The 2018 TMP is intended to be used as a basis for adopting safe, innovative and dynamic approaches that guide future development within the City of Leduc.

1.4 METHODOLOGY

The TMP methodology was structured so as to:

- develop a blueprint for the future transportation network;
- develop strategic transportation policy statements;
- identify and improve the:
  - transportation network;
  - multiway system;
  - heavy vehicle routes; and
  - rapid transit corridors.
- enhance the City's:
  - pedestrian connectivity;
  - roadway connectivity; and
  - inter-regional transportation network.

The 2018 TMP study objectives were achieved by undertaking the following study methodology tasks and activities:

- background information, such as related plans, strategies, past TMPs, and other City of leduc planning documents were assembled and reviewed;
- current traffic information was reviewed to determine existing local travel trends and patterns that were analyzed with the objective of improving the short-term network efficiency;
- the Strategic Policy Statements from the 2013 TMP were reviewed and updated to further encourage sustainable development;
- ultimate cross-sections for major City roadways were defined through the functional planning/design process;
- operations of the CP Rail corridor were reviewed and evaluated in terms of there potential to accommodate future public transit opportunities;
- current City transit services were reviewed and a "go-forward" plan developed that would see existing and future residential communities

connected with employment and entertainment centers;

- opportunities were explored that would see the expanded development of the multiway system to encourage sustainable modes of transportation such as cycling and walking between communities and attractions;
- opportunities to modify the existing heavy vehicle route network were identified that incorporated future transportation network elements to assure sustainable goods movement; and
- traffic forecasts were developed based upon population and employment forecasts and an understanding of current travel trends obtained from an origin-destination survey
- a long-term roadway network was established to provide a "go-forward" approach that matched long-term infrastructure with identified long-term planning requirements.

The 2018 TMP also included a functional corridor analysis throughout the City of Leduc to establish the ultimate cross-sections for each of the following major corridors:

- 42nd/43rd Street (Allard Ave to Airport Rd);
- Grant MacEwan Blvd (Southwest (SW) Boundary Rd to 65th Ave);
- 65th Ave West (74th St to Highway 2);
- 65th Ave East (Highway 2 to Rge Rd 250);
- Black Gold Dr (50th St to Grant McEwan Blvd);
- Southeast (SE) Boundary Rd (Highway 2A to East of Robinson Access); and
- SW Boundary Rd (74th Street to East of Grant MacEwan Blvd).

The functional corridor analysis served to establish ultimate requirements for the roadway width, the roadway alignment, the ultimate number of lanes, the type of intersection control (i.e traffic signal, All-Way-Stop), and future access provisions. The major corridors have been planned to provide for multiways, where applicable.

The functional planning approach incorporated roadway designs intended to afford optimum traffic flow while maintaining a high regard for safety of road users.

In concert with the TMP, a noise evaluation along the Grant MacEwan corridor (from the new Blackstone community in the south to Bridgeport Gate in the north) was undertaken. The evaluation conducted forecast modelling and simulation to estimate future long-term noise levels along the corridor.

1.5 The Previous Transportation Master Plan

The previous TMP document[4] is roughly 5-years old and served to guide the municipality "*in the implementation of transportation facilities throughout*

[4] "*Leduc Transportation Master Plan*" ISL Engineering and Land Services (May 2013), Pg,. 1

the City in an orderly and logical fashion."

The intent of the 2013 TMP was to address the significant growth that had occurred and took note that the average annual growth rate was 8.6% between 2006-to-2011 with a 2011 population of 24,139. Comparing this population to the 2017 municipal census of 31,130 persons would result in an average annual growth rate between 2011-to-2017 of 4.8%. This indicates that despite the downturn in the energy sector, which was thought to first affect municipal growth in 2014, the City of Leduc continues to demonstrate growth. A comparison of 2018 residential building permits issued with the same period of 2017 indicated a 2.5% year-over-year growth underscoring the need for continuing to plan for the City's future growth and infrastructure.

The 2013 Leduc TMP Report…

- emphasized the need for the 65th Avenue Interchange and noted its implementation as a short-term initiative;
- suggested traffic calming[5] on Alton Drive triggered by 50th Avenue improvements;
- identified opportunities for transit improvement strategies through:
  - service enhancements to the 50th Avenue and 50th Street corridors;
  - infrastructure enhancements such as park-n-ride lots to further the "C-Line" in the vicinity of the Leduc Recreational Centre linking to Edmonton's transit facilities;
  - service enhancements to at least one of the following areas: EIA, Nisku/Leduc Industrial Area, South Leduc and/or West Leduc; and
  - the advent of Smart Bus technology.
- suggested enhancements to the multiway system to address future community requirements and complete the network that would enhance connectivity and encourage sustainable and healthy mode choices;
- highlighted short, medium and long-term roadway impovements in the form of upgrades, intersection improvements, and new transportation facilities;
- encouraged the City to establish capital plans that improve transit, cycling and walking with emphasis on:
  - 50th Street (from Rollyview Road to 65th Avenue);
  - 50th Avenue (from 47th Street to Highway 2 including the downtown); and
  - linking West Leduc to the planned EIA developments.
- suggested the City consider future modifications to the heavy vehicle route network that recognize the advent of the future 65th Avenue and Highway 2A interchanges and Spine Road.

[5] Ibid, Section 5.3

The City of Leduc has taken a proactive approach to developing their transportation network. By 2018, the majority of the 2013 TMP infrastructure recommendations had either been, or were well on their way to being, completed. This served to underscore the need for an update of the TMP document which would recognize the current infrastructure performance characteristics and identify where transportation infrastructure and policy improvements are forecast to be required.

2 EXISTING CONDITIONS

2.1 THE MAJOR ROAD NETWORK

The City of Leduc currently maintains a roadway network comprised of 120 lane-km of arterial roadways, 55 lane-km of collector roadways, 31 traffic signals and an extensive network of local roadways.

The City's arterial roadway network is intended to accommodate higher traffic volumes, have limited access and connect to major Provincial highway corridors while also providing the City's neighborhoods with enhanced connectivity and accessibility.

The City's collector roadway network is characterized by lower speed corridors that connect the City's local roadways within neighborhoods to the higher capacity arterial roadways and other collector roadways.

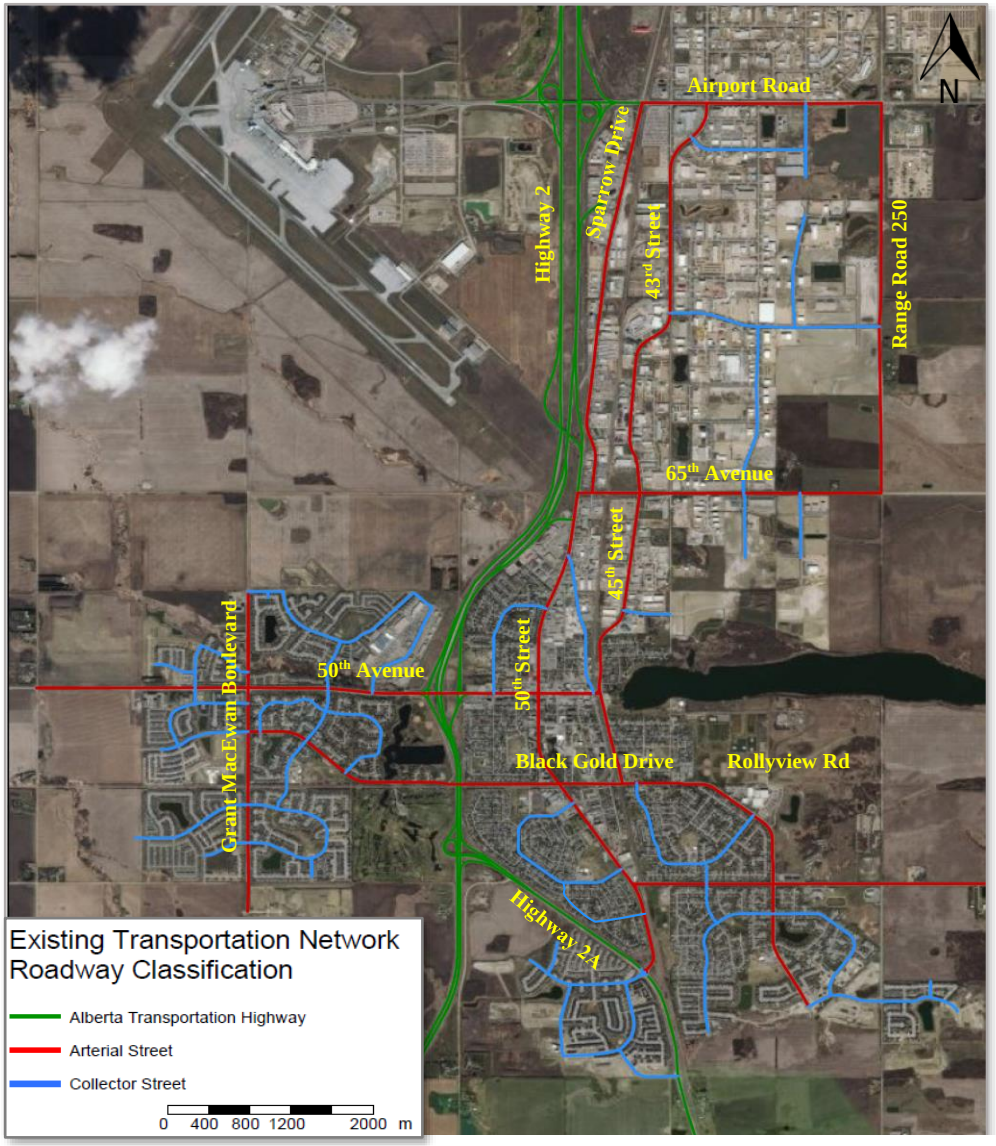


Exhibit 1-1: Existing Transportation Network and Roadway Classification

The City is bisected by approximately 6.0 km of the Provincial (AT) Highway 2 corridor, which traverses the City in the north-south direction. There are currently four access points to the Highway 2 corridor[1].

In addition, a short (2.7 km) segment of Highway 2A is also located within the City boundary in the south-east section of the City with two access points[2]. The City and Province have participated in functional planning studies that depict the relocation of the Highway 2/Highway 2A interchange further to the south outside of the current municipal boundary[3].

2.2 Existing Traffic Trends

A baseline of existing peak hour traffic trends inclusive of origin-destination and heavy vehicle characteristics was determined.

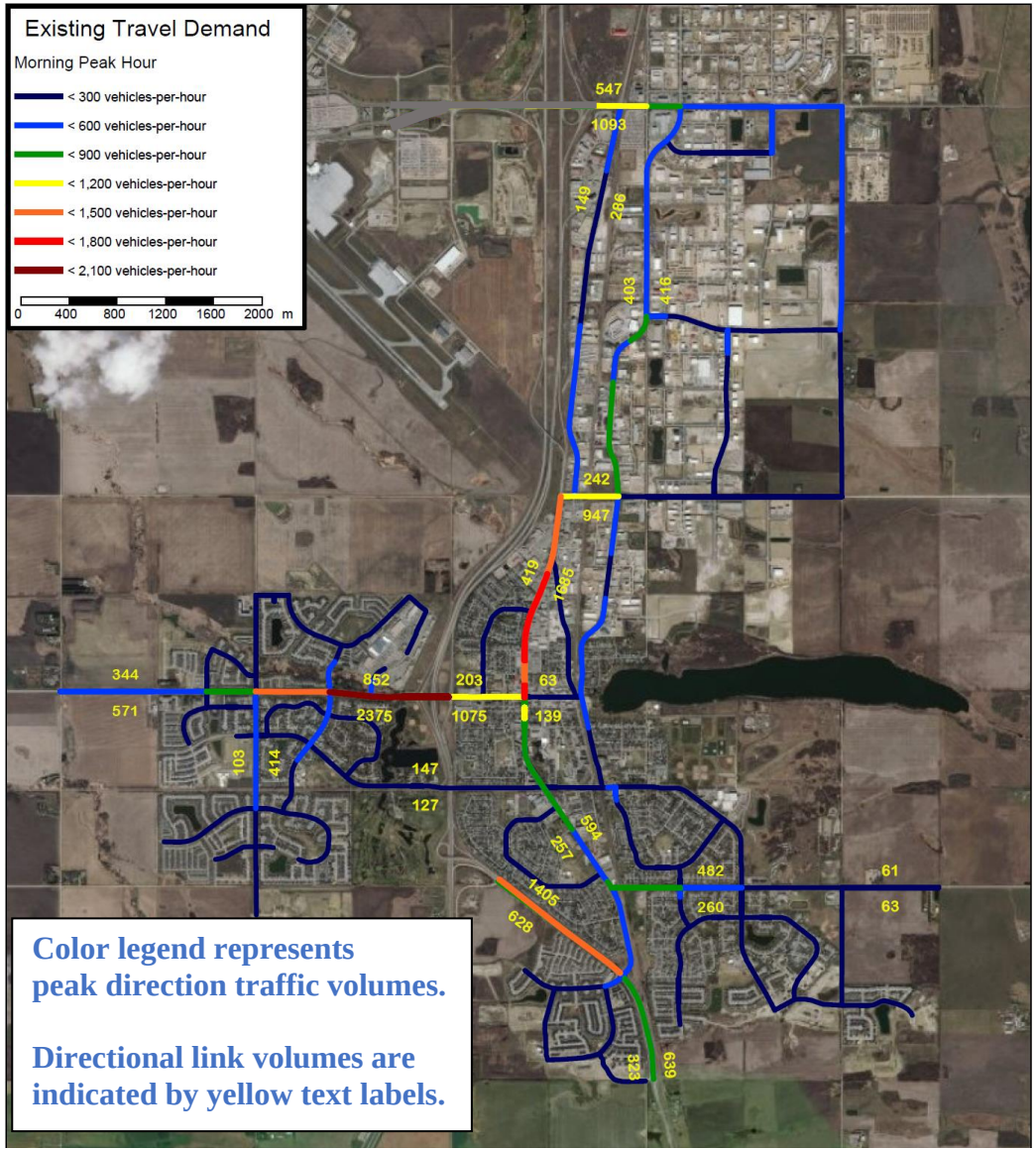


Exhibit 2-2: Morning Peak Hour Traffic Volumes

[1] The four access points are the Hwy 2A interchange, 50th Avenue interchange, the 50th Street On-and-Off-ramps and the Airport Road interchange
[2] The two access points are the 50th Street-Southfork Drive intersection and the Southfork Road/South East Boundary Road intersections with Highway 2A.
[3] See Section 3.3 for further discussion.

2.2.1 Traffic Volumes

The TMP saw traffic counts information assembled at 68 intersections throughout the City of Leduc. Traffic counts were undertaken in June (prior to school ending) and September (after school commencement) to provide a current and thorough understanding of traffic characteristics.

Exhibit 2-2 and Exhibit 2-3 illustrate the morning and afternoon peak hours of travel demand, respectively.

Current traffic volume trends indicate:

- a heavy east-west traffic movement along the 50th Avenue and Airport Road corridors in the vicinity of Highway 2;
- significant north-south traffic movements along the 50th Street corridor between 50th and 65th Avenues;
- a significant draw to the northbound Highway 2 corridor during the morning peak hour of travel demand; and
- an equally heavy amount of return traffic southbound on Highway 2 during the afternoon peak hour.

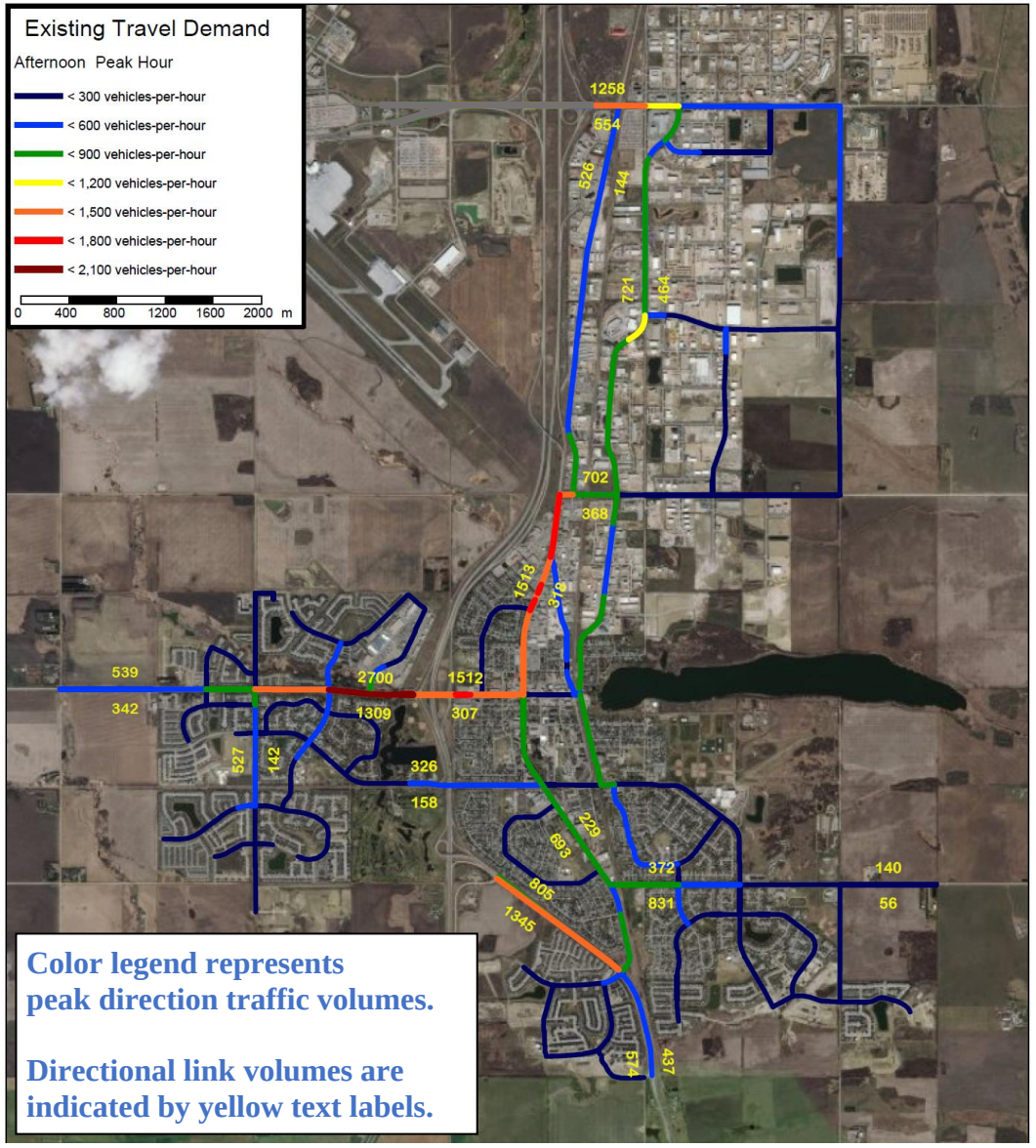


Exhibit 2-3: Afternoon Peak Hour Traffic Volumes

2.2.2 Origin-Destination Trends

An origin-destination survey was undertaken as part of the TMP in an effort to identify current vehicular travel trends. The origin-destination (OD) survey was done by collecting travel information of Rogers Wireless phone subscribers[4] travelling between defined cellular zones. The survey was undertaken over a three-month period (between September 3rd to December 4th, 2016)[5] by anonymously geo-referencing active devices on the Rogers Wireless network. The geo-referencing matches between zones indicate travel has occurred and the travel patterns were recorded in the form of intra-regional and inter-regional travel.

Intra-Regional Travel

The City of Leduc offers its residents an opportunity to live and work within its own municipal boundary. The OD Survey determined that roughly 40% of Leduc residents live and work within the City/EIA/Nisku area.

Table 2-1 highlights the proportional outbound and inbound travel trends internal to the City by segmenting the municipality into four quadrants: north-east, north-west, south-east and south-west.

Table 2-1: Intra-Municipal Origin-Destination Trends

OUTBOUND Trips					
		Destination			
Origin		North-East	North-West	South-West	South-East
	North-East		9%	18%	73%
	North-West	10%		53%	37%
	South-West	5%	25%		70%
	South-East	20%	12%	68%	

INBOUND Trips					
		Destination			
Origin		North-East	North-West	South-West	South-East
	North-East		11%	9%	32%
	North-West	14%		21%	13%
	South-West	16%	56%		54%
	South-East	70%	33%	70%	

[4] Approximately 23% of wireless service subscribers in Alberta use Rogers Wireless. "Communications Monitoring Report 2016", C.R.T.C., 5.0 Telecommunications Sector Overview: iii) Competitive Landscape, Table 5.5.8 Wireless Subscriber Market Share, by Province and Territory (2015) (%).
[5] Note: The origin-destination survey was carried out prior to the opening of the Outlet Mall, Costco and related EIA developments.

Travel trends within the City indicate heavy movements crossing the Highway 2 corridor between:

- the south-east and south-west sectors, linking the residential and downtown sectors; and
- the south-east and north-east sectors, linking the downtown and industrial sectors.

Inter-Regional Travel

Travel between the City of Leduc and its neighboring municipalities was also determined. Exhibit 2-4Exhibit 2-4: Inter-Municipal Origin-Destination Trends depicts the outbound and inbound travel trends destined to, or coming from, regions outside of the City of Leduc. The overall travel trends indicate that:

- approximately 30% of traffic remains within the City of Leduc;
- approximately 40% of traffic remains within the Leduc/Nisku/EIA area;
- there is a large draw for traffic travelling to and from Edmonton (about 40%);

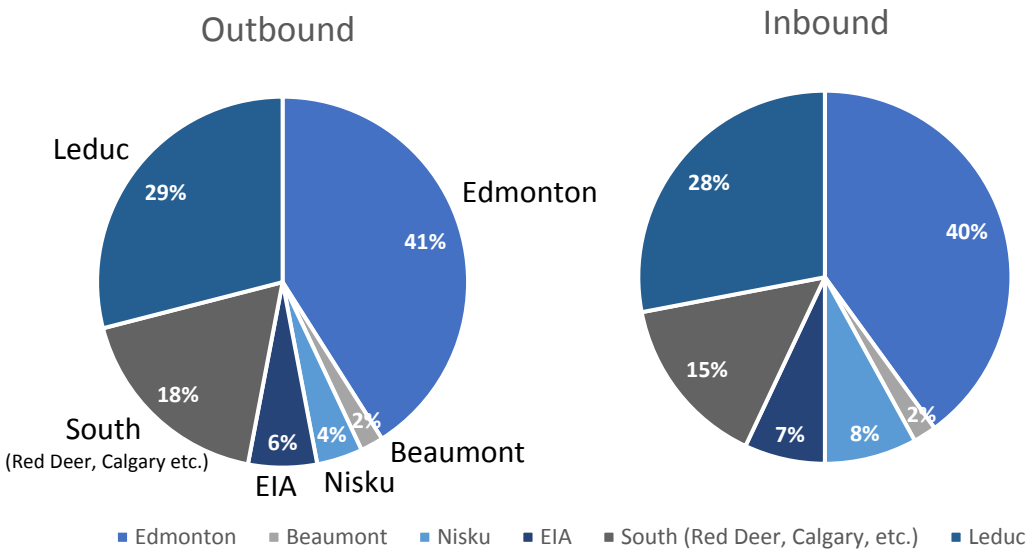


Exhibit 2-4: Inter-Municipal Origin-Destination Trends

- approximately 15-to-20% of traffic is destined to the south.

2.2.3 Heavy Vehicle Routes

The City of Leduc By-Law No. 878-2014 defines heavy vehicles as those with a:

- maximum gross weight of 8,000 kg or more; or
- a length exceeding 12.5 metres.

Exhibit 2-5 illustrates the current heavy vehicle routing within the City. Heavy vehicles are restricted to these designated routes, unless the vehicle is being operated on the most direct and practical route between a location and the nearest truck route for reasons such as, but not limited to, providing services, goods delivery or collections.

In addition, all provincial highways are designated as heavy vehicle routes. The Highway 2 corridor is part of the National Highway System, connecting the City of Leduc to Edmonton and to Calgary to the south. The current City heavy vehicle route reflects the importance of the National Highway System on economic diversity.

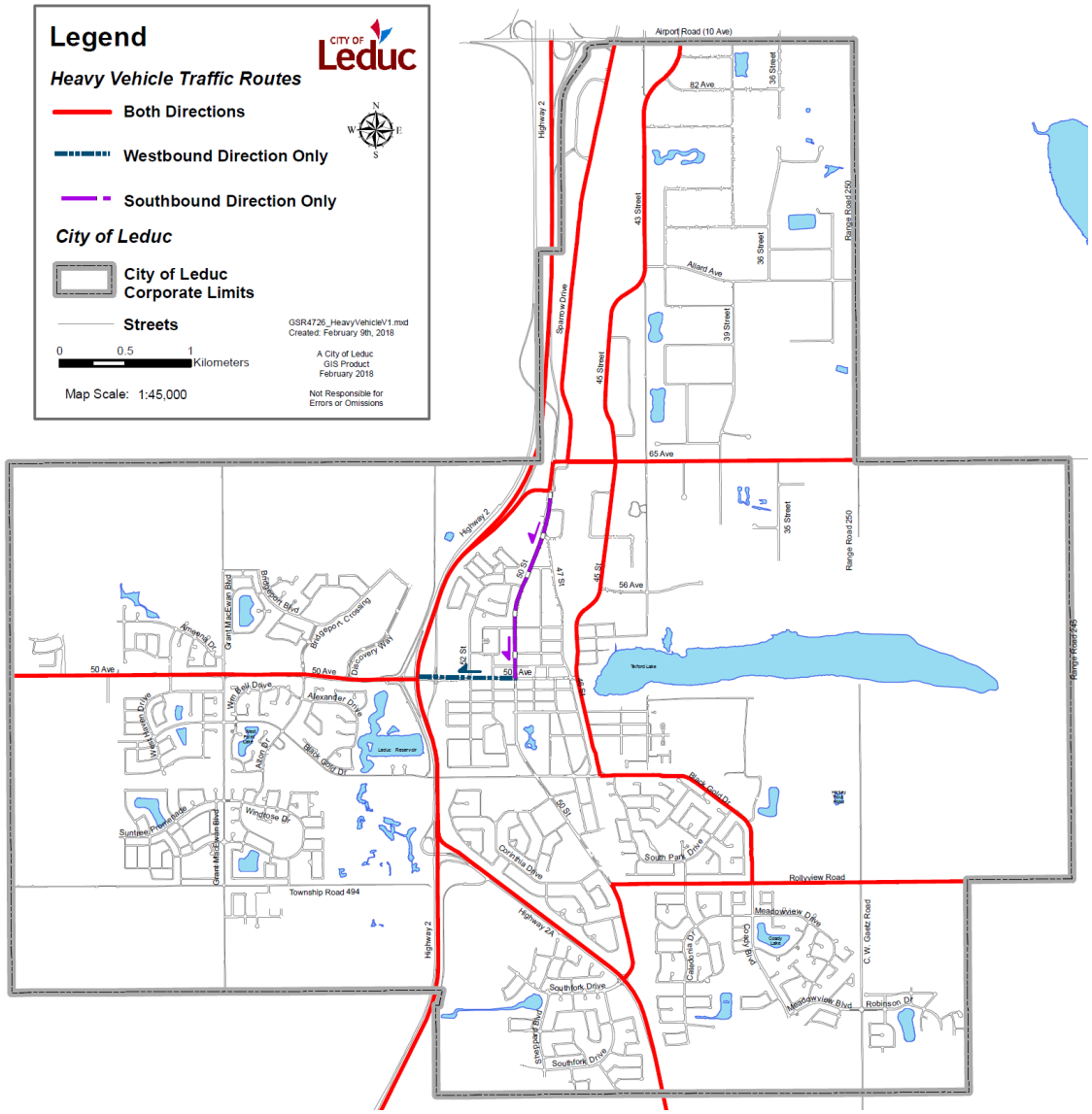


Exhibit 2-5: Existing Heavy Vehicle Traffic Routes (City of Leduc, February 2018)

Within the City of Leduc, the routes generally follow approximately 23 km of arterial roadways (of which about 2.5 km along 50th Street and 50th Avenue are one-way only).

The intention of the designation of heavy vehicle routes is to limit travel to major arterial roadways and highways and thereby reduce maintenance requirements to local and collector roadways, damage to adjacent landscaping (tree) damage and related noise and vibration impacts.

2.3 EXISTING TRANSIT SERVICE

The following section provides a summary of the current Leduc transit service network and ridership characteristics.

Transit Service Network

Leduc Transit is an inter-municipal partnership between the City of Leduc and Leduc County.

Leduc Transit provides six routes:

- ***Route 1*** is a commuter bus route (AM and PM weekday) between Leduc, Century Park (south Edmonton), Nisku and Royal Oaks.
- ***Route 2*** is a local feeder bus route (AM and PM weekday) that operates in the west sector of Leduc.
- ***Route 3*** is a local bus route (AM and PM weekday) that operates from 50th Street/47th Avenue in Leduc to the Leduc County Centre and EIA via the Leduc Business Park and hotel corridor on Sparrow Drive and Sparrow Crescent.
- ***Route 4*** is a local feeder bus route (AM and PM weekday) that operates in the southeast sector of Leduc.
- ***Route 5*** is a local bus route (AM and PM weekday) that operates in Nisku between 5th and 8th Streets and Airport Road and 25th Avenue. With service to 19th Avenue/ Sparrow Drive, and to 19th Avenue/Range Road 251.
- ***Route 10*** is a local bus route that operates from 50th Street/47th Avenue to the Leduc County Centre via the hotel corridor on Sparrow Drive and Sparrow Crescent, to the Premium Outlet Collection at EIA and the EIA terminal. This route also connects with Edmonton Transit's Route 747 to provide additional service between Leduc and Edmonton in time periods that Route 1 is not operating.

The routing pattern is characterized by large one-way open loops. All routes provide 30-minute frequency during the AM and PM peak periods weekdays only, with the exception of Route 10, which operates on a 60-minute frequency, 8:50am to 10:06pm Monday to Saturday and from 9:50am to 7:06pm Sundays and stats (except Christmas).

Service is provided by three 40-foot buses and five 28-foot buses. The routes within the Leduc transit network serve different sectors of Leduc, Nisku, the EIA, Royal Oaks and the Century Park Station in Edmonton. The route network uses bus zones at 50th Street and 47th Avenue in Leduc as a common connection or transfer point.

There are three park and ride lots available free of charge for Leduc Transit customers. The lots are located at the Alexandra Arena, the Leduc Recreational Centre and the Leduc County Centre.

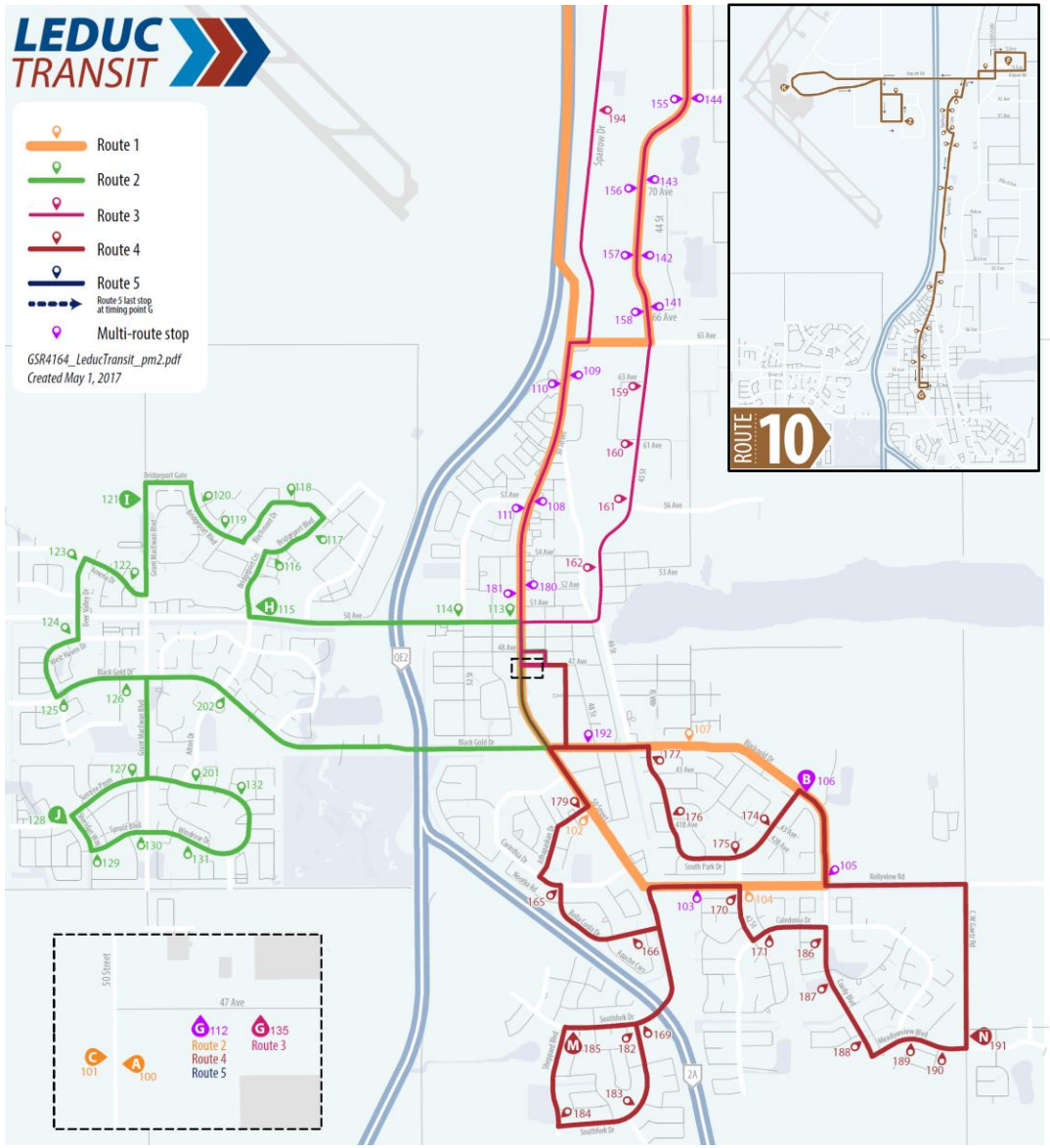


Exhibit 2-6: Leduc Transit Routes 1-5 Map, Route 10 Map Inset (Leduc Transit, 2018)

Daily Passenger Volumes

Leduc Transit has, over the 2011-to-2017 period, seen a tripling in transit patronage from 33,106 riders in 2011 to 90,500 riders in 2017. The 2018 projection is forecast to reach 100,000 riders.

The growth in ridership since 2011 emphasizes the extent of which the City has made the transit system a priority within its transportation network.

Despite each of the Leduc Transit routes exhibiting approximately the same schedule and annual operating hours, Exhibit 2-7 illustrates that roughly 2/3rds of the patronage makes use of Route 1 that connects the City to Edmonton's transit system.

Leduc Transit 2017 operations statistics include:

- 0.39 hours of operation-per-capita;
- 2.62 ridership-per-capita;
- 6.73 passengers-per-operating hour; and

- 22% revenue-to-cost percentage.

In comparison to similar transit systems in Alberta[6], Leduc Transit has comparable ridership-per-capita statistics.

Specialized Transit Service

The City of Leduc operates LATS that provides service for seniors (65+) and adults (18+) with cognitive and/or physical disabilities.

Service is provided by six cutaway buses via a shared ride, door-to-door and driver-assisted accessible transportation service and a fixed route scheduled shuttle service connecting senior's residential complexes and several shopping centers with the City of Leduc.

- The door-to-door service is available weekdays (8:00 to 21:30) and Saturday and Sunday (9:00 to 17:30).
- The shuttle service is available weekdays (9:00 to 15:00).

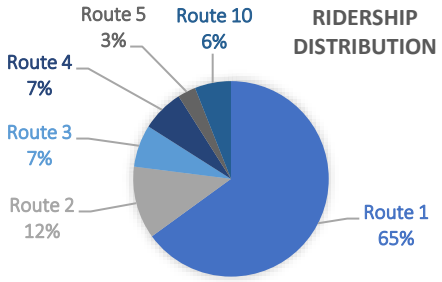


Exhibit 2-7: Ridership Distribution

LATS ridership has increased by 46% between 2011-to-2016 where ridership increased from 20,573 to 30,182. The 2018 projection is forecast to reach 30,900 riders.

In comparison with other small Canadian specialized transit services LATS has good ridership per operating hours and operates close to the average in terms of service provided per registrant and revenue to operating cost ratio. Leduc also has one of the highest levels of registrants per capita.

[6] Spruce Grove and Fort Saskatchewan operate service similar to Leduc, their 2016 ridership-per-capita was 2.68 and 2.7, respectively.

2.4 ACTIVE TRANSPORTATION

Many residents work in or around the Leduc area, and the municipality's size and flat topography would serve to encourage active transport modes (such as walking and cycling) for many trips in the area. The provision for pedestrian and cyclist facilities encourage people to use active transport modes on a more regular basis and help reduce the overall motor-vehicle footprint and level of congestion on municipal roadways.

The Multiway System Network

The multiway system in Leduc is an extensive network of multi-use trails that provides a transportation and recreational function for its residents.

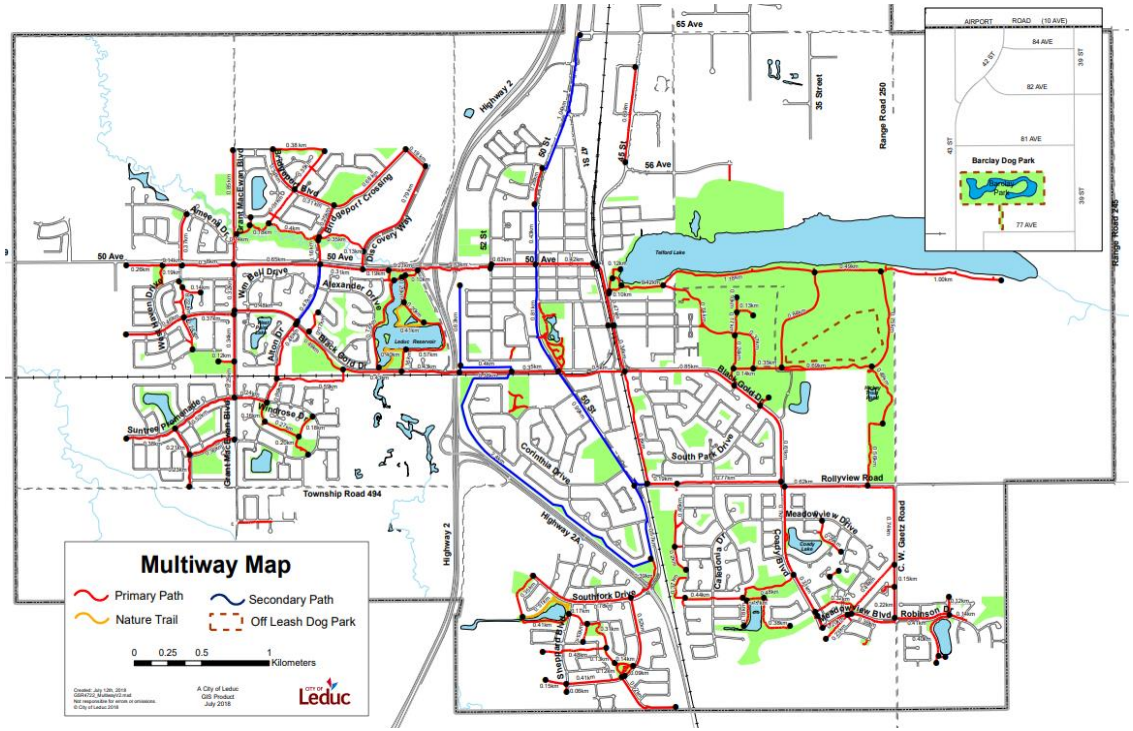


Exhibit 2-8: City of Leduc Multiway Map (City of Leduc, July 2018)

The TMP recognizes the importance of continued maintenance of the multiway system and the need to provide for the necessary planning that would assure expansion of the network so as to best integrate with the future growth of the municipality. The multiway network is considered a valuable facility which is well-used by local residents.

The multiway trail network (is approximately 68km in length) and is primarily comprised of paved pathways, which provide accessibility and accommodation of many active transportation modes. Approximately 1km of nature trails also exist within the City. These gravel trails are located around the Leduc Reservoir and around the stormwater pond in Southfork.

The paths are provided within community or regional parks and other open spaces, as well as along arterial and local collector roads; they are cleared of snow in winter months.

The City's multiway standard provides for a 3m wide pathway, which is intended to accommodate the safety of all users, by allowing passing maneuvers to accommodate speed differentials.

The multiway path network also forms part of Canada's Trans-Canada Trail, otherwise known as The Great Trail, which is the longest network of recreational trails in the country. The Great Trail connects to two main east-west multiway routes, 50th Avenue and Black Gold Drive. It is also proposed to connect to Telford Lake, which is Leduc's main recreational facility.

Sidewalks

Sidewalks are located throughout residential neighbourhoods and alongside central streets within the City of Leduc, which are in addition to the Primary and Secondary Multiway Paths. However, there are limited sidewalk provisions in the industrial part of Leduc with several roads in the area having no sidewalks at all on either side of the roadway.

Numerous mid-block pathways are also provided for pedestrians and cyclists within the residential neighborhoods to shorten walking distances to neighborhood parks or streets. These mid-block pathways are also cleared of snow during winter months.

Most of the neighbourhood sidewalks are not included in the snow removal service provided by the City. However, Item 10 from the City's Community Standards Bylaw (Bylaw No. 711- 2008) includes the following requirement:

"*A Person shall reasonably remove snow and ice from any Sidewalk adjacent to land they Own or Occupy within 48 hours after the snow or ice has been deposited.*"

Connecting Transportation Modes

In general, the multiway paths and sidewalks enable bus users to access transit services. For most of the transit network in Leduc, the bus stops are accessible via the multiway or existing sidewalks. This facilitates easy access between transit and active transportation modes. However, there are sections of the transit network that the multiway does not cover. These conditions are found in the industrial areas of Leduc, specifically the Leduc business park.

The City of Leduc's residential and commercial areas currently have an extensive active transportation network that allows for pedestrians to access the multiway, sidewalks and transit services. However, industrial areas in the City remain underserved for pedestrians.

2.5 EXISTING RAIL CORRIDORS

The City is bisected by two CP Rail lines that provide for the movement of freight and goods across the Province.

- CP's Leduc subdivision track travels in the north-south direction on the east side of Highway 2. The line is a single track with spur lines and accommodates:
  - 10 trains-per-day between Edmonton and Black Gold Drive; and
  - 8 trains-per-day south of Blackgold Drive[7].
- CP's Breton subdivision travels in the east-west direction and connects Sunnybrook to Leduc. The rail line is located immediately to the south of Black Gold Drive and transitions on to the Leduc Subdivision north of Black Gold Drive[8]. The line accomodates two trains-per-week.

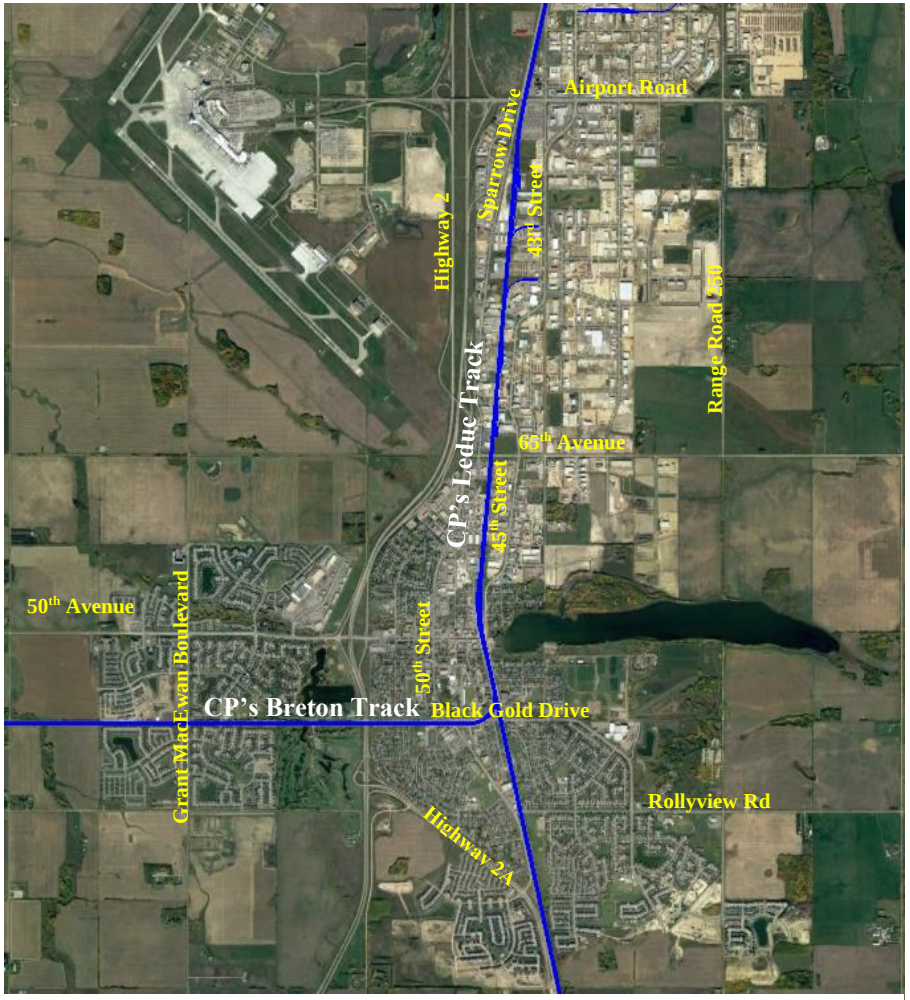


Exhibit 2-9: Existing Canadian Pacific Railway Tracks (Transport Canada)

[7] Transport Canada Dept of Natural Resources 2018 Data set.
[8] It is understood that CP had in the past approached the City of Leduc to acquire the east-west rail corridor.

2.6 Environmental Noise Monitoring

An environmental noise survey was undertaken within the City of Leduc to measure the current noise levels at various residential locations most affected by major roadways. This section provides a summary of the findings of the noise survey undertaken.

As part of the 2018 TMP, ten (10) noise monitoring sites were selected throughout the City boundary. The 24-hour noise measurements were conducted collecting broadband A-weighted as well as 1/3 octave band sound levels and were conducted under "typical" weekday traffic conditions during the summer months (All measurements were undertaken between August 10th, 2016 to August 26th, 2016).

Sound levels from roadways are commonly described in terms of equivalent sound levels over a 24-hour period ($L_{eq}24$).

The "City of Leduc Surface Transportation Noise Guideline" defines the permissible outdoor criterion sound level as 65 dBA $L_{eq}24$ for residential dwellings adjacent to an existing major transportation facility. This threshold is similar to other local municipalities.

Results of the noise monitoring show:

- typical trace of traffic noise levels that include: engine noise from vehicles, tire noise and typical acceleration and deceleration[9];
- an increase in noise level during the morning peak hour period that is sustained until after the afternoon peak hour period;
- noises were primarily dominated by the noise contributions of nearby roadways; and
- noise levels at all monitoring locations are below the permissible sound level of 65 dBA $L_{eq}24$, with the exception of two locations (along 54th Street and Willow Park Estates).

The two noise monitoring locations which were higher than the City's guideline are adjacent to Highway 2, which is under the Provincial jurisdiction. In these cases, AT would be responsible for noise attenuation as described by the Provincial Policy Guidelines.

Overall, no noise mitigation is required for the noise monitoring locations in the vicinity of arterials within the City of Leduc.

Noise levels next to local roadways in the City of Leduc are below the permissible sound level of 65 dBA $L_{eq}24$. No noise mitigation on behalf of the City is required.

[9] "*Bylaw 711-2008 Community Standards Bylaw*", which deals with noise nuisance and enforcement, prohibits engine retarder breaks and/or any sounds related to motor vehicles that "disturbs the peace of other individuals", #16(1) & #20.

3 FUTURE DEMAND FOR TRAVEL

The increase in population and employment within the City of Leduc mandates dynamic transportation planning to meet the needs of the community.

3.1 POPULATION AND EMPLOYMENT FORECASTS

The City of Leduc has more than doubled in population over the last 15-years, to 32,448 persons (City of Leduc 2018 Census). The next 30-years is anticipated to see continued economic and demographic expansion.

The City of Leduc continues to actively plan and strategize to meet the evolving transportation vision of the community. As a baseline for identifying future infrastructure needs within the City, population and employment forecasts were determined geographically as part of the model development exercise.

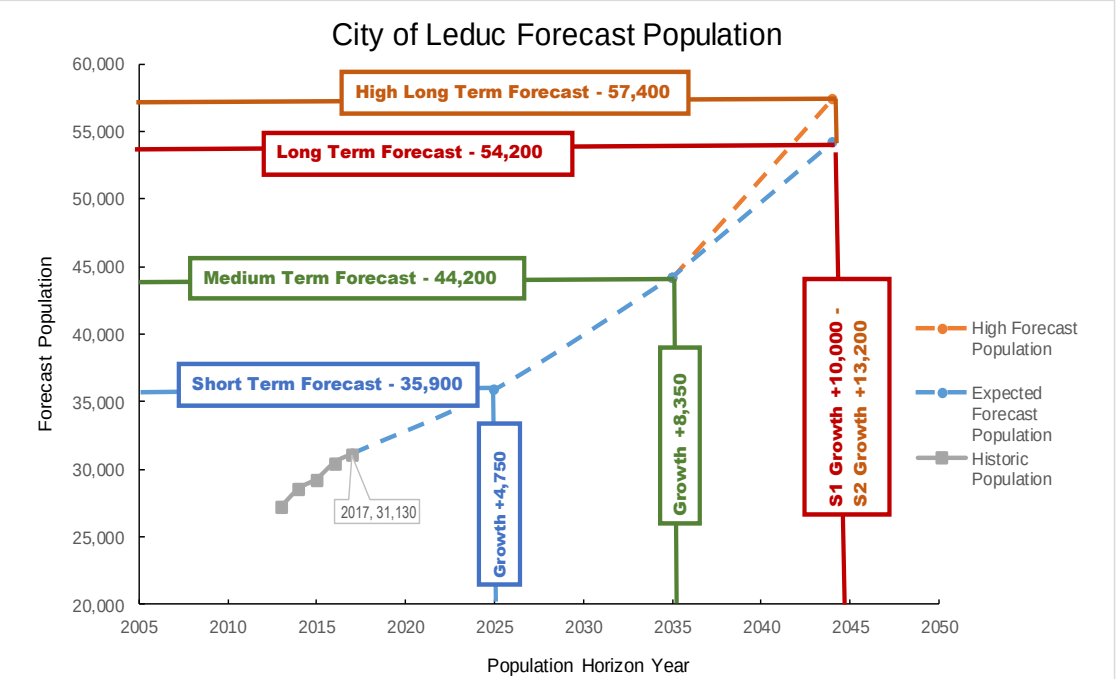


Exhibit 3-1: City of Leduc Forecast Population

With its roots based in the energy sector, the City of Leduc has a growing industry and employment base situated adjacent to the Edmonton International Airport and the Nisku Industrial Park.

To investigate future transportation needs, three planning time periods were selected, which would see:

- Short-Term Horizon: a 15.2% increase in today's population and a 24.8% increase in employment within the City;
- Medium-Term Horizon: a 23.1% increase in population and a 35.9% increase in City employment; and
- Long-Term Horizon: two growth scenarios that envisioned a 22.6-to-29.9% increase in population and a 23.6-to-53.2% increase in City employment.

Exhibit 3-1 summarizes the growth for each horizon year, and Table 3-1 details the growth in number of dwellings, retail and non-retail employment.

To establish employment and population estimates for the future, the City of Leduc's municipal boundary was divided into a zone system[1] that reflected key areas of future growth. The 2016 Census results and future population estimates were integrated into the zone system to develop a demographic map for the City of Leduc. The employment and population growth for each horizon year was then refined based on planning documents, such as ASPs, and communication with the development community to identify future areas of growth.

Where growth areas identified future number of dwelling units, an average persons-per-household rate was applied to determine forecast population values. The average person-per-household rate was based on municipal neighbourhood planning documents.

In regards to forecast employment growth, the City provided an employment zone phasing strategy. This provided an estimate of when development within each employment zone would be forecast to occur. Each of the traffic zones were assessed in terms of the zone's existing (2016) land uses, existing development level, planned land uses, available land for development and a review of planning documents. This assessment was then used to assign employment growth potential to each traffic zone.

The estimates of building area were then converted into employment estimates distinguishing retail from non-retail land uses. The ITE Trip Generation Manual was referenced to derive estimates of employment density.

Table 3-1: City of Leduc Forecast Dwellings, Employment and Population

	Short-Term	Medium-Term	Long-Term
Residential Dwellings	13,400 (+2,100)	16,700 (+3,300)	20,500-21,800 (+3,850-5,100)
Retail Employment	6,600 (+1,000)	8,000 (+1,400)	9,300-9,900 (+1,300-1,900)
Non-Retail Employment	14,000 (+3,100)	20,000 (+6,000)	25,300-33,000 (+5,300-13,000)
Population	35,900 (+4,750)	44,200 (+8,350)	54,200-57,400 (+10,000-13,200)

[1] The zone system was developed such that the detailed boundaries align with the larger Regional Transportation Model zone system.

3.2 GROWTH AREAS

Exhibit 3-2: City of Leduc Growth Areas illustrates all planned developments within the City of Leduc. The south and west areas are predominately residential developments and the north and east areas are designated business/industrial developments.

Exhibit 3-3 depicts forecast population and employment growth in the short-, medium and long-term time horizons in terms of number of new persons and number of new jobs within each zone.

The following sections serve to describe the land use potential envisioned in the following areas:

- City of Leduc: West;
- City of Leduc: South-East;
- City of Leduc: East; and
- City of Leduc: North.

A phasing strategy was developed for each growth area based upon communication with the City of Leduc and individual developers.

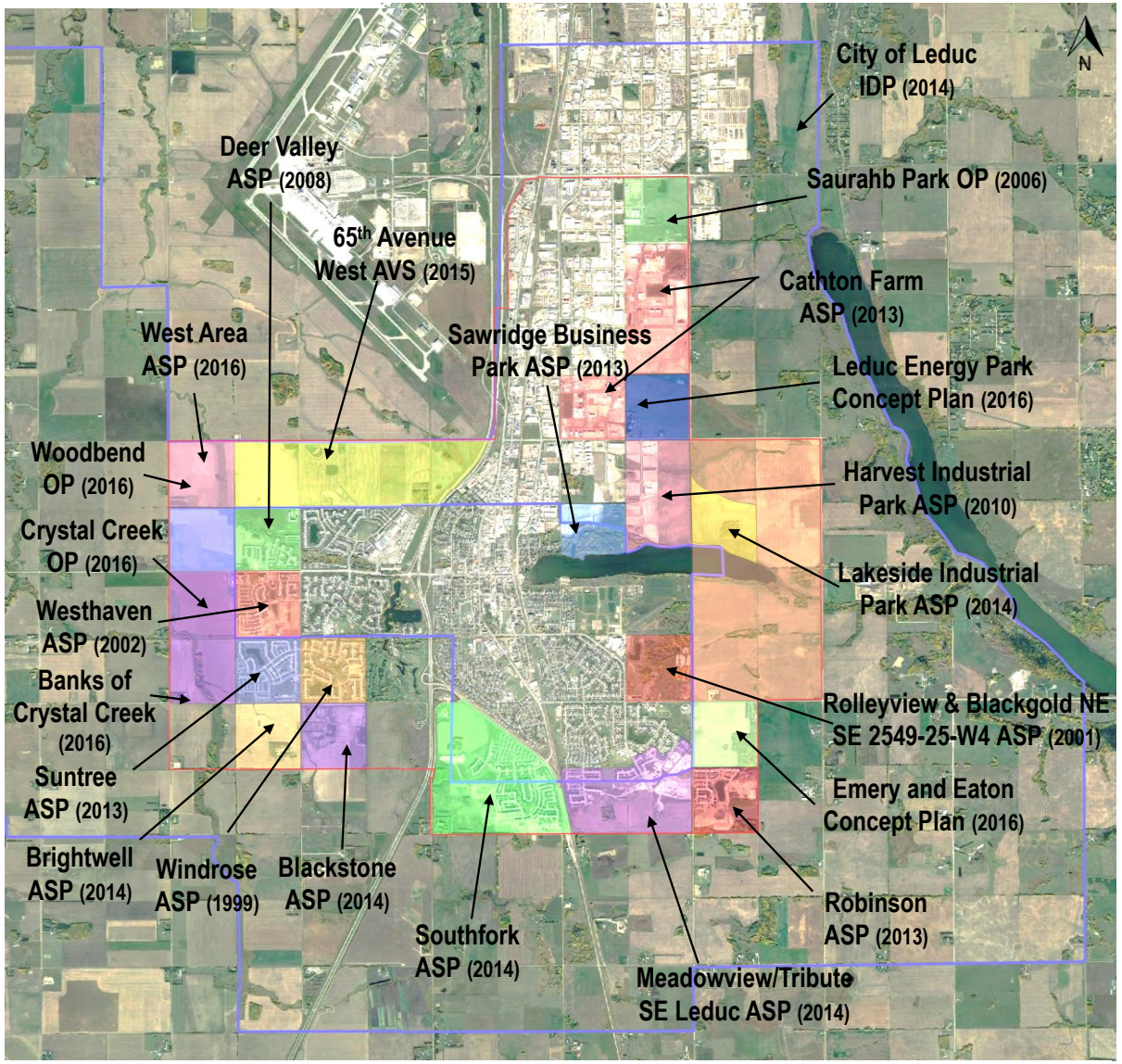


Exhibit 3-2: City of Leduc Growth Areas

City of Leduc West

- 65th Avenue West (~ 500 acres) located south of 65th Avenue and west of Highway 2. The development consists of commercial, public/semi public and residential land uses that are compatible with Airport noise contour data. The development would focus towards aerospace and aviation, life sciences, transportation and logistics. The development is intended to integrate with EIA initiatives and to work in concert with the 65th Avenue west corridor;
- West Area, Woodbend and Crystal Creek (~ 800 acres / five quarter sections) predominantly low-density residential with higher densities in the vicinity of the future 65th Avenue west corridor. Some commercial and institutional land uses would be located closer to 50th Avenue; and
- Blackstone and Brightwell (~300 acres) consist of residential development south of 50th Avenue, east and west of Grant McEwan Boulevard. [2]

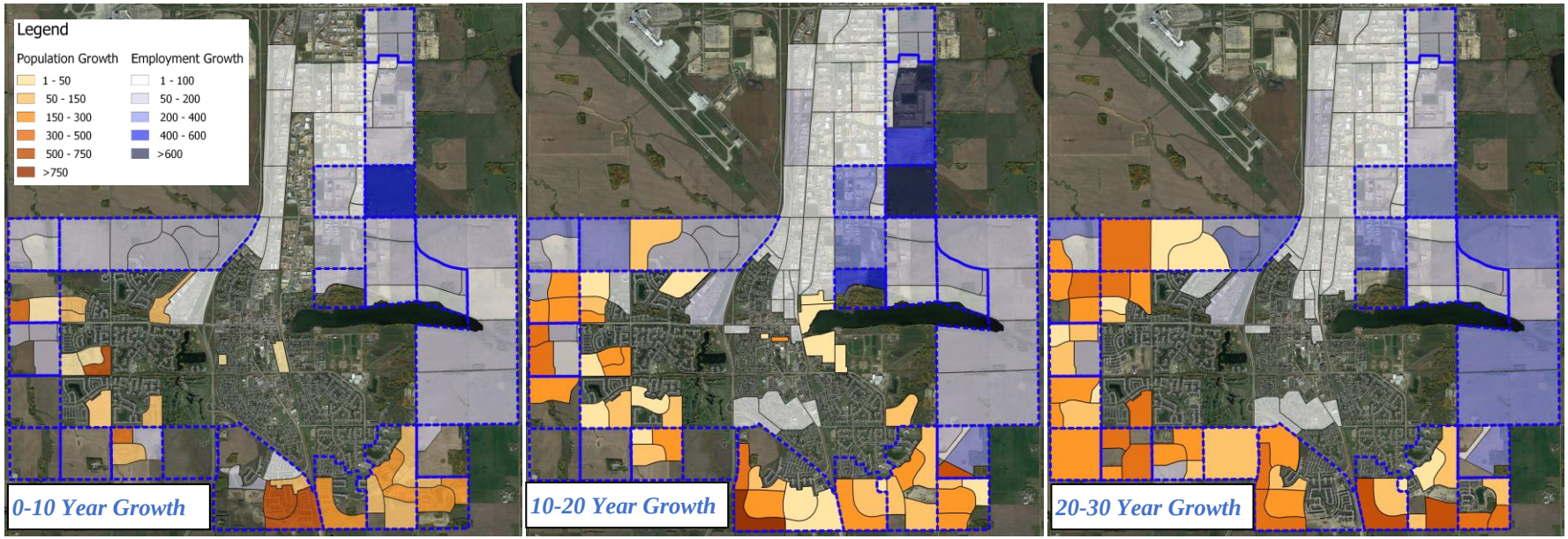


Exhibit 3-3: Forecast Population and Employment Growth

[2] Brightwell ASP (Stantec, 2016); Blackstone ASP (Stantec, 2014); Alberta Aerotropolis Viability Study (MXD Development Strategists and Stantec, 2015), Land Uses By-law 809-2013 (Leduc)

City of Leduc South-East

The southeast developments consist of a mix of low-to-medium density residential developments. Approximately half of the land within the municipal boundary is built-out.

The developments include:

- Southfork (~ 500 acres) located west of Highway 2A and east of the Highway 2;
- Meadowview/Tribute (~ 300 acres) located east of Highway 2A, south of Rollyview Road and west of C.W. Gaetz Road; and
- Robinson (~ 150 acres) located south of Rollyview road and east of C.W. Gaetz Road. [3]

City of Leduc East

The developments that border the eastern municipal boundary are primarily composed of employment parks, such as the:

- Sawridge Business Park, Harvest Industrial Park and Lakeside Industrial (~ 550 acres) located north of Telford Lake. The development would consist of mostly business employment and industrial development with green space protected;
- Telford Lake Southern District (~ 500 acres) located east between Telford Lake and City of Leduc boundary. The area would be the hub for transportation and logistics, agri-business and other Aerotropolis land uses; and
- Eaton and Emery (~ 160 acres) located south of Rollyview Road and east of C.W. Gaetz Road. The development would consist of residential, commercial and business developments. [4]

City of Leduc North

The City of Leduc north developments consist of:

- Saurahb Park, Cathton-Farm and Leduc Energy Park (~ 900 acres) located north of 65th Avenue, west of Range Road 250 and south of Airport Road. The development is predominately employment and industrial developments with some commercial land uses. Some development has already taken place within Saurahb Park, Cathton Park, along and west of 39th Street.[5]

[3] Southfork ASP (Stantec, 2014); South East Leduc ASP (Al-Terra, 2014); Robinson Overall Unit/Lot Count (IBI, 2016)
[4] Sawridge Business Park ASP (FOCUS 2013), Harvest Industrial Park ASP (Welder Eng., 2010), Lakeside Industrial ASP (Watkins, 2014); Eaton and Emery ASP, Figure 4 (IBI, 2016)
[5] Saurahb Park OP (Durrance Projects Ltd, et al., 2006); Cathton-Farm Air Leduc Industrial Park OP (Stantec 2013); Leduc Energy Park OP (Stantec 2016)

3.3 THE INTER-MUNICIPAL TRANSPORTATION NETWORK

The City of Leduc is unique in many respects to other municipalities in that its transportation and transit networks are closely inter-related and inter-dependent upon infrastructure and decisions that fall well outside of its boundaries.

Land use, infrastructure and planning decisions made within other jurisdictions such as Leduc County, the Province (AT), the City of Edmonton, the EIA, the Town of Beaumont and the EMRB can and most likely will have a significant influence upon the municipality.

The Highway 2 corridor, which functions as the major north-south commuting corridor for residents, falls within AT's mandate and as such all planning and modifications concerning new or upgraded interchanges must be coordinated with the Province.

The EMRB has recently updated its Regional Transportation Priorities Evaluation Criteria[6] and determined that the City's 65th Avenue Interchange and arterial ranked highest of all projects being considered for construction in the region. The north section of the Nisku Spine Road within Leduc County (north of the City) ranked 6th as projects ready for construction.

The City of Edmonton, Leduc County and the Town of Beaumont have all progressed with annexation plans that involve the lands north of the EIA/ Nisku Industrial area and around the Town of Beaumont.

The TMP accounted for the effects of future urbanization of these annexation lands and the development of supporting transportation infrastructure.

The City and Leduc-Leduc County Intermunicipal Development Plan[7] identifies the boundary lands surrounding the City, which fall within Leduc County jurisdiction but to which several transportation network policies apply. These include such corridors as Spine Road, SW Boundary Road and 74th Street. The policies are intended to:

- assure coordination of transportation planning initiatives, truck route coordination, water crossings, public transit, and trail development;
- highlight responsibilities for roadway construction and maintenance; and
- determine requirements for developments and subdivisions within the proximity to major boundary roadways.

The TMP has identified several inter-municipal transportation initiatives, some falling outside of the City's roadway jurisdiction, which represent

[6] "*Regional Transportation Priorities Evaluation Criteria Update*" May 10, 2018, Item 6.1
[7] "*City of Leduc/Leduc County Intermunicipal Development Plan 2010-2044*" Approved Jan. 12, 2015, Pg 40

critical corridors required to assure overall network integrity and accessibility:

- Highway 2 realignment, widening and core lanes initiative;
- Improved Highway 2 / Airport Road interchange;
- New Highway 2 / 65th Avenue interchange (Phases 1 and 2);
- Upgrade of the Highway 2 / 50th Avenue interchange;
- Relocated Highway 2 / Highway 2A interchange;
- 65th Avenue West (Highway 2 to 74th Street), which borders the EIA lands;
- Spine Road (Airport Road to SE Boundary Road);
- SW Boundary Road (Highway 2 to 74th Street); and
- 74th Street (SW Boundary Road to 65th Avenue W).

In addition to these somewhat defined projects, the TMP has identified several regional-level projects that remained to be addressed through future functional planning exercises, which are certain to have an impact upon the municipality.

The Terwillegar South Extension

The City of Edmonton, in concert with AT undertook the 170th Street Planning study[8], which was intended to confirm the short and long-term plans for a corridor that would extend from Anthony Henday as far as 41st Avenue with the intent of the facility being an urban freeway.

Exhibit 3-4 illustrates a conceptual corridor for the Terwillegar South Extension that could see a continuous freeway corridor extend from 41st Avenue in Edmonton to as far south as the Highway 2/Township Road 490 (Glenn Park Road/Kavanagh Road) interchange. Such a facility was identified through traffic simulation exercises on behalf of the Province (AT) to be required to assure satisfactory traffic operations along the Highway 2 corridor.

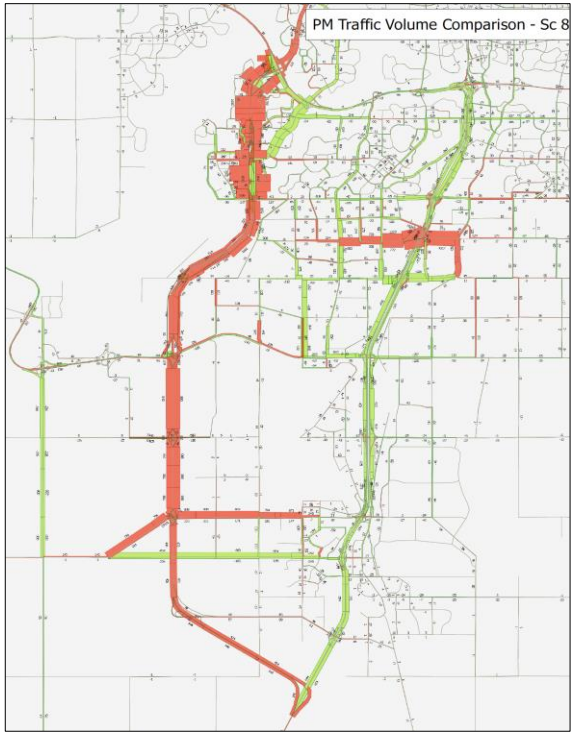


Exhibit 3-4: Diversion of Highway 2 Traffic to Terwillegar Corridor

[8] "*170 Street South Planning Study – Report #3*", Executive Summary, ISL Engineering & Al-Terra Engineering, March 2011

Exhibit 3-4 illustrates the extent of diversion of traffic that is anticipated to occur by the thirty-year time horizon. A review of the simulation results indicated that an average 10-to-20 percent of forecast traffic could be diverted away from the Highway 2 corridor assuming the Terwillegar South Extension as a freeway would be in place.

Nisku Spine Road

Exhibit 3-5 illustrates the 23.2 kilometer, four phase Nisku Spine Road, a major arterial roadway that is intended to connect 41st Avenue SW in the north to the future realigned Highway 2A.

The Nisku Spine Road Phases 1-to-3 have had their alignment and configuration planned through functional plannign studies. However, a gap in planning exists for how the future Spine Road connection will be made with the realigned Hwy 2A (Phase 4).

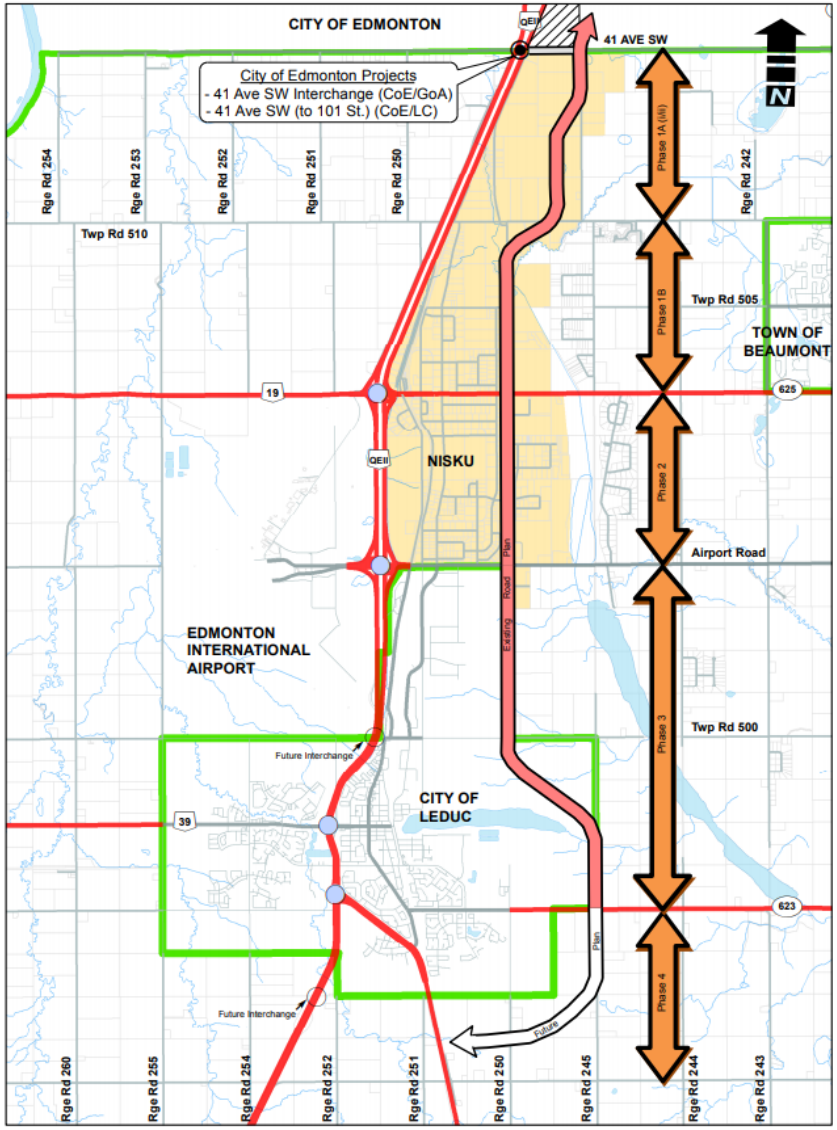


Exhibit 3-5: Nisku Spine Road – 4 Phase Roadway
[Source: Leduc County]

A NS Arterial West of Leduc

The TMP currently envisions 74th Street as a continuous north-south arterial roadway that would serve the future requirements of the municipality. However:

- approximately 1.6 km north of the 65th Avenue/74th Street intersection, the EIA lands extend 800m to the west for a distance of 3.2km. North of this point the EIA has an Airport Reserve Protection (of approximately 480 hectares) to accommodate its long-term requirements for passengers, cargo and aircraft movements;
- the City of Edmonton has put in a request for annexation of the lands to the north of the EIA (Highway 19). The City would designate the area for urbanization. Conceptual plans for arterial roadway connections to Highway 19 exist, however these connection points do not envision any extension south of Highway 19; and
- The EIA has not planned for any future roadways or intersections from the west side of their lands.

Priority Inter-Municipal Planning Studies

All of the above underscores the necessity of an inter-municipal regional planning initiatives that would identify continuous north-south infrastructure to meet forecast regional demands.

While the Highway 2 corridor represents the current backbone to regional transportation, major planning initiatives are required to support north-south connectivity.

The following list of planning projects are recommended to be considered, in order of priority, for the City of Leduc:

- A 74th Street functional plan from 65th Avenue West to SW Boundary Road (the functional plan should protect for a transit corridor);
- Spine Road South Extension to Highway 2A / Highway 2 Planning Study to investigate potential alignments south of Highway 623 (Rollyview Road);
- The Terwillegar (170th Street) South Extension from 41st Ave to 50th Ave (14.5km) and further south to the Highway 2 corridor (8km);
- Inter-Municipal Regional Plan to address continuous north-south arterials to the west of Leduc;
- A Leduc-Edmonton Comprehensive Transit Strategy to determine long-term transit corridor (currently envisionned along 74th Street and involving the 65th Avenue ASP) and infrastructure requirements to connect the City of Edmonton, the City of Leduc, the EIA and surrounding muncipalities;
- Highway 2A Interchange Update plan to assess potential of the existing Highway 2A bridge as a "fly-over" and to assure planning efforts protect for an 8-lane Highway 2 corridor;
- Highway 2 Core Lane alignment and staging from Ellerslie to 65th Avenue; and
- 50th Avenue interchange functional plan update to address the Highway 2 corridor between Highway 2A and 65th Avenue.

3.4 THE MODEL

3.4.1 Model Development

The planned population and job growth within and surrounding the City of Leduc would correspond to a greater demand for travel within the region. A comprehensive link-based PTV Visum™ Transportation Demand Model was developed for the City of Leduc as part of the 2018 TMP update.

The purpose of the comprehensive model was to develop a tool that could respond to the dynamic needs of the City by evaluating the impact of future network improvements, of different population scenarios, and alternate employment densities.

The work was undertaken with the City of Leduc, Leduc County and the City of Edmonton to prepare land use estimates for the short, medium, and long term time horizons (described above in Section 3.2). Each forecast horizon envisioned forecast dwelling units (by type), population levels and the level of retail and non-retail employment. The model utilized the 2016 base-year traffic volumes for calibration.

The model roadway network extended from Anthony Henday Drive south to Township Road 490 (Kavanagh Road). The zone system of the model was developed such that the detailed boundaries align with the larger Regional Transportation Model (RTM) zone system. The roadway network of the model includes all arterial, collector and key local roadways.

The traffic demand model utilized a traditional four-stage approach that included:

1. The generation of vehicle trips that would use the local and the regional transportation network;
2. The distribution of those trips between their origins and destinations;
3. The assignment of those trips by mode of travel (passenger vehicle, transit, pedestrian, etc); and
4. Assign those trips to specific links through the transportation network.

The travel demand model would output future traffic volumes and produce volume-to-capacity (v/c) ratio exhibits.

The v/c ratio is a measurement of the level of congestion on a roadway segment. A "normal" measurement (depicted in blue in the following exhibits) represents a v/c ratio that is below 0.80, where vehicles flow freely along the roadway network; a "below average" measurement (depicted in orange) represents a v/c ratio that is between 0.80 and 0.90, and a "congested" measurement (depicted in red) represents a v/c ratio that is 0.90 or greater.

The higher the volume-to-capacity ratio, the greater the risk that traffic congestion and slow-downs would occur during the morning and afternoon commutes. The traffic flow breakdowns would result in slower operating speeds, longer queues and longer travel times for passenger vehicle transportation.

3.4.2 Travel Demand Model Results

The Base Year

The current transportation roadway network was evaluated using 2016 traffic volumes to identify key congestion areas throughout the City of Leduc.

Exhibit 3-7 indicates the base model outputs for the existing City of Leduc roadway network for the morning and afternoon peak hours.

The base model results indicate congestion is currently occurring in the following locations during the morning peak hour:

- at the on-ramps at Highway 2A and 50th Avenue;
- along Highway 2 northbound in the vicinity of 50th Street; and
- 50th Street north of 50th Avenue.

These trends are reversed during the afternoon peak hour at the same locations.

What If We Do Nothing?

Development growth drives the need for new and improved infrastructure. The sustainability of the short- and long-term road network depends on road improvements following long-term growth plans. The 2018 TMP has undertaken an exercise that saw the 10-year regional growth in population and employment evaluated on today's roadway network.

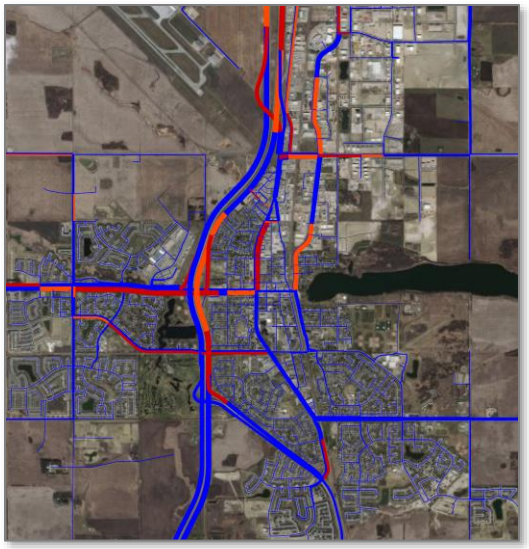


Exhibit 3-6: 10-Year Growth on Existing Network – Morning Peak Hour

A review of the roadway capacity-based model found that an additional 12,000 vehicles-per-day would use the Highway 2 corridor, resulting in significant northbound (100% freeway capacity) and southbound (>110% capacity) demands.

A "spill-over" effect was found to occur on several key municipal corridors that approach the Highway 2 exceeding, their desirable volume-to-capacity ratios:

- Black Gold Drive (AM-EB, PM-WB);
- 65th Avenue West (AM-EB, PM-WB);
- 50th Avenue (AM-EB, PM-WB); and
- 50th Street Southbound (AM).

This exercise highlights the necessity that regional roadway improvements are a requirement to be undertaken in concert with municipal improvements.

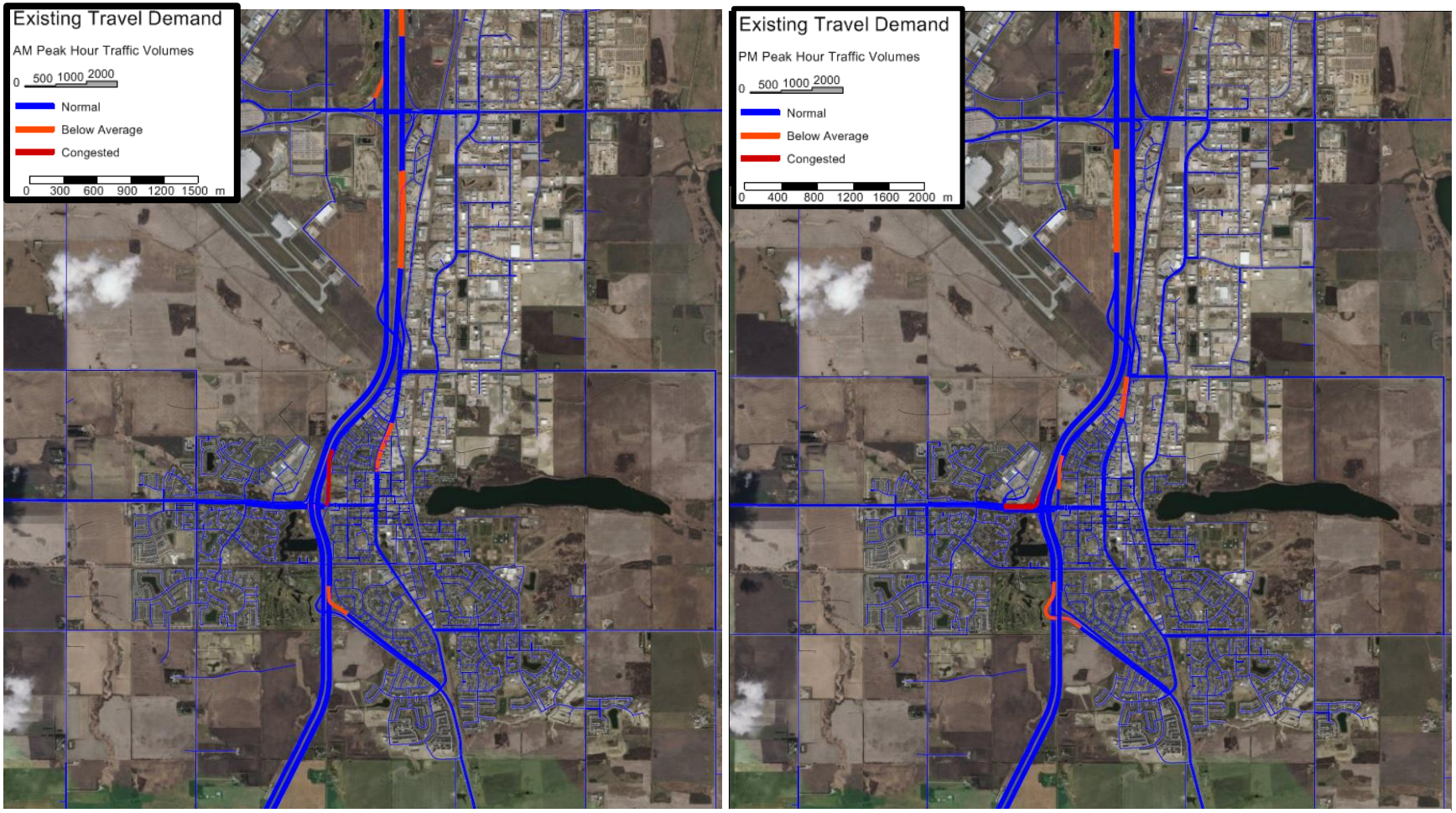


Exhibit 3-7: Base Year Model Results for Morning (left) and Afternoon (right) Peak Hours

Short-Term (0-10 Years) With Network Improvements

The additional City of Leduc infrastructure required to satisfy short-term (10-year) forecast demands included:

- 65th Avenue / 50th Street Twinned Bridge (Phase I);
- New 2-lane 65th Avenue West corridor;
- Extend 2-lane 65th Avenue East to Spine Road;
- Extend 2-lane Spine Road to South of 65th Avenue East;
- 2-lane Grant MacEwan Drive extension to north;
- New SE Boundary Road;
- Coady Boulevard extension to new SE Road;
- Widen Grant MacEwan south of 50th Avenue to Black Gold; and
- Widened 43rd Street to 4 lanes (from 82nd Avenue to south of Allard).

Exhibit 3-8 depicts the short-term model results. Despite the advent of the 65th Avenue interchange (Phase I) the exhibit indicates capacity constraints along the Highway 2 corridor and the approaches which include:

- along the Highway 2 in the vicinity of Highway 2A, 50th Avenue and north/south of Airport Road;
- 50th Street bridge during both peak hours of travel demand;
- 50th Avenue NB on-ramp during both peak hours of travel demand;
- the south leg of 50th Street / 65th Avenue intersection during the morning peak hours; and
- sections of Airport Road during both peak hours of travel demand.

What Happens if 65th Avenue (Phase I) is not In Place?

The 65th Avenue Functional Planning Study (2016) was undertaken to determine the "interim" and "ultimate" requirements for the Highway 2 corridor and a future 65th Avenue interchange within the City of Leduc.

The 65th Avenue (Phase I) infrastructure recommended an interim solution to occur within the short-term time horizon of the study involving:

- a new 2-lane southbound 50th Street structure and the conversion of the existing single-lane 50th Street bridge to NB operation;
- a new arterial roadway that would extend from the EIA lands to provide public access connecting the new 65th Avenue West corridor to the EIA; and
- a reconfigured Highway 2 southbound 50th Street off-ramp to a new double lane off-ramp terminating at a traffic signal controlled "T" intersection.

The inset in Exhibit 3-8 illustrates the constraints associated with not having the 65th Avenue (Phase I) interchange in place with congestion occurring on:

- 50th Avenue during the peak periods;
- 50th Street; and
- Airport Road (A single access/egress cannot accommmodate the combined traffic impact of the EIA terminal and the build-out of the EIA lands.)

Overall, 65th Avenue Phase I promotes inter-connectivity across the Highway 2 corridor, and relieving demands from existing Highway 2 interchanges.

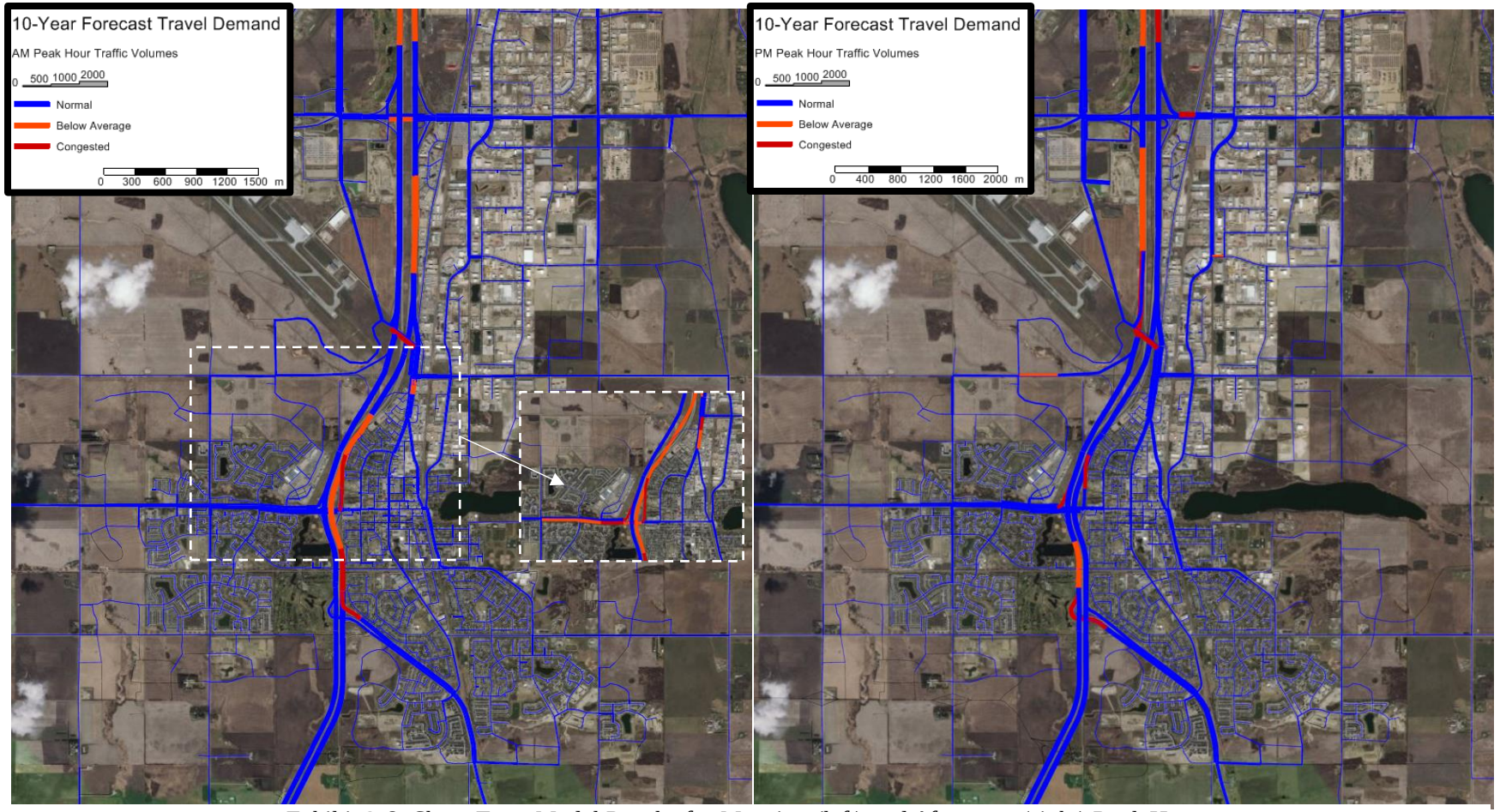


Exhibit 3-8: Short-Term Model Results for Morning (left) and Afternoon (right) Peak Hours.
Inset exhibit depicts Morning Peak Hour without 65th Avenue Phase 1 in place.

Medium-Term (10-20 Years)

The medium-term model includes new infrastructure beyond those envisioned in the short-term horizon which include

- 65th Interchange (Phase II);
- 65th Avenue Corridor extended west to 74th Street to form continuous east-west connection;
- Extend Spine Road to Rollyview Road;
- Widen 65th Avenue East to 6 lanes to the CP Rail tracks, 4 lanes to Spine Road
- Widen 65th Avenue West to 4 lanes (from Highway 2 to Grant MacEwan);
- Grant MacEwan widening (from 65th Avenue to Bridgeport Gate); and
- A 2-lane 74th Street to complete a second north-south connection (between 65th Ave and Grant MacEwan).

Exhibit 3-9 illustrates the medium-term model results and indicates:

- Improvements along the Highway 2 corridor compared to the short-term results;
- The SB 50th Street bridge is anticipated to continue to exhibit congestion during the morning peak hour of travel demand; however, improvement to this link is anticipated in the afternoon peak hour when compared to the short-term time horizon; and
- Sections of Airport Road continue to show congestion during both peak hours of travel demand.

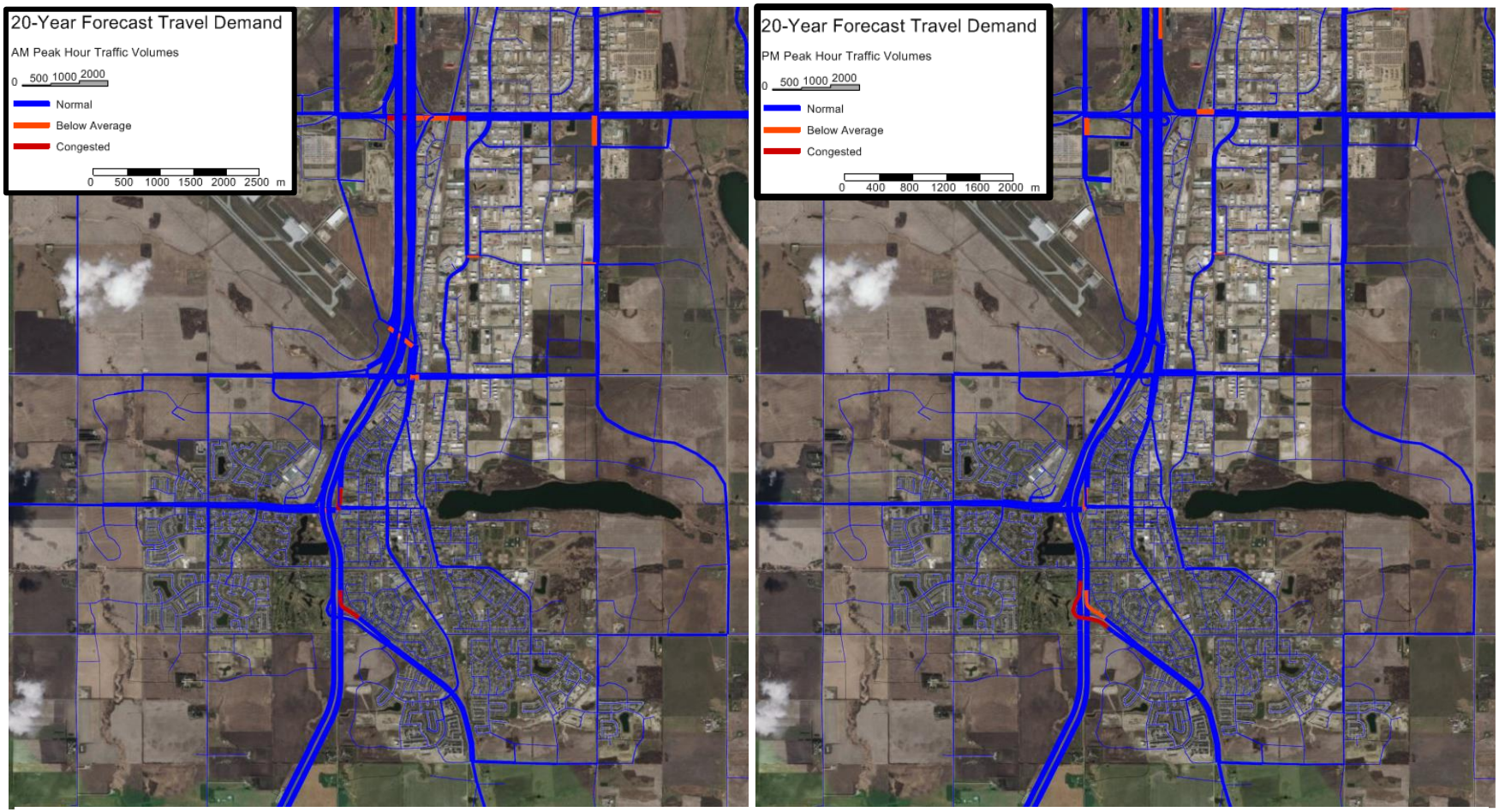


Exhibit 3-9: Medium Term Model Results for Morning (left) and Afternoon (right) Peak Hours

Long-Term (20-30 Years)

The ultimate long-term model included improvements listed within Section 6.4 of this document.

The long-term model results indicate:

- The 50th Street bridge is anticipated to exhibit congestion in both directions during the morning period and in the southbound direction in the afternoon period;
- Minor delays are anticipated along the 65th Ave East corridor associated with the planned industrial lands to the north-west;
- Sections of Airport Road continue to exhibit congestion during both peak hours of travel demand; and
- 50th Avenue in the vicinity of the Highway 2 corridor is anticipated to experience minor congestion.

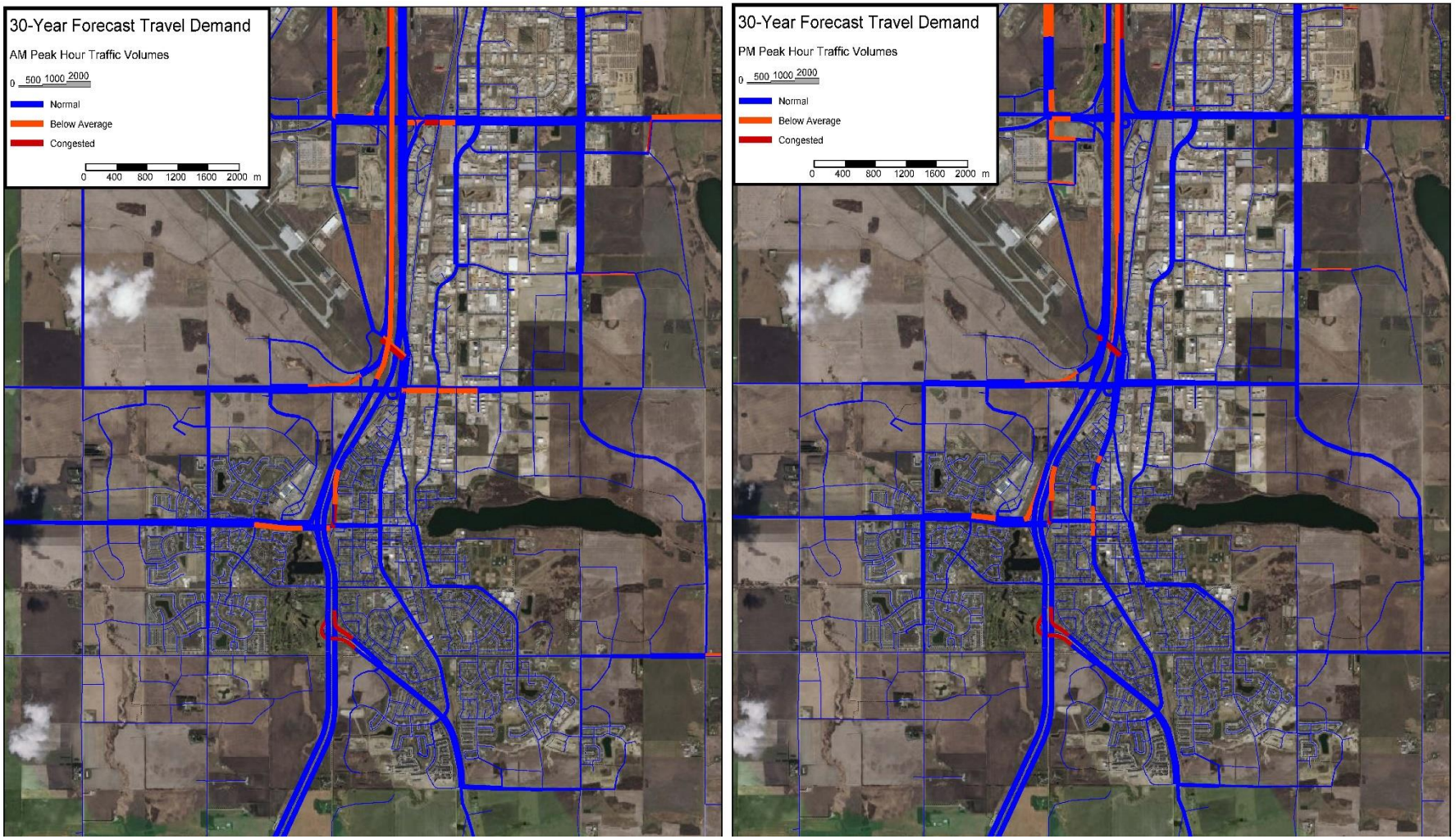


Exhibit 3-10: Long-Term Model Results for Morning (left) and Afternoon (right) Peak Hours

4 TMP Policy Statements

As part of the 2018 TMP update, the previous TMP Policy Statements that were prepared in 2013 were reviewed and refined. The following sections outline the proposed TMP Policy Framework, as they relate to, and support, the City of Leduc's 2012 Municipal Development Plan policies.

4.1 Environment

2A Environmental Sustainability

The City shall encourage environmental sustainability through the promotion of:

- environmentally sustainable modes of transportation within a multi-modal transportation system that would include provision for high quality active transportation facilities, and transit services; and
- opportunities, in partnership with community organization, for meaningful public participation regarding the City's guiding principles and indicators for environmental sustainability as concerns transportation and transit planning, infrastructure and services.

2B: Clean Air and Greenhouse Gas Emissions

The City shall encourage improved air quality and reduction of green house gas emissions through the promotion of:

- active modes of travel such as walking and cycling;
- improvements through expansion and enhanced interconnectivity of the multiway trail system and municipal sidewalks;
- expanded transit use and services offered to community residents;
- enhanced cycling and pedestrian infrastructure;
- travel alternatives to motorized transport and single occupant vehicle travel; and
- transportation and transit plans that promote and support compact urban forms and mixed land uses.

2C: Energy Efficiency

The City shall encourage improved energy efficiency through:

- expanded public transit usage through promoting increased services, frequency and convenience to transit patrons;
- consideration of energy conservation and the use of alternative technologies for municipal transportation and transit infrastructure and fleet;
- responsive traffic signal technologies to encourage the efficient progression of traffic and reduce congestion;
- enhanced energy efficient street lighting; and
- energy efficiency practices in transportation and transit infrastructure planning, design and construction.

4.2 Economy and Tourism

3A: Regional Economic Development and Tourism

The City shall foster regional economic development and tourism through the development and provision of:

- convenient municipal roadway corridors that provide effective and efficient access to the Highway 2 corridor, the CP Rail corridor, the EIA terminal, supporting cargo and freight facilities and significant employment generators such as the Aerotropolis concept and Telford Lake area;
- the municipal multi-modal transportation network that would integrate with a wider regional transportation system to support the realization of additional commercial employment and industrial areas; and
- safe and convenient multi-modal access to municipal transportation infrastructure to and from places, facilities and events of significant interest to the City or region.

3B: Local Economic Development

The City shall foster local economic development initiatives through:

- encouraging initiatives that promote the establishment of alternative modes of transportation to access commercial and industrial areas, inclusive of the downtown core;
- assuring that new developments having access to municipal roadways are well-planned in terms of adequate on-site parking, loading/unloading facilities and on-site circulation routes; and
- assuring that an adequate supply of on-street parking is provided for those areas where off-street parking cannot be provided, such as the downtown core.

4.3 Building Our City

4A: Growth Management

The City shall foster growth management by ensuring that:

- enhanced infrastructure and transportation services intended to support alternative modes of transportation are applied to existing urban area developments that favour increased density or compact urban form;
- transportation infrastructure (inclusive of municipal servicing) be planned in a contiguous manner by way of extending existing services;
- forecast travel demand associated with new growth be accommodated by a choice of mobility options inclusive of infrastructure and services related to transit, cycling and pedestrian modes of travel;
- a complete streets approach to the re-development of existing municipal corridors and planned new urban corridors be considered where appropriate; and
- the transportation infrastructure (inclusive of municipal servicing) required for new sub-divisions be

sustainable in terms of the natural environment, the required municipal economic commitment, and the ability to meet the desired growth objectives of the municipality.

4B: General Land Use Planning

The City, in concert with its general land use planning policies shall:

- encourage transportation planning policies, principles and guidelines that facilitate more compact and dense urban areas, which provide enhanced mode choices such as walking, cycling and transit;
- promote the objectives of the Downtown Master Plan by encouraging future phases of streetscaping improvements on adjacent blocks within the downtown core;
- assure that the planning for mixed residential and commercial developments such as new town centres are supplemented with a comprehensive transportation strategy that:
  - is pedestrian oriented with generous pedestrian connections;
  - incorporates Transit Oriented Development (TOD) principles with ease of access to public transit facilities;
  - favours transit and non-motorized travel modes;
  - incorporates a complete streets approach; and
  - assures the scale of the urban footprint is designed to human levels and compatible with promotion of transit and non-motorized travel modes.
- assure that the planning for new commercial, industrial and business park developments incorporate convenient access to major transportation corridors that include the Highway 2, the future Spine Road and 65th Avenue West extensions and major municipal arterial roadways;
- assure that the multiway trail system is integrated and interconnected with the new development initiatives;
- assure that land use planning and development initiatives that incorporate transportation infrastructure investments are fully supported and documented by accompanying transportation plans and studies; and
- encourage the refinement of its ASP and Transportation Impact Assessment (TIA) guidelines to assure that the two documents are integrated with, and supportive of the objectives, of each other.

4C: Downtown Leduc

The City shall within the downtown area:

- implement the improvements relating to pedestrian facilities, transit routes and other infrastructure as outlined within the Downtown Master Plan[1];
- assure access from/to adjacent neighbourhoods by way of the multiway system, sidewalks, open space corridors and natural amenities;
- incorporate a complete streets approach in defining the ultimate

[1] The City's Downtown Master Plan is intended as a long-term plan to be implemented in phases as funds become available and as growth progresses. The City cannot move forward with the plan without economic growth to pay for the proposed upgrades.

cross-sections for improved streetscaping as a constituent component of servicing upgrades;

- assure that frequent and high-quality transit service is provided to the downtown area, with convenient transit stop locations, routings and transfer facilities;
- assure that pedestrian facilities within the downtown core are upgraded;
- enhance the safety and efficiency of access to, and within, the downtown area;
- enhance the supply of safe and secure bicycle parking in highly visible and convenient locations; and
- confirm that the downtown parking strategy:
  - assures that the supply of short-term on-street vehicle parking take precedence over the supply of long-term on-street parking in high demand areas;
  - is to the benefit and convenience of downtown businesses;
  - does not impact any plans for future streetscape initiatives or roadway improvements associated with downtown revitalization;
  - has considered the implications associated with slight reductions to the supply of long-term downtown parking upon other modes of travel; and
  - has considered within the design of downtown public and private parking facilities improvements to cycling parking facilities that are located to assure safe and convenient access to the local pedestrian system, transit operations and accessibility.

4D: Existing Neighbourhoods

The City, in concert with its existing neighbourhoods policies, shall:

- encourage a more compact form of mixed development in existing neighbourhoods. This is intended to lead to more efficient utilization of existing transportation infrastructure and shorter average trip lengths which can be met by sustainable (pedestrian and cycling) transportation modes;
- encourage the provision of transit service enhancements into developed neighbourhoods, with convenient bus stop locations and routings. (Such network improvements are to balance increased transit service levels with the risk of "stretching the transit service too thin" by servicing lower-density neighbourhoods.);
- encourage the development of convenient, integrated and safe access by way of the multiway system that links existing neighbourhoods. The multiway system, and other pedestrian and bicycle facilities, are intended to increase accessibility and mode choice to existing neighbourhoods;
- assure that traffic management or other road-based strategies proposed to address traffic concerns within existing neighbourhoods should also consider and accommodate all travel modes inclusive of transit, walking and cycling as well as maintenance requirements; and
- when warranted, and subject to a study of alternative options, mitigate the effects of significant volumes of cut-through traffic upon existing neighbourhoods.

4E: New Residential Development

The City, in concert with its new residential development policies, shall:

- during all stages of the planning process ensure that an approach is undertaken when planning street layouts within new residential areas to assure that all modes of transportation are incorporated within the planning and design of the community;
- encourage the provision of multi-modal transportation networks from the outset of the planning process to encourage future residents and visitors within the new neighbourhoods to make use of transit and active transportation modes on a regular basis;
- encourage the planning of connecting pathways that link the multiway corridors to, and within, planned residential communities;
- consider the advent of protecting rights-of-way to establish transit-only corridors intended to assure that transit service is superior to that of traditional roadways in terms of accessibility and convenience;
- assure that all new developments that require traffic and transportation assessments are completed in accordance with the City's TIA guidelines, that identify road and parking requirements; and
- assure, through the detailed site planning process, that the implementation of noise mitigation measures does not inhibit alternate pedestrian and cycling accessibility to and from the planned neighbourhoods. (Avoid the development of walled neighbourhoods that result in significant pedestrian and cycling diversions between communities.)

4F: Commercial Development

The City, in concert with its commercial development policies, shall:

- ensure that the transportation planning for new, redeveloped and upgraded commercial and retail areas considers:
  - the implementation of a multi-modal transportation network approach intended to encourage safe and convenient access between adjoining residential neighbourhoods and the commercial areas;
  - internal site pedestrian circulation and accessibility such as pedestrian-oriented frontages and universal access; and
  - linkages connecting to the City's trail, pathway, sidewalks and multiway systems.
- ensure that, safe and secure bicycle parking is provided in convenient and highly visible locations;
- encourage the provision of on-site facilities intended to encourage cycling;
- ensure that both short-term parking for customers and visitors is provided, in addition to long-term parking to accommodate employees;
- ensure provisions related to deliveries, garbage collection, loading, unloading and emergency accesses are provided; and
- ensure that the development planning process provides for appropriate transit facilities and services to be fully integrated within the development, which may include protecting sufficient right-of-way for future public transit services.

4.4 Social Wellness & Safety

5C: Healthy, Inclusive and Safe Communities

The City, in concert with its healthy, inclusive and safe community policies, shall:

- provide accessible fixed transit services;
- encourage the enhancement of LATS based on current and predicted future demand;
- assure that all transportation infrastructure addressed within the TMP framework is planned, developed and constructed with safety and accessibility provisions in mind;
- encourage the development of regulations that foster community inclusivity by encouraging the development of a network of integrated of pathways, corridors and facilities intended to link communities;
- assure that provisions within the transportation planning process be made to encourage and enhance opportunities that develop active and integrated transportation modes within a more compact urban footprint. These measures are intended to achieve significant health benefits, reducing greenhouse gas emissions and improve air quality; and
- encourage the development of detailed strategies that would further enhance the safety of pedestrians, cyclists and road users.

4.5 Recreation & Culture

6A: Active and Healthy Community

The City, in concert with its active and healthy community policies, shall:

- incorporate active transportation modes such as walking and cycling into a multi-modal transportation system, as these can have significant health benefits, and can help reduce greenhouse gases and improve air quality;
- provide active transportation facilities such as the multiway and other complimentary pedestrian and cycling facilities as part of the multi-modal transportation system;
- explore opportunities to incorporate corridors that may become available for multiway or transit use, such as abandoned rail corridors; and
- ensure the expansion of the multiway network early within the planning and development of new residential, commercial and retail development initiatives to include linkages to future parks, schools, recreational, high activity areas and large development initiatives. Protecting for the 3m wide pathway at the planning stage will ensure the required right-of-way is protected and allow for the accomodation of all multiway users.

6C: High Quality, Safe and Accessible Public Open Spaces

The City, in concert with its high quality, safe and accessible public open spaces policies, shall:

- ensure that all modes of transport, including roadways, the multiway network, pedestrian and cycling facilities (including links to transit routes), are treated as an integral part of Leduc's transportation system, with high priority given to visibility, accessibility, safety, maintenance, snow clearing, ice control and lighting; and
- encourage the development of detailed strategies that would further enhance the safety of pedestrians, cyclists and road users.

4.6 Governance

7D: Regional Context Statement

The City, has developed its TMP in concert with, and within the context of, an overall regional context. The City's TMP initiative:

- has been based upon ten, twenty and thirty-year population and employment forecasts, which were in concert with forecasts produced by the EMRB and developed as part of the overall RTM undertaken by AT; and

- saw the development of its own travel demand forecast model and origin-destination survey to further the TMP process. As well, the process provided the opportunity to undertake sensitivity testing of various land use alternatives. The conclusions regarding infrastructure requirements remain consistent with the overall regional infrastructure context and fully integrate with County, Provincial government and EIA planning initiatives.

4.7 VISION TO REALITY

8B: MDP Monitoring

The City's TMP Policy provides the framework for conducting monitoring activities and obtaining feedback that would further support the achievements of the MDP's goals and objectives.

The TMP encourages the City to continue collecting information (such as travel demand information) on a regular basis that would prove useful in providing further insight into local travel characteristics and trends.

This information is intended to include all travel modes and permit the City to ascertain the success of measures that are intended to promote sustainable transportation facilities. The information gathering activities would include:

- conducting regular traffic counts inclusive of motor vehicles, heavy vehicles, pedestrians and cyclists at intersections and along strategic corridors;
- conducting pedestrian and cycling counts along the multiway trail network;
- surveying transit ridership on a regular basis; and
- obtaining travel trend information inclusive of origin-destination demand information.

The above information collection effort would prove useful in assisting the City in assessing the potential impacts upon municipal transportation infrastructure.

5 IDENTIFICATION AND EVALUATION OF TRANSPORTATION IMPROVEMENTS

5.1 TRANSIT

Transit Policies

As noted within Section 4, numerous municipal policy statements within the TMP and MDP explicitly support transit and LATS initiatives. These initiatives address areas such as:

- *Right-of-Way and Corridor Protection*: Explore opportunities to incorporate corridors that may become available for transit use, such as abandoned rail corridors;
- *Integration*: Plan for transit facilities and services to be fully integrated within future developments/communities;
- *Promoting Transit Ridership*: Encourage residents within new neighbourhoods to make use of transit on a regular basis;
- *Multi-Mode Networks*: Encourage transit ridership through the provision of multi-modal transportation networks from the outset of the planning process;
- *Transit Only Corridors*: Protecting right-of-way to establish transit-only corridors intended to assure that transit service is superior to that of traditional roadways in terms of accessibility and convenience;
- *Maintenance*: Transit routes are to be adequately maintained in terms of visibility, accessibility, safety, maintenance, snow clearing, ice control and lighting;
- *Monitoring Effectiveness*: Establish current and predicted transit demand profiles and service reliability efficiency objectives to determine the success of transit infrastructure investments; and
- *Accessible Transit*: Encourage the enhancement of the LATS service based on current and predicted future demand.

In terms of capacity, transit offers the highest capacity for moving people within a constrained space. A typical single travel lane on an urban street might typically move 600-to-1,600 people-per-hour, where literature has indicated that a dedicated bus lane can potentially carry up to ten times that amount.

Current transit activity within the City of Leduc can be described by the following operational and ridership characteristics:

- headways between transit vehicles of 15 minutes-or-more,
- 4 or fewer buses-per-hour; and
- typically fewer than 100 passengers-per-hour.

Although this volume of activity can be considered to be low in relation to major urban centers in the Province, there are numerous elements and strategies that can be integrated within the municipality that can be useful in achieving the above objectives, which include:

- street design aimed at enhancing safety and ease of access;
- operational measures aimed at assuring schedule adherence and general reliability;
- transit signal priority measures to reduce transit delay;

- enhanced transit stops to improve patron comfort and confidence;
- passenger information such "Bus Tracker" for mobile users and information at stops to ensure ease of usability of the service;
- integration with Edmonton Transit initiatives concerning fares (such as the "Smart Fare" intitiative), and coordinated transit schedules at common transfer points (to minimize patron transfer time);
- integration with EIA current and future transit initiatives, which include:
  - current transit routing;
  - future transit only corridors; and
  - future transit stations.
- Planning for the advent of transit supportive infrastructure within the planning process, such as:
  - dedicated transit lanes; and
  - queue jump lanes at busy intersections to route transit vehicles through congested intersections ahead of motor-vehicle traffic.

Community Transit Planning

The TMP calls for transit planning to be emphasized within the planning of new communities and employment areas. Toward this end, supporting planning documents such as ASPs and TIAs are to:

- highlight estimated future transit demand;
- highlight assumptions regarding:
  - the required future transit frequency necessary to sustain the development; and
  - changes to existing routes in terms of additional route length to be added to the system to provide service to the community or new routes if necessary.
- identify future transit infrastructure requirements, such as the suggested location of future stops and stations along key corridors; and
- make recommendations to permit the municipality to better estimate the final costs related to providing and extending the required transit services.

Transit Initiatives

The TMP explored the possible development of a transit corridor to/from Leduc's west side that would extend to transit infrastructure, (inclusive of future stations and transit corridors) planned within the EIA lands. The benefit of this infrastructure was to develop a stronger synergy between transit and land use by encouraging TODs for the proposed expanded western communities.

TOD communities are designed to be compact, pedestrian-oriented, mixed-use communities characterized by walkable neighborhoods and quality urban places, all of which are centered around a high-quality transit system. These communities hold the promise of reducing private motor-vehicle dependence and achieving lifestyle, environmental and economic benefits.

The EIA planning documents recognize that transit options are likely to increase over the next several years in light of the growth of the Edmonton area in the vicinity of EIA lands and as regional transit lines are extended and systems expanded. The EIA has made provisions within its master plan to protect a north-south transit alignment that runs parallel to Airport Perimeter Road with future transit stations on either side of Airport Road. The corridor is anticipated to follow the progression of scheduled bus service, Bus Rapid Transit (BRT), and then Light Rail Transit (LRT).

Transit planning for Leduc's western communities should ideally fully integrate with these initiatives.

A West Transit Corridor

The following transit initiatives were recommended to respond to Leduc's growing western community:

- development of a transit corridor that would connect with the EIA's protected transit corridor in the vicinity of Airport Perimeter Road north of 65th Avenue;

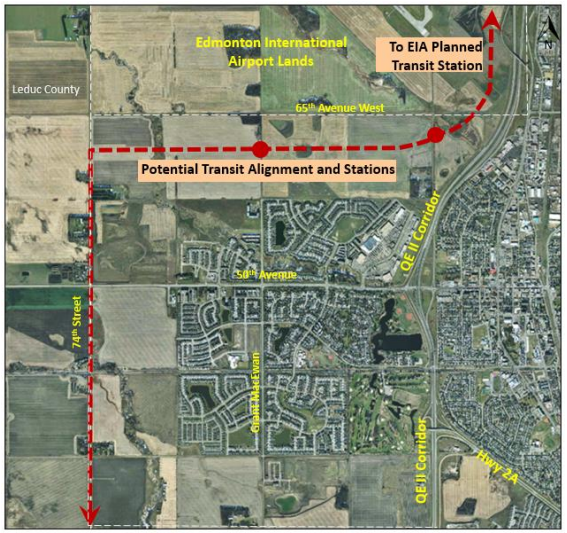


Exhibit 5-1: Proposed West Transit Corridor

- development of east-west transit infrastructure that would service the 65th Avenue West lands;
- extension of the proposed east-west transit roadway to service the northern portion of the west area lands; and
- development of the 74th Street corridor to provide separate transit infrastructure.

This rationale for this western community transit alignment was based upon:

- the lands being currently under-developed;

- an opportunity to amend the existing MDP and ASPs to conform with and support the establishment of a transit corridor initiative (that would connect the planned transit station at the EIA, the 65th Avenue West corridor and the 74th Street corridor);
- planned urban uses on the west side of the corridor (Leduc County land) where the urban/rural interface still remains to be determined;
- current ASPs that propose primary residential developments; and
- the opportunity to promote significant inter-municipal planning and development coordination.

Grant MacEwan Transit

The functional plans for the Grant MacEwan Boulevard corridor provide for the widening of the corridor to a 4-lane cross-section. The functional plans and cross sections provide for the new outside lanes to function as dedicated bus lanes should the municipality desire the future lane widenings to be designated as such.

Transit Planning for the Region

It is recommended that the future 65th Avenue Area Structure Plan (ASP) involve detailed planning of the future west transit corridor, with a focus on route alignment, transit stop locations, and connections to other transit facilities.

In concert with the 65th Avenue ASP transit planning, it is recommended that the City of Leduc create long term plans for the 74th Street corridor that would incorporate a transit connection in West Leduc. The 65th Avenue ASP is suggested to tie the 74th Street planning and the EIA transit initiatives into a full corridor to serve the needs of the City of Leduc.

5.2 ACTIVE TRANSPORTATION

Multiway Network

The multiway network forms an integral part of the City's active transportation network. The existing multiway map is currently available on the City's website and is updated on a regular basis. The following concepts should be considered by the City of Leduc with regard to the multiway network:

- Building multiway facilities from the outset when developing new residential and commercial areas, as retrofitting these facilities at a later date may be more difficult to implement.
- The inclusion of multiway in any new or upgraded east-west crossings of the Highway 2. Measures to make the existing multiway routes underneath the Highway 2 at Black Gold Drive and 50 Avenue more inviting (e.g. improved lighting) should also be considered.
- Where multiway routes cross side streets at intersections, the City should look to include crosswalk markings or similar to highlight to drivers that a multiway link is present. This should be prioritized at busier intersections where possible, and/or where higher vehicle speeds may be prevalent.
- The sections of multiway (secondary paths) along back lanes in the Corinthia Park and Linsford Park neighbourhoods should be reviewed further to ascertain to what extent the City may wish to upgrade to a higher standard. This could include surfacing improvements and/or lighting. These routes could be made more attractive due to their directness, although the City would need to consider the extent of further investment that would be justified.
- Providing multiway connections with neighboring municipality initiatives, such as the EIA's new retail developments.
- Providing a north-south link into Leduc's industrial business park, north of 65th Avenue.

The Great Trail

The City of Leduc has recently adopted and approved a re-routing of The Great Trail in Leduc.

Exhibit 5-2 depicts the planned ultimate trail path (note that only small sections of this pathway are currently in place).

Sidewalks

Sidewalks provide a secure conduit for pedestrians to walk to their destinations directly, approach transit facilities or make use of the extensive multiway network.

Consideration should be given to building new sidewalk facilities from the outset when developing new residential, commercial and industrial areas to facilitate and encourage active transportation for residents.

Exhibit 5-2: Ultimate Great Canadian Trail Map (2018)

5.3 TRAFFIC CALMING

The City of Leduc's Traffic Advisory Committee currently has a guideline for the implementation of traffic calming to address roadway safety concerns on local roadways.

Ensure that all road users - Motorists, Transit Riders, Pedestrians, and Cyclists - of all ages and abilities - have equal and safe use of transportation facilities.

The TMP provides a supporting strategy to implementing traffic calming measures on local roadways.

The traffic calming policies and guidelines would guide the application of traffic calming measures to mitigate the harmful aspects of traffic, while maintaining the roadways ability to effectively move residents in and out of Leduc neighborhoods.

What is Traffic Calming?

The 21st Century has seen a shift in road design to accommodate more than just passenger vehicles. Roadways are now seen as multi-modal pieces of infrastructure that move people of different ages and different abilities.

The Institute of Traffic Engineers (ITE) defines traffic calming as the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.[1]

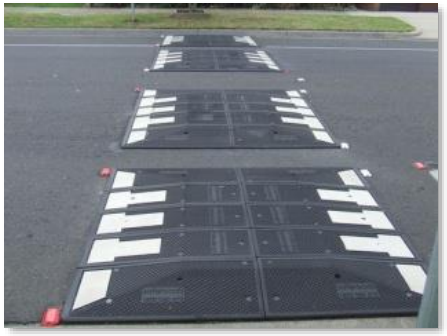


Exhibit 5-3: Speed Cushion Traffic Calming Measure

The goals for City of Leduc traffic calming measures are to promote:

- *Safety:* Traffic calming improves safety for all users – pedestrians, cyclists, motorists and transit riders – by reducing vehicle operating speeds, discouraging the amount of cut-through vehicle traffic, and minimizing road user conflict points.
- *Liveability:* High amounts of traffic increase noise, pollution, and erode at the foundations of a community. Well designed streetscaping can reduce traffic speeds, encourage pedestrian and cyclist activity, and develop unique identities for Leduc neighbourhoods.
- *Multi-Modal Transportation:* Traffic calming measures enhance the street environment to increase the amount of access for all modes of transportation. Encourage pedestrian and cyclist activity leads to a framework for improved transit activity throughout the region.

[1] Lockwood, Ian. *ITE Traffic Calming Definition*. ITE Journal, July 1997, pg. 22.

Exhibit 5-4: Signage for City of Leduc Neighborhood Traffic Calming Location

Traffic Calming Measures

ITE and the Federal Highway Administration (FHWA) summarize four types of traffic calming measures:

- Vertical Deflections: Creates a change in height of the roadway (i.e. speed tables, raised crosswalk, speed cushion);
- Horizontal Shifts: Alters the straight path of a motorist (traffic circle, roundabout, realigned intersection, chicane);
- Roadway Narrowings: Reduces the width of roadway to slow motorists and allow pedestrians a shorter distance to cross the roadway. (choker, median island, bulb-out); and

Exhibit 5-6: Sample Permanent Speed Table

- Road Closures: Restricting access at an intersection intended to remove or reduce cut-through traffic, however may impact local travel.

Exhibit 5-5: Curb and Gutter Chicane Traffic Calming Sample

Recommended Traffic Calming Guidelines

Traffic calming measures can be applied to a wide variety of roadway types, inclusive of arterials, collectors and local roadway access. Typically traffic calming measures are implemented on residential collector roadways under two classifications.

Minor Collectors: These roadways serve to connect local roads to minor arterial accesses or major collectors. Traffic calming measures could be considered when either:

- A traffic volume of 1,000 vehicles-per-day is exceeded;
- "cut-through" traffic exceeds 10 percent; or
- the 85th percentile operating speed is 10 km/hr above the posted speed limit.

Major Collectors: These roadways link communities to main arterials and commercial attractions and can be considered for traffic calming measures when either:

- A traffic volume of 3,000 vehicles-per-day is exceeded;
- cut through traffic exceeds 10%; or
- the 85th percentile operating speed is 10 km/hr above the posted speed limit.

Despite the above rule-of-thumb thresholds, special circumstances may occur where traffic calming is justified in the absence of such thresholds being satisfied. Each location is to be assessed on a case-by-case basis and other factors considered such as driveways fronting the roadway, roadway geometric concerns, the presence of a significant volume of heavy vehicle traffic, sight lines, the presence of school zones designations etc. In these cases, safety concerns may arise that warrant additional study on the appropriateness of traffic calming measures to achieve the desired safety, livability and multi-modal goals.

The TMP recommends best practices be followed for the consideration, design, and implementation of traffic calming measures. The traffic calming measure process should:

- fully consider resident input and suggestions as to the cause of the traffic problems, and possible solutions;
- put preference to addressing the problem by shifting vehicles to the arterial network through engineering improvements;
- be considered after efforts have been expended on traffic education and enforcement;
- be put forward to a localized study review to defined traffic issues, such as a demonstrated safety, speed, or cut-through traffic concern. The review should be undertaken by an independent consultant that is an expert in the subject matter and can identify traffic calming solutions; and
- involve temporary implementation and be continuously monitored for a period of time, with a follow up study conducted to assess the effectiveness of temporary measures.

Traffic Calming on Alton Drive

Alton Drive is a north-south collector roadway within southwest Leduc that travels through the Windrose and Leduc Estate neighborhoods. Alton Drive provides a more direct route to Highway 2 than the longer Grant MacEwan Blvd to 50th Avenue route for many local residents which results in significant cut-through traffic component. Alton Drive although originally intended as a "backbone" collector roadway for the local community, was never envisioned as a higher speed corridor accommodating cut-through traffic through a school zone.

A traffic review Alton Dr found that:

- more than 5,000 vehicles per day use the Black Gold Drive/Alton Drive intersection;
- 2,000 vehicles per day travel along Alton drive south of 50th Ave; and
- More than 1,100 vehicles per day use the Alton Dr/Windrose Dr intersection.

Alton Drive was identified as an ideal pilot project for temporary traffic calming measures (inclusive of speed tables).

The high cut-through traffic component along Alton Dr is not desirable due to the location of the school zone and because the frontage of driveways along nearly the entire roadways length create hazards for vulnerable road users. The implemented traffic calming measures are intended to slow traffic and encourage the use of Grant MacEwan Blvd arterial as the preferred route to and from Highway 2 by encouraging lower motor-vehicle speeds and through traffic to divert away from the Alton Drive corridor.

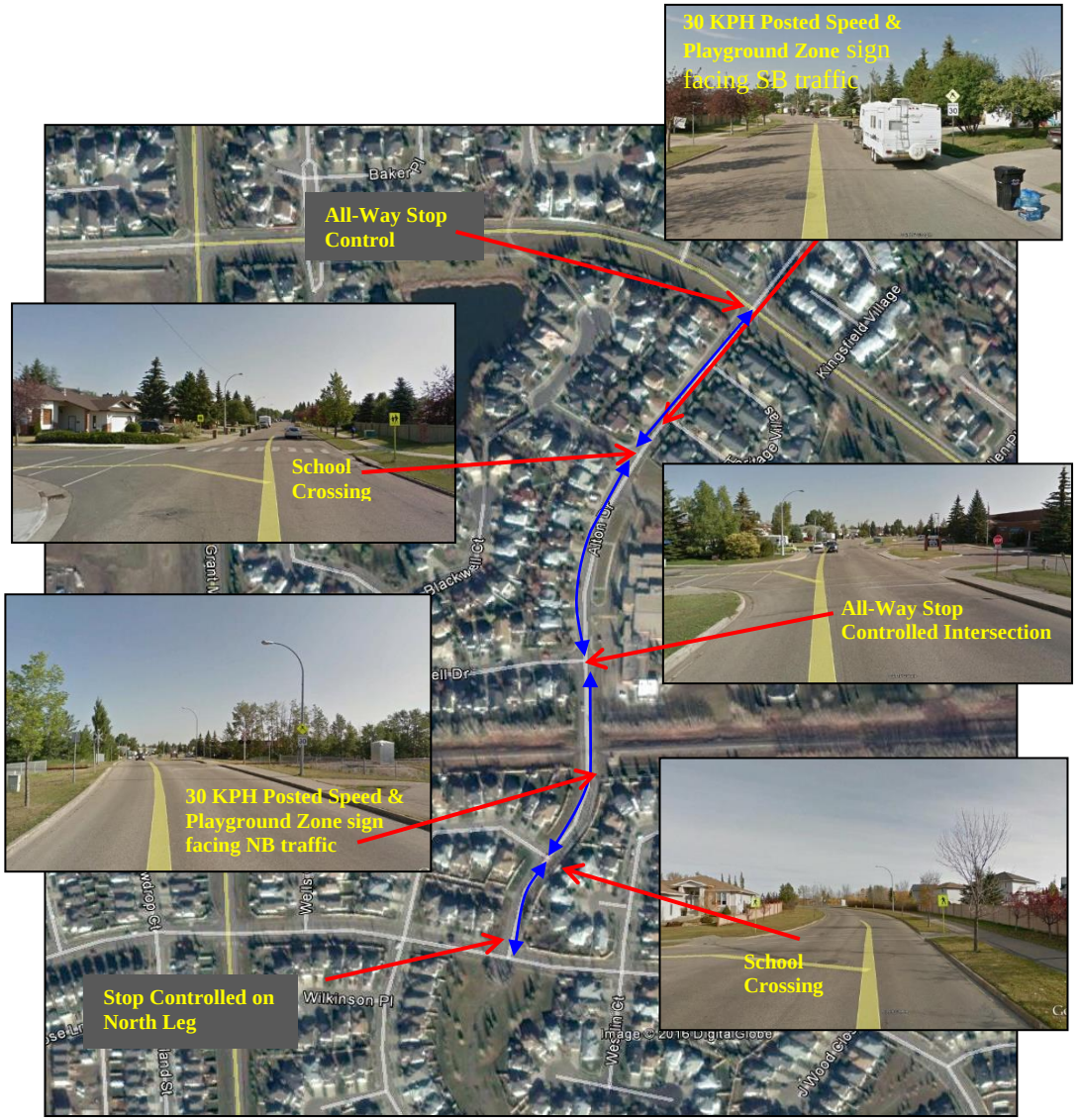


Exhibit 5-7: Alton Drive between Windrose and Black Gold Drive – Through School Zone

5.4 CP Rail Crossings

The north-south CP Rail corridor known as the Leduc Subdivision traverses several City roadways by way of at-grade intersections; these include:

- SE Boundary Road (currently under detailed design);
- Rollyview Road (2016 2-way AADT = 12,330 vehicles-per-day (vpd));
- Black Gold Drive (2016 2-way AADT = 10,000 vpd);
- 50th Avenue (2016 2-way AADT = 8,400 vpd);
- 65th Avenue (2016 2-way AADT = 13,970 vpd); and
- Airport Road (2016 2-way AADT = 14,360 vpd).

Current (2018) train volumes indicate 10 trains-per-day using the corridor, while 2017 data when referenced indicated 15 trains-per-day.

Each of the at-grade crossings remain future candidates for consideration (further study would be required) of rail grade-separation, at a time when the cross-product of rail-motor-vehicle traffic exceeds 200,000. Assuming the 2017 data, 15 trains-per-day, multiplied by the vehicular traffic results in:

- Airport Road's cross product is currently 215,400;
- 65th Avenue's cross product is currently 209,550; and
- Rollyview Road's cross product is currently 184,950.

The long-term costs associated with grade separation of these urban roadway crossings merits consideration at a time when capacity, congestion and safety concerns arise. Annual monitoring of these crossing points merits consideration where two-way traffic volumes would exceed 15,000-to-20,000 AADT.

Alternatively, and due to the significant costs of grade separation, the City of Leduc is encouraged to consider participating in regional discussions that may include future re-routing of CP Rail away from the City.

5.5 Future Roadway Network

The future roadway network was defined as part of growth area planning, as well as the travel demand forecasts and model results outlined in Section 3. The long-term roadway network would see the addition of:

- 75 lane-km of new arterial roadways;
- 70 lane-km of new collector roadways; and
- 15 new traffic signals.

The TMP provides for a future roadway network that will meet the needs of the residents and businesses of the City of Leduc by ensuring efficient multi-modal transportation.

Exhibit 5-8 depicts the long-term transportation network and roadway classifications.

Sections 5.7.1 to 6.4 within this report outline the phasing, project descriptions and conceptual-level costing of the proposed new roadway system.

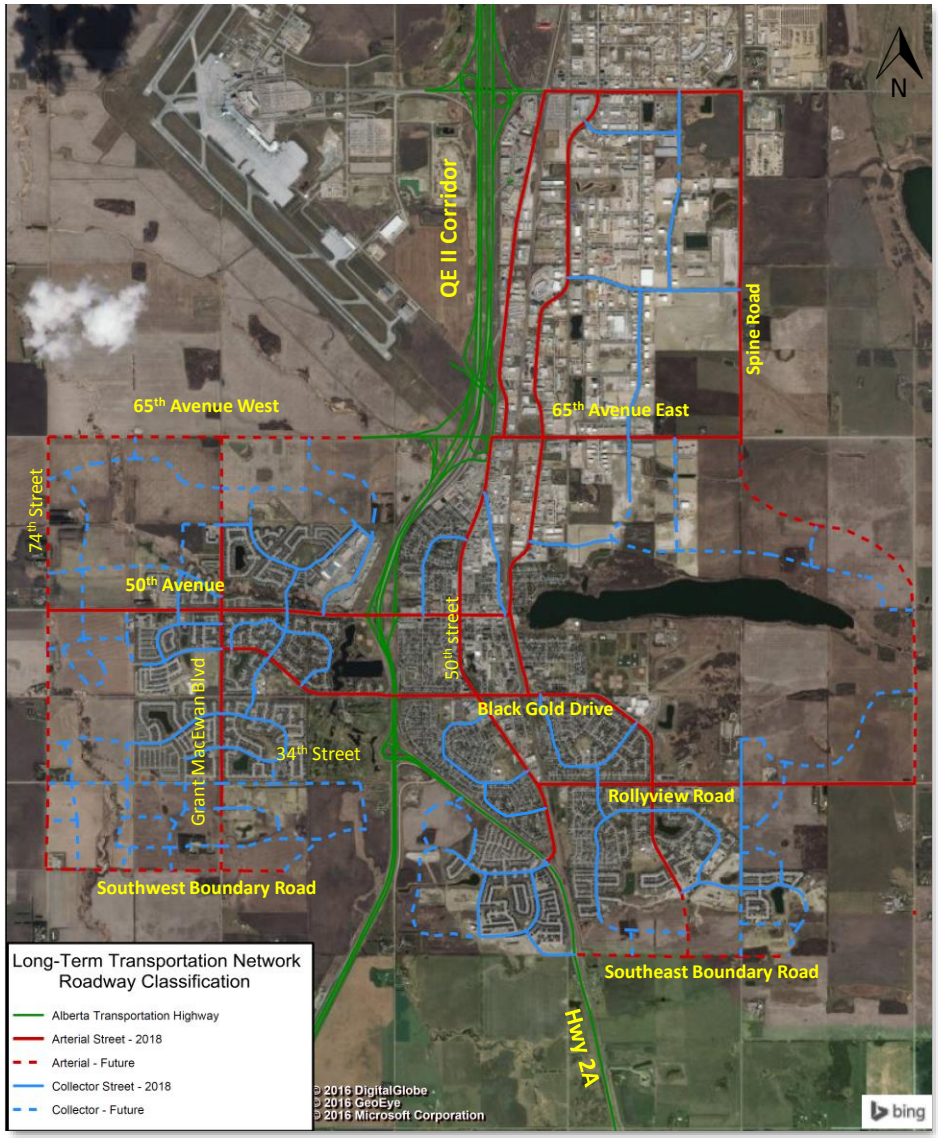


Exhibit 5-8: Proposed Long Term City of Leduc Roadway Network

5.6 HEAVY VEHICLE ROUTING

Heavy vehicle routes were developed as part of the TMP to ensure integration with the future long-term roadway network being proposed. Heavy vehicle routes must connect the City of Leduc to the rest of the Province of Alberta and support economic prosperity of the region while providing safe and operationally efficient connections that promote connectivity to the City's local community centers.

Guiding Principles

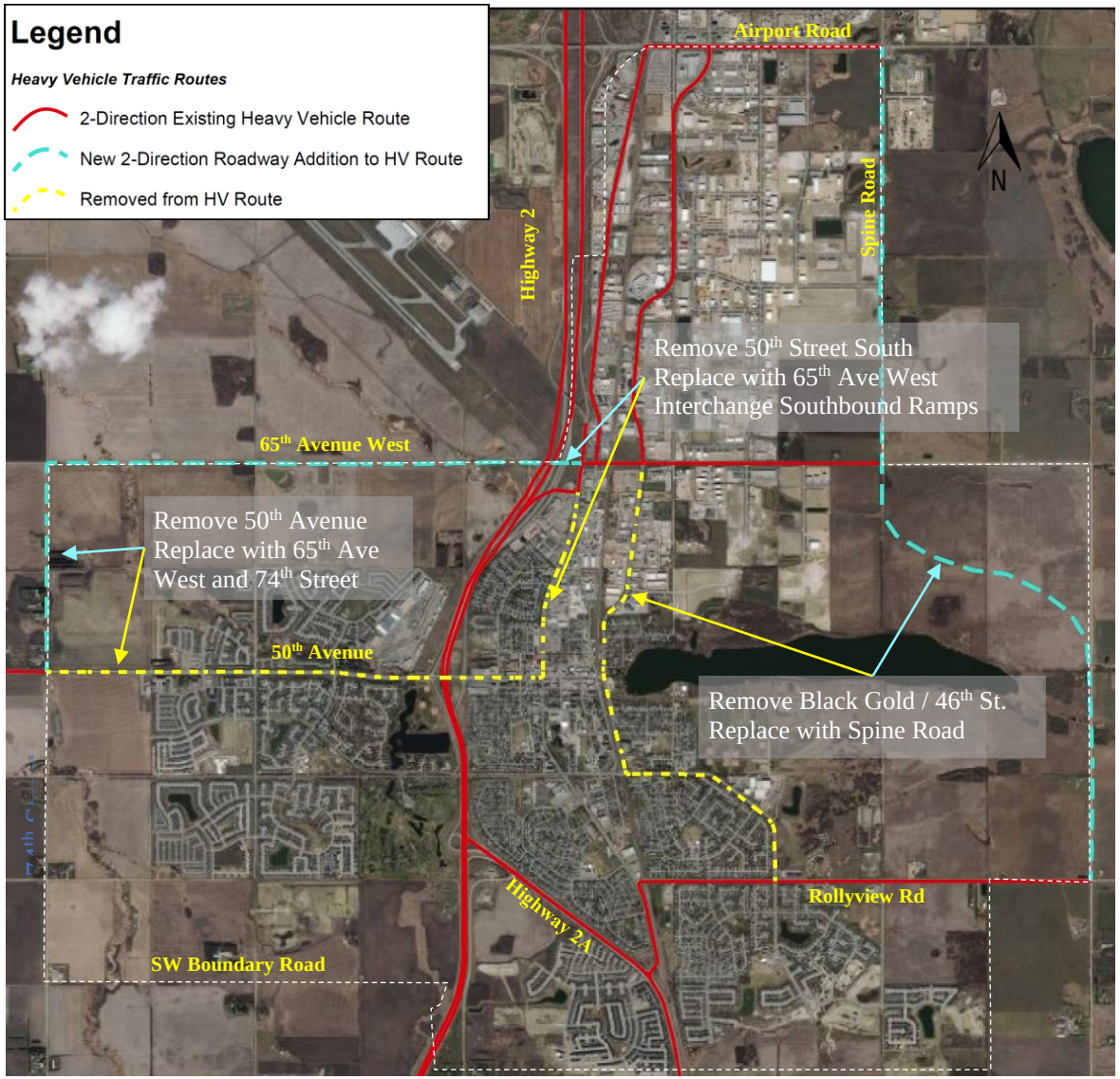
1. ***Support economic prosperity with efficient regional connectivity.***
2. ***Remove primary truck routes from downtown City of Leduc.***
3. ***Provide continuous, congestion free movement of goods.***
4. ***Efficiently integrate heavy vehicle routes into the future roadway network to meet the needs of all users.***

The heavy vehicle routes were developed with consideration of:

- *Roadway Classification*: Only arterial roadways should be considered. Provincial routes are considered truck routes by default and direct connections to provincial infrastructure should be encouraged, such that goods movement will be a priority;
- *Continuity and Connectivity*: Continuous routes with the most direct travel paths are preferred. The routes should provide optimum links to and between the City's activity centres, specifically to industrial lands;
- *Institutional Facilities*: Routes adjacent to schools and hospitals should be avoided;
- *Protected Areas*: Long segments through sensitive land use areas, such as parks or conservation areas, should be avoided;
- *Residential Land Uses*: Long segments through densely populated residential areas should be avoided;
- *Congestion*: Routes that have highly congested traffic volumes should be avoided; and
- *Roadway Grades*: Routes that have long sections with steep grades should be avoided.

The TMP encourages on-going communication with the public and private sectors as regards heavy vehicle routing that would continue to ensure the needs of urban freight are satisfied in concert with the necessary protection required to address sensitive land uses and Leduc's residential communities.

As part of the TMP update, a proposed revised truck route map is depicted as Exhibit 5-9.



A Long Term Vision…

Add: 65th Avenue Interchange and Highway 2 Ramps

Remove: 50th Street Southbound as the Phase 2 65th Avenue interchange would provide a direct connection to Highway 2 from 65th Avenue East

Add: Spine Road South Extension

Remove: Black Gold Drive / 46th Street connection through the downtown core by diverting trucks to the new Spine Road corridor

Add: 65th Avenue West and 74th Street

Remove: 50th Avenue connection as the new 65th Ave West corridor provides direct access to the future 65th Ave Interchange and realigend Highway 39

Exhibit 5-9: Long Term Heavy Vehicle Route Network

5.7 THE FUNCTIONAL PLANS

The functional corridor plans served to establish ultimate requirements for the City of Leduc roadway system. The functional plans provide roadway width, alignment, number of lanes, the type of intersection control and future access provisions. The major corridors have been planned to provide for multiway corridors, where applicable.

The goals of undertaking the functional design at the TMP phase are to:

- Define ultimate requirements for each corridor well in advance of the need for the roadway;
- Avoid expensive future retrofits;
- Provide a plan for sequential staging of the corridors; and
- Provide an opportunity for residents and stakeholders to familiarize and comment on the designs at the early planning phase.

Design future roadways and roadway improvements that afford optimum traffic flow while maintaining a high regard for safety of the road users.

The proposed functional plans assured:

- A transportation network that can safely and efficiently move both people and goods, enhance connectivity within the City and to/from surrounding areas and promote variety of travel choices.
- The impact to the natural environment is minimized where possible.
- Compatibility with policy, such as Provincial plans, County plans and municipal growth plans.
- Socio-economic factors are taken into consideration. This includes minimizing property impacts, supporting the existing and potential business community, maximizing development potential and providing opportunities for planned future growth.
- Financial implications are minimized, which include capital and maintenance costs and the effect to the municipal tax base.

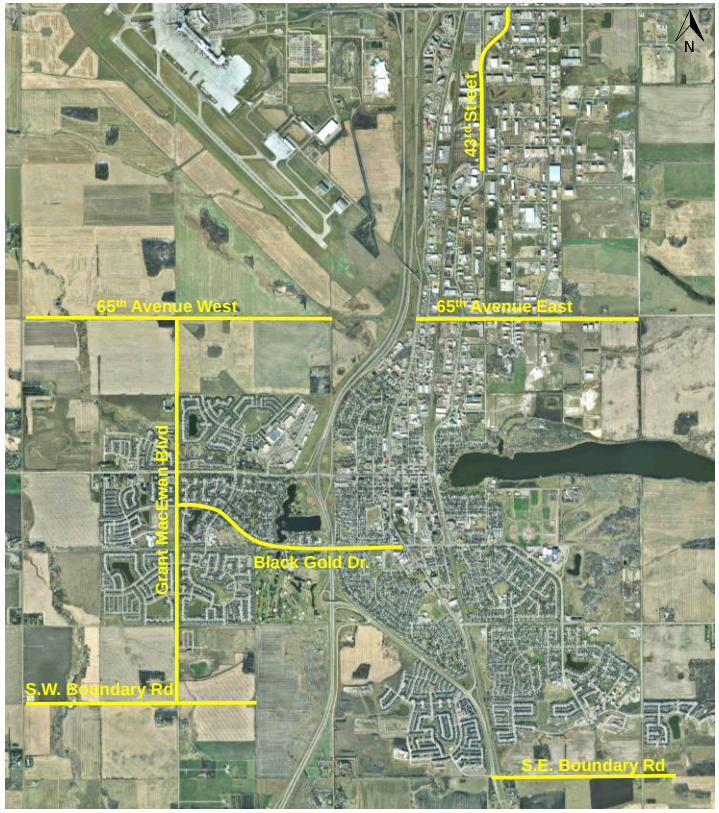


Exhibit 5-10: Functional Design of Corridors Key Map

Preliminary cost estimates (based upon 2017 construction costs) were prepared for each of the functional plans.

The complete set of functional plans are located within the Annex document.

5.7.1 42nd/43rd Street

Corridor Limits:

175m north of 70th Avenue to 82nd Avenue

Current Configuration:

The corridor currently has a 2-lane rural cross-section. Auxiliary lanes are provided at the 82nd and 83rd Avenue intersections (Kenworth Accesses). 43rd Street currently connects to 42nd Street by way of a stop-controlled T-intersection (where 43rd Street is the minor leg). An existing traffic signal is in place at Allard Avenue.

Future Improvements:

The corridor plans includes widening to a 4-lane, rural cross-section with a 6m painted median. Northbound left turn lanes are provided for all accesses along the corridor and southbound auxiliary lanes are provided at intersections (Allard Avenue, 81st Avenue and 82nd Avenue) and as required at private accesses.

A new traffic signal is proposed at the 42nd/43rd Street intersection.

Triggers:

Industrial development growth in the north east portion of the City would form the trigger for this infrastructure requirement; such as Saurahb Park, Cathton Farms, Leduc Energy Park. The industrial growth within Leduc County (Saunders Lake) would also impact the need for this infrastructure.

Providing north-south capacity parallel to the Highway 2 corridor is also an important consideration.

Staging:

The improvements would be constructed in a single stage. Widening of the existing corridor would take place on the east side. This improvement is planned for the short-term time horizon. (Project 10.03)

Cost Estimate:

$6.4M

Rural versus Urban Cross-Section:

The functional plan also includes an option to accommodate an urban cross-section within the right-of-way, with a multiway trail on the west side. The urban configuration would come at a cost of an additional $1.67M (over the same corridor limits). Should the City wish to include a multiway in its industrial business park, the 42nd/43rd Street corridor would be the preferred north-south route, because it would also accommodate transit users along Route 1.

Intersection Spacing and Proximity to Airport Road:

The northern end of the corridor (42nd Street) is characterized by having three intersections within 525m to Airport Road (42nd/43rd Street, 82nd Avenue, and 84th Avenue).

A minimum intersection spacing of 400m is desired along an arterial to maintain signal progression and prevent

"grid-lock" situations with traffic signals. Currently, the 43rd/42nd Street "T" intersection is 525m south of Airport Road, which is ideal.

The 84th Avenue corridor will likely serve as a local connection to 39th Street only, however 82nd Avenue will ultimately connect 42nd Street to Spine Road providing a connection between the two arterials and resulting in through-traffic volumes and potentially warrant traffic signals in the future.

Providing traffic signals at 82nd and 84th Avenues are not recommended for the following reasons:

- The 82nd Avenue intersection is located only 200m north of the 43rd/42nd Street intersection and 84th Avenue only 200m north of 82nd, which are too short distances to allow traffic signal control.
- The predominant movements are to/from the north (SB-LT in the morning, WB-RT in the afternoon). The primary concern is the safety and operation of the SB-LT at both intersections; as the forecast northbound traffic stream increases the available gaps in the northbound traffic stream decrease. As SB-LT queues form, they may spill back into Airport Road; and
- The 43rd/42nd Street intersection traffic signal is not anticipated to provide significant gaps in the northbound traffic flow (since the site accomodates a Park n Ride, where the majority of vehicles are headed north to Edmonton), as when the NB movement is held at a red, the EB-LT would occupy the available gaps.

It is therefore recommended that when traffic signals are warranted[2] or if safety concerns arise, the median should be extended across both 82nd and 84th Avenues restricting the intersections to right-in/right-out movements.

The movement restriction would be forecast to affect vehicles inbound from the north via Airport Road, who would have to drive passed 42nd Street and make a right turn onto 39th Street, to access either 84th Avenue or 82nd Avenue from the east (this diversion would cause an additional 500m-to-700m travel distance). Vehicles destined north from the Kenworth Truck retailer would need to use the accesses to the west of their property and head to Airport Road via the signalized 43rd/42nd Street intersection (a detour of about 500m-to-900m).

[2] As per TAC's "Manual of Uniform Traffic Control Devices"

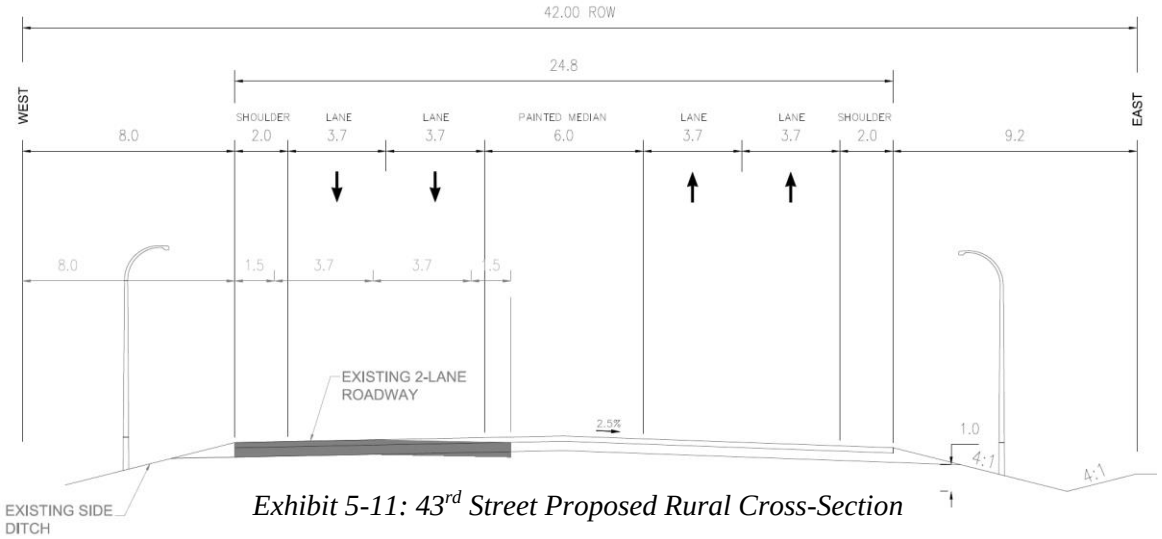


Exhibit 5-11: 43rd Street Proposed Rural Cross-Section

Exhibit 5-12: 43rd Street Functional Plan

5.7.2 Grant MacEwan Boulevard

Corridor Limits:

SW Boundary Road to 65th Avenue West

Current Configuration:

The corridor currently has a 2-lane cross-section along its length. The corridor is paved from Blackstone Blvd to Bridgeport Gate, and has a gravel surface along the remainder of the corridor. The cross-section is rural from SW Blvd to 50th Avenue and urban from 50th to 65th Avenue. Auxiliary lanes are provided at the 50th Avenue signalized intersection. On-street parking is currently provided north of Ameena Dr to 65th Avenue. A multiway link is located from Spruce Blvd to Bridgeport Gate. An existing traffic signal is in place at Black Gold Drive.

Future Improvements:

The corridor plans include widening to a 4-lane, urban cross-section along its entire length. A 6m raised median[3] would be provided from the CP Rail crossing to 65th Avenue (divided) and a painted median would be provided southward to SW Boundary Road (undivided). Auxiliary lanes are provided at intersections along the entire length of the corridor. The multiway corridor would be extended from its existing limits to SW Boundary Road on the south and to 65th Avenue West on the north.

Traffic signals are proposed at SW Boundary Road, 38th Avenue, Spruce Blvd, Suntree Promenade, Bridgeport Gate, 400m north of Bridgeport Gate and 65th Avenue West.

A 1.83m tall noise barrier[4] is proposed from 100m south of Black Gold Dr to 50th Avenue to address noise mitigation for existing residential developments.

Triggers:

Residential and mixed-use development growth in the west and southwest portions of the City would form the trigger for this infrastructure requirement (e.g. West Area, Crystal Creek). Growth within Leduc County (Aerotropolis) and the EIA lands would also impact the need for this infrastructure.

Implementation of the proposed 65th Avenue interchange, providing a new crossing of the Highway 2 is also an important consideration.

[3] Providing a raised median represents the design standard for urban divided arterials (the roadway classification is based upon traffic volumes). Alternatives to raised medians can be considered at the time of construction and are to be determined on a case by case basis. This footnote applies to all corridors presented within Section 5.7 of this report (where applicable). Additional information regarding access management is also available within Section 5.7.8.

[4] A comprehensive noise study was undertaken along Grant MacEwan Blvd, which included evaluating current noise measurements and modeling noise mitigation requirements for existing residential developments.

Staging:

Three independent projects were identified within Phase 1, which would coincide with the short-term time horizon:

- Paving from Bridgeport Gate to 65th Avenue West (this improvement forms part of the 65th Avenue Interchange Phase 1 project);
- Widening to a 4-lane cross-section from Black Gold Dr to 50th Avenue (Project #10.08); and
- A new traffic signal at Suntree Promenate (Project #10.02).

Phase 2 would involve widening to a 4-lane divided arterial from Bridgeport Gate to 65th Avenue West, and new traffic signals at Bridgeport Gate, 400m north of Bridgeport Gate and 65th Avenue West (Project #20.09). This project would take place during the medium-term horizon.

Phase 3, which takes place during the long-term horizon, would involve:

- Widening to a 4-lane cross-section from 50th Avenue to Bridgeport Gate;
- Widening to a 4-lane cross-section from Spruce Blvd to Black Gold Dr and a new traffic signal at Spruce Blvd; and
- Paving from SW Boundary Road to Blackstone Blvd (Project #30.07)

Phase 4 is beyond the timeline of this TMP and would involve:

- Widening to a 4-lane cross-section from SW Boundary Rd to Spruce Blvd; and
- New traffic signals at SW Boundary Road and 38th Avenue.

Cost Estimate:

$17.4M

Which can be divided by phase as follows:

Phase 1: $1.89M

Phase 2: $3.43M

Phase 3: $8.20M

Phase 4: $3.90M

Deer Valley Creek Crossing

The existing bridge crossing over Deer Valley Creek, 200m north of 50th Avenue, accommodates a 2-lane cross-section, a sidewalk on the west side and a multiway on the east side. When widening of the corridor to 4-lanes in the long-term horizon, widening to the east was planned so that the sidewalk can remain in its existing location. A survey must be undertaken at the time of detailed design to determine if the widening could be accommodated without extending the bridge.

Storm Water Requirements

Stormwater requirements along the corridor must be confirmed at the time of detailed design.

West Haven Dr, Ameena Dr and Ravine Villas Intersections

The West Haven Dr, Ameena Dr and Ravine Villas intersections are currently full-movement T-

intersections, with a stop-control on the minor leg.

At the time of widening Grant MacEwan Blvd between 50th Avenue and Black Gold Dr (within the short-term time horizon), the West Haven Dr intersection will be converted to right-in/right-out by way of a raised median along Grant MacEwan Blvd. This restriction was deemed necessary due to the proximity of the 50th Avenue signalized intersection (125m) and the safety concerns associated with having consecutive northbound left-turn movements within a short distance to one another. A detour to the nearby signalized intersections (50th Avenue/West Haven Blvd and Black Gold Drive/Grant MacEwan Blvd) will accommodate northbound movements.

In the long-term horizon, at the time of widening Grant MacEwan to the north of 50th Avenue the Ravine Villas SB-LT movement will essentially be located within the Grant MacEwan Blvd/50th Avenue SB-LT taper. In addition, the close proximity of Ameena Dr, Ravine Villas and 50th Avenue (all within 130m) would likely pose significant safety concerns. At the time of detailed design, the median on the north leg of Grant MacEwan Blvd can be extended to turn both intersections to right-in/right-out operations. For both residential developments, small detour routes would result from this conversion:

- Residents of Ravine Villas would detour via Bridgeport Crossing to head SB to 50th Ave; and
- Residents of Ameena would either do a SB-to-NB U-turn at Grant MacEwan/50th Ave or detour via Deer Valley Dr, 50th Ave EB and head NB on Grant MacEwan.

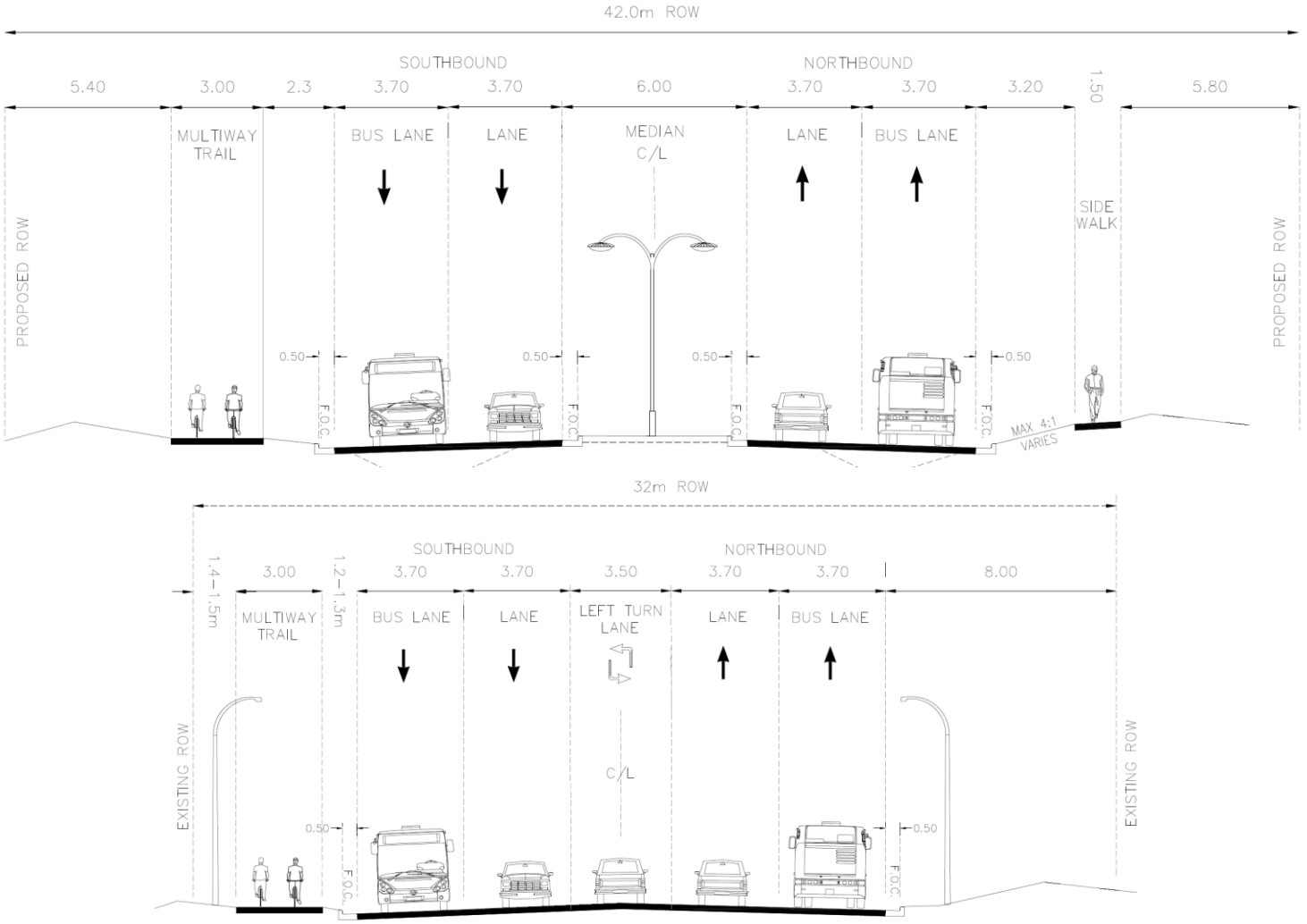


Exhibit 5-13: Grant MacEwan Boulevard Proposed Cross-Sections
(Top, 42m ROW from STA 10+000 to STA 10+800; Bottom, 32m ROW from STA 12+500 to STA 14+050)

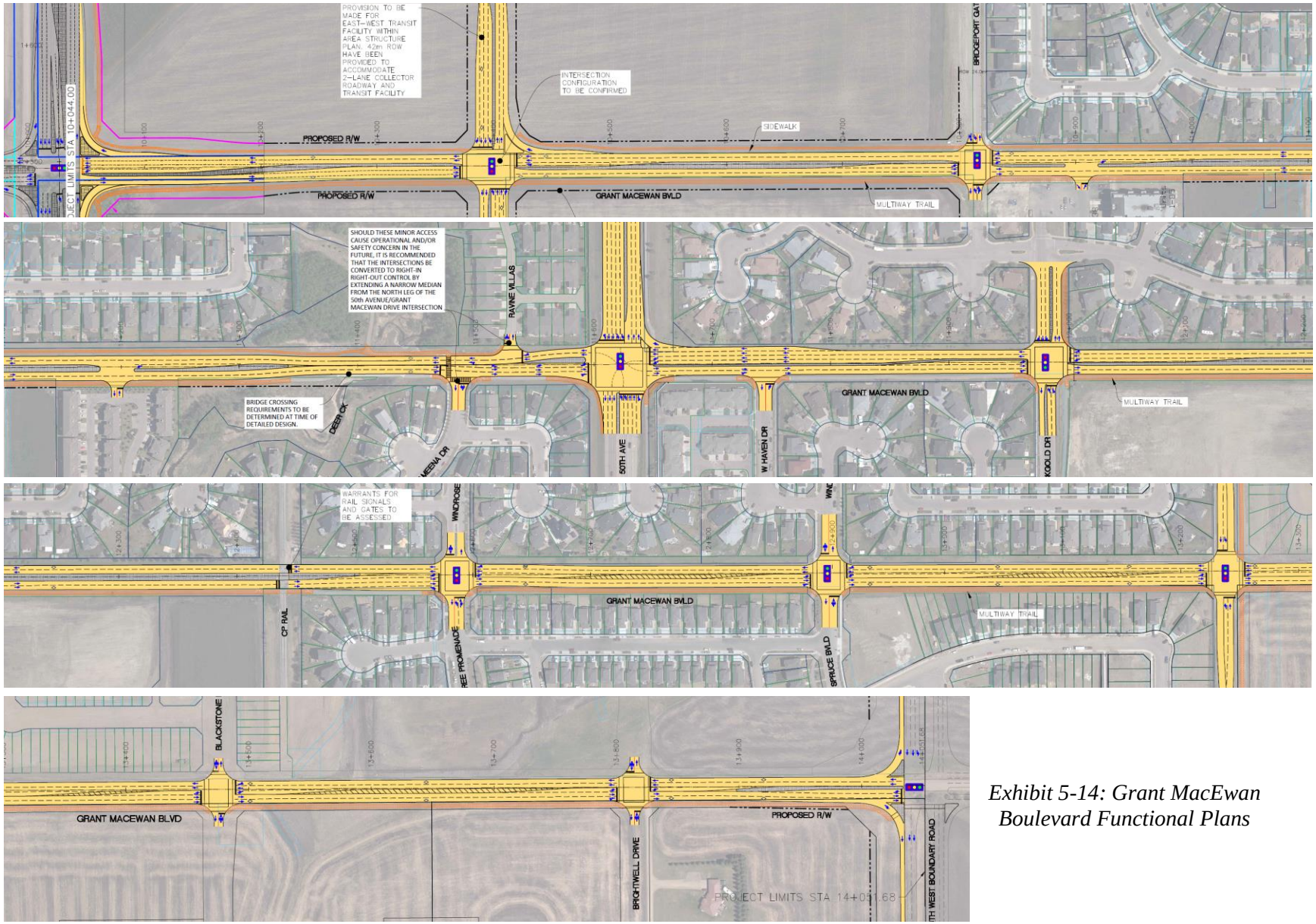


Exhibit 5-14: Grant MacEwan Boulevard Functional Plans

5.7.3 Black Gold Drive

Corridor Limits:

Grant MacEwan Boulevard to 50th Street

Current Configuration:

The corridor currently has a 2-lane urban cross-section along its length. Auxiliary lanes are provided at the Grant MacEwan Blvd and 50th Street signalized intersections. A traffic signal is also in place at Alton Drive.

A multiway link is located on the north side of the corridor from Grant MacEwan to Alton Drive and on the south side from Alton Drive to 50th Street.

Future Improvements:

The corridor plans include widening to a divided (6m raised median), 4-lane, urban cross-section along its entire length. Widening would take place on the south side of the existing corridor. Auxiliary lanes are provided at intersections along the entire length.

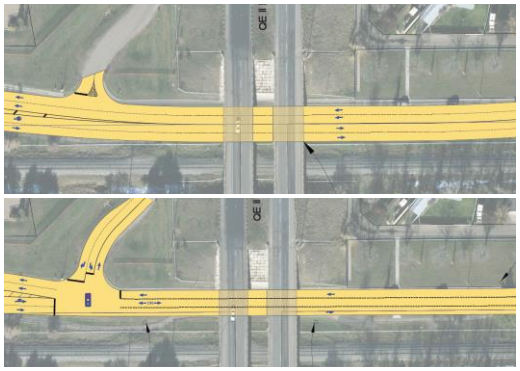


Exhibit 5-15: Black Gold Drive Interim Stage Alternatives
(Top, 4-lane cross-section; Bottom, 3-lane cross-section with reversible center lane)

The functional plans include provision for widening under the existing and future Highway 2 corridor. Under the existing Highway 2, an undivided 4-lane cross-section can potentially be achieved, as an alternative, a three-lane configuration with a reversible traffic light can be accommodated; a detailed survey of the area would be required to choose the best configuration.

In the long-term, the realignment of the Highway 2 will require new bridges over Black Gold Dr; an upgrade to a 4-lane divided configuration would be possible at that time.

Improvements to the 50th Street intersection are also planned and would include a slight realignment southward of the Black Gold Drive corridor to accommodate the roadway widening and new auxiliary lanes. Right-of-way

Exhibit 5-16: Black Gold Drive/50th Street Intersection Improvements

would be required from CP Rail to accommodate this design.

Triggers:

Residential and mixed-use development growth in the southwest and southeast portions of the City would form the trigger for this infrastructure requirement (e.g. Westhaven, Crystal Creek to the west, and Rollyview and Blackgold to the east).

Staging:

Phase 1 would involve the improvements at the 50th Street intersection and would take place during the medium-term horizon (Project #20.08).

Phase 2 is beyond the timeline of this TMP and would involve widening of the corridor from Grant MacEwan Blvd to 50th Street.

Cost Estimate:

$8.55M

Which can be divided by phase as follows:
Phase 1: $0.85M
Phase 2: $7.70M

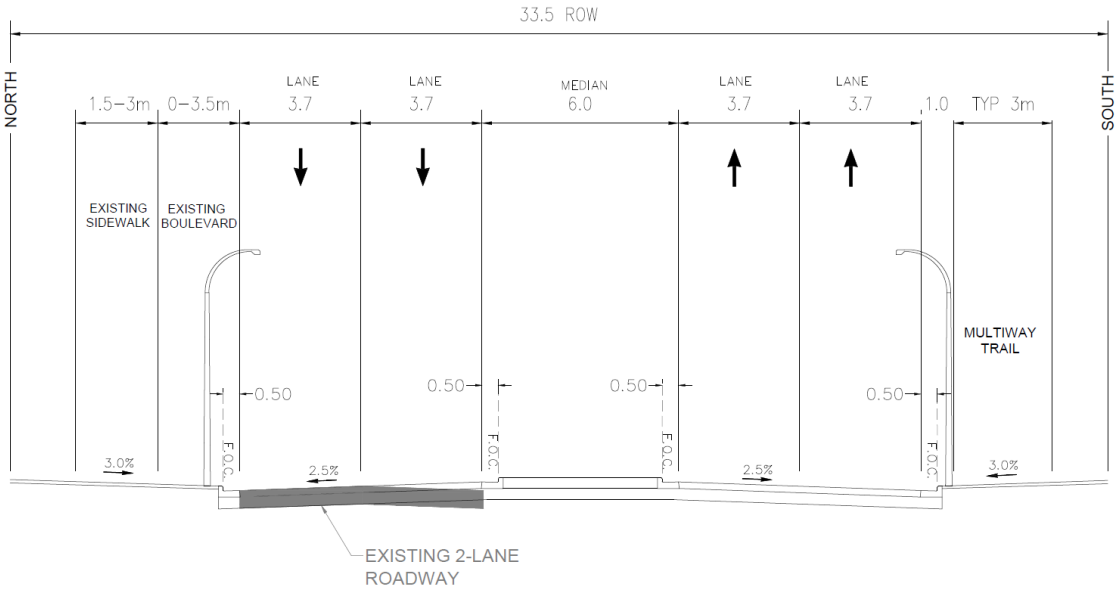


Exhibit 5-17: Black Gold Drive Proposed Cross-Section

Exhibit 5-18: Black Gold Drive Functional Plan

5.7.4 SE Boundary Road

Corridor Limits:

Highway 2A to 290m east of Robinson

Current Configuration:

The is no existing roadway.

Future Improvements:

The plans include a new divided (6m raised median), 4-lane, urban cross-section along its entire length.

Traffic signals are proposed at Highway 2A, Caledonia Dr, Coady Blvd and C.W. Gaetz Rd and auxiliary lanes are provided at each intersection.

A 3m wide multiway link would be provided along the north side of the roadway. Provision for a noise barrier[5] is also included within the plans.

Triggers:

Residential development growth in the southeast section of the City would trigger this infrastructure requirement (e.g. Meadowview, Tribute, Robinson, and Eaton & Emery).

SE Boundary Road could ultimately form part of the City's truck route and connect to Spine Road.

Staging:

Stage 1 would coincide with the short-term time horizon and include:

- A new 4-lane divided arterial from Highway 2A to Caledonia Dr;
- A new traffic signal at Highway 2A; and
- A new 2-lane arterial from Caledonia Dr to Coady Blvd (Project #10.10).

Phase 2 would involve a new 2-lane arterial from Coady Blvd to 290m east of the Robinson access and new traffic signals at Coady Blvd (Project #20.10). This project would take place during the medium-term horizon.

Phase 3, which takes place during the long-term horizon, would involve a new traffic signal at Caledonia Dr (Project #30.03).

Phase 4 is beyond the timeline of this TMP and would involve:

- Widening to a 4-lane cross-section from Caledonia Dr to 290m east of the Robinson Access; and
- New traffic signals at C.W. Gaetz.

Cost Estimate:

$17.1M

Which can be divided by phase as follows:
Phase 1: $6.15M
Phase 2: $4.97M
Phase 3: $0.37M
Phase 4: $5.54M

[5] A noise study was not undertaken for SE Boundary Road.

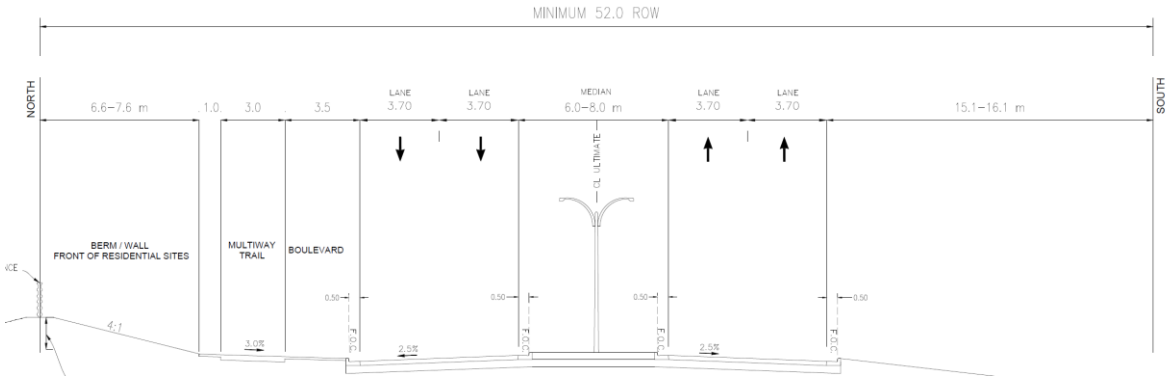
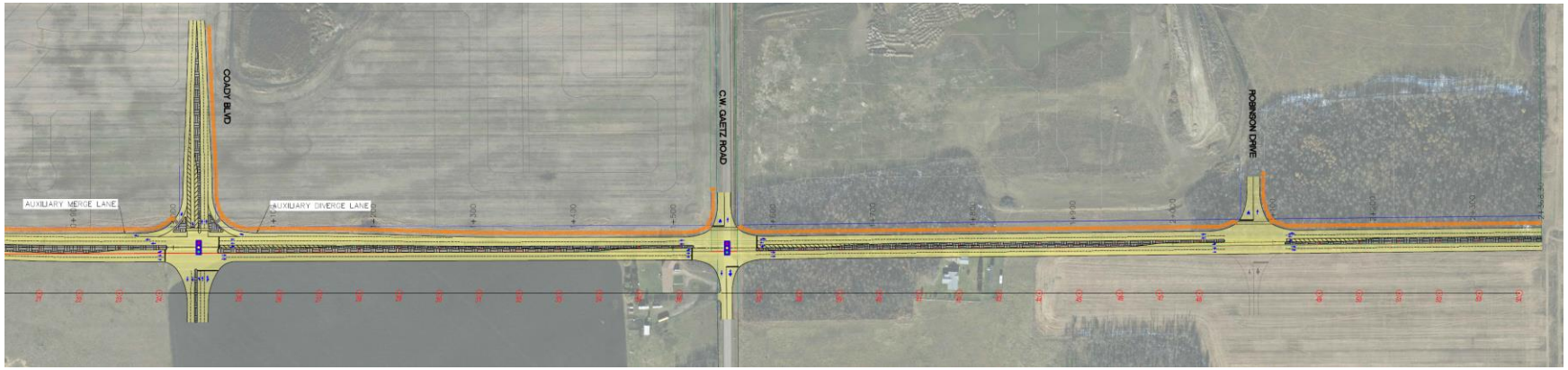


Exhibit 5-20: South East Boundary Road Proposed Cross-Section

Exhibit 5-19: SE Boundary Road Functional Plan



5.7.5 SW Boundary Road

Corridor Limits:

74th Street to 400m east of Grant MacEwan Blvd

Current Configuration:

The is no existing roadway.

Future Improvements:

The plans include a new 2-lane, rural cross-section along its entire length. Traffic signals are proposed at 74th Street and Grant MacEwan Blvd, with auxiliary lanes provided at the 74th Street intersection. A bridge or culvert over the tributary to Whitemud Creek would be required. A 3m wide multiway would be provided along the south side[6].

Provision for a possible Highway 2A west extension was protected within the functional plans.

Triggers:

Residential development growth in the southwest section of the City would trigger this infrastructure requirement (e.g. Brightwell, Windrose and Blackstone).

Connecting infrastructure, such as the Grant MacEwan south extension and the Highway 2A westerly extension may also contribute as triggers.

Staging:

Phase 1 would coincide with the long-term time horizon and include construction of the 2-lane corridor from 74th Street to 400m east of Grant MacEwan Blvd (i.e. the Blackstone access) (Project #30.08).

Phase 2 is beyond the timeline of this TMP and would involve new traffic signals at the 74th Street and Grant MacEwan intersections. At the time of detailed design, setback requirements at the intersection must be confirmed due to the location of the power station at the northeast quadrant of the intersection.

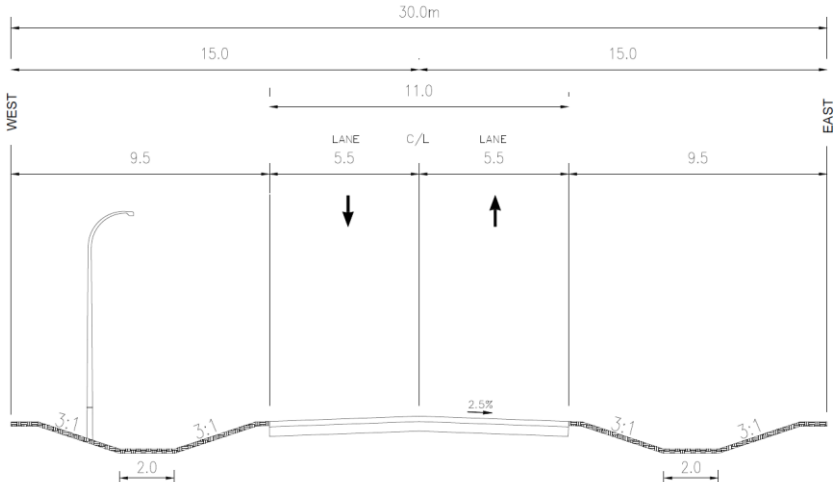


Exhibit 5-21: South West Boundary Road Proposed Cross-Section

[6] The location of the multiway (i.e. north versus south) is to be re-evaluated at the time of detailed design and will be dependent upon the Highway 2A alignment and classification.

Cost Estimate:
$12.85M

Which can be divided by phase as follows:
Phase 1: $12.09M
Phase 2: $0.76M

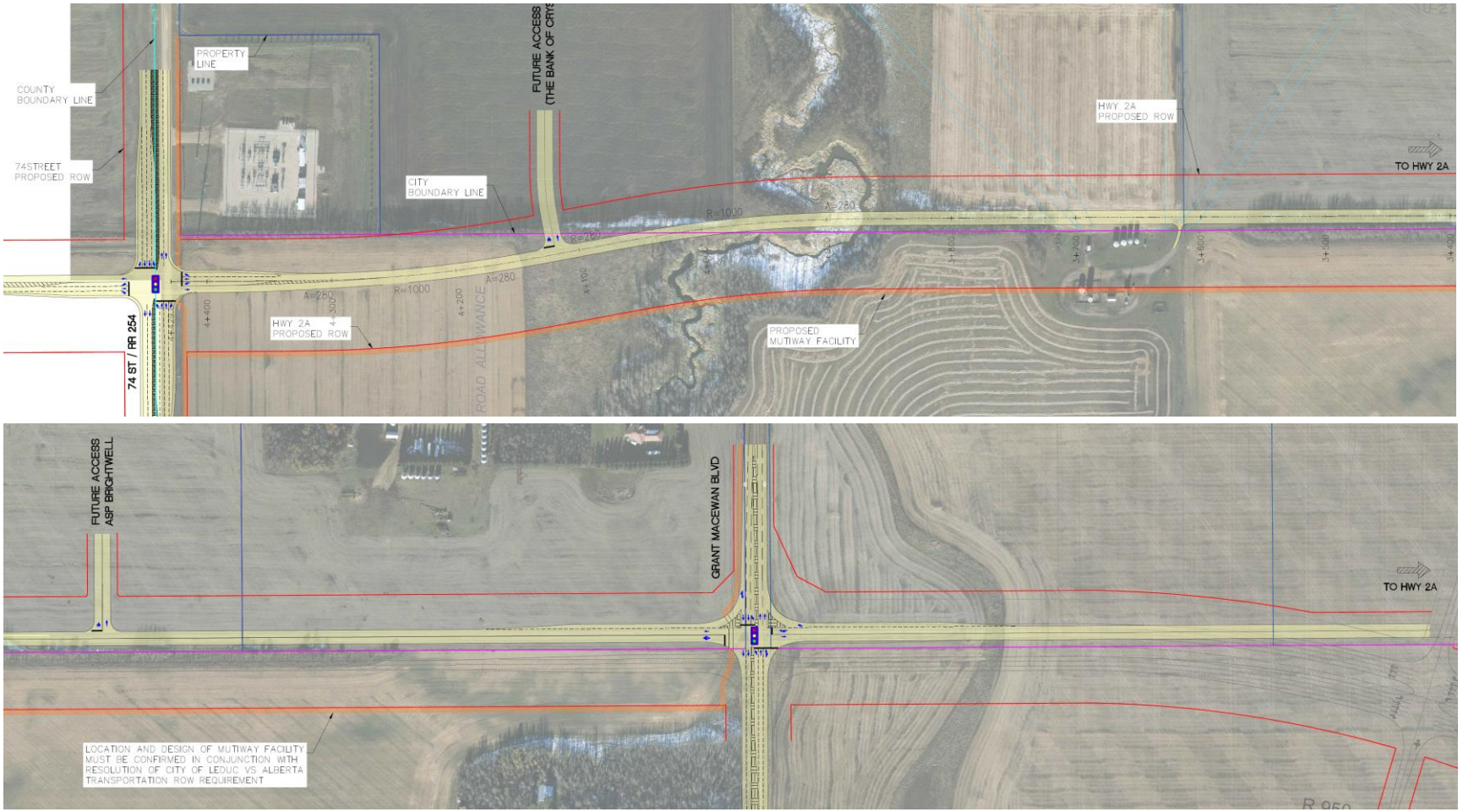


Exhibit 5-22: SW Boundary Road Functional Plan

5.7.6 65th Avenue East

Corridor Limits:

200m west of 45th Street to Spine Road

Current Configuration:

65th Avenue East has a 4-lane rural cross-section west of 45th Street and 2-lanes east of 45th Street. The road is gravel from 39th Street to Spine Road. There is a traffic signal at 45th Street.

Future Improvements:

The ultimate plans include a 6-lane urban, divided, cross-section with a 6m raised median along the entire corridor. Traffic signals are proposed at 39th Street and Spine Road, with auxiliary lanes provided at all intersections.

A 3m wide multiway is included on the north side from 45th to 43rd Street.

Triggers:

Major industrial development within the City (e.g. Telford Lake) and within Leduc County (Saunders Lake) would trigger this infrastructure requirement.

Connecting infrastructure, such as the 65th Avenue interchange, as well as the Spine Road south extension are also important factors.

Staging:

Phase 1 would coincide with the short-term time horizon and include paving the 2-lane section from 35th Street to Spine Road (Project #10.05).

Phase 2 would take place in the medium-term and involve:

- widening to 6-lanes from the CP Rail corridor to 45th Street;
- widening to 4-lanes from 45th Street to Spine Road, with urban and rural cross-sections, west and east of 43rd Street, respectively; and
- a new traffic signal at Spine Road (Project #20.04).

Phase 3 is beyond the timeline of this TMP and would involve:

- widening to 6-lanes and conversion to an urban cross-section from 45th Street to Spine Road; and
- a new traffic signal at 39th Street.

Cost Estimate:

$17.75M

Which can be divided by phase as follows:

Phase 1: $0.90M

Phase 2: $8.29M

Phase 3: $8.55M

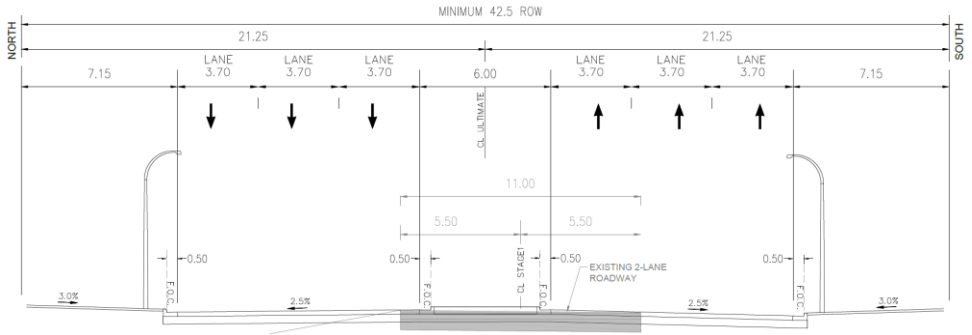


Exhibit 5-23: 65th Avenue East Proposed Cross-Section

Exhibit 5-24: 65th Avenue East Functional Plans

5.7.7 65th Avenue West

Corridor Limits:

74th Street to 200m east of Discovery Way

Current Configuration:

The corridor is currently a 2-lane gravel roadway from 74th to 54th Street.

Future Improvements:

The plans include a new divided (6m raised median), 6-lane, rural cross-section along its entire length. Traffic signals are proposed at 74th Street, Grayson Access, Grant MacEwan Blvd and Discovery Way, with auxiliary lanes provided all intersections.

A 3m wide multiway link would be provided along the south side of the roadway.

Triggers:

Residential and mixed-use development growth in the west section of the City (e.g. 65th Avenue West, West Area) as well as EIA development of their lands (between 65th Avenue and Airport Road) would trigger this infrastructure requirement.

Connecting infrastructure, such as the 65th Avenue interchange (Phase 1 and Ultimate) is also an important consideration[6].

Staging:

Phase 1 would coincide with the short-term time horizon and include paving the 2-lane corridor from Grant MacEwan Blvd to Discovery Way and signalization of the Discovery Way intersection (these improvements forms part of the 65th Avenue Interchange Phase 1 project).

Phase 2 is within the medium-term horizon and includes:

- Paving the 2-lane roadway from 74th Street to Grant MacEwan Blvd; and
- Widening to 4-lanes from Grant MacEwan Blvd to Discovery Way (Project #20.05).

Phase 3 includes a new traffic signal at the Grayson access (Project #30.01) and coincides with the long-term time horizon.

Phase 4 is beyond the timeline of this TMP and would involve:

- A new traffic signal at 74th Street;
- Widening to 4-lanes from 74th Street to Grant MacEwan Blvd;
- Widening to 6-lanes from 74th Street to Grant MacEwan Blvd;
- Widening to 6-lanes from Grant MacEwan Blvd to Discovery Way

Cost Estimate:
$19.82M

Which can be divided by phase as follows:
Phase 1: Included as part of 65th Avenue Interchange project
Phase 2: $7.68M
Phase 3: $0.3M
Phase 4: $11.84

[6] In the case of the first phase of the 65th Avenue West corridor, the interchange represents the main trigger for this project.

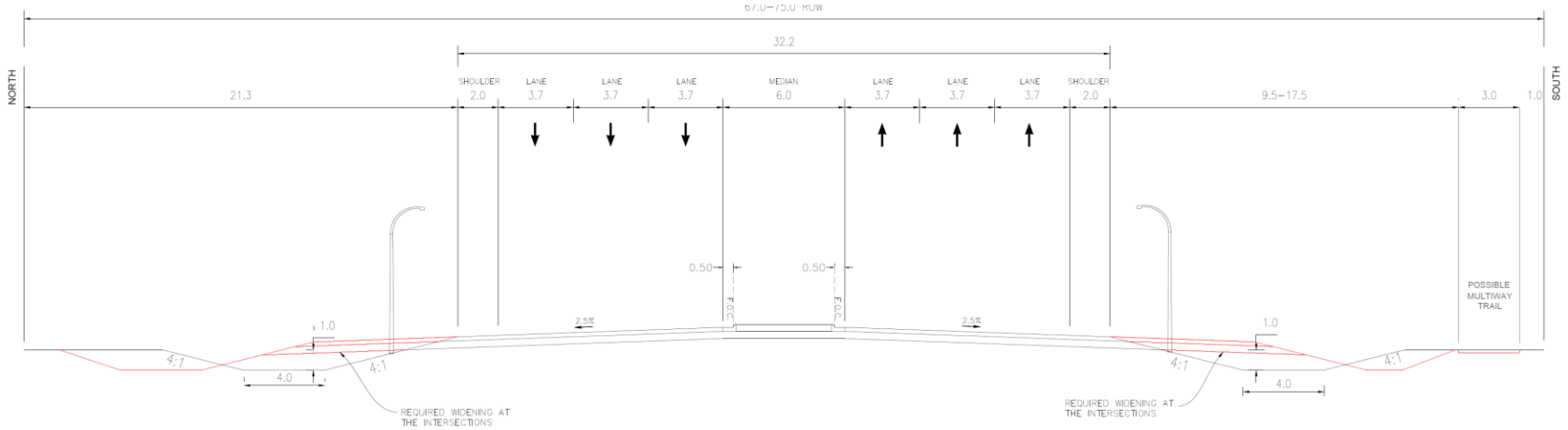


Exhibit 5-25: 65th Avenue West Proposed Cross-Section

Exhibit 5-26: 65th Avenue West Functional Plan

5.7.8 Access Management

The Transportation Association of Canada (TAC) provides access management guidelines addressing both urban and rural roadway environments. These guidelines define a seven-level category system that ranging from local roadways (where driveway accesses are only limited by safety requirements and no operational requirements are applicable) to fully grade-separated roadways.

TAC's guidelines (Table 5-1) define: "*arterials as roads where traffic movement is the primary consideration while land access is a secondary function*" and segments the arterials into "minor" and "major" categories.

Common elements to both "minor" and "major" categories are:

- traffic flow should be un-interrupted except at traffic signals and cross-walks;
- transit service accommodation by way of express and local buses being permitted;
- cyclists accommodation may be provided by lane widening or desirably by way of separate facilities; and
- pedestrians accommodation may be provided by way of sidewalks.

Table 5-1: TAC Characteristics of Urban Arterials

	Minor	*Major*
Traffic Movement is a ...	Major Consideration	Primary Consideration
Land Service Access	Some access control	Rigid Access Control
Traffic Volume (vpd-typical)	5,000-to-20,000	10,000-to-30,000
Design Speed (kph)	50-to-70	60-to-100
Average Running Speed (kph off-peak)	40-to-60	50-to-90
Vehicle Type	All types	All, Up to 20% Trucks
Minimum Intersection Spacing	200	400

Source: "Geometric Design Guide for Canadian Roads, Table 1.3..4.2., Page 1.3.4.3 (TAC, Sept 1999)

Table 5-2 presents three levels of access limitation defined within TAC's Geometric Design Guide for Canadian Roads that are presented in order of increased access restriction (Levels 1 and 2 are applicable to expressways and freeways). Access level 5 favors increased accessibility at the cost of overall roadway mobility and lower traffic operational performance, while Level 3 is intended to assure greater mobility along the corridor.

Within the functional plans for the proposed new corridors (i.e. SE Boundary Road, SW Boundary Road and 65th Avenue West), a typical desired minimum spacing of 400m was provided between signalized intersections along major arterials.

Table 5-2: Arterial Category Access Levels

Access Level	Arterial	Arterial Access Limitations
3	Major	Right-turn access driveways only.
4	Major	Right and left-turn access in, right-turn access out.
5	Minor	Right and left-turn access in/out of activity centre: left-turn lanes required.

Source: "Geometric Design Guide for Canadian Roads, Table 3.2.2.2., Page 3.2.2.3 (TAC, Sept 1999)

For corridors assumed to be characterized by ultimately higher operating and design speeds, greater intersection spacing was provided. This would lead to intersections being spaced farther apart to achieve the same appropriate signal phasing and progression opportunities.

When the spacing between signalized intersections increases over 800 meters, the benefits to traffic signal progression become marginal. However, if needed from a land use and planning perspective, unsignalized intersections could "fill-the-gaps" at 400-meter intervals depending on the ability of the access to demonstrate satisfactory traffic operational characteristics.

Prohibiting Accesses on Arterial Roadways

On some urban corridors (e.g. Grant MacEwan) existing intersection spacing was deficient to meet long term traffic operational requirements. In these cases, prohibition or limitation of access was considered. In some cases, stop controlled intersections were converted to right-in/right-out access.

For arterial corridors (existing and proposed), access should be limited to major intersections and the City should assure that all other residential, retail center or industrial direct access onto the roadway corridor should be prohibited. Access should be limited to adjacent collector designated roadways.

Prohibiting Residential Accesses on Collector Roadways

The City of Leduc should consider disallowing private residential driveways onto collector roadways in future new development areas. This planning initiative is intended to be a best practice that would address safety issues (e.g. Alton Dr).

Access to collector roadways should be limited to local roadways and activity centers (e.g. multi-family buildings, schools, commercial or retail developments) and assure appropriate separation between the access and adjacent intersections.

In the case where residential homes front a collector roadway, consideration should be given to developing a parallel laneway backing onto the residential homes that would allow for individual driveway connections.

6 IMPLEMENTATION PLAN

6.1 SCHEDULING AND COSTS

The 2018 Leduc TMP implementation plan was developed based upon the infrastructure requirements identified to encourage growth within the City of Leduc over the next three decades.

The TMP supports an ultimate roadway network which is intended to:

- include all roadway improvements identified for an ultimate transportation network to accommodate planned growth, inclusive of inter-municipal initiatives and projects shared with other jurisdictions, such as AT and the EIA;
- provide an implementation timeline with flexibility for when infrastructure improvements are required; and
- respect the limits of affordability for the municipality as much as possible.

Conceptual cost estimates were prepared for each project and are listed in Tables 6-1 to 6-3. Cost estimates were prepared using 2017 construction costs and represent total project costs (inclusive of right-of-way). Further costing refinements, as well as allocation of contributions, remains to be confirmed and would be defined on a project-by-project basis.

The projects presented are intended to be a prioritization list of how the City of Leduc will respond to growth.

The implementation plan as presented is dependent upon growth within the City's boundary from forecast development. The proposed improvements are important to maintain adequate traffic operations for each time horizon.

It is recommended that the City of Leduc monitor their transportation system performance and update their transportation network model as projects are completed, as development occurs, and/or as changes in development plans arise.

The 2018 TMP Implementation Plan (Table 6-1 to 6-3) has been assembled in the following sections which serve to outline the improvements needed in the short, medium and long-term time horizons.

It is emphasized that project timelines are dependent upon planned and on-going development initiatives. The nature of the Implementation Plan is to remain flexible and sensitive to the needs of the City. The following three sections define the projects that would fall exclusively within the existing municipal boundaries of the City of Leduc.

6.2 SHORT-TERM

Short-term improvements (See Exhibit 6-1 and Table 6-1) were defined as all local improvements required within the next decade, which include (in no particular order):

- 50th Avenue widening (from Deer Valley Drive to east of the fire hall access);
- New 74th Street (from 800m North of 50th Avenue to 400m South of 50th Avenue);
- Grant MacEwan Dr. widening (from 50th Avenue to Black Gold Drive)
- A new traffic signal at the Grant MacEwan Drive/Suntree Promenade intersection;
- Intersection improvements to the SB-RT at 50th Street & Highway 2A;
- Extend 65th Ave East to Spine Road (Range Road 250);
- New SE Boundary Road (from Highway 2A to Coady Blvd);
- Improvements to the traffic signal at the SE Boundary Road/Highway 2A intersection;

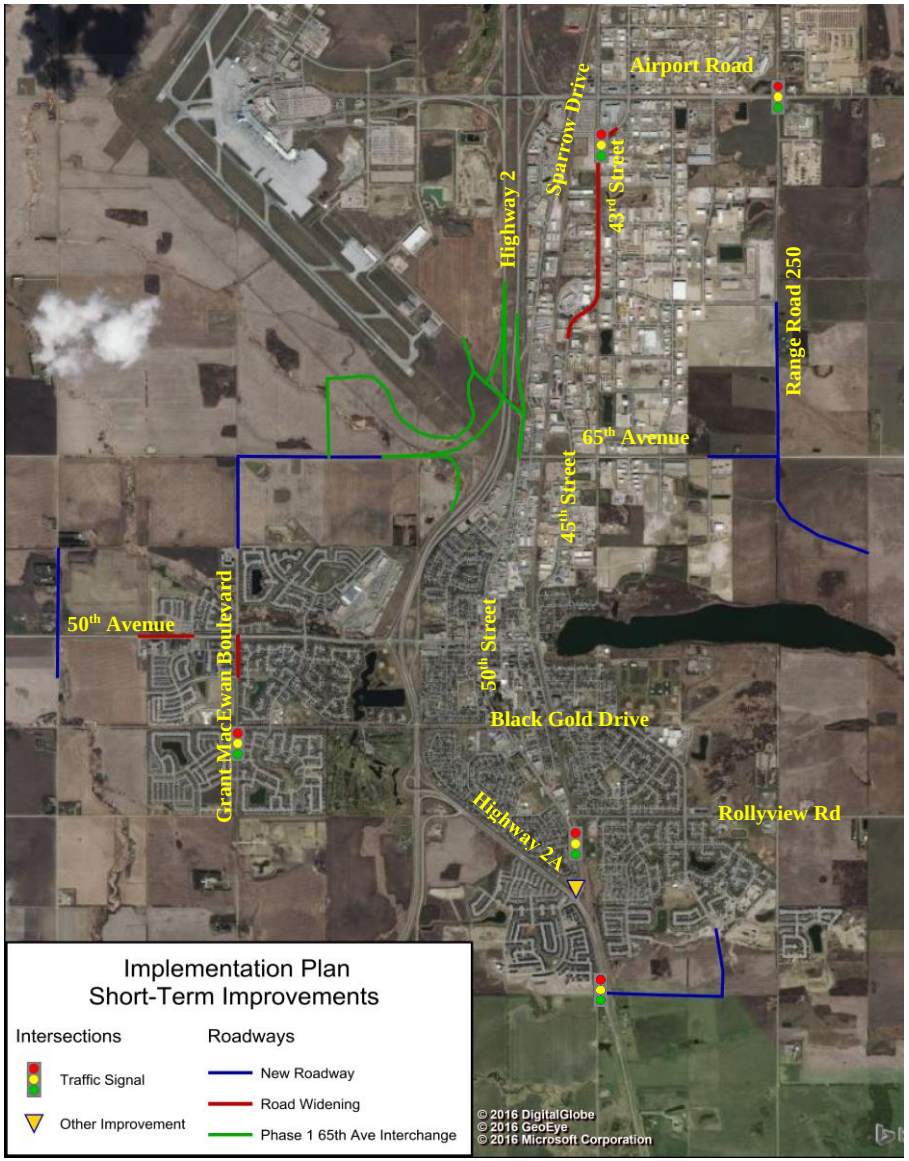


Exhibit 6-1: Short Term Implementation Plan

- Spine Road South Extenstion (from Allard Avenue to south of 65th Ave East (Lakeside Access));
- 43rd Street widening (from 82nd Ave to south of Allard);
- A new traffic signal at the 42nd/43rd Street intersection;
- Coady Blvd South Extension (to the new SE Boundary Road);
- A new trafic signal at the 50th Street/Bella Coola intersection; and
- A new traffic signal at the Airport Road and Spine Road intersection.

Table 6-1: Implementation Plan – Short Term Improvements

Project No.	Roadway /Intersection	From/To Limits	Project Description	Project Cost Estimate
10.01	50th Street & Bella Coola	Intersection	New traffic signal	$290,000
10.02	Grant MacEwan & Suntree	Intersection	New traffic signal	$290,000
10.03	45th/43rd Street	175m north of 70th Ave to 82nd Avenue	Widen to 4-lane undivided arterial and new traffic signal at 42nd Street	$6,400,000
10.04	50th Avenue	Deer Valley Drive to west of Fire Hall access	Widen to 4-lane divided arterial	$525,000
10.05	65th Avenue East	35th Street to Spine Road	Pave 2-lane arterial	$900,000
10.06	74th Street	800m north of 50th Avenue to 400 m south	New 2-lane arterial	$2,860,000
10.07	Coady Blvd	Meadowview Blvd to SE Boundary Road	New 4-lane undivided arterial	$3,000,000
10.08	Grant MacEwan North	50th Ave to Black Gold Drive	Widen to 4-lane divided arterial	$1,600,000
10.09	Highway 2A & 50th Street	Intersection	New southbound right-turn lane	$150,000
10.10	SE Boundary Road	Highway 2A to Coady Blvd	New traffic signal at Highway 2A, New 4-lane divided arterial (to Caledonia) and New 2-lane arterial (to Coady)	$6,150,000
10.11	Spine Road	Allard Avenue to Lakeside Access	Pave 2-lane arterial (to 65th Avenue East) and New 2-lane arterial (to Lakeside Access)	$5,450,000
10.12	Spine Road & Airport Road	Intersection	New traffic signal	$330,000

6.3 MEDIUM-TERM

Medium-term improvements (See Exhibit 6-2 and Table 6-2) were defined as all improvements required within the 10-to-20 time horizon, which include (in no particular order):

- 65th Avenue West widening from the Highway 2 to Grant MacEwan;
- A new traffic signal at the 65th Avenue West/Grant MacEwan intersection;
- 65th Avenue West extension (from Grant MacEwan to 74th Street);
- Black Gold Drive and 50th Street intersection improvements;
- New 74th Street (from 65th Ave to 800m south);
- A new traffic signal at the 74th Street/50th Avenue intersection;
- Grant MacEwan widening (from 65th Avenue West to Bridgeport Gate)
- A new traffic signal at the Grant MacEwan/Bridgeport Gate intersection;
- A new traffic signal at the Grant MacEwan and 400m north of Bridgeport Gate intersection;
- 50th Avenue widening (from Highway 2 West ramp terminal to Discovery Way);

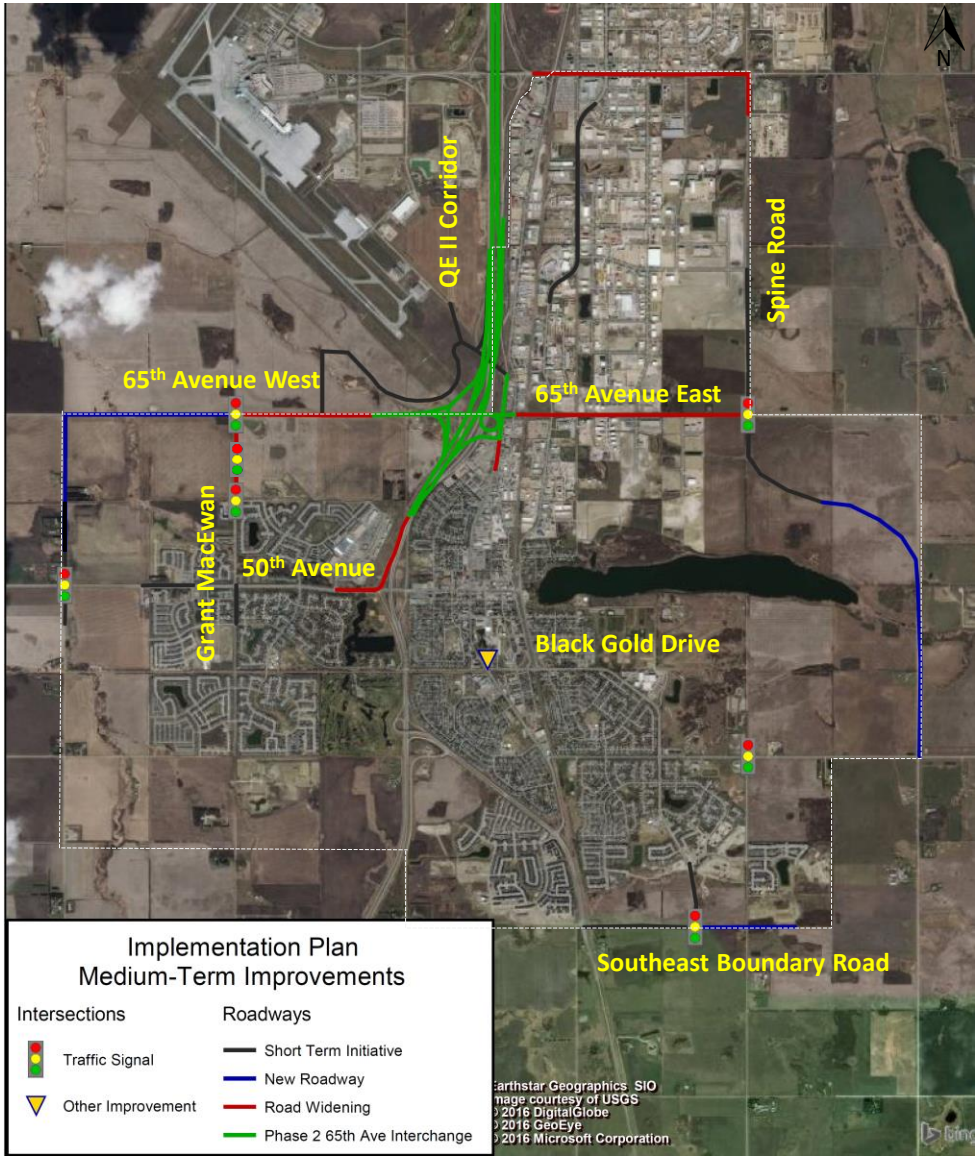


Exhibit 6-2: Medium Term Implementation Plan

- 65th Avenue East widening (from east of CP Rail to Spine Road)
- A new traffic signal at the 65th Avenue/Spine Road intersection;
- New SE Boundary Road extension (from Coady Blvd to Robinson Entrance)
- A new traffic signal at the SE Boundary Road/Coady Blvd intersection;
- 50th Street widening (from 64th Avenue to 61st Avenue);
- Spine Road south extension (From south of 65th Ave East (Lakeside Access) to Rollyview Road)
- Spine Road widening (from Airport Road to 82nd Avenue); and
- A new traffic signal at the Rollyview Rd & C.W Gaetz Rd intersection.

Table 6-2: Implementation Plan – Medium Term Improvements

Project No.	Roadway/ Intersection	From/To Limits	Project Description	Project Cost Estimate
20.01	Rollyview Rd & CW Gaetz Rd	Intersection	New traffic signal	$360,000
20.02	50th Avenue	Highway 2 West RT to Discovery Way	Widen to 4 WB lanes	$975,000
20.03	50th Street	61st Ave to 64th Ave	Widen to 6-lane undivided arterial	$752,000
20.04	65th Avenue East	East of CP Rail to Spine Road	Widen to 6-lane divided arterial (to 45th Street); Widen to 4-lane undivided arterial (to Spine Road) and a new traffic signal at Spine Road	$8,284,000
20.05	65th Avenue West	74th Street to Discovery Way	Pave 2-lane arterial (to Grant MacEwan) and Widen to 4-lane divided arterial (to Discovery Way)	$7,675,000
20.06	74th Street	65th Ave West to 800m south	New 2-lane arterial	$2,658,000
20.07	74th Street & 50th Avenue	Intersection	New traffic signal	$360,000
20.08	Black Gold Dr & 50th Street	Intersection	New auxiliary lanes and widen to the south	$846,000
20.09	Grant MacEwan	65th Ave West to Bridgeport Gate	Widen to 4-lane divided arterial and new traffic signals at Bridgeport Gate, 400m north of Bridgeport and 65th Avenue West	$3,432,000
20.10	SE Boundary Road	Coady Blvd to Robinson Access	New 2-lane arterial and traffic signal at Coady Blvd	$4,968,000
20.11	Spine Road	Airport Road to 82nd Avenue	Widen to 4-lane divided arterial	$1,209,000
		Lakeside Drive to Rollyview Road	New 2-lane arterial	$12,083,000

6.4 LONG-TERM

Long-term improvements (See Exhibit 6-3 and Table 6-3) were defined as all improvements required within the 20-to-30 year time horizon, including (in no particular order):

- New 74th Street extension (50th Avenue to SW Boundary Road);
- New SW Boundary Road (between 74th Street and Blackstone);
- 50th Avenue widening (from Bridgeport Crossing to 74th Street);
- Widen Grant MacEwan Blvd (from Bridgeport Gate to 50th Avenue);
- Widen Grant MacEwan Blvd (from Black Gold Drive to Spruce Blvd);
- Grant MacEwan Blvd extension (from Blackstone Blvd to SW Boundary Road);
- A new traffic signal at the Grant MacEwan Blvd/Spruce Blvd intersection;
- A new traffic signal at the 65th Avenue West/Grayson Access intersection;
- Spine Road widening (from Airport Road to 65th Avenue East);
- Rollyview Road corridor widening (from C.W. Gaetz to Spine Road);

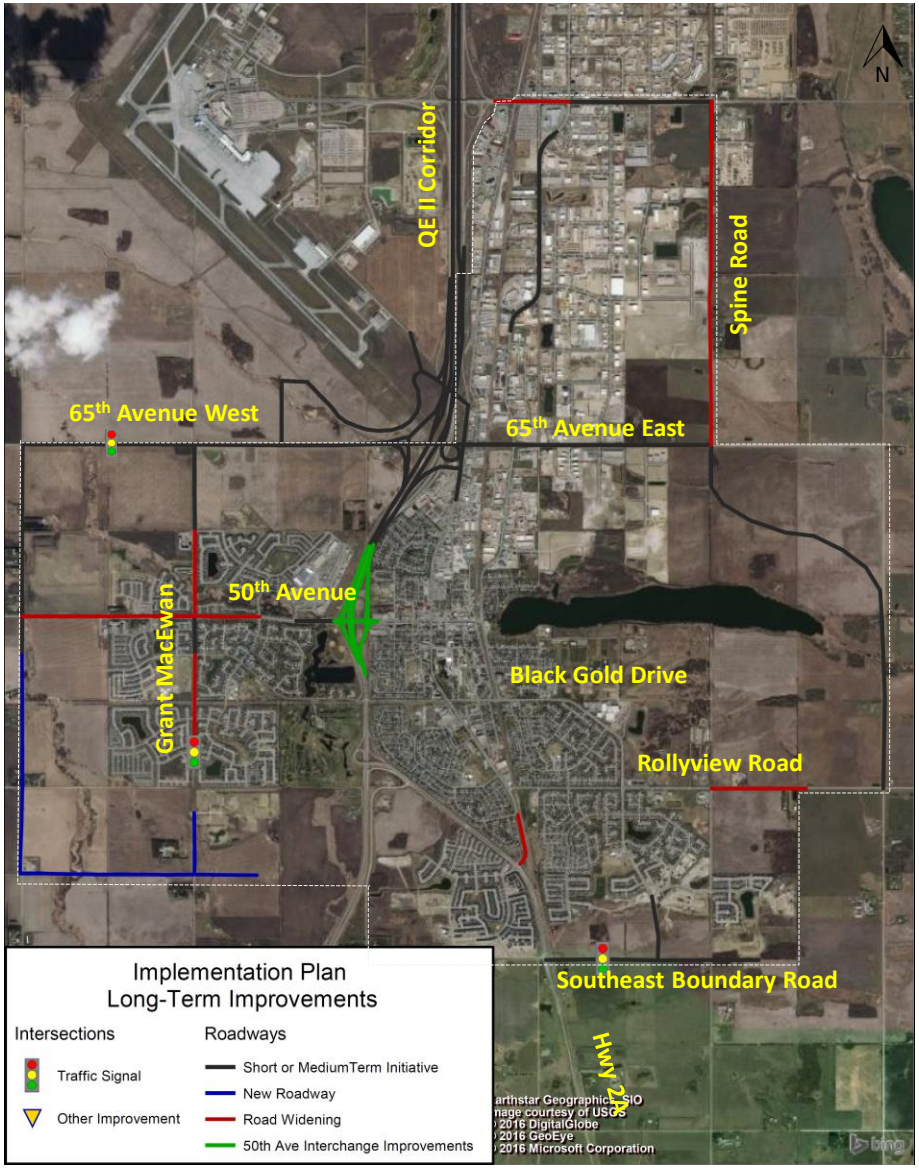


Exhibit 6-3: Long Term Implementation Plan

- 50th Street widening (from Bella Coola to Highway 2A); and
- New traffic signal at the SE Boundary Road / Caledonia Drive intersection.

Table 6-3: Implementation Plan – Long Term Improvements

Project No.	Roadway or Intersection	From/To Limits	Project Description	Project Cost Estimate
30.01	65th Ave West & Grayson Access	Intersection	New traffic signal	$300,000
30.02	Rollyview Road	C.W. Gaetz to Spine Road	Widen to 4-lane divided arterial	$6,380,000
30.03	SE Boundary Rd & Caledonia	Intersection	New traffic signal	$373,000
30.04	50th Avenue	74th Street to 550m east Bridgeport Crossing to Deer Valley Dr	Widen to 4-lane divided arterial Widen to 6-lane divided arterial	$2,038,000 $5,250,000
30.05	50th Street	Bella Coola to Highway 2A	Widen to 4-lane undivided arterial	$1,049,000
30.06	74th Street	400m south of 50th Ave to SW Boundary Road	New 2-lane arterial	$7,254,000
30.07	Grant MacEwan Blvd	Bridgeport Gate to 50th Ave Black Gold Drive to Spruce Blvd Blackstone Blvd to SW Boundary Rd	Widen to 4-lane divided arterial Widen to 4-lane divided arterial and traffic signal at Spruce Blvd Pave 2-lane arterial	$2,676,000 $3,789,000 $1,742,000
30.08	SW Boundary Road	74th Street to Blackstone Access	New 2-lane undivided arterial	$12,087,000
30.09	Spine Road	Airport Road to 65th Avenue East	Widen to 6-lane divided arterial (to 82nd Avenue) and widen to 4-lane divided arterial (to 65th Avenue East)	$9,690,000

6.5 INTER-MUNICIPAL PROJECTS

Traditionally, inter-municipal roadway projects such as boundary roadways similar to Spine Road and Airport Road, have called upon joint funding relationships to be established.

Inter-municipal facilities such as the development of continuous north-south arterial corridors both east and west of Highway 2 that connect Edmonton South to the City of Leduc will, over time, become of increasing importance.

The required upgrades to the Highway 2 corridor involving Airport Road, 65th Avenue, 50th Avenue, Highway 2A will all require the close cooperation and planning with the Province (AT).

Significant changes in forecast land use have recently occurred:

- the City of Edmonton annexation of lands to the north of the City of Leduc, urbanization will require coordination between the City of Edmonton, Leduc County, the EIA and the City of Leduc;
- the Town of Beaumont annexation lands and population projections of an additional 21,000-to-42,100 persons over the next 3 decades[2];
- development of the EIA[3] lands (particularly to the west of the runways and the EIA Terminal building); and
- major employment centres developing such as 65th Avenue West and West Area lands[4], and employment areas in northeast Leduc[5].

It remains clear that joint planning and coordination through a regional priority setting coupled with cooperation between the affected municipalities is a requirement. The TMP encourages building upon past successes and current initiatives, in that even greater inter-municipal funding challenges are likely to affect the municipality over the next two decades, necessitating enhanced joint planning and design efforts.

Integration of inter-municipal corridors with the City's roadway systems will be essential in providing residents with access (other than by way of the Highway 2 corridor), to and from, south Edmonton.

[2] Town of Beaumont, "*Municipal Development Plan",*Table 3.2: Population projections, November 28th, 2017

[3] The EIA is the largest Airport in Canada (2,800 hectares). The current developed lands at the airport represents approximately 38% of the available land.

[4] The 65th Avenue West and West Area lands are anticipated to generate 6,500-to-10,400 jobs.

[5] Cathon-Farm Industrial Park, Leduc Energy Park, Sawridge Business Park, Saurahb Park, Harvest Industrial Park, Lakeside Industrial Park, Telford Lake Southern District, Eaton and Emery Development together have been estimated to generate 9.500-to-13,500 jobs internal to the City of Leduc lands and Saunders Lake, within Leduc County lands have been estimated to generate an additional 7.500-to-11,000 jobs. (Feb 2017, ASP)

Short-Term

With planned job growth along 65th Avenue on either side of Highway 2 and within the EIA, the Highway 2 & 65th Avenue Phase I project was the highest ranked project for construction in 2018 by the EMRB[6].

The *65th Avenue (Phase 1) Interchange* is predominantly intermunicipal and includes:

- twinning the 50th Street bridge;
- interchange ramps to/from the Highway 2;
- the extension of 65th Avenue West as a 2-lane arterial (from Grant MacEwan Blvd to the Highway 2 East Ramp Terminal);
- a new 4 lane Perimeter Road connection onto the EIA lands.
- paving of Grant MacEwan Blvd (from 65th Avenue West to the Bridgeport Gate access); and
- a new 4-leg 65th Avenue West/ Discovery Way traffic signal.

Estimated Cost: $75M

Medium-Term

Employment growth forecasts within the EIA, Leduc County and City of Leduc lands are forecast to require the following inter-municipal projects that include:

- *Airport Road*: The project includes widening the corridor to a rural 6-lane divided cross-section (from Sparrow Drive to Spine Road).
  Estimated cost: $3.9M.
- *65th Avenue (Ultimate) Interchange*: This project includes the new 65th Avenue overpass over the Highway 2, interchange ramps, widening 65th Avenue (From Discovery Way to the West Ramp Terminal and from the East Ramp Terminal to 45th Street), and further improvements at the CP Rail crossing.
  Estimated cost: $93M.
- *Highway 2 Core Lanes* The project involves the construction of new Phase 1 Core Lanes from Ellerslie Road to 65th Avenue.
  Estimated cost: $44M.

Long-Term

Inter-municipal long-term projects include:

- *50th Avenue Interchange:* This project would include a new 50th Avenue interchange that would be reconfigured as an overpass, as well as widening of the Highway 2 southbound off-ramp to two-lanes. The 50th Avenue corridor would be configured as a 6-lane divided cross-section.
  Estimated cost: $100M
- *Airport Road Interchange*: The project includes a new westbound bridge structure and widening of Airport Road to 8-lanes (from the east ramp terminal to 43rd Street), as well as an ultimate grade separation over the CP Rail corridor.
  Estimated cost: $45M.

[6] Edmonton Metropolitan Region Board, *"2018 Priority Regional Transportation Procts"*, Table 3.1. June 14th, 2018

6.6 FUNDING SOURCES

The TMP has highlighted numerous inter-municipal projects that, although being critical to meeting forecast travel demand requirements of the municipality, require cooperation and participation from other jurisdiction in order to be implemented in a timely manner. Cooperative arrangements can share roles, responsibilities, resource contributions and add value to a major infrastructure project.

The formation of partnerships involving public agencies, including Leduc County, AT, the City of Edmonton, and authorities such as the EIA, local business associations and private developers, is encouraged to increase the potential for advancing these initiatives.

6.6.1 Highway Corridors

The Highway 2 corridor represent the dominant route used by Leduc residents that travel to-and-from areas north of the City. A review of average daily 2016 traffic volumes along the Highway 2 corridor indicate:

- 43,000 vpd south of the Highway 2A interchange on the existing 4 lane corridor; and
- over 80,000 vpd north of Airport Road on the existing 6 lane corridor.

The TMP highlights the necessity of improvements to the interchanges along the Highway 2, and the ultimate required freeway lane widenings (core and collector lanes) to address forecast congestion on the corridor and assure convenient access to the freeway for City residents and employers.

The City has already formed strategic partnerships with the Province (AT) and the EIA to advance the required improvements in terms of enhanced:

- east-west access across the Highway 2 by way of the proposed 50th Street structure in the short-term; and
- access to/from the Highway 2 corridor by way of the 65th Avenue (Phase 1) improvements and ultimately the Phase II interchange.

The strength of these partnership has resulted in the potential for joint funding of the planning and design of priority projects[7] involving this essential freeway corridor.

Other future initiatives related to the Highway 2 corridor include:

- widening of the Highway 2 collector lanes within the muncipality to four lanes per direction;
- the construction of Highway 2 core lanes (from the City of Edmonton to the City of Leduc (core-collector system));
- enhancements to the Airport Road interchange;
- enhancements to the 50th Avenue interchange; and
- new freeway bridge structures over Black Gold Drive.

[7] Queen Elizabeth II/65th Avenue Interchange Phase 1

The Highway 2A corridor to the south of the City also falls within the jurisdiction of the Province and current planning studies provide for the ultimate relocation of the existing Highway 2/Highway 2A interchange to a point further to the south. The planning for this future facility is inextricably linked to Provincial planning decisions regarding the future Terwillegar South extension (See Section 3.3) and the need for infrastructure replacement[8].

6.6.2 Transit Infrastructure

The City of Leduc, Leduc County, the City of Edmonton and the EIA have already established a strategic partnership to address shorter-term transit related initiatives[9,10].

The EIA also shares an interest in both short-term[11] and longer-term[12] public transit initiatives as a major employer in the area, recognizing that transit initiatives are necessary to further the development plans within EIA lands.

The TMP encourages the planning and development of transit infrastructure at a finer level of detail that address provisions such as transit park-and-ride facilities, transit centers, or enhanced transit stops to be designed within planned communities.

The TMP encourages the formation of partnerships with development proponents to achieve these objectives.

6.6.3 Community Support Facilities

Partnerships with development proponents and other agencies will be required to advance the transportation facilities necessary to integrate within the City of Leduc's planned communities and services.

Ancillary infrastructure such as transit maintenance facilities, transit queue-jump lanes, dedicated transit lanes and/or traffic signal modifications to permit transit improvements may be eligible for Provincial and Federal infrastructure funding related to green funds or economic development initiatives in addition to direct developer contributions.

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[8] The existing Highway 2A bridge over the Highway 2 has been estimated to require replacement or major maintenance within the next decade (Source: "*Highway 2 - Calgary to Edmonton Corridor Improvement Study*", Appendix F, Pg 29)

[9] Shared costing of Route 747 linking EIA to Centrury Park LRT Station.

[10] Municipal coordination with the EIA resulted in the creation of Route 10 serving East Leduc, the EIA and the new Outlet Mall as of May, 2018.

[11] The EIA indicated the desire to implement a free shuttle service between the Main Terminal, the Premium Outlet Mall, Rosenau Transport, Aeroterm building, BBE warehouse and the STARS hangar internal to the EIA lands.

[12] The EIA has protected a NS transit alignment parallel to Airport Perimeter Road with future transit stations on either side of Airport Road.

6.6.4 Development Levies

The development community is required to contribute to increased transportation and municipal roadway infrastructure (water, sanitary, storm drainage, etc.) requirements associated with the arterial roadway system in the form of off-site levies.

The Municipal Government Act (MGA) allows municipalities to collect levies to help pay for:

- "new or expanded roads required for or impacted by a subdivision or development;
- (…) new or expanded transportation infrastructure required to connect, or to improve the connection of, municipal roads to provincial highways resulting from a subdivision or development"[13]

The scope of applicable infrastructure has, as a result on recent changes to the MGA[14], been expanded to include municipal road projects that connect to, or improve connections to Provincial highways[15]. This provides the flexibility to the City to apply development levies in relations to future improvements related to the 65th Avenue interchange, 64th Avenue off-ramp, 50th Avenue and Highway 2A.

The need for municipal infrastructure improvements is a direct reaction to growth within the City of Leduc.

The TMP recognizes that:

- new municipal arterial projects are a direct result of growth within the community. The increased capacity of the network is required to support the new demand created by local development initiatives;
- the municipal levy process will require monitoring on a regular basis to ensure that revenues reflect the current needs of the municipality; and
- the municipal levy process remains sensitive to the infrastruture demands associated with both proposed employment and residential developments.

6.6.5 Direct Developer Costs

New local roads, collector roads and arterial connections are primarily the developer's responsibility. Despite this, retrofitting of existing collector roads to support improved transit facilities and multiway linkages fall within the City's responsibility.

The TMP calls for identification of "growth-related" transportation retro-fit improvements, or components thereof, to assure that developer contributions to such are accounted for.

[13] "Municipal Government Act", Section 648 Off-Site Levy (July 1st, 2018)

[14] MGA changes came into force May 1st, 2018.

[15] At the time of report preparation, the City of Leduc is not currently collecting these additional levies. The City is currently consulting with other municipalities to determine a method to implement the new MGA scope.

6.7 TRANSPORTATION FACILITIES MANAGEMENT

The City of Leduc, in addition to providing for the financing of new infrastructure, is responsible for investments required to manage, operate and maintain all of its assets related to transportation infrastructure.

"Transportation Asset Management focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well-defined objectives."[16]

Transportation infrastructure must be maintained throughout the entire life-cycle, inclusive of its eventual replacement/reconstruction. Asset management programs are comprised of strategic and systematic processes that are applied to operate, maintain, upgrade and expand the physical assets of the municipality throughout their life cycle. The processes are used by municipalities to evaluate transportation investments accounting for ongoing maintenance while planning for the eventual replacement of the asset.

Throughout North America, many municipalities are experiencing the impacts of aging infrastructure. This has led to a need for:

- greater accountability in the effective use of funds;
- an increased relationship between performance and funding; and
- more sustainable transportation solutions.

Toward this end, the City of Leduc works hard at maintaining a pavement quality rating of 65 and analyzing their infrastructure through assessments on a semi-annual basis; the City is efficiently prioritizing what roads to work on. The current budget for

roadway maintenance is currently $6M per year and $1M for lanes and that will only continue to grow as pressures increase.

The TMP recognized the importance of transportation asset management and encourages the City to further this objective by:

- recognizing the economic value of its transporation assets;
- achieving economic efficiency and optimization of capital expenditures over the life of the assets; and
- facilitating the municipal role as "steward" of the assets.

[16] "*NCHRP Report 632*", National Cooperative Highway Research Program, 2009

The benefits of this include:

- assuring a long-term view;
- establishing clear relationships, transparency, and accountability;
- facilitating the implementation of growth management plans;
- maximizing the benefits of that infrastructure to which a capital investment has already been made;
- providing the desired level of service to match demand as it occurs; and
- assuring the optimum use of existing funds.

The following initiatives have been identified as contributing processes already in place within the City.

- *Traffic*: Enhancement of the City's traffic data collection program through the use of permanent or temporary traffic counting devices. This is required to maintain a historical record of growth, provide a base to which the efficiency of traffic movements can be monitored, and to assess any changes in travel demand throughout the City's major roadways and neighbourhoods.
- *Transit*: Passenger boardings and alightings should continue to be collected on each transit route served by Leduc Transit along with estimates of the costs associated with operating, and maintaining each route. This is required to provide the City with the ability to monitor the effectiveness and performance of the transit services being offered on a route-by-route basis and determine the relative success of changes to schedules, fares and routings.
- *Multiway*: The multiway trails and pathway system (intended for hiking, walking, cycling, rollerblading, etc., while assuring wheelchair access) continues to expand througout the City[17] promoting walkability, with links to residential subdivisions, recreation destinations (parks, playgrounds and open space), cultural destinations, commerce hubs and high activity areas. The system currently represents a considerable asset to the community and as such monitoring the relative attractiveness, performance and surface condition and integrity of each segment and its related support infrastructure can continue to provide further insight into maintenance levels, lighting requirements, safety provisions and performance characteristics. Such information is useful in assuring the success of further expansion of the network.
- *Travel Trends*: As both the City of Leduc and the areas that surround it (Leduc County, City of Edmonton, Town of Beaumont, EIA) continue to experience growth, it becomes essential to fully understand travel trends to recalibrate the City's travel demand model. To this end the City should plan for an origin-destination travel survey to be undertaken sometime within the next five years, which would include sampling both residents and employees to determine current travel trends. This should ideally be undertaken in concert with the the City of Edmonton's Region Household Travel Survey[18]

[17] The multiway system has grown from a 45km length in 2012 to a current length of 68km.

[18] The last region-wide survey was undertaken in the Fall of 2015.

to assure that the information fully incorporates and integrates Leduc's more detailed requirements with the region-wide initiative.

The above recommendations are essentially bottom-up activities that involve the collection of substantial amounts of information and processing such data into smaller but more useful quantities of information. This is then communicated and further condensed through the organization, however, such information and processing activities are to be guided by a coherent strategic vision that specifies the goals, objectives and the performance measures to be satisfied.

The TMP encourages the City to develop a set of standards to guide their processes. In several cases, concerning transportation infrastructure, the City has already developed such standards, however in some areas, planning standards remain to be formalized.

Adoption of proposed TIA Guidelines

The City has developed a "*Transportation Impact Assessment Guide*" (TIA)[19].

The TMP recommends that the TIA guide include standards in relation to:

- The minimum acceptable planning level of service to be adopted for its collector and arterial roadways and associated intersections in terms of level-of-service to be provided to each travel mode inclusive of accommodating heavy vehicle operations.
- Transportation and transit planning guidelines to assist the development community in assuring that the desired City planning standards are incorporated within its development ASPs and TIAs to assure planned future transportation and transit infrastructure meets the City's objectives.

The guide is to ensure that development proponents clearly identify how their proposed developments would impact the roadway, transit and multiway system. The development proponents must identify any required new infrastructure, modifications or enhancements to the existing networks and traffic operational measures

[19] DRAFT "*Transportation Impact Assessment Guide*" (June, 2018) is currently under review.

necessary to address existing and forecast travel demand for each phase of a proposed development. The TIA would:

- identify how the proposed development would affect the City of Leduc's transportation system;
- address any and all safety related concerns; and
- fully integrate with the City's multi-modal transportation network.

The TIA Guide is intended to ensure:

- an objective assessment is used to evaluate the transportation-related impacts of each phase of a proposed development;
- all initial assumptions are clearly defined, identified and are acceptable to the City well in advance of formal submission of a TIA document; and
- the process of developing a TIA is a collaborative process that develops transportation solutions that best satisfy existing and forecast travel demand, while promoting positive community development.

The TMP recommends adoption of the TIA guidelines to be applicable to all development or re-development initiatives that are proposed within the City of Leduc's municipal boundaries.

Operational Management

The daily activities related to the efficiency and utility of transportation infrastructure related to such items as:

- On-time transit arrival information;
- Snow clearing and ice mitigation of transportation infrastructure on a priority basis;
- Emergency response protocols to respond to accidents/events; and
- Traffic signal coordination and management.

Many of the City's operational functions are indeed addressed through various policies, procedures and practices, however, as the City continues to experience future growth, it is likely that these functions will also experience increased demand for optimization.

The TMP recognizes the future need to enhance traffic operational management measures, in concert with other sister agency initiatives, to assure the City's residents benefit from maximizing available roadway infrastructure. Such areas include:

- *Traffic Signal Coordination and Management*: The TMP has identified the future growth related requirements for traffic signals at several locations throughout he City. As the number of traffic signals increase, the need to assure effective traffic signal cooridination for the smooth progression of traffic and address congestion concerns throughout the City will become of increasing importance. As such, the TMP recommends that City establish a formal operations procedure to monitor and optimize the performance characteristics associated with its existing and future supply of traffic signals.

- *Cooperation with Other Agency Operational Initiatives*: The TMP has emphasized the integration and dependence of the City upon infrastrucutre that falls within other jurisdictions. Assuring municipal participation and coordination with such operational initiatives hold the promise of maximizing travel benefits to City residents. As an example, AT has recently initiated a project scoping study in relation to implementing variable speed limits along the Highway 2[20] corridor. This along with various intelligent transportation initiatives are aimed at improving mobility.
- The TMP recommends that the City participate fully in such inter-agency operational initiatives oriented at addressing congestion between Leduc and Edmonton.

[20] "*Detailed Project Scoping Study for Variable Speed Limit System on Highway 2 from Edmonton to Calgary*" This scoping study had a closure date of August 7th, 2018.

7 PUBLIC INVOLVEMENT

Inform citizens, businesses and adjacent jurisdictions of the plans and provide the community the opportunity to exchange ideas and provide feedback.

As part of the preparation of the 2018 TMP, a public involvement process was developed and numerous sessions were held throughout the study to ensure the community and various stakeholders were informed and had the opportunity to contribute.

The meetings allowed for individuals, groups and neighboring jurisdictions to gain an understanding of the study, its policy and design requirements, and provide input into the plans. At all phases, the consulting team ensured that the information related to the development of the 2018 TMP and its associated impacts were conveyed in a clear, concise manner.

General Public

Two public open houses were held for the general public at the City of Leduc Civic Centre. The first meeting was held in April, 2017, and was used to outline the study objectives, the study methodology, the existing conditions and constraints and describe the functional design of corridors. The second meeting was in May, 2018, and was used to present the study findings and recommendations regarding transit, the multiway system, heavy vehicle routes, traffic, and the final functional designs for future roadways and roadway improvements. For both events, the consulting team was present to answer questions. Additionally, a website was available for submitting comments online for a two-week period following the meeting dates. A total of 22 individuals were in attendance at the first public open house, and 15 people attended the second.

Development Community

Two meetings were held with members of the development community by way of the Urban Development Institute (UDI). The first meeting was held in January, 2017, was to present the study and convey the necessity for current planning standards and best practices addressing transportation facilities (roadways, intersections, multi-use pathways, pedestrian areas, etc.). In addition, all of the development proponents within the City were contacted as part of the TMP model development to confirm the intensity of their proposed developments.

The second meeting with the UDI was held in May, 2018. This meeting was intended to present preliminary findings regarding infrastructure requirements and timing, as well as the final functional designs for future roadways and roadway improvements.

Adjacent Jurisdictions

The EIA, Leduc County and AT were informed of the 2018 TMP study by way of meetings held in January, 2017, and May, 2018. The City of Leduc maintains a close working relationship with both these jurisdictions to ensure positive partnerships on joint projects.

Other Stakeholders

Finally, at all stages of the study, the following groups were informed of the work being undertaken by way of invitations to the public open houses: RCMP, Leduc Chamber of Commerce and CP Rail.

The 2018 TMP was also circulated with the EMRB for comment.