City of Kawartha Lakes
Colborne Street Schedule B
Class Environmental Assessment and Corridor Study

Project File Report

July 2020

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EXECUTIVE SUMMARY

The City of Kawartha Lakes is responsible for monitoring and managing growth within its municipal borders and implementing required transportation network improvements in a strategic and timely manner. The City's ***Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan*** ("TMP", February 2012), has identified existing and future improvement needs for Colborne Street West from Highway 35 to William Street in the Town of Lindsay.

To further assess the existing and future corridor needs, the City has initiated a corridor operations study following the Schedule B Class Environmental Assessment (EA) process for Colborne Street West under the ***Municipal Class Environmental Assessment*** (October 2000, as amended in 2007, 2011 and 2015). The limits of the EA for Colborne Street West are from Highway 35 to William Street North.

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. The bulk of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes, depending on the location. As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes without improvements to address increased vehicle-vehicle and vehicle-pedestrian conflicts.

Transportation solutions are necessary to enhance the safety and mobility of motorists, pedestrians, and cyclists along the corridor, and to address projected capacity deficiencies. This includes maintaining and enhancing the character of the existing Colborne Street corridor through streetscaping opportunities, while enhancing the transportation system and providing increased capacity.

The Class Environmental Assessment process requires documentation and examination of all reasonable alternatives, or means to address the problem, referred to as planning alternatives. An evaluation is undertaken to ensure that the process is traceable and reproducible, and that technical, social, economic, and environmental concerns are considered as part of the evaluation process. Each of the planning alternatives considered presented a different approach to address the problems and opportunities identified for this EA. To determine the most appropriate functional solution for the corridor, advantages and disadvantages of each planning alternative were identified and evaluated to determine the best functional solution.

The City of Kawartha Lakes conducted a consultation program that extended beyond the requirements of the ***Municipal Class Environmental Assessment (Schedule 'B')***, which included: newspaper advertisements; mailings; website updates, two stakeholder meetings; and two Public Open Houses. Comments and questions received from the public and stakeholders via comment sheets, verbal

questions, letters, e-mails, and telephone calls were compiled and considered in the analysis and evaluation of alternative solutions.

Based on the analysis of existing and future traffic conditions, the evaluation of alternatives and design concepts, and the consideration of existing constraints, the preferred solution for the Colborne Street corridor will be to:

- widen to four through-lanes from Highway 35 to east of St. Joseph Road, with multi-use paths on both sides of the road;
- transition to a 3-lane cross-section with centre two-way left-turn lane west of Charles Street, with a multi-use path on the south side of the road;
- maintain the 3-lane cross-section to Angeline Street with the centre two-way left-turn lane becoming an exclusive eastbound left-turn lane at Angeline Street, and also provide an exclusive eastbound right-turn lane and a multi-use path on the south side;
- provide a 2-lane cross-section from Angeline Street to William Street, widen sidewalks on both sides of the road and provide a new sidewalk on the south side of the road between Victoria Avenue and Cambridge Street, increase boulevard, and maintain a parking lane on the north side of the road from Adelaide Street continuing to the east;
- separate the eastbound left-turn lane at the intersection of Victoria Street, which should be able to be accomplished through restriping;
- install a new traffic signal at Albert Street;
- undertake geometric improvements at William Street intersection including installation of a new traffic signal;
- coordinate geometric improvements at the intersection of Colborne Street and Highway 35 with the Mason Homes / Jennings Creek Traffic Impact Study, including potential widening of approaches on Highway 35 and Colborne Street to 4-lane cross-sections; and,
- improve transit service in line with future development (including Jennings Creek Development Plan Area) and coordinate improvements through a town-wide or city-wide Transit Strategy or Transit Master Plan.

The proposed solution to improve the operations to the intersection of Colborne Street at Angeline Street involves the widening of Angeline Street from two lanes to four lanes in each direction. These improvements would be the subject of a separate EA for the widening of Angeline Street intersection; consequently, the ultimate intersection configuration to meet 2031 demands cannot be finalized at this time.

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1 INTRODUCTION

The City of Kawartha Lakes is responsible for monitoring and managing growth within its municipal borders and implementing required transportation network improvements in a strategic and timely manner. As such, the City's ***Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan*** ("TMP", February 2012), has identified existing and future improvement needs for Colborne Street West from Highway 35 to William Street in the Town of Lindsay.

To further assess the existing and future corridor needs, the City has initiated a corridor operations study following the Municipal Class Environmental Assessment (EA) process for two of its primary east-west corridors, Colborne Street West and Kent Street West. The limits of this operations study for Colborne Street West are from Highway 35 to William Street North. For Kent Street West the limits are from Highway 35 to Lindsay Street North.

Given the proximity of these two corridors and the connection and interaction of north-south streets between these two arterial roads, the corridor studies were conducted at the same time. This report addresses the study findings and recommendations for Colborne Street only; the findings for Kent Street are documented under separate cover.

1.1 Study Purpose and Objectives

The purpose of this study is to determine the specific transportation needs for the Colborne Street corridor from Highway 35 to William Street, identifying improvements to both safety and accessibility within the corridors while maintaining or increasing capacity of the road network to accommodate future growth. First and foremost, this study is an operational review, which has been carried out as a ***Schedule 'B'*** Class EA following Phases 1 and 2, in accordance with the Municipal Engineers Association, ***Municipal Class Environmental Assessment*** (October 2000, as amended in 2007, 2011 and 2015). The Schedule B was recommended based on the assessment of the existing and future needs and opportunities for improvements.

One key component to the EA process is the requirement to justify the need for modifications to the corridor (Phase 1). The needs assessment involves the identification and evaluation of existing and future deficiencies and opportunities to improve the transportation network with respect to network capacity, traffic safety, design and operation. This Project File Report documents the needs assessment and the alternative solutions considered (Phase 2) and the decision-making process leading to the selection of preferred solutions for Colborne Street.

In a Schedule 'B' EA, the project may be considered Approved subject to Screening. The screening means you can undertake proposed improvements subject to comments/approval from agencies and members of the public. Upon issuance of the Notice of Completion and end of the minimum 30-day review period, if no request for a Part II Order is received by the Minister within the review period, then the City may develop the project, based on the preferred solution, and proceed with detailed design and the preparation of contract drawings and documents.

1.2 Project Location and Study Area

The Colborne Street corridor from Highway 35 to William Street is located in the Town of Lindsay on the west side of the Scugog River. The study area limits for both corridor studies are shown in **Exhibit** 1-1.

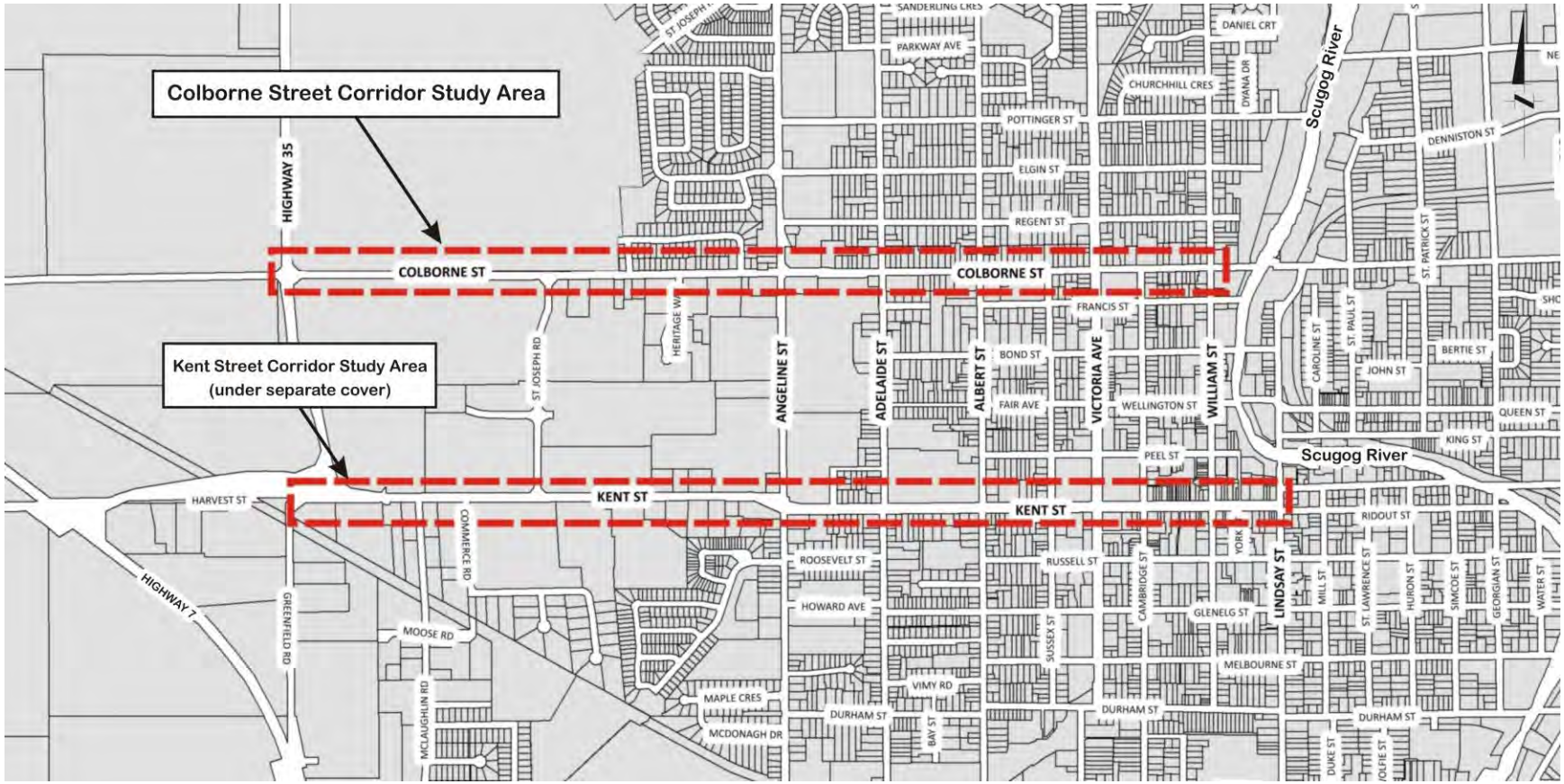


Exhibit 1-1: Colborne Street Corridor Study Area

1.3 Background

Colborne Street is an arterial road with two through travel lanes (one lane per direction) within the study limits. Turn lanes are only provided at the intersection of Angeline Street, curb parking is permitted in some sections, and sidewalks are generally provided on both sides where the adjacent lands are developed.

The corridor is surrounded primarily with residential uses in the east and central sections (east of St. Joseph Road). Schools and retirement homes and City Hall are also located along Colborne Street. Colborne Street also serves Wilson Fields in the west end and will also serve future development within the NW quadrant of the Town including the Jennings Creek Development Plan Area.

On-street parking is permitted on the north side of the street, east of Adelaide Street and on the south side, west of St. Joseph Road; however, there are no posted parking restrictions on other sections of Colborne Street. While Colborne Street currently does not cross the Scugog River, Colborne Street is the only continuous east-west arterial road (other than Kent Street) serving the Town of Lindsay west of the Scugog River.

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031; a population increase of approximately 33% from 2011 (last Census available at time of reporting). Much of this growth is expected to occur within the Town of Lindsay, and as a result, traffic volumes on various town roads are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes.

As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes. Colborne Street will require mitigation measures and improvements to either accommodate or manage this traffic growth. Transit services and pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must also be addressed through improvement alternatives and opportunities that will provide a balanced approach to all modes.

1.4 References and Background Studies

Other studies reviewed or referenced are outlined below:

- City of Kawartha Lakes Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan (UEM, February 2012);
- City of Kawartha Lakes Growth Management Strategy (UEM, May 2011);
- City of Kawartha Lakes Shoreline Environmental Studies in Support of Official Plan Policies Report, (Gartner Lee, August 2002);
- City of Kawartha Lakes and Kawartha Region Conservation Authority, Sturgeon Lake Management Plan – Watersheds of Sturgeon Lake (2010);

- Kawartha Region Conservation Authority Final Draft Sturgeon Lake Management Plan (2014);
- Heritage Buildings - City of Kawartha Lakes (July 2007);
- City of Kawartha Lakes Heritage Master Plan (Richard Fortin Associates, January 2012);
- Proposed Commercial Developments – 449 Kent Street, Lindsay, City of Kawartha Lakes – Traffic Impact Study (Tranplan Associates, February 2013);
- Addendum Report to the Traffic Impact Study for the Commercial Development on Kent Street, Lindsay, City of Kawartha Lakes (Tranplan Associates, May 6, 2013);
- City of Kawartha Lakes (Lindsay) Walmart Transportation Study (HDR, July 2013);
- Chadwin Drive Mixed Use Development Blocks 13 and 16 – Old Lindsay Fairgrounds, City of Kawartha Lakes – Traffic Impact Study Final Report (Tranplan Associates, September 2012);
- Highlands Subdivision Traffic Impact Study – Angeline Street & Kent Street, City of Kawartha Lakes, Ont. (Tranplan Associates, November 2004);
- Proposed Mason Commercial Development – City of Kawartha Lakes (Lindsay) – Traffic Impact Study (Cole Engineering, May 31, 2007);
- City of Kawartha Lakes Aggregate Haul Route Study – Final Report (TSH, June 2006);
- The Corporation of the City of Kawartha Lakes Report – North West Sanitary Sewer Background Study (May 29, 2012);
- The Corporation of The County Of Victoria Transportation and Public Works Department – Scugog River Crossing Class Environmental Assessment ESR (totten sims hubicki associates, January 1994);
- County of Victoria – Scugog River Crossing Phase 2 – Colborne Street Bridge – Addendum to the 1994 ESR (Cole, Sherman & Associates, 2000);
- Noise Impact Study – Scugog River Crossing, Preliminary Design – Colborne Street West to Colborne Street East, Town of Lindsay, County of Victoria, Ontario (SS Wilson Associates, May 22, 2002);
- The Greenbelt Plan (Ontario Ministry of Municipal Affairs and Housing, 2005);
- Oak Ridges Moraine Conservation Plan (Ontario Ministry of Municipal Affairs and Housing, 2001);
- Growth Plan for the Greater Golden Horseshoe (Ontario Ministry of Infrastructure, 2006);
- City of Kawartha Lakes Official Plan (2010);

- City of Kawartha Lakes Trails Master Plan (ENVision – the Hough Group, March 2006);
- Sturgeon Lake Management Plan – Watersheds of Sturgeon Lake (Kawartha Region Conservation Authority, 2010); and
- Shoreline Environmental Studies in Support of Official Plan Policies (Gartner Lee Limited, August 2002).
- City of Kawartha Lakes Streetscape and Façade Design Guidelines

1.5 Provincial Planning Context

The provincial plans and policies considered as part of the land-use planning objectives review for the study are discussed below.

1.5.1 Greenbelt Plan

The study corridor falls within the designation of a “Settlement Area outside the Greenbelt” in the ***Greenbelt Plan***, 2005.

1.5.2 Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine Conservation Plan (ORMCP), 2001, provides land use and resource management planning direction to provincial ministries, agencies, municipalities, municipal planning authorities, landowners and other stakeholders, on how to protect the Moraine’s ecological and hydrological features and functions.

The study corridor does not fall within the boundaries of the ORMCP.

1.5.3 Provincial Policy Statement

The ***Provincial Policy Statement*** issued under Section 3 of the Planning Act came into effect as of March 1, 2005.

The Provincial Policy Statement focuses growth within settlement areas and away from significant or sensitive resources and areas which may pose a risk to public health and safety and vice versa. It recognizes that the wise management of development may involve directing, promoting or sustaining growth. Land uses must be carefully managed to accommodate appropriate development to meet the full range of current and future needs, while achieving efficient development patterns.

1.5.4 Places to Grow Act / Growth Plan for the Greater Golden Horseshoe

The Provincial ***Places to Grow Act,*** 2005 and the associated regional ***Growth Plan for the Greater Golden Horseshoe,*** 2006 is a framework for implementing the Government of Ontario’s vision for building stronger, prosperous communities by

better managing growth to 2031. The Plan will guide decisions on a wide range of issues in the interest of promoting economic prosperity.

The vision for the Greater Golden Horseshoe (GGH) is grounded in the following principles that provide the basis for guiding decisions on how land is developed, resources are managed, and public dollars invested:

- Build compact, vibrant and complete communities.
- Plan and manage growth to support a strong and competitive economy.
- Project, conserve, enhance and wisely use the valuable resources of land, air and water for current and future generations.
- Optimize the use of existing and new infrastructure to support growth in a compact, efficient form.
- Provide for different approaches to managing growth that recognize the diversity of communities in the GGH.
- Promote collaboration among all sectors – government, private and non-profit, and residences to achieve the vision.

1.6 Municipal Planning Policies

Planning policies and related studies were reviewed to develop an understanding of the City's vision. The applicability of the subsequent documents, as they relate specifically to the study corridor, is discussed in later sections of this report.

1.6.1 Official Plan

The Official Plan (2012) is currently under appeal. However, the basis upon which the guiding principles were developed are separated into the following five categories:

1. Environment;
2. Economy;
3. Housing;
4. Strategic Planning Exercise (Community Vision); and,
5. Health and Sustainability.

<u>Environment</u>

- The Official Plan states that the City is blessed with a number of natural features that are considered irreplaceable assets, and these features must be protected.
- Furthermore, that the environment is the basis upon which all planning takes place and measures will be taken to protect the water quality and quantity of the surface and groundwater resource.

Economy

- Generally, manufacturing and agriculture comprise two of the largest sectors in the local economy by gross sales. Tourism, retail, and commercial uses continue as steady and healthy contributors to the economy. The City must plan on the basis of the Provincial Growth Plan projections which currently target 27,000 new jobs by 2031.
- The tourism industry represents a significant component of the City's economy. In Kawartha Lakes, there is potential for increased growth in this sector, particularly in the following areas: eco-nature tourism, education and learning vacations, sustainable development, resource conservation and healthy lifestyle activities. Increasing the number of recreational opportunities should also be explored as a method of increasing tourism.
- Access to serviced industrial lands is available throughout the City. The Lindsay Industrial Park offers serviced industrial lots ranging from 0.4 ha to 402.43 ha. In addition to municipally owned industrial land, many private and publicly owned industrial building sites exist, including an industrial subdivision in Pontypool located within minutes of Highways 115 and 35.

Housing

- The predominant form of housing within the City is single detached dwellings. Within the urban centres, multiple residential developments in the form of apartments and townhouses are available. There is a need for additional housing for lower income families, seniors and those with special needs. Housing will be encouraged in existing settlement areas; however, care needs to be given with respect to location, density, servicing and impact on surrounding land uses.
- The City will encourage the provision of a broad mix and range of housing to meet the needs of present and future households in the area. The City also encourages the provision of housing types, densities and tenures that are affordable to moderate and lower income households. The City encourages residential intensification in the built up area and establishing cost effective development standards for new residential development and redevelopment.

Strategic Planning Exercise (Community Vision)

- A Community Profile was completed which provided a summary of Community Values and a list of key initiatives which form the basis of the Community Vision.
- "The Vision for the City of Kawartha Lakes recognizes the City as a community of vibrant communities. The Vision emphasizes the City's dedication to good government, responsible planning and growth management. Attention will be given to special population groups, including seniors, youth and persons with special needs. As a green community, value will be placed on conservation of the area's natural environment. Economic

prosperity will be realized, with well-established sectors such as tourism and agriculture growing further as important contributors to the local economy."

Health and Sustainability

- The City of Kawartha Lakes is attractive to many, with its natural beauty, rich heritage and natural resources. The Official Plan manages lands and resources and directs future growth to ensure that community needs and desires are met for today and into the future.
- The City of Kawartha Lakes will strive to balance the community's economic, environmental and social objectives through, among other things, policies and directions in the Official Plan that encourage sustainable community development and active and healthy living for residents, businesses and visitors to enjoy.
- The Official Plan reflects a determination by City Council to establish a safe, healthy and active community while achieving a high quality of life for citizens of all ages. The City is committed to partnering and collaborating with community and government stakeholders to achieve this goal.
- The Official Plan contains policies to encourage and promote active transportation and connectivity for pedestrians and all modes of transportation.

1.6.2 City of Kawartha Transportation Master Plan

The City's Transportation Master Plan was developed to assist the City in preparing a comprehensive transportation plan to support the City's goals to maintain a high quality of life in the future, and provide for economic development throughout the City's rural and urban areas. It was developed through the identification of policies, guidelines, improvement recommendations and an implementation plan, to accommodate growth in a healthy and sustainable way.

The key Transportation Strategy recommendations from the TMP are:

- Adopt a balanced strategy of providing both structural improvement and non-structural improvements to address future capacity deficiencies. This will include road widenings to corridors identified in Appendix G of the TMP. This will also include the planning for additional traffic capacity across the City by:
  - providing improved transit services to new development areas in Lindsay, and between Lindsay and other settlement areas;
  - planning sidewalk and cyclist facilities to new roads and widened roads to encourage use of active transportation modes;
  - providing improved signage of cycling routes;
  - updating promotional materials describing the walking and cycling facilities available in the City;

- considering implementation of 'Share-the-Road' signing of cycling routes and 'Active and Safe Route to School' walking programs at local schools;
- encouraging preparation of Transportation Demand Management (TDM) plans, including programs for cyclists, by considering bonuses under the Planning Act or other incentives including reduced parking requirements; and,
- undertaking a comprehensive Transportation System Management (TSM) program.

- Implement the recommendations of the Trails Master Plan in conjunction with the recommendations of the TMP plan. Specifically, that a cycling network study be initiated to identify and review the cycling, pedestrian and trails connectivity and improvement priorities.
- Undertake a Parking Strategy Study to assess the operation of existing downtown parking in Lindsay and other settlement areas, the costs of providing this parking (operations and maintenance), the parking requirements for new development and redevelopment sites in the downtown areas, the method of parking enforcement and the potential to provide additional parking to meet future demands.

1.6.3 City of Kawartha Growth Management Strategy

The Growth Management Strategy is part of the City's Municipal Master Plan Project. The purpose of the City of Kawartha Lakes Growth Management Strategy is to develop a strategy to plan for and manage growth in a sustainable manner that addresses economic, social and environmental considerations. The goal of the City of Kawartha Lakes Growth Management Strategy is to prepare an overall comprehensive growth management plan.

- The majority of the growth in the City will be in the four urban settlement areas, including Lindsay.
- Out of the four settlement areas, Lindsay has the highest estimated growth potential (in number of units as well as in population capacity).
- Higher density developments should be targeted for the Town of Lindsay.
- There is limited potential for office development and employment lands in any of the settlement areas, except for Lindsay.

1.6.4 City of Kawartha Trails Master Plan

The City's Trails Master Plan recognizes that there will be significant growth in the City, concentrated in Lindsay. Trails and paths are currently used by both non-motorized and motorized vehicles. The paths are also used year round and accommodated a variety of modes. There is also an expectation that since the population is comprised of a large proportion of those over the age of 65, interest in outdoor activities will become more important.

The Trails Master Plan seeks to link the various settlement areas within the City together, as well as providing loop trails serving each community. In Lindsay there are several trails surrounding the Town. No existing or proposed trails enter the study area; however, a proposed snowmobile / ATV bypass route uses Highway 35, along the western edge of the study area.

1.7 Class Environmental Assessment Process

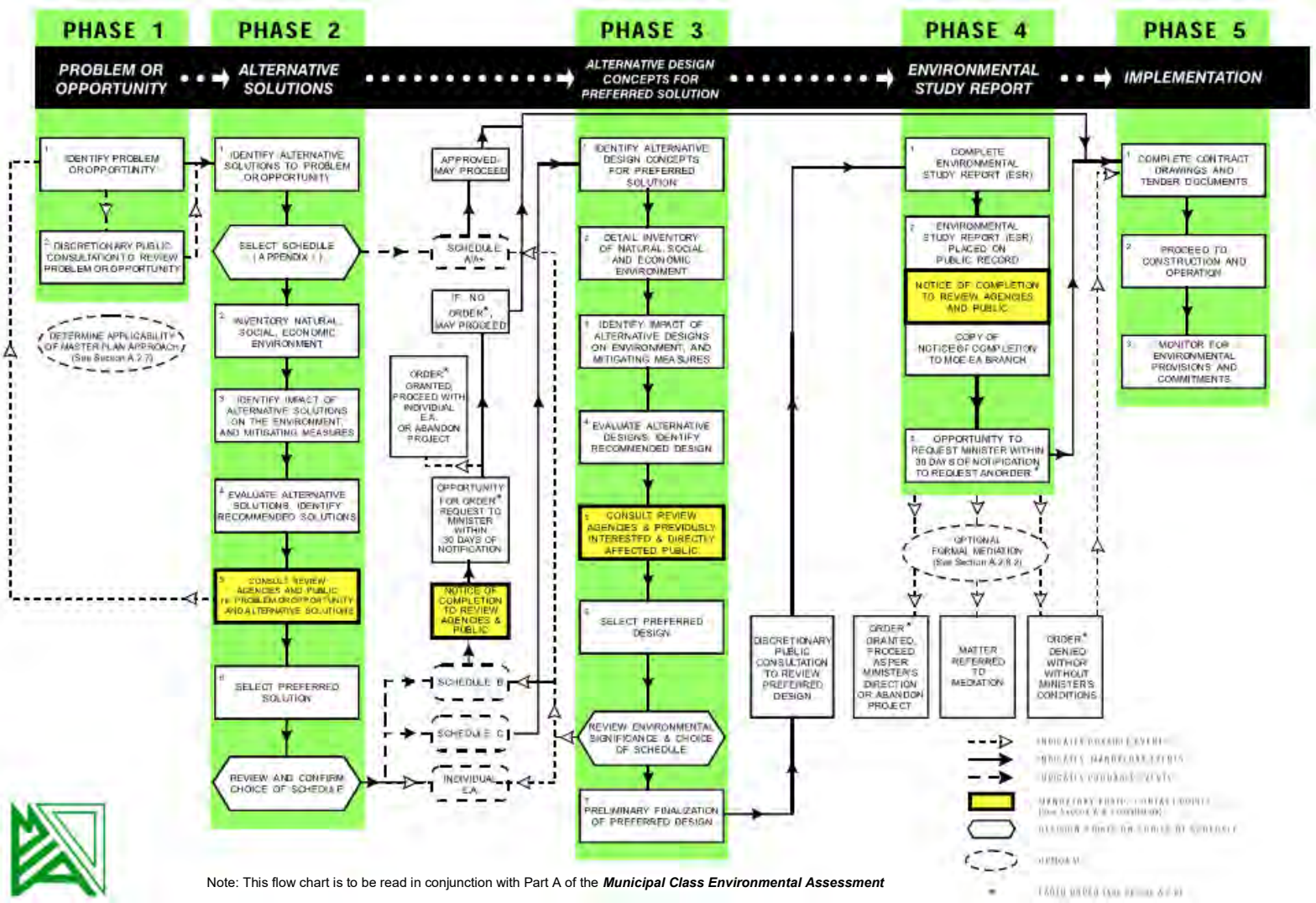
This Class EA and corridor (operational review) study was undertaken and prepared in accordance with the guidelines of the Municipal Engineers Association ***Municipal Class Environmental Assessment,*** October 2000 (amended in 2007, 2011 and 2015) and is being carried out as a Schedule "B" project, in accordance with the requirements of Class EA process. A ***Schedule 'B'*** project involves improvements and minor expansions to existing facilities. This could include minor road widening and operational improvements at intersections at a cost of less than $2.4 million. **Exhibit 1-2** illustrates the sequence of activities within the approved Class EA process leading to project implementation.

The phases for this study are described below:

- **Phase 1** – Identify the problem (deficiency) or opportunity.
- **Phase 2** – Identify alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input. Document in a Project File Report (PFR) a summary of the rationale, and the planning design, and consultation process of the project.

Upon finalization of the PFR, it will be filed and placed on public record for a voluntarily-extended 45-calendar day review period to allow for additional review by the public and review agencies. This extended review period is longer than the 30-day minimum requirement under the ***Municipal Class Environmental Assessment***. At the time the report is filed, a Notice of Completion of the Project File Report is advertised to notify the public and other stakeholders where the Project File Report can be found and reviewed, and how to submit public comments.

For information on the issuance of the Notice of Completion and Part II Orders, please refer to **Section 8.7** of this report**.**



Note: This flow chart is to be read in conjunction with Part A of the ***Municipal Class Environmental Assessment***

Exhibit 1-2: Class Environmental Assessment Process

1.7.1 Canadian Environmental Assessment Act (CEAA)

Under the ***Canadian Environmental Assessment Act, 2012 (CEAA 2012)***, a federal environmental assessment study may be required to assess the environmental effects of the physical activities that constitute a "designated project", under the project list identified in the ***Regulations Amending the Regulations Designating Physical Activities, 2013***. This project list ensures that federal environmental assessments are focused on the major projects with the greatest potential for significant adverse environmental impacts on matters of federal jurisdiction.

The Colborne Street Schedule B Class EA and Corridor Study does not constitute a "designated project" and therefore does not require an environmental assessment under the CEAA 2012; however, the Minister of the Environment may order an assessment for any project not included in the project list, where there may be adverse environmental effects related to federal jurisdiction.

2 EXISTING STUDY AREA CONDITIONS

The following section documents existing conditions with respect to the socio-economic environment, cultural environment, natural environment, and infrastructure. These existing conditions provide the context and constraints to potential solutions for the Colborne Street corridor. The existing and future transportation conditions in the study area, which is the focus of the corridor study, are discussed in later sections of the report.

2.1 Socio-Economic Environment

2.1.1 Existing Land Use and Access

The Colborne Street corridor is predominately residential, with single family detached homes fronting along both sides Colborne Street between William Street and Charles Street. Besides the single family homes, there are a few other notable land uses:

- Heritage Gardens Retirement Residence (at Heritage Way);
- Heritage Christian School (at Walker Street);
- Fairview Baptist Church (at Angeline Street);
- Colborne Lodge Senior Apartments (at Angeline Street);
- Briarwood Apartments (between Angeline Street and Adelaide Street);
- Brentwood Apartments (at Adelaide Street);
- Alexandra School (at Sussex Street); and
- City of Kawartha Lakes Town Hall (at Cambridge Street).
- Wilson Fields recreation area

West of Charles Street and on the north side of Colborne Street is currently undeveloped vacant lands which are expected to be developed into a residential subdivision, along with a commercial-retail node. On the south side of Colborne Street opposite this future subdivision is Wilson Fields sports facility. Between Wilson Fields and Charles Street, the land on the south side of Colborne is currently vacant.

Most residences along Colborne Street have private driveways. Although there are many closely spaced driveways, they are low traffic generators; therefore, the high number of access points long Colborne Street is not currently causing any operational or safety concerns.

2.2 Cultural Heritage and Archaeology

Cultural Heritage

A desktop review of existing built heritage and cultural resources was conducted based on available information provided by the City of Kawartha Lakes.

The Town of Lindsay, as well as the surrounding area, has a rich history dating back thousands of years; however, most built heritage was established in the 19th century and onwards. The Kawartha Lakes website states that:

> *"The Kawartha Lakes Heritage Victoria is a volunteer committee appointed by Council to assist and provide guidance on community heritage matters. In particular, Heritage Victoria will review and establish criteria, and recommend candidate sites of historic value and interest for designation under the Ontario Heritage Act. Historic Designation is a method of recognizing, preserving and celebrating the heritage of our community through the protection of historically significant sites, buildings and structures."*

The Heritage Victoria committee, through their publication ***Heritage Buildings - City of Kawartha Lakes*** (July 2007) has identified 35 buildings within the Town of Lindsay that are of historic significance; however, a review of the Canadian Register of Canada's Historic Places undertaken in November 2013 did not yield any results within the Town of Lindsay. The Canadian Register only includes locations which are formally recognized under the *Ontario Heritage Act*. None of the buildings identified by the Heritage Victoria committee as having historic significance are situated adjacent to the Colborne Street study corridor. This study does not anticipate impacting heritage assets.

Archaeology

The proposed project and activities for the Colborne Street corridor are anticipated to occur within the existing road right-of-way with the exception of the area in the vicinity of Angeline Street where additional property will be required due to the existing available right-of-way, and recommended improvements at the intersection of Colborne Street and Angeline Street. Given that these areas have been extensively disturbed by previous construction and utility installation activities, there is minimal potential for encountering archaeological resources in the study area.

Should an archaeology assessment be required, it will be completed during detailed design. .

2.3 Natural Environment

A desktop review of the existing natural heritage environment was undertaken based on previous studies and available literature.

The Scugog River runs north-south through the Town of Lindsay; however, it is located beyond the easterly limits of the study area.

According to the City of Kawartha Lakes and Kawartha Region Conservation Authority ***Sturgeon Lake Management Plan – Watersheds of Sturgeon Lake, 2010*** the study corridor falls within a "built-up area" of the Jennings Creek and Scugog River sub-watersheds. This mapping also indicates that no provincially significant wetlands fall within or adjacent to the study corridor. Refer to **Exhibit 2-1.**

In addition, the Kawartha Region Conservation Authority's ***Jennings Creek Sub-watershed Map,*** and the ***Scugog River Sub-watershed Map,*** indicates that the study area is designated in lands demarcated as "built-up area." As well no MNR Wetlands are shown within the limits of the study corridor. Refer to **Exhibit 2-2 and Exhibit 2-3**.

An excerpt from ***Figure 2: Shoreline Environmental Features - Summary for the City of Kawartha Lakes*** from the ***Shoreline Environmental Studies in Support of Official Plan Policies Report, August 2002, Gartner Lee*** is provided in **Exhibit** 2-4. According to this figure no Areas of Natural and Scientific Interest (ANSI), Evaluated Wetlands, or other environmental features are identified within or adjacent to the study corridor. A "cartographic" wetland (i.e. an area identified as wetland from the interpretation of aerial photography based on the presence of visual indicators such as wetland vegetation, organic soils and high water table conditions) is shown in ***Figure 2*** west of the Highway 35 and Colborne intersection; however, it is noted that according to the Kawartha Region Conservation Authority ***Wetlands Map, 2013, Jennings Creek Sub-watershed Map,*** and the ***Scugog River Sub-watershed Map,*** no wetlands or MNR Wetlands are shown within the limits of the study corridor.

Figure 1.13 from the Kawartha Region Conservation Authority ***Final Draft Sturgeon Lake Management Plan, 2014*** indicates meadow natural cover exists southeast of the Highway 35 and Colborne Street intersection and southeast of the Angeline and Colborne Street intersection. Refer to **Exhibit 2-4.**

Exhibit 2-5 and **Exhibit 2-6** respectively provide reference to the bedrock geology and the quarternary geology for the study corridor. The bedrock geology is classified as 51 Limestone, dolostone, shale, arkose, sandstone and 51a Ottawa Group; Simcoe Group; Shadow Lake Formation. The quaternary geology of the study corridor is classified as 19: Till and 24: Glaciolacustrine deposits.

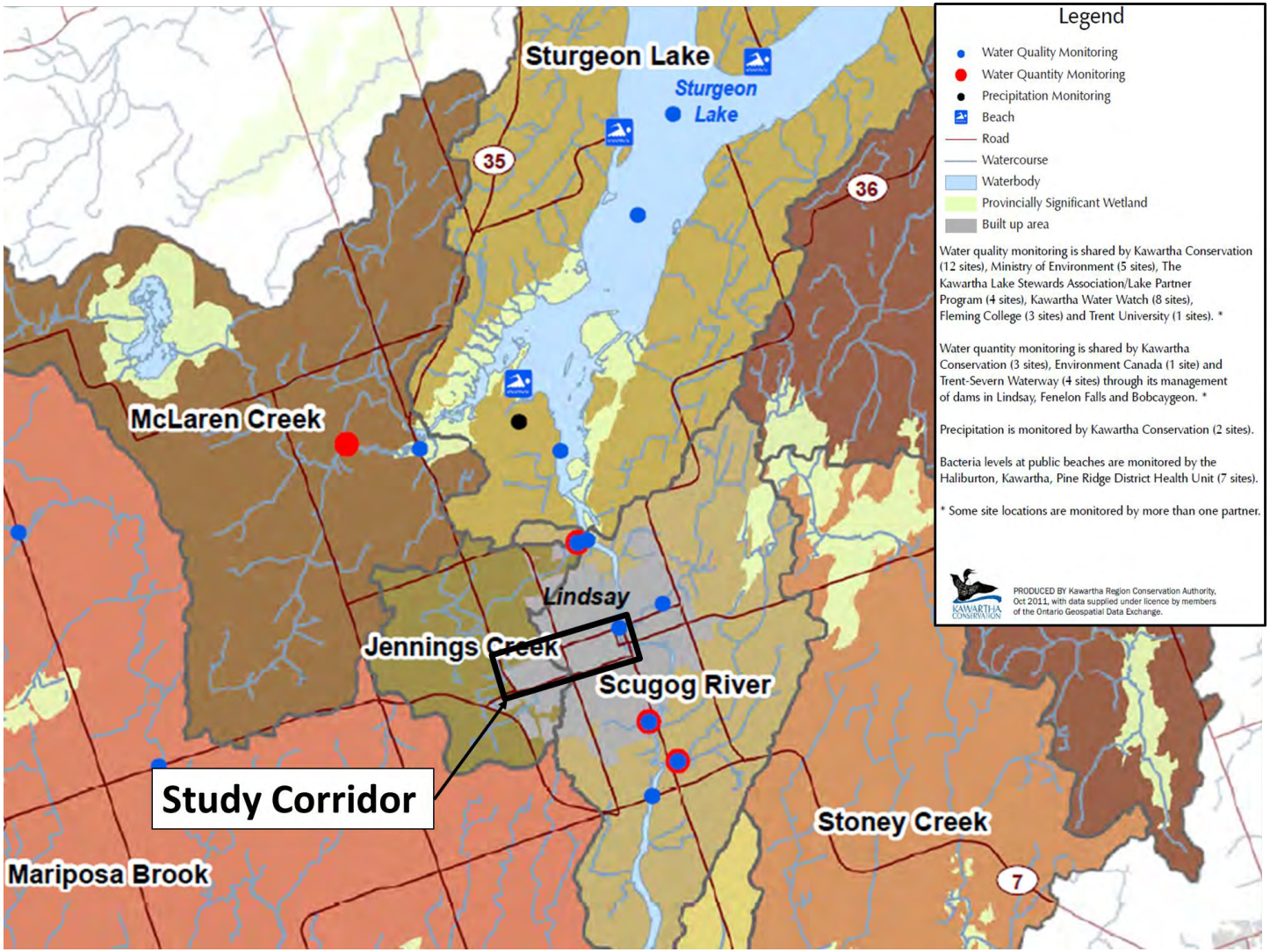


Exhibit 2-1: Watershed Boundaries *(Excerpt from Sturgeon Lake Management Plan - Watersheds of Sturgeon Lake, 2010)*

Exhibit 2-2: Sub-Watershed Mapping (Excerpt from Kawartha Region Conservation Authority Jennings Creek and Scugog River Watershed Maps)

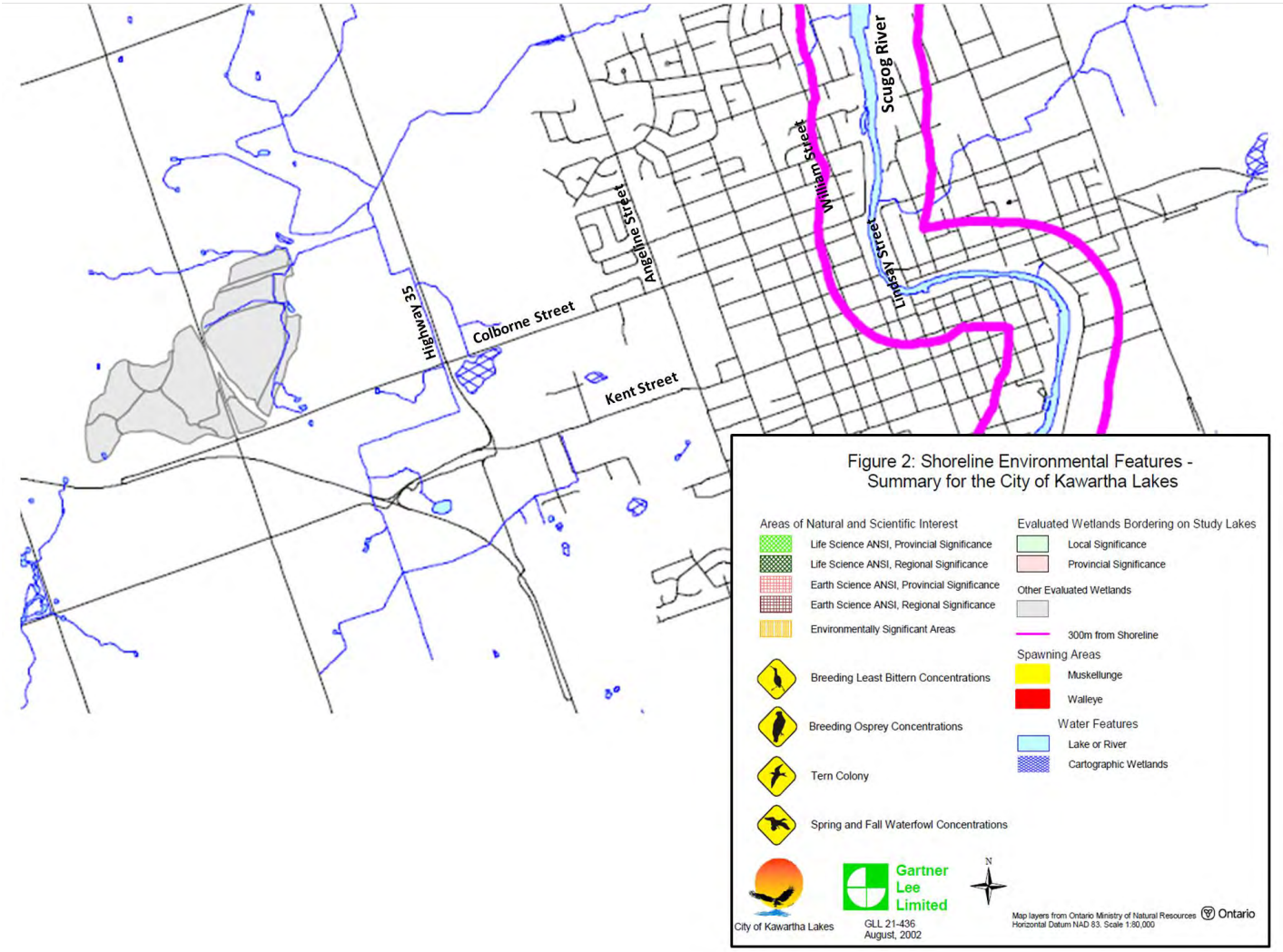


Exhibit 2-3: Environmental Features *(Excerpt from Figure 2 of Shoreline Environmental Studies Report, 2002)*

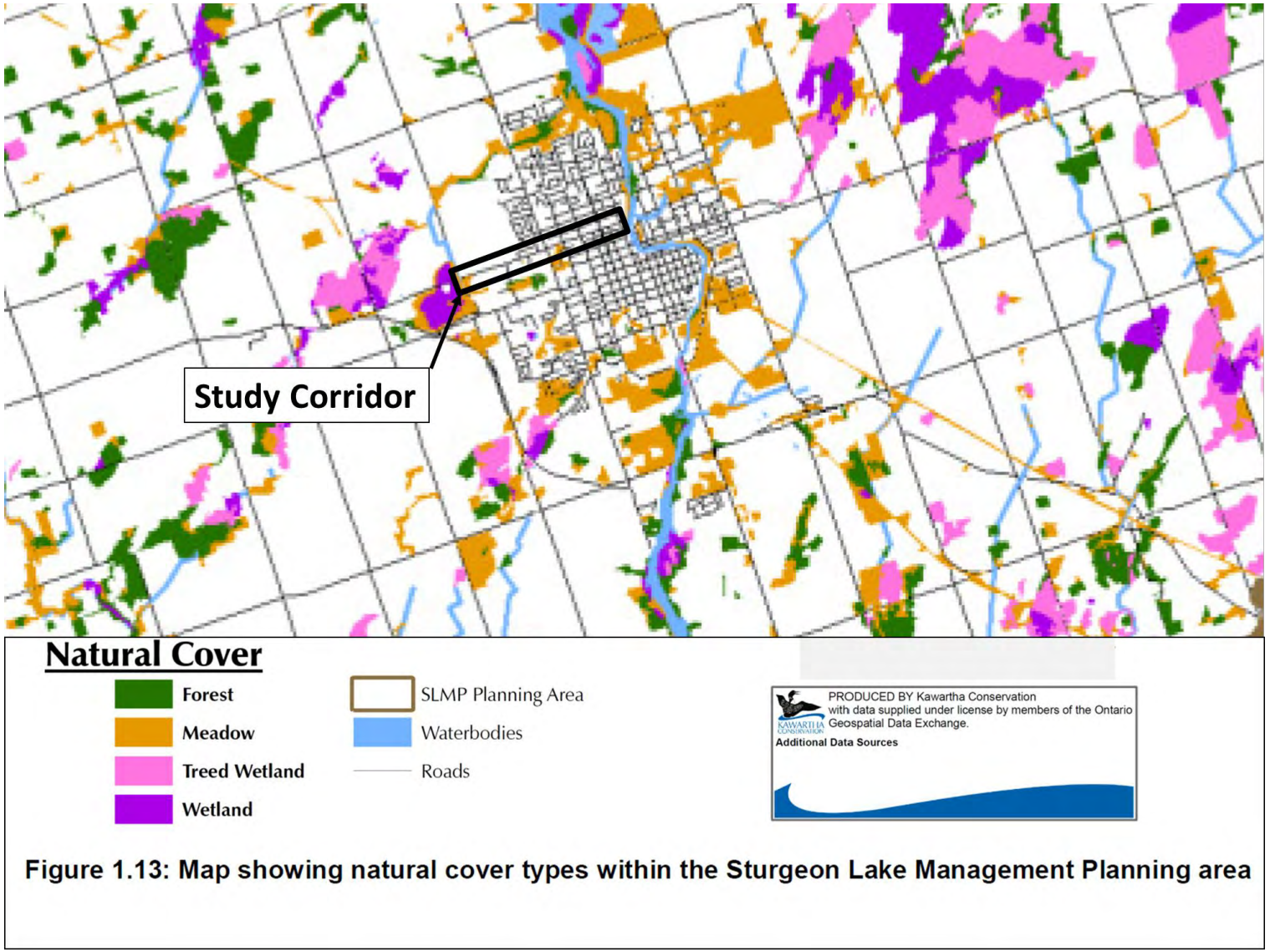


Exhibit 2-4: Natural Cover *(Excerpt from Figure 1.13 of Sturgeon Lake Management Plan, 2014)*

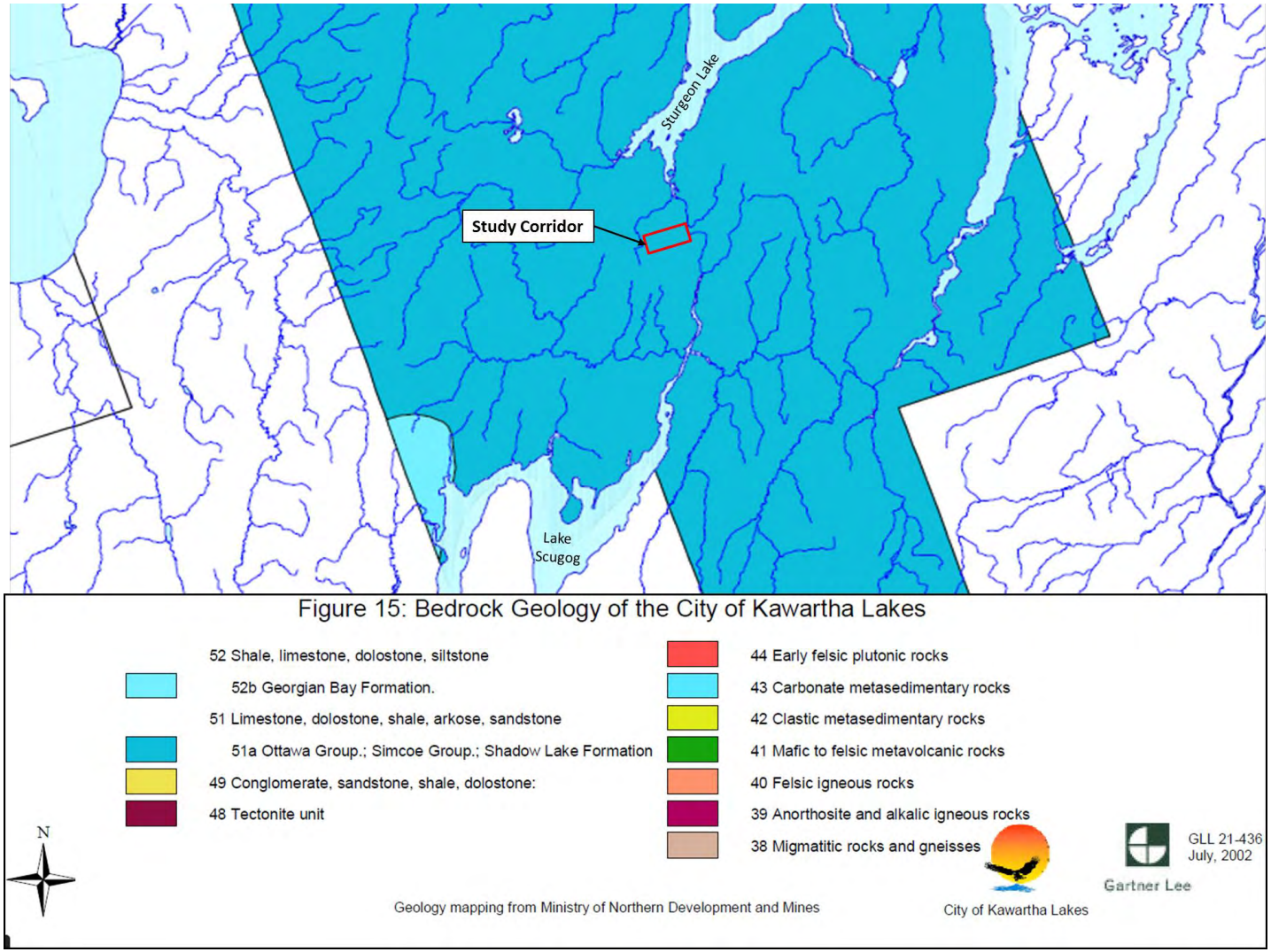


Exhibit 2-5: Bedrock Geology *(Excerpt from Figure 15 of Shoreline Environmental Studies Report, 2002)*

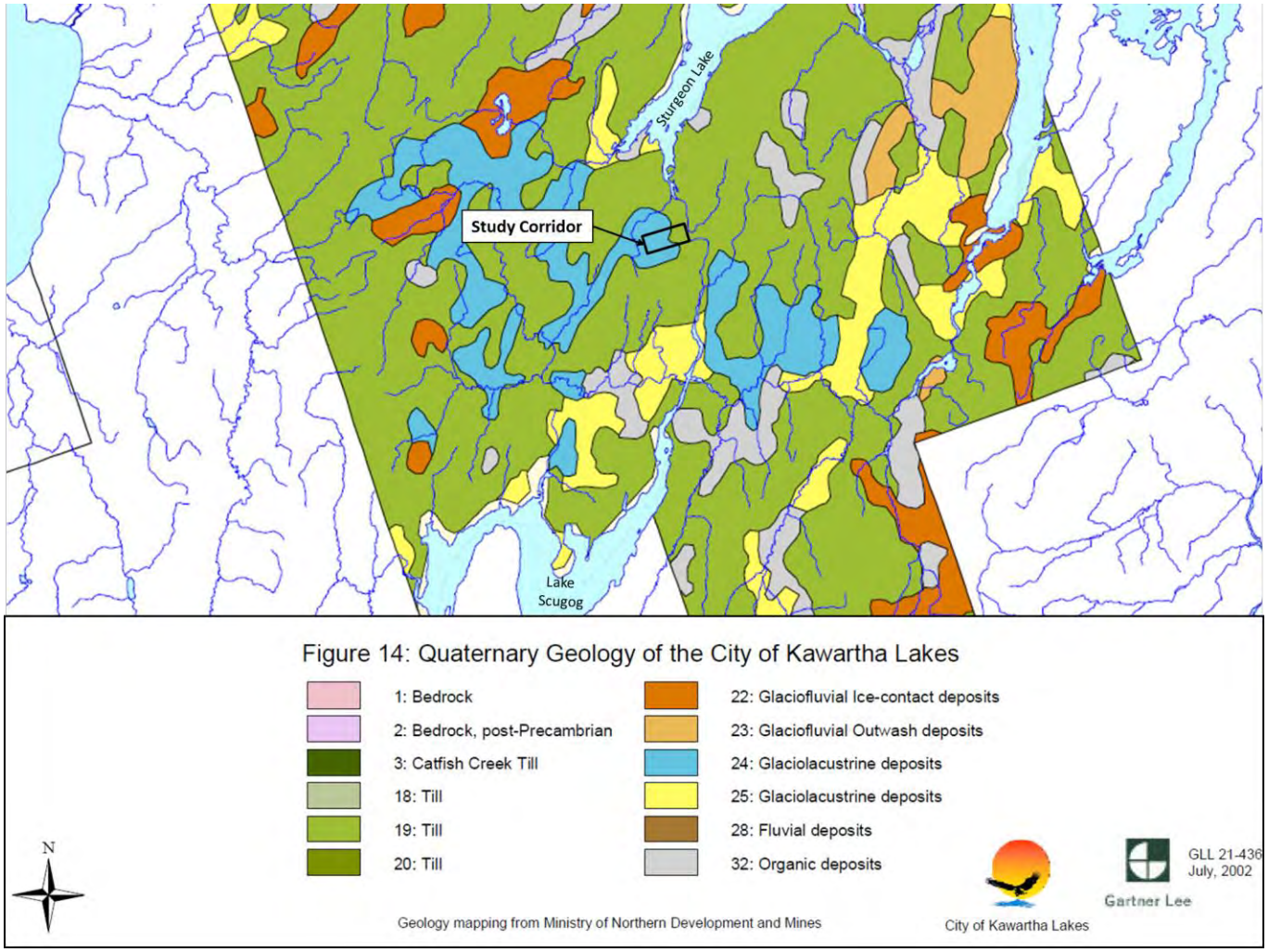


Exhibit 2-6: Quaternary Geology *(Excerpt from Figure 14 of Shoreline Environmental Studies Report, 2002)*

2.4 Existing Infrastructure

A detailed inventory and assessment of drainage/hydrology and geotechnical conditions, and utilities will be carried out during detailed design as necessary and if the proposed solutions could result in potential effects.

3 EXISTING TRANSPORTATION CONDITIONS

A detailed review of existing 2013 traffic conditions for Colborne Street was undertaken to confirm existing operations, capacity deficiencies, and safety issues experienced by the public traveling along the study corridor. The operational deficiencies and constraints identified at this stage provided input to the needs assessment and problem statement and were fundamental to the process of defining alternative solutions.

A field investigation was undertaken and included a detailed inventory of the road network including lane configuration, signage, and pavement markings. Traffic operations from a capacity and safety perspective were also observed using a design hour based on the weekday PM peak period.

3.1 Existing Cross-Section

Colborne Street has a varied right-of-way and varied cross-section throughout the corridor. The right-of-way varies from 26 m in the west end to 20-23 m in the central and east sections and 16 m for a short portion of Colborne immediately west of Angeline Street.

A summary of key characteristics of the existing cross-section, including the existing right-of-way, lane configurations and lane widths, is provided as follows:

Colborne West of St. Joseph Road

- 26.0 m right-of-way (typ.)
- 3.5 m (eastbound) and 4.0 m (westbound) general purpose travel lanes, one in each direction
- 1.2 m sidewalk, on south side, extending midway to Highway 35 from St. Joseph Road
- 2.5 m parking lane, on south side

Colborne East of St. Joseph Road

- 26.0 m right-of-way (typ.)
- 6.0 m (eastbound) and 4.0 m (westbound) general purpose travel lanes, one in each direction
- 1.2 m sidewalk, on south side
- No parking

Colborne West of Angeline Street

- 16.0 m right-of-way (typ.)
- 3.2 m (eastbound) and 3.8 m (westbound) general purpose travel lanes, one in each direction
- 2.8 m eastbound left-turn lane

	▪ 1.2 m sidewalk, on south side ▪ No parking
Colborne East of Angeline Street	▪ 23.0 m right-of-way (typ.) ▪ 4.0 m (eastbound) and 5.8 m (westbound) general purpose travel lanes, one in each direction ▪ 2.6 m sidewalk on south side, 1.8 m sidewalk on north side ▪ No parking
Colborne East of Victoria Avenue, at City Hall	▪ 20.0 m right-of-way (typ.) ▪ 4.0 m (eastbound) and 3.3 m (westbound) general purpose travel lanes, one in each direction ▪ 2.0 m sidewalk, on north side ▪ 2.4 m parking lane, on north side
Colborne East of Victoria Avenue, East of City Hall	▪ 20.0 m right-of-way (typ.) ▪ 4.0 m (eastbound) and 3.3 m (westbound) general purpose travel lanes, one in each direction ▪ 2.4 m sidewalk on north side, 1.2 m sidewalk on south side ▪ 2.4 m parking lane, on north side

The variation of the existing right-of-way throughout the corridor is shown in **Exhibit** 3-1.

3.2 Active Transportation

3.2.1 Pedestrian and Cyclist Facilities

The Lindsay Area Trails Master Plan, as taken directly from the ***Trails Master Plan for the City of Kawartha Lakes*** shows there are currently no trails internal to the study area. There are currently no dedicated cycling routes within the Town.

Pedestrian and bicycle volumes are relatively consistent throughout the corridor. Sidewalks are not continuous along the entire length of the corridor, as shown in **Exhibit 3-2**. Bicycles currently use the sidewalks or the road. Existing 2013 bicycle and pedestrian volumes are shown in **Exhibit 3-3**.

Beginning from the west end of the corridor, no sidewalk is provided on the **south side** of Colborne Street until midway to St. Joseph Road. A sidewalk is then provided on the south side of the road continuously until Victoria Avenue, at which

point there is a one block segment along the frontage of City Hall, where no sidewalk is provided. Sidewalk is then provided along the remainder of the south side from Cambridge Street until William Street. West of Angeline Street the sidewalk on the south side is separated from the roadway by landscaped grass boulevard. An asphalt splash-pad is provided between Angeline Street and Adelaide Street, and from Cambridge Street to William Street. In other sections, the south side sidewalk is directly adjacent to the curb and gutter.

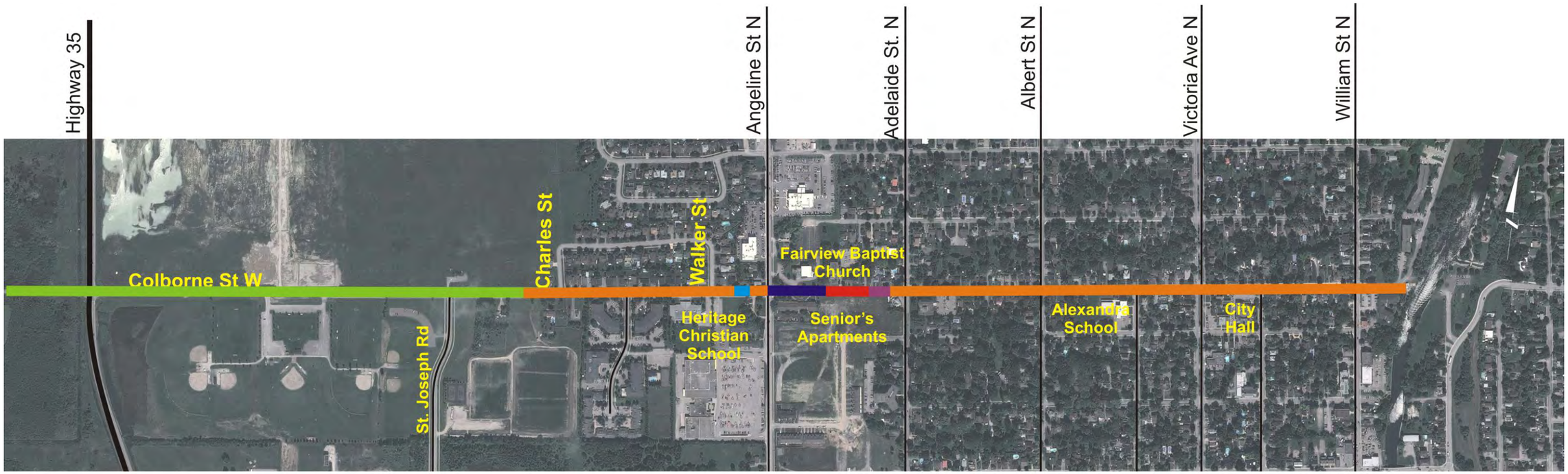


Exhibit 3-1: Existing Right-of-Way

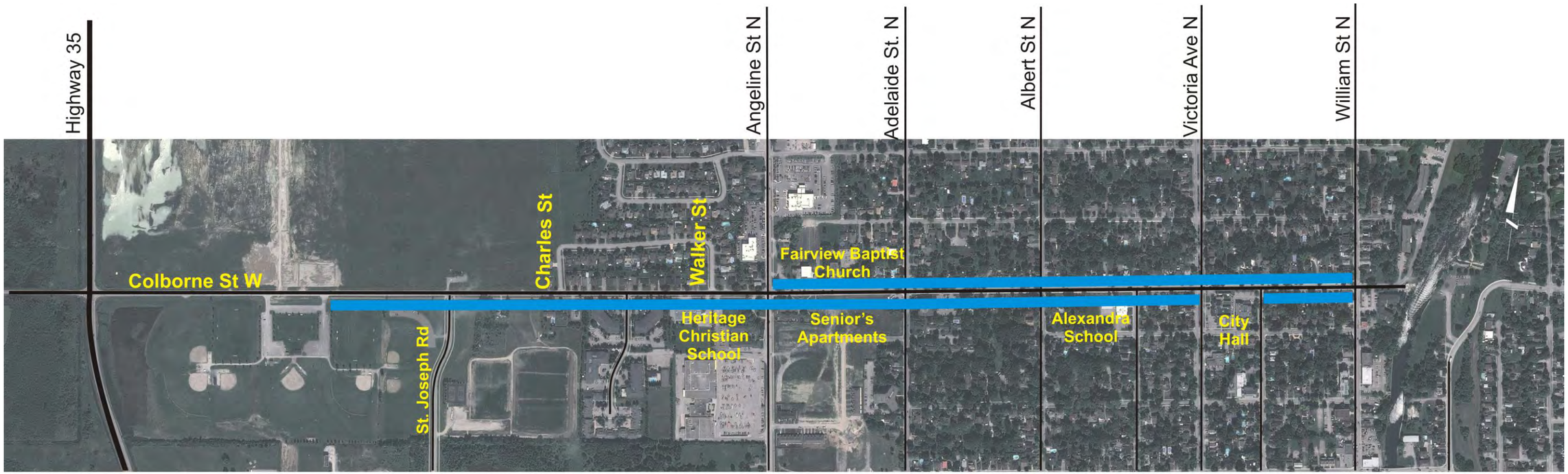


Exhibit 3-2: Existing Active Transportation Facilities (Sidewalks)

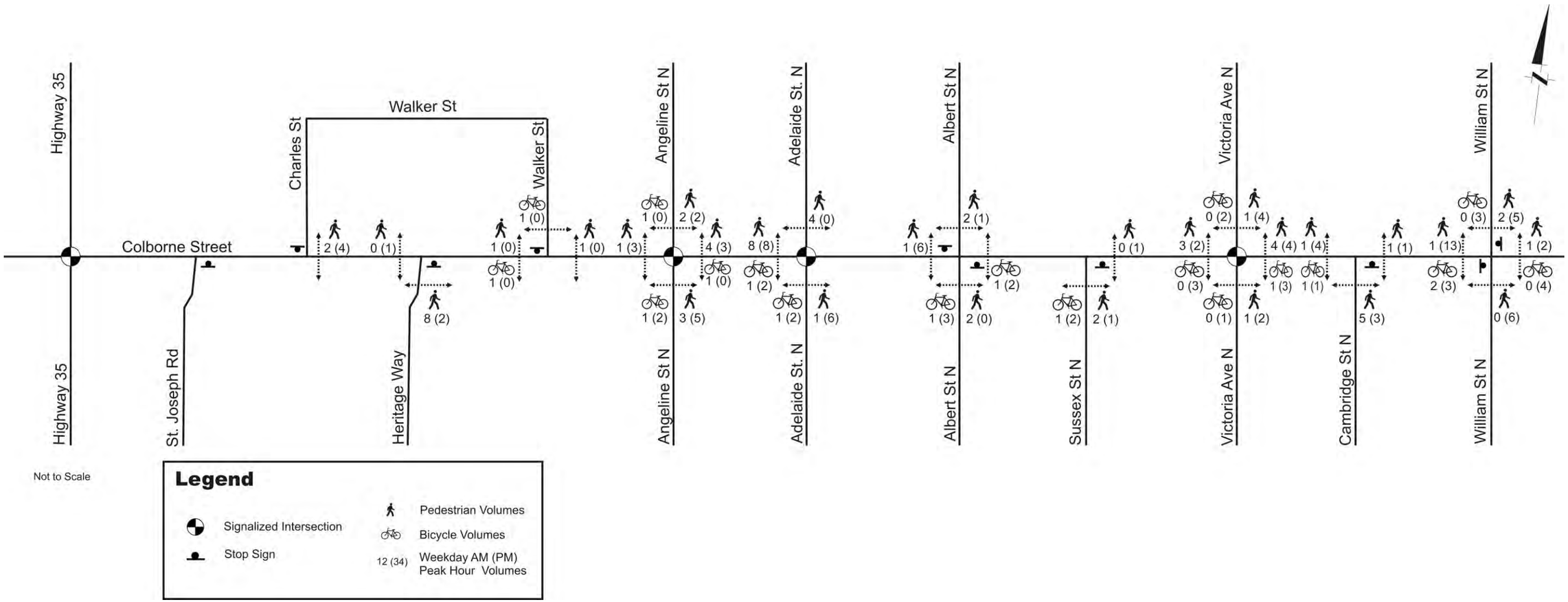


Exhibit 3-3: Existing Bicycle and Pedestrian Volumes (during AM and PM traffic peak hours generally between 8:00 and 9:00 AM and 4:30 and 5:30 PM, respectively)

Beginning from the west end of the corridor, on the **north side** of Colborne Street, no sidewalks are provided until Angeline Street. A sidewalk is then provided on the north side of the road continuously until the easterly limit of the corridor, at William Street. The sidewalk on the north side of the roadway is directly adjacent to the curb and gutter (no splash-pads or boulevards are present).

Sidewalk widths vary between 1.2 m and 2.6 m, but the average is closer to 1.2 m.

Based on discussions with residents and City staff, there is a higher number of pedestrians crossing in the vicinity of Alexandra School near Sussex Street (younger children) and Albert Street (youth). On the west leg of Sussex Street there is a pedestrian crosswalk which is supervised by a crossing guard when school is in session. Existing signage on Colborne warns drivers that the crossing is approaching. At the time of the inventory the signage on approach to the crossing for the eastbound approach consisted of 3 signs, while 2 signs were used for the westbound approach. A sign posted after the crosswalk also warned drivers that the crossing area has ended for westbound traffic. The main concerns raised by the public and identified by the City is the provision of safe crossing locations in this area particular when traffic will increase in the future. Signage related to the Sussex Street crossing is shown in **Exhibit 3-4**.

Warning Sign 1
(Both Approaches)

Non-standard Warning Sign 2
(Eastbound Approach Only)

Crosswalk Sign
(Both Approaches)

Crossing Area Ends
(Westbound Direction Only)

Exhibit 3-4: Sussex Street Crosswalk Signage

3.2.2 Transit Service

Currently there are three routes serving Lindsay; however, none of the bus routes serve the entire length of Colborne. The service map is shown below in **Exhibit 3-5**. The Green route passes Colborne in a north-south direction on William, Victoria, Adelaide, and Angeline Streets; while the Blue route services Colborne between St. Highway 35 and Adelaide Street. Service is generally provided Monday to Saturday between 7:00am and 7:00pm with headways of one hour (not including overlapping

route schedules). There is no Sunday service. The two routes serving the Colborne corridor connect to Lindsay Square in the west commercial section of Kent Street and a transit hub on William Street immediately south of Kent Street.

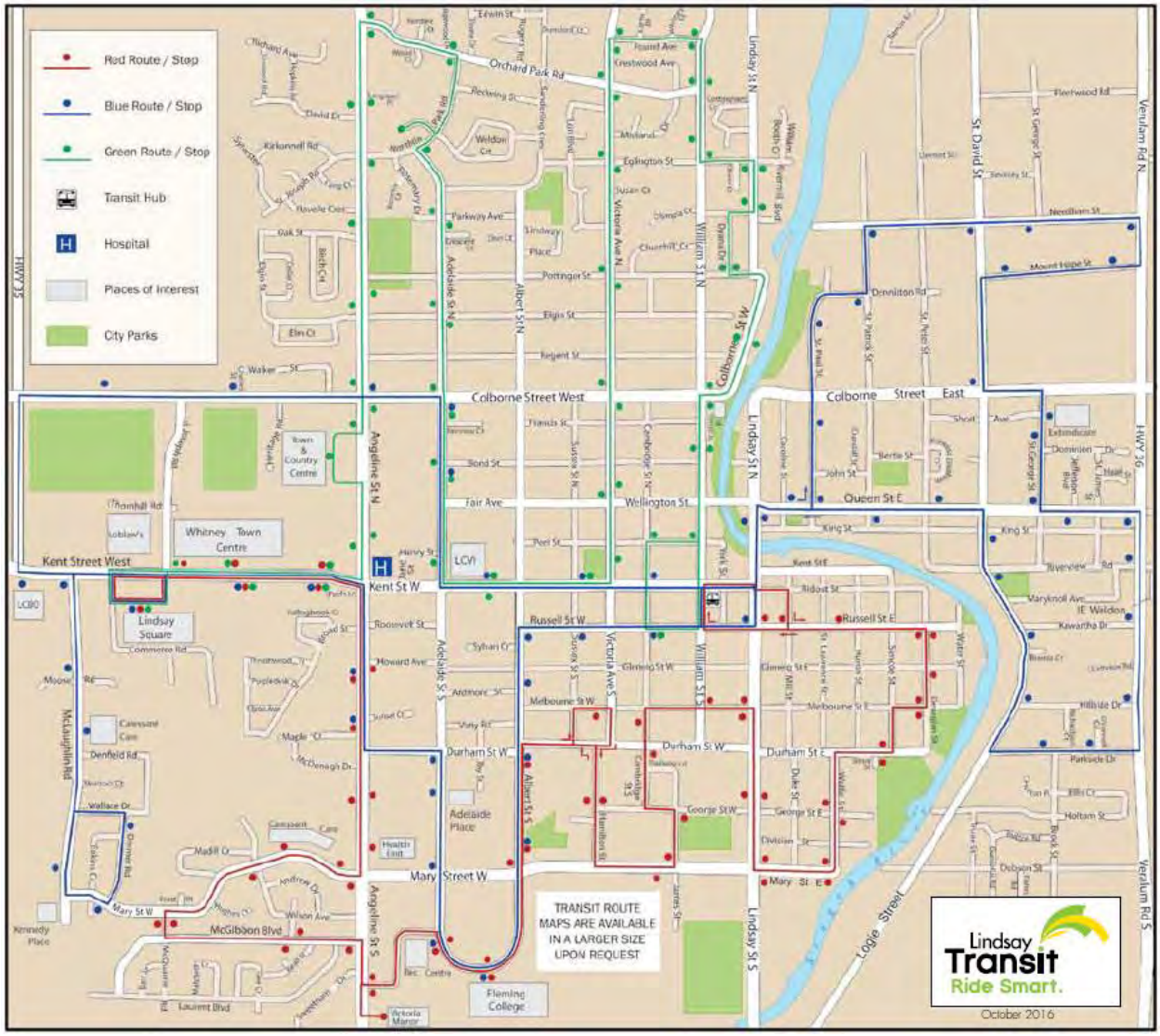


Exhibit 3-5: Existing Transit Network

3.3 Parking

West of Angeline Street along Colborne Street there are no posted parking restrictions. A parking lane is provided on the south side of Colborne Street, west of St. Joseph Road, which extends midway to Highway 35 along the frontage of Wilson Fields Park.

East of Angeline Street, parking is not permitted on the south side of the road for the entire corridor, or on the north side between Angeline Street and Adelaide Street. A

parking lane is provided on the north side of Colborne Street east of Adelaide Street extending to the east end at William Street.

Residents feel that the on-street parking located on Colborne Street is highly utilized in the vicinity of City Hall (Cambridge Street and Victoria Avenue). Many state that at times there is no room for them to park on street, especially when City Hall is holding events or meetings. With the on-site parking supply at capacity, the surrounding local road network is the only other option for parking. Residents have suggested that City Hall's on-site parking supply is insufficient and does not accommodate the employee demand, forcing employees to utilize the on-street parking supply for extended periods of time. Given the choice of maintaining the on-street parking or using this space for additional travel or turning lanes, residents have noted that they feel the parking provided along Colborne Street must remain.

3.4 Traffic Operations

Existing traffic operations were assessed based on traffic counts undertaken on Wednesday August 14th, 2013. A Synchro traffic model was developed to assess operations of the road network based on the counts. The model included adjustments for parking lanes, and utilized the signal timing plans provided by the City. Only the weekday PM peak hour has been assessed since hourly counts over the day show a constant increase of traffic volumes throughout the day. This was consistent with field observations. Weekday AM peak or mid-day peak periods were not assessed for this reason.

Under existing conditions, study intersections are operating well based on industry criteria for delay and level of service (see **Appendix A** for level of service definitions). The intersection of Colborne Street and Angeline Street is the only intersection with overall level of service 'C' during the PM peak hour. Otherwise all intersections are operating with overall level of service 'B' or better. Some movements at unsignalized intersections along Colborne Street will operate with level of service 'C'. One exception is the westbound left-through-right movement at the intersection of Colborne Street and William Street, which is operating with level of service 'F' during the weekday PM peak hour. There is excess capacity at all study intersections along the Colborne Street corridor.

Operations are similar to those summarized in the ***Transportation Master Plan***, but have improved slightly in some instances due to decreases in traffic volumes compared to the counts shown in the ***Transportation Master Plan***. Currently there are no areas identified with capacity deficiencies.

More details on the existing conditions analysis are provided in **Appendix A**.

3.5 Pavement Markings and Signage

Pavement markings in the corridor are generally in good condition. Most of the corridor signage is generally correctly placed and in good condition. There are some instances where non-standard signs have been installed as of the time of our inventory (2013).

The condition of pavement markings on Colborne Street varied from good to fair. In most instances, pavement markings were well delineated and are in accordance with the **Ontario Traffic Manual (OTM)**. There are faded white pavement markings along Colborne Street near Adelaide Street**.** As there is no bike route along this corridor and this faded line could potentially confuse cyclists and drivers.

An inventory of regulatory and warning signs was carried out. The placement of the signs, their size, and condition were appropriate. The corridor was noted as having consistent regulatory and warning signs that are in conformance with the **OTM**.

Generally no issues were identified with respect to drivers' ability to detect, identify, and react to the signs at intersections. There were no signs that could potentially be considered unnecessary or confusing that should be removed. All signs were clearly visible well in advance for drivers to process their intended message. Spacing of the signs also assured that there were no locations where signs obscured each other.

Alexandra Public school is located in the southwest corner of Colborne Street and Sussex Street. School area and crossing warning signs are in accordance with the **OTM**. The visibility and clarity of school crossing signs are adequate except there was one school area sign located west of Sussex Street which has tabs that do not conform to the **OTM**.

More details on the existing pavement marking and signage conditions are provided in **Appendix A**.

3.6 Collision History

A high level collision analysis was undertaken to evaluate the overall safety performance of the corridor, and to identify collision-prone locations, collision-types, and frequency, and probable causes. The City provided HDR with collision history data from January 2004 to August 2012. Only the most recent five-year history was reviewed. Due to the format in which the data was presented, no accurate information was obtained on some key elements including severity, environment condition, time of day, and road surface condition. This is a brief summary of the findings:

- 127 reported collisions during the five-year study period.
- Five collisions involved pedestrians.

- On average the corridor experienced 25.4 collisions per year over the study period.
- The predominant impact types on the corridor are rear-end, angle, and turning movement collisions.
- The two collision prone intersections are:
  - Angeline Street (26 collisions) - the predominant impact type is rear end collisions. There was one pedestrian collision in the history reviewed.
  - Albert Street (17 collisions) - the predominant impact type is angle collisions. Two pedestrian collisions in the history reviewed were both caused by driver inattentiveness.

More details on the collision history review are provided in **Appendix A**.

4 FUTURE TRANSPORTATION CONDITIONS

This section documents the future conditions of the study corridor, including future traffic operations, and active transportation, transit, parking, and access management needs and opportunities.

4.1 Future Land Use

The general land uses previously described will be maintained into the future horizon year of 2031.

Approximately half of the future residential developments will be "intensification" of existing land uses. The remaining half is the development of "greenfield" properties already surrounded by residential land uses (according to the ***City of Kawartha Lakes Growth Management Strategy***). Furthermore, the commercial developments which are proposed are generally located near existing commercial or mixed-use areas. Thus, the overall land use structure of the Town is not anticipated to change; rather, new developments will result in intensification of existing land uses along each corridor, rather than conversion.

4.2 Future Transportation Network

4.2.1 Planned Future Network Improvements

To carry out the operational review it was assumed the same background network improvements as listed in the Transportation Master Plan **Section 1.1 Committed / Approved Network Improvements**. These improvements are also depicted in Figure 9-2 of the Transportation Master Plan as "future roads", shown in **Exhibit 4-1**. Additional "improvements by others" are depicted in Figure 9-4 of the Transportation Master Plan, shown in **Exhibit 4-2**. Only some of these improvements are within the vicinity of the study corridors and will have an impact on corridor operations.

In both of these figures, one future improvement for which a need is anticipated is an additional crossing of the Scugog River somewhere in the vicinity of Kent Street and Colborne Street. The figures depict the new crossing closer to the easterly limit of the Colborne Street corridor study area which is the location that was ultimately decided on through the Council decision as of September 22, 2015. The implications of a new crossing have been explored in later sections of this report, assuming the crossing is located at the easterly end of Colborne Street (see **Section 6.1.5**).

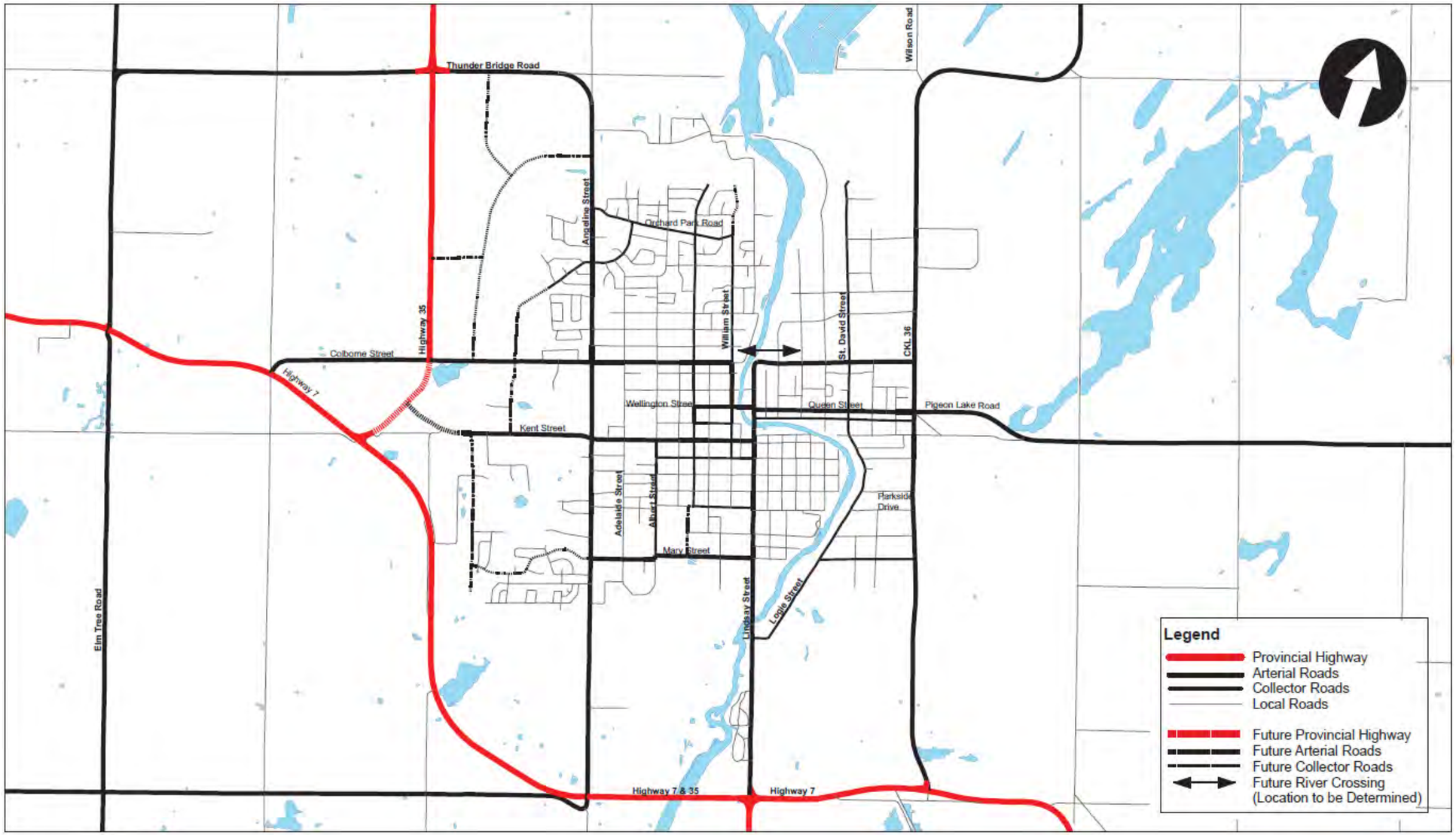


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Figure 9-2
Proposed Lindsay Roadway Functional Classification

City of KAWARTHA LAKES Catch the Kawartha spirit

Exhibit 4-1: Transportation Master Plan Figure 9-2 (Proposed Lindsay Roadway Functional Classification)

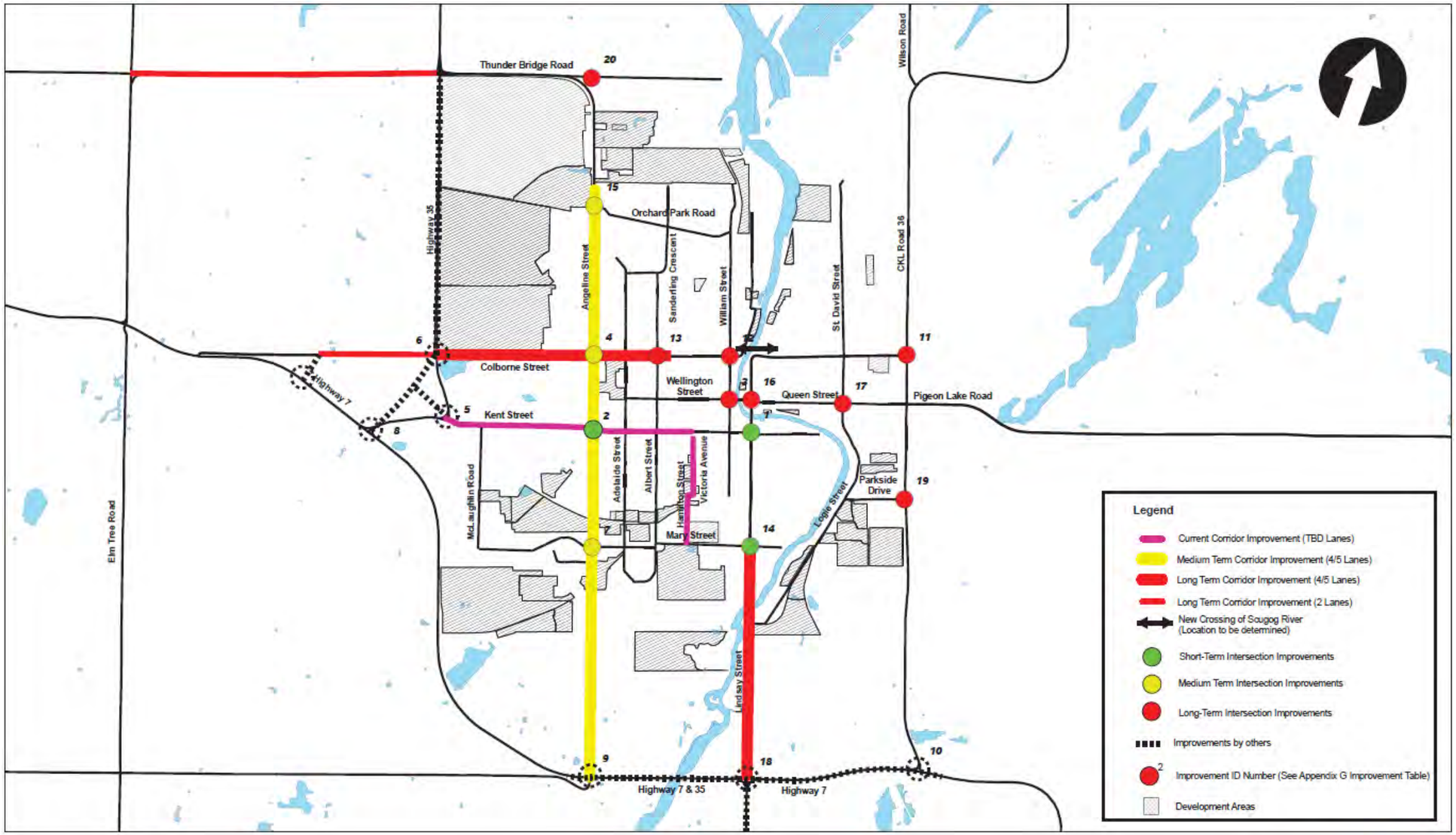

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Figure 9-4
Proposed Improvement Plan - Lindsay

City of KAWARTHA LAKES Catch the Kawartha spirit

Exhibit 4-2: Transportation Master Plan Figure 9-4 (Proposed Improvement Plan - Lindsay)

4.2.1.1 Assumed 2031 Base Network Improvements for Colborne Street Corridor Operations Review

To carry out the operational review and assessment of future 2031 deficiencies, some of the above road network improvements (outside of the Colborne Street corridor) need to be assumed before undertaking the analysis. The selected improvements assumed for future 2031 analysis are:

1. Widening of Highway 35 from two to four lanes. This improvement is uncertain since timing and funding has not yet been secured; however, for this study it was assumed the widening will be undertaken prior to 2031.

2. Realignment of the Highway 7 and Highway 35 interchange (by MTO). The MTO already has a design for the realignment; however, the timing for this improvement is uncertain since funding has not yet been secured; however, for this study both the existing and the proposed realignments were considered.

3. The extension of St. Joseph Road to Angeline Street to the north (as a collector roadway).

4. Completion of Street A in the NW greenfield development area of Lindsay.

5. The extension and completion of local and collector roads, including McLaughlin Road, within the neighbourhood to the south of the Kent Street west commercial area.

6. Signalization of St. Joseph Road at Colborne Street was assumed since it is required to handle future volumes with the northerly extension.

7. Signalization of Colborne Street at William Street was assumed since it is deficient today and will be required to handle future volumes.

The Colborne Street operational review did not assume a new Scugog River bridge crossing since Council selected the crossing location after this study had commenced, and further determined that the trigger for a crossing will not be until the future crossing demand of 26,000 vehicles per day is reached, which is expected to occur around or after 2031; however, the implications of not constructing the bridge were assessed (in **Section 6** and **6.1.5**) based on 2031 traffic projections. The location for the new crossing is determined to be at the easterly end of Colborne Street, connecting to Colborne Street East on the east side of the Scugog River, as depicted in **Exhibit 4-1** and **Exhibit 4-2**, above.

4.3 Future Traffic Conditions

4.3.1 Traffic Projection Overview

Travel demand forecasts constitute the primary inputs for estimating future travel demand and assessing the alternative transportation solutions. Travel demand forecasts for 2031 had four components:

1. Future background traffic growth (1.0% per year) associated with development growth from outside the Town of Lindsay. Derived from a review of historic traffic volumes along Ministry of Transportation of Ontario highways in the vicinity, as well as a review of historic traffic volumes within Lindsay (where available). Growth was applied to existing traffic volumes.

2. Traffic growth associated with development within the Town of Lindsay based on the projected residential units provided by the Town through the ***City of Kawartha Lakes Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan (UEM, February 2012)***. For these developments, traffic volumes were projected based on the unit counts.

3. Traffic growth associated with development within the Town of Lindsay based on the proposed commercial developments for which traffic impact studies were available and provided by the Town. For these developments, traffic volumes were taken directly from the respective reports.

4. Traffic diversion associated with new roadways and links.

The commercial development forecasts were based on the following reports:

- Proposed Commercial Developments – 449 Kent Street;
- Walmart Transportation Study;
- Chadwin Drive Mixed Use Development Blocks 13 and 16 – Old Lindsay Fairgrounds;
- Highlands Subdivision Traffic Impact Study; and
- Proposed Mason Commercial Development – Kawartha Meadows.

In addition to traffic volumes included from the reports noted above, traffic volumes were also manually projected and assigned to the road network for the potential expansion of the Loblaws located in the north-west quadrant of the Kent Street and St. Joseph Street intersection. The expansion would add an additional 120,000 square feet of gross floor area.

4.3.1.1 Residential Development Trip Generation Methodology

To determine the magnitude of trips projected for the future (2031) scenario, the ***City of Kawartha Lakes Growth Management Strategy*** projections (unit counts) were used. The plan simply provided the locations of future residential developments and the number of units expected to be developed between now and the year 2031. Units were separated by type (e.g., single-detached, semi-detached, townhouses, apartments, and seniors residents). Based on the locations of the developments, they were grouped according to how trips would disperse throughout the road network. The development grouping and unit counts are shown in **Exhibit 4-3**.

Using rates provided in the Institute of Transportation Engineers (ITE) publication ***Trip Generation Manual 9th Edition***, the magnitude of trips generated by each of the nine development groups was estimated for the weekday PM peak hour, by converting unit counts (for each dwelling type separately) into peak hour two-way trips. The weekday PM peak hour trip generation is summarized in **Table** 4-1.

Table 4-1: Weekday PM Peak Hour Trip Generation (Residential Developments)

Group	Developments	Total # Units	Trips Generated			Percent Total
			In	Out	Total	
1	1, 2, 3, BB	2,896	1,393	795	2,188	27%
2	20-25, AA	732	427	239	666	8%
3	U, X, DD	212	103	55	158	2%
4	4	765	370	207	577	7%
5	19, 26, R, S, T, V, W, KK	556	275	153	428	5%
6	12-18, P, Q, FF-JJ	1,121	617	343	960	12%
7	10, 11, D-O	1,864	865	477	1,342	16%
8	5- 9, B, C, EE	1,900	973	551	1,524	19%
9	A, Y, Z	806	238	130	368	4%
ALL	ALL	10,852	5,261	2,950	8,211	100%

The trips generated above comprise:

1. Trips between Lindsay and areas external to Lindsay, and

2. Trips within Lindsay (trips which do not leave Lindsay).

4.3.1.2 Residential Development Trip Distribution

To distribute and assign the trips projected in **Table 4-1**, the split between internal and external trips was necessary, as well as the origin-destination patterns for each development grouping. Information from the Transportation Tomorrow Survey 2006 (TTS) was employed. TTS separates Southern Ontario into traffic zones for the aggregation and interpretation of data which was collected during telephone surveys of households during 2006. The Town of Lindsay is itself quartered into four (4)

traffic zones. The 2006 TTS data also provided mode splits and trip purpose. An expansion factor was applied to the data since only a subset of households was surveyed.

For the weekday PM peak hour, 2006 TTS data indicated that 63% of trips originating from Lindsay (the 4 zones which comprise Lindsay) were destined internally, while the remaining 37% outbound trips were destined externally. Furthermore, 69% of trips destined to Lindsay (the 4 zones which comprise Lindsay) were of internal origin, while the remaining 31% were of external origin. The resultant internal and external trip distributions are summarized in **Table 4-2**. The 2006 TTS traffic zones are also show in **Exhibit 4-3**.

Table 4-2: Internal/External Residential Trip Distributions – PM Peak Hour

External Trips		
To/From	In	Out
North	28%	34%
South	23%	15%
West	24%	13%
East	25%	38%
Total	100%	100%

Internal Trip Origins				
From Zone	To Zone			
	8709	8710	8711	8712
8709	22%	2%	71%	5%
8710	28%	7%	47%	19%
8711	29%	8%	50%	13%
8712	20%	13%	42%	25%

Internal Trip Destinations				
To Zone	From Zone			
	8709	8710	8711	8712
8709	11%	10%	69%	10%
8710	3%	9%	66%	23%
8711	18%	9%	62%	11%
8712	5%	13%	58%	24%

The internal/external split was applied to the total trip generation for inbound and outbound trips separately, to determine the number of internal and external trips. Then using the distributions shown above, these trips were assigned to the road network. For internal trips, mode split reductions were applied as per the 2006 TTS research. Inbound trips were reduced by 7% and outbound trips were reduced by 5%. This reflects the existing non-vehicular mode split within Lindsay as of 2006. A conservative approach was used whereby the non-vehicle reduction for the future scenario was not increased (i.e. transit ridership remains the same relative to other modes including vehicular trips).

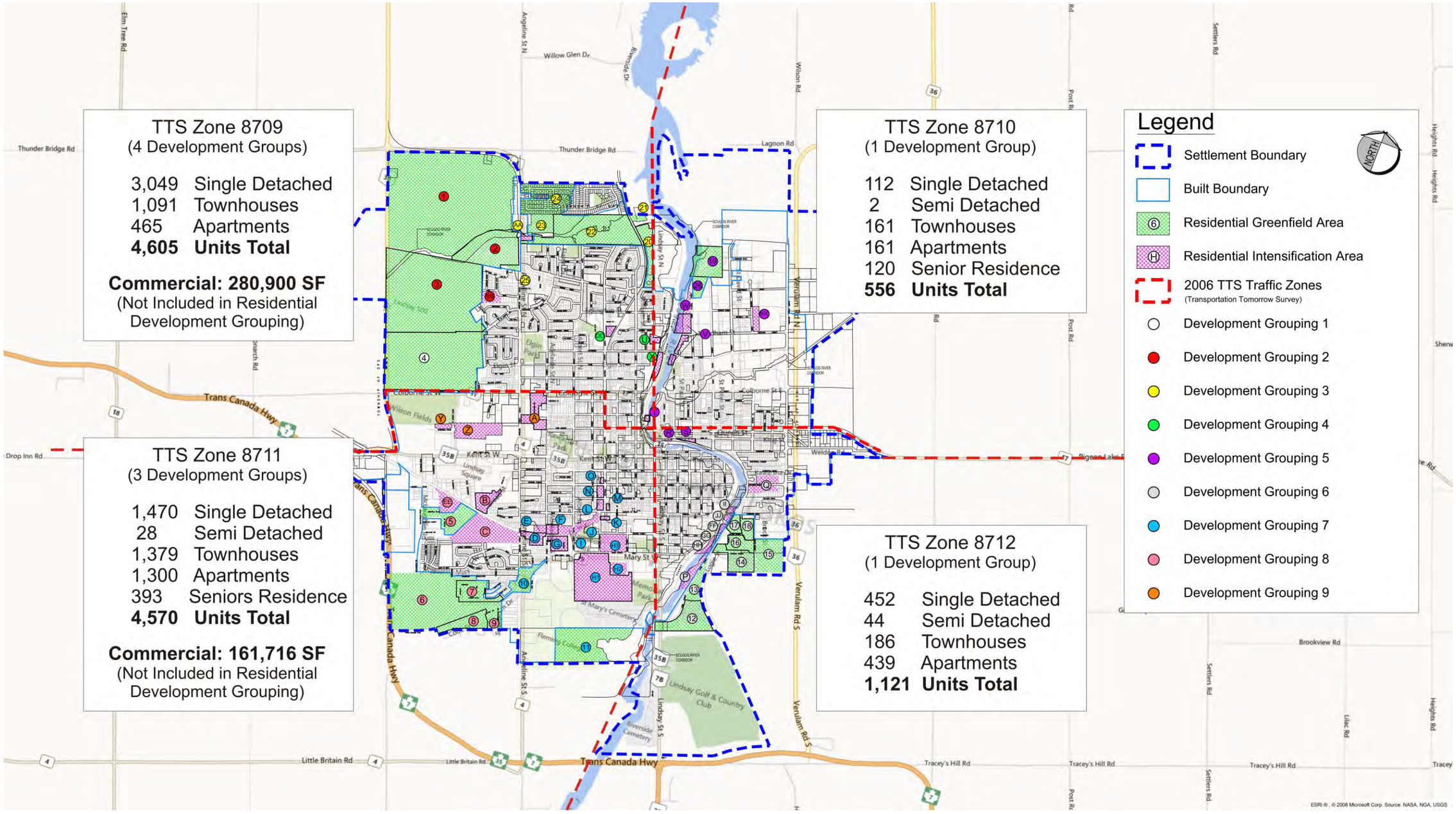


Exhibit 4-3: Development Grouping

4.3.1.3 Residential Development Trip Assignment

Trips were assigned on the existing road network based on professional judgment, existing traffic patterns, and future background road network improvements which were assumed as part of the future analysis. Trips originating and destined to locations external to Lindsay were assigned separately from those originating and destined to areas within Lindsay. Trips destined internally (specifically Zone 8711) were also "sunk" into commercial driveways to reflect intensification.

4.3.1.4 Commercial Development Trips

Trip generation for the residential component should technically account for the majority of the commercial trips which would be attributed to future commercial developments; however, some commercial trips may be externally generated, and the residential trip generation would not account for this. For a conservative analysis, commercial trips were added on for developments. In total, five commercial developments were accounted for; four of which had traffic impact studies from which volumes were taken.

4.3.1.5 2031 Total Traffic Volumes

Total traffic volumes were determined by applying background growth to existing traffic volumes, plus residential traffic projections, plus commercial traffic projections. Weekday PM peak hour total traffic volumes are depicted in **Exhibit 4-4**. The future 2031 total traffic volumes take into consideration all of the background road network improvements outlined in **Section 4.2.1.1** in terms of the impact on route selection.

4.3.2 Future Traffic Conditions and Deficiencies

Traffic operations on Colborne Street were assessed based on the projected 2031 PM peak hour traffic volumes shown in **Exhibit 4-4**, and the existing road network with background improvements outlined in **Section 4.2.1.1**. Traffic signal timings were optimized for this 2031 base (Do Nothing) scenario.

Signalized intersection operations are shown in **Exhibit 4-5** based on the overall intersection level of service, while unsignalized intersection operations are shown based on the level of service for the most critical turning movement. Level of service is an indicator of delay commonly used to identify congestion and deficiencies as they relate to the user experience ('A' being the best and 'F' being the worst).

Arterial link volume projections are also shown in **Exhibit 4-6** along with the anticipated percentage growth. Arterial level of service is shown in **Exhibit 4-7**.

Detailed operations analysis findings for future 2031 do nothing scenario are summarized in **Appendix C.1**.

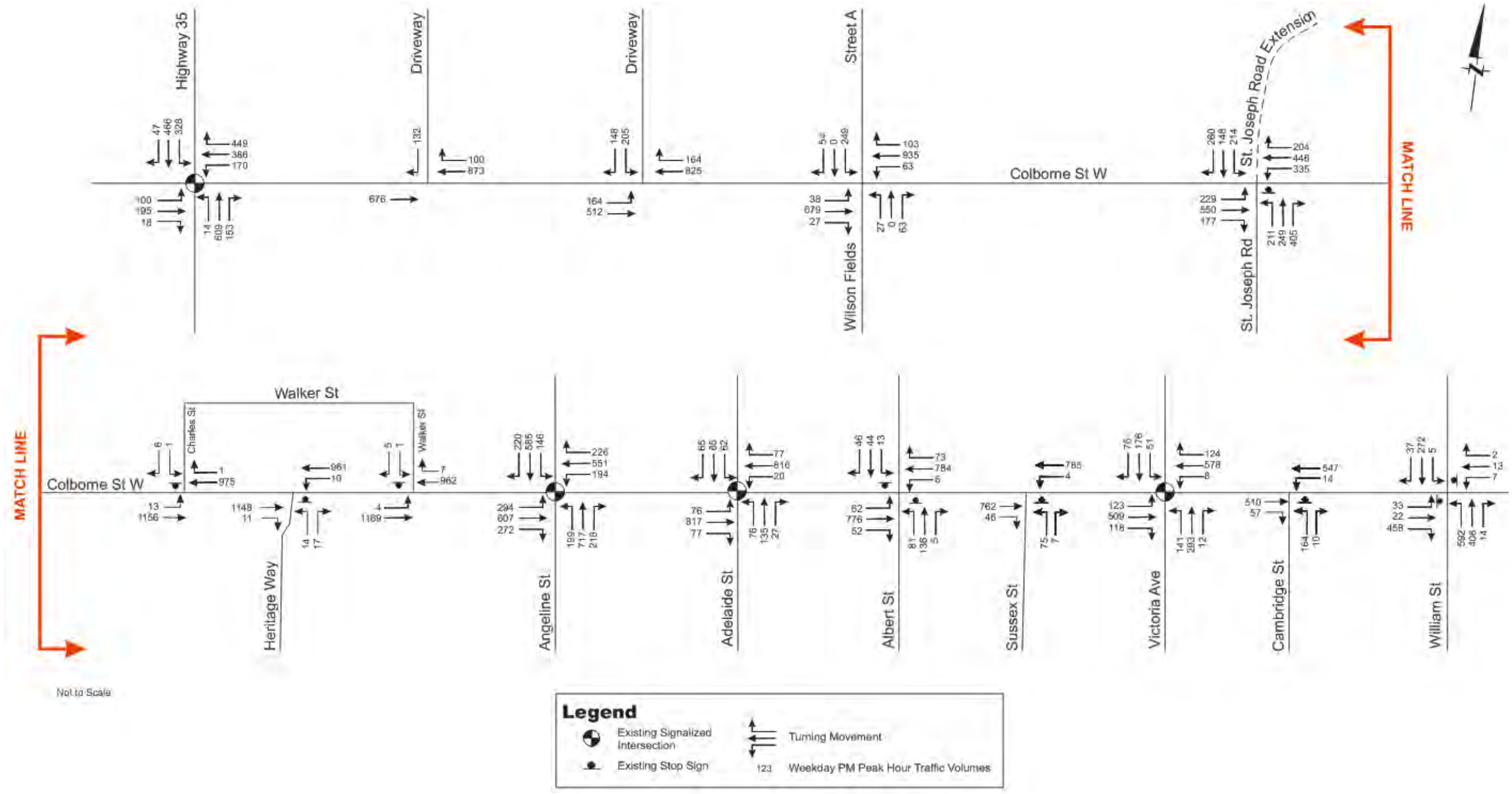


Exhibit 4-4: 2031 Forecast Traffic Volumes

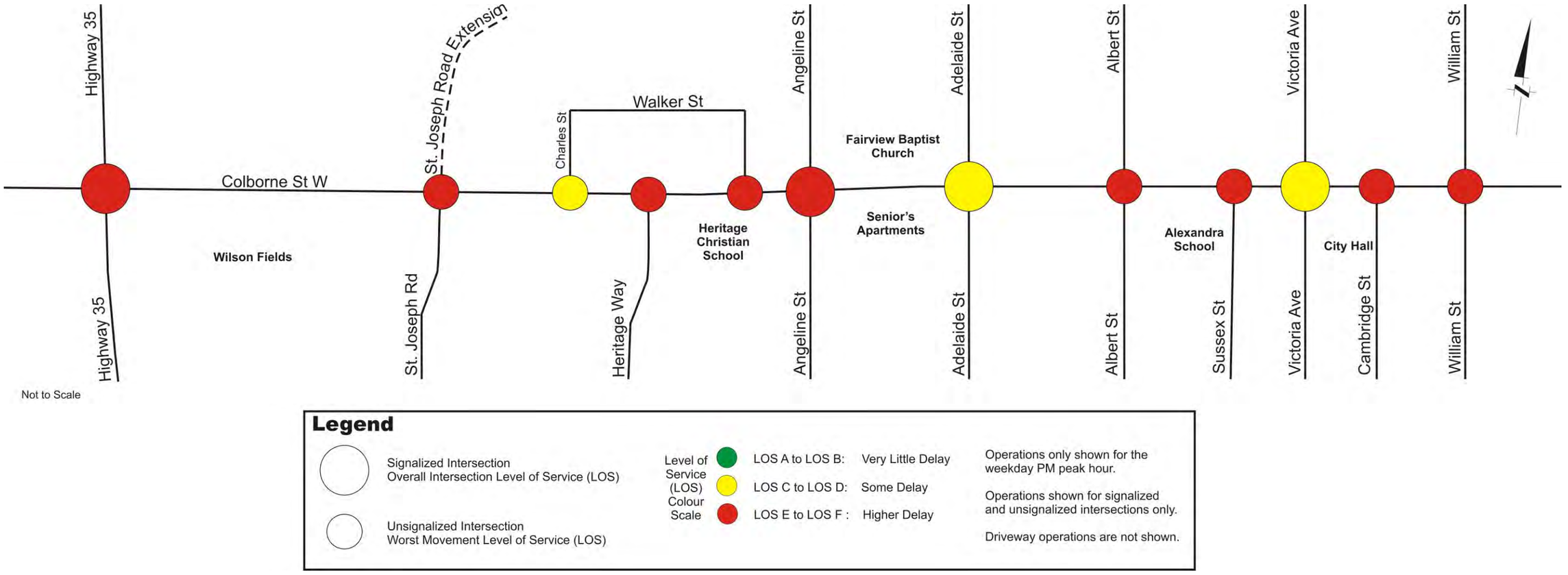


Exhibit 4-5: 2031 Traffic Operations (Do Nothing Scenario with Background Improvements Only)

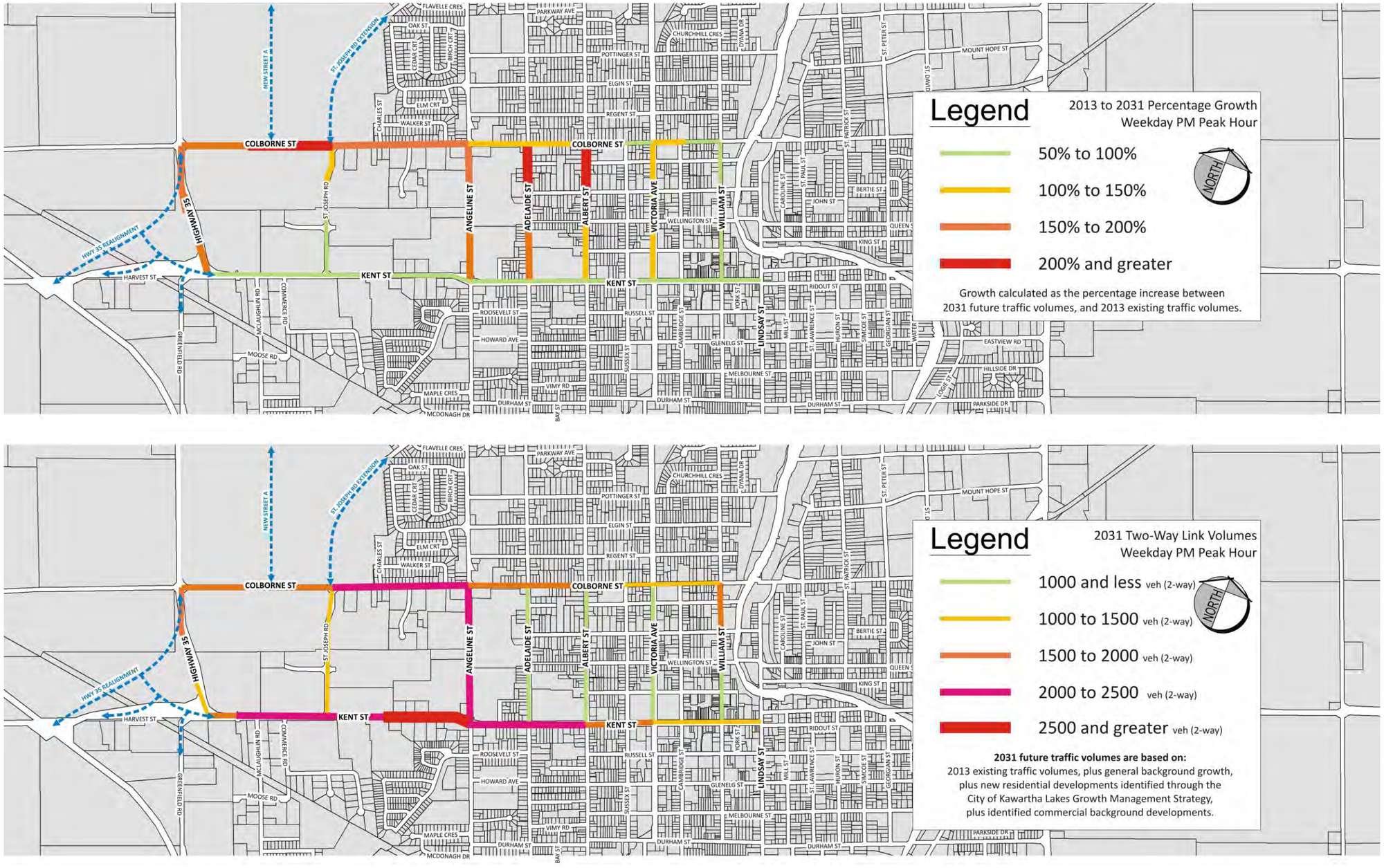


Exhibit 4-6: Arterial Link Volume Projections

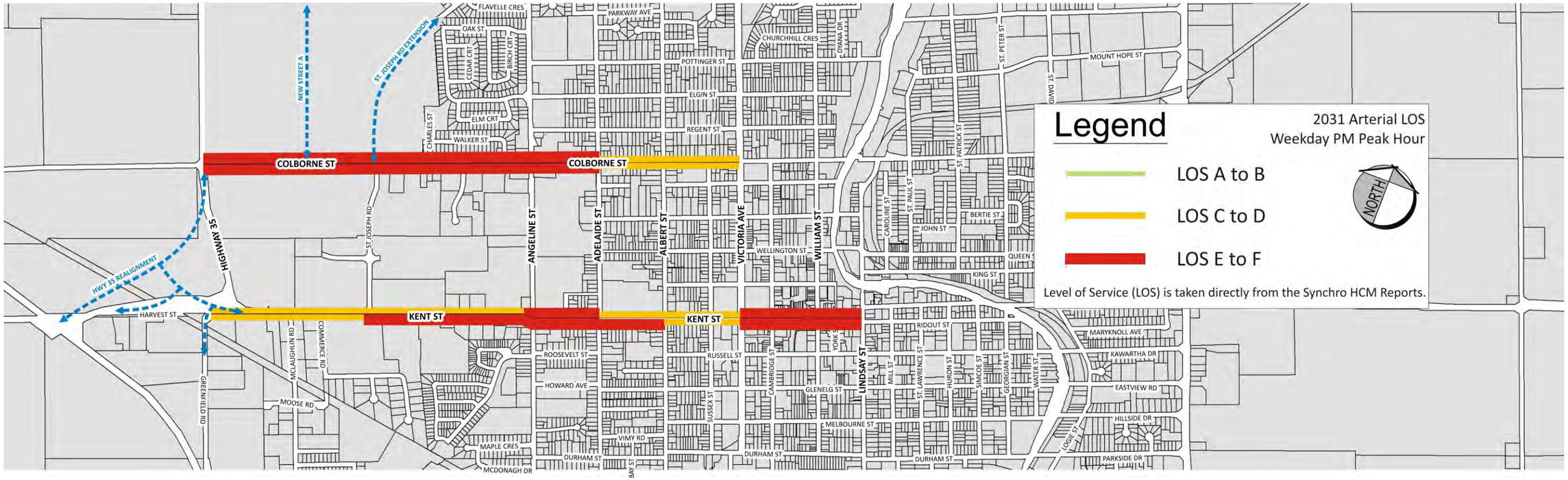


Exhibit 4-7: 2031 Arterial Level of Service (Do Nothing Scenario)

The following **unsignalized intersections** will be operating with unacceptable level of service under 2031 conditions (shown as red circles):

- St. Joseph Road at Colborne Street (assuming the north leg extension)
  - Minor street movements will be operating with level of service 'F' and with volume to capacity ratios well beyond 1.00, without signalization.
  - Mitigation measures include signalization to accommodate the extension of St. Joseph Road to the north, as well as widening along Colborne Street. Signalization and improvements will be part of the development process and as part of the process of widening Colborne Street.
- Heritage Way at Colborne Street
  - The northbound approach will operate with level of service 'F' and a volume to capacity ratio exceeding 1.00.
  - Mitigation measures include separation of northbound left and right-turn movements, addition of a centre two-way left-turn lane along Colborne Street, or signalization.
- Walker Street at Colborne Street
  - The southbound approach will operate with level of service 'F'.
  - Mitigation measures include separation of northbound left and right-turn movements, addition of a centre two-way left-turn lane along Colborne Street, or signalization.
- Albert Street at Colborne Street
  - The northbound and southbound approaches will operate with level of service 'F' and with volume to capacity ratios exceeding 1.00.
  - Mitigation measures include signalization.
- Sussex Street at Colborne Street
  - The northbound approach will operate with level of service 'F' and a volume to capacity ratio exceeding 1.00.
  - Mitigation measures include signalization.
- Cambridge Street at Colborne Street
  - The northbound approach will operate with level of service 'F' and a volume to capacity ratio exceeding 1.00.
  - Mitigation measures include signalization.
- William Street at Colborne Street
  - The eastbound and westbound approaches will operate with volume to capacity ratios exceeding 1.00, and level of service 'F'.

- Mitigation measures include geometric improvements plus signalization.

Some of the future capacity deficiencies and poor level of service which will be experienced by vehicles approaching Colborne Street from the minor streets (Albert Street, Sussex Street, Cambridge Street, and especially William Street) are a result of the *Colborne Street-William Street-Wellington Street* traffic pattern/route already observed under existing conditions. This traffic pattern or established route is closely tied with the Town's east-west river crossing capacity (or lack thereof). As the intersections along this route become more overloaded, drivers will find and burden alternative routes. This diversion has been incorporated into the analysis, and is in part the cause of some of these future capacity deficiencies.

The following **signalized** intersections will be operating with unacceptable level of service or with volume to capacity ratios exceeding 1.00, under 2031 conditions (shown as red circles):

- Highway 35 at Colborne Street
  - The westbound through approach and the southbound left-turn movement will be operating with level of service 'F' and a volume to capacity ratio well beyond 1.00. The eastbound approach will also operate with level of service 'E'.
  - Overall intersection level of service 'F'.
  - Mitigation measures include geometric improvements and widening along Colborne Street.
- Victoria Street at Colborne Street
  - The eastbound left-through-right which will be operating with a volume to capacity ratio of 1.00.
  - Overall intersection level of service 'C'.
  - Mitigation measures include separation of the eastbound left-turn and through-right movements.
- Adelaide Street at Colborne Street
  - The eastbound left-through-right will be operating with a volume to capacity ratio of 0.99. The northbound left-through-right will operate with level of service 'E'.
  - Overall intersection level of service 'C'.
  - The northbound approach at this intersection is wide enough to accommodate left-turns separately from through and right-turn movements. It is likely that operations are better than reported. This intersection should be monitored in the future to identify the need for separation of the northbound left-turn through painting an exclusive turn lane.

- Angeline Street at Colborne Street
  - All movements, with the exception of the southbound left-turn, will be operating with volume to capacity ratios of 1.00 or greater. All movements, with the exception of the southbound approach movements, will operate with level of service 'F'.
  - Overall intersection level of service 'F'.
  - Mitigation measures include geometric improvements and widening along Angeline Street.

4.4 Transportation System Needs and Opportunities

4.4.1 Active Transportation

Active transportation includes modes of travel such as walking and cycling. These modes utilize the available sidewalks, trails and cycling networks within the Town. Trails may also potentially be used by motorized vehicles such as all terrain vehicles (ATVs), or snowmobiles during the winter months. Active transportation can be integrated into both urban and rural environments and yield similar benefits.

The ***City of Kawartha Lakes Transportation Master Plan*** (February 2012) reiterated the sentiment of the ***Official Plan*** as well as in the ***Trails Master Plan for the City of Kawartha Lakes***. Active transportation is an excellent way to improve health, reduce congestion, and facilitate improved community cohesion. Active transportation has positive impacts on the environment as well as our health, and saves money for not only individuals but for the community as a whole. As shown in the Lindsay Area plan there are currently no trails internal to the study area, except for a proposed trail along Highway 35 to the west.

Improvements to the Colborne Street corridor present opportunities to improve accommodation for active transportation. The ***Transportation Master Plan*** summarized the issues raised by the ***Trails Master Plan***, and distinguished the issues between the trails and cycling network. Issues related to trails include "a need for urban by-pass routes, particularly for motorized trail uses". Since the study area does not contain any existing or proposed trails and would be described as urbanized, only the sidewalk and cycling network issues are relevant. They are reiterated below:

- A need for signed *safe cycling routes in the urban areas*;
- A need for cycling routes to connect the gaps in the Victoria Rail Trail Corridor (VRTC);
- A need to identify safe routes for children through the urban areas, *particularly in Lindsay*; and

- Public consultation feedback also identified the need to provide better cycling facilities along the corridor, feeding into the commercial area along Kent Street near St. Joseph Road.

The VRTC runs east-west to the south of the Town and does not impact the study area; however, it is clear that establishment of signed safe cycling routes within the town, with consideration to the safety of children, is extremely important. This was an important consideration throughout the study process. New cycling routes would be integrated with existing trails where possible, although there are currently no existing opportunities for integration at the study area periphery.

4.4.1.1 Sidewalks

As the Town grows, increased active transportation activity will also need to be accommodated safely along the Colborne Street corridor; however, some segments of the existing sidewalk has widths of only 1.2 m (west of Angeline Street) and will be insufficient to comfortably accommodate pedestrians, pedestrians with strollers, and scooters driven by seniors. There are existing issues with the narrow sidewalks including the difficulty for both directions to use the sidewalk at the same time as well as accommodating cyclists (including children) using the sidewalks. This study has reviewed the feasibility of accommodating wider 1.5-2.0 m sidewalks, and alternatively, 3.0 m multi-use paths which would be used by all modes of active transportation; all within the existing right-of-way width.

4.4.1.2 Pedestrian Crossings

As traffic volumes increase there will be fewer available gaps to accommodate pedestrians at existing crosswalk locations, mid-block locations where pedestrians are currently crossing illegally, and at existing traffic signals. As the number of available gaps decrease with increased traffic volumes, the difficulty of crossing also increases along with the likelihood of collisions. The following locations have been identified:

1. Colborne Street and Sussex Street – existing crosswalk location.
2. Colborne Street and Albert Street – unsignalized (north-south stop control).

Improvements to the Colborne Street corridor present opportunities to improve accommodation for pedestrian crossings through:

1. Modifications to the existing geometry.
2. Provision of entirely new crossing locations.
3. Modifications and updates to the existing signal timing (walk and don't walk times).
4. Crossing guard supervision where appropriate.

4.4.2 Transit Needs and Service Objectives

Local and inter-municipal transit needs have been reviewed in the past and there have been ongoing recommendations and changes to the transit system. The recommendations from the ***Transportation Master Plan*** remain valid.

Improvements to the Colborne Street corridor present opportunities to modify the existing routes based on new links and need for increased capacity. More importantly, the large number of new residential developments including the development of the Jennings Creek Development Plan Area will drive new origin-destination patterns which will directly impact bus routing based on demand. This should be monitored in the future to determine the best alternatives to implement, as new developments are constructed.

4.4.3 On-Street Parking

Improvements to the Colborne Street corridor could present opportunities to provide more on-street parking, modify existing on-street parking, or to recommend locations for future parking provision off-street. There is also the potential to reduce parking demand through transportation demand management measures (TDM), which would include expansion to public transit or active transportation facilities as a means to increase non-vehicular trips and decrease parking demand.

5 PROBLEM STATEMENT

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. This is a population increase of approximately 33% from 2011. Some of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes, depending on the location. As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes without improvements to address increased vehicle-vehicle and vehicle-pedestrian conflicts.

Colborne Street will operate with level of service 'E' and 'F' during the weekday PM peak hour. Two out of four signalized intersections will operate with overall level of service 'E' or 'F'.

While the goal is to improve and accommodate vehicular flow, pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must be addressed through improvement options that will provide a balanced approach.

Transportation solutions are necessary to enhance the safety and mobility of motorists, pedestrians, and cyclists along the corridor, and to address projected capacity deficiencies. This includes maintaining and enhancing the character of the existing Colborne Street through streetscaping opportunities, while still enhancing the transportation system and providing increased capacity.

6 ANALYSIS AND EVALUATION OF PLANNING ALTERNATIVES

The Schedule 'B' MEA Class Environmental Assessment process requires documentation and examination of all reasonable alternatives, or means to address the problem, referred to as planning alternatives. An evaluation is undertaken to ensure that the process is traceable and reproducible, and that technical, social, economical, and environmental components are considered as part of the evaluation process. This section introduces the proposed planning alternatives considered, discusses the evaluation methodology used, and presents the evaluation of each alternative and the recommended alternative.

6.1 Development and Evaluation of Planning Alternatives

Each of the planning alternatives considered present a different approach to address the problems and opportunities identified for this study. To determine the most appropriate functional solution for the corridor, advantages and disadvantages of each planning alternative were identified and evaluated to determine the best functional solution.

6.1.1 Development of Planning Alternatives

The following planning solutions were considered:

a) **Do Nothing** – no improvements;

b) **Travel Demand Management Measures** – encourage non-vehicle modes of travel;

c) **Improve Transit** – implement new routes or improved service;

d) **Improve Active Transportation Network** – sidewalks, multi-use paths, bicycle lanes;

e) **Intersection Improvements** – new signal timing, signal coordination, and turning lanes; and

f) **Improve Road Network** – road widening to provide through-capacity (within existing right-of-way).

Each planning alternative is described in further detail below:

a) **Do Nothing**

This alternative was included in the assessment to provide a benchmark against which the other alternatives could be compared. This planning alternative

represents a continuation of existing conditions and would involve no changes or improvements to the existing transportation network.

b) and c) **Travel Demand Management & Transit Service Improvements**

These alternatives are closely tied since they both involve methods to modify existing and future travel demand by reducing the proportion of single-occupant vehicular travel during the peak travel periods. Measures such as designated HOV lanes, carpooling, improved active transportation facilities, transit pass incentives and of course increases in transit service, all help reduce the proportion of single-occupant vehicle use.

d) **Improve Active Transportation Network**

The active transportation alternative is also closely linked to travel demand management as it serves to improve the active transportation network, hopefully encouraging a higher proportion of its use and conversion of trips which are currently vehicular under existing conditions. Opportunities include improving sidewalks, or providing bicycle lanes or multi-use paths.

e) **Intersections Improvements**

This alternative includes methods to increase the capacity at specific intersections, such as changes to traffic signal timings and phasing, coordination of traffic signals, intersection geometric improvements, and adding or changing exclusive turn lanes at intersections.

f) **Improve Road Network**

This alternative involves adding capacity to the road network through widening of existing corridors to provide additional through lanes within the existing right-of-way or outside the right-of-way.

The alternatives listed above are roughly ordered in terms of the potential property requirements for each respective improvement, beginning with no property requirements in the Do Nothing alternative. These alternatives can be implemented in conjunction with each other, and to varying degrees.

6.1.2 Planning Alternatives Evaluation Criteria

The evaluation criteria listed below were developed following the requirements and guidelines of the ***Municipal Class EA*** document, and include inputs received during the consultation process with the Project Review Team.

The advantages and disadvantages of each planning alternative should be evaluated following a clear, traceable and reproducible methodology, taking into account technical, as well as economic, social, and environmental considerations.

Transportation Service

- Level of Service
- Traffic Congestion and Delays
- Public Transit Service
- Accommodation of Pedestrians and Cyclists
- Traffic Safety

Socio-Economic Impacts

- Business Impacts
- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Archaeological / Cultural Heritage Resources
- Visual Aesthetics
- Accommodation of Planned Development

Natural Environment

- Vegetation
- Green Space
- Air Quality

Engineering

- Capital Costs
- Operating Costs
- Property Acquisition
- Utility Relocation

6.1.3 Analysis and Evaluation of Planning Alternatives

The planning alternatives were evaluated based on the ability of the alternative to address the problem statement, including impacts to transportation, anticipated property impacts, and environmental impacts.

Following the evaluation, a recommendation was made on which Planning Alternative(s) would be carried forward to the next stage. **Table 6-1** contains the evaluation of the alternative planning solutions and a summary of the impacts and recommendations.

6.1.4 Recommended Planning Alternative

Colborne Street is an important transportation corridor in the Town, and will become more important as the Town continues to grow. This road serves as one of the primary main east-west links through the Town. Providing adequate capacity in this corridor is critical to planning for the economic growth and well-being of the Town of Lindsay, as well as the City of Kawartha Lakes. The need for improvements along this corridor has been identified in the ***Transportation Master Plan***.

Based on the assessment and evaluation of the Planning Alternatives, the preferred and recommended planning solution is a combined and balanced approach; to incorporate transportation demand management measures and improve transit service where appropriate and as opportunities arise, with a primary focus on improving active transportation facilities and to provide specific intersection improvements where necessary.

Widening along the Colborne Street corridor to provide additional lane capacity may be necessary from a capacity perspective but would sacrifice the opportunity to improve the active transportation network through new or improved facilities (widening the existing sidewalks or providing new multi-use paths).

One important note is that through the public consultation process residents expressed concerns with the potential for new traffic being funnelled through residential areas and creating high-volume pedestrian unfriendly environments. Refer to **Section 8.6**. Thus, it seems there is a preference to improving active transportation and safety for those modes of travel, rather than improving vehicular capacity along the corridors such that it would *encourage* higher volumes, rather than simply accommodate the expected traffic volumes.

Table 6-1: Analysis and Evaluation of Planning Alternatives

Criteria	ALTERNATIVE a) Do Nothing	ALTERNATIVE b) and c) Travel Demand Management & Transit	ALTERNATIVE d) Improve Active Transportation Network	ALTERNATIVE e) Intersection Improvements	ALTERNATIVE f) Network Improvements (Widening)
<u>Transportation</u> ▪ Level of Service and Delays ▪ Traffic Congestion and Capacity ▪ Public Transit Service ▪ Accommodation of Pedestrians and Cyclists ▪ Traffic Safety	▪ Capacity needs not met ▪ Level of service is poor ▪ Improved transit, pedestrian, and cyclist objectives are not met ▪ Safety improvement objectives are not met	▪ Minimal capacity and level of service improvements due to reduced single occupant vehicle use and expected mode share shift ▪ Reduction in vehicles and improved transit may not improve the existing safety concerns on Colborne Street ▪ Pedestrian, and cyclist objectives are not met ▪ Promotes sustainability goals	▪ Minimal capacity improvements due to reduced single occupant vehicle use ▪ Minimal level of service improvements due to reduced single occupant vehicles ▪ Safety and accommodation objectives are met for pedestrian and cyclist safety ▪	▪ Major capacity improvements ▪ Major level of service improvements ▪ Transit, pedestrian, and cyclist objectives are not met ▪ Intersection improvements may address safety issues through redesign and elimination of sight line issues ▪ Transit service may have to deal with bus stops in turn lanes	▪ Widening improves capacity and level of service but at the expense of other modes. Widening only necessary from a capacity perspective, west of Angeline Street ▪ Longer pedestrian crossings if Colborne Street is widened ▪ Widening could result in increased vehicle speeds ▪ Potential for reduced safety due to added through lanes ▪ Transit, pedestrian, and cyclist objectives are not met ▪ No change to transit service
<u>Natural Environment</u> ▪ Vegetation ▪ Green Space ▪ Air Quality	▪ No impacts to vegetation, green spaces ▪ Air quality may be reduced due to increased congestion	▪ No impacts to natural environment ▪ Reduction in single occupant vehicles and improved transit will reduce overall emissions which should lead to minor improvements to air quality	▪ No impacts to vegetation unless boulevard is used for multi-use path ▪ Air quality may experience minor improvement due to reduced congestion	▪ Some impacts to vegetation, aquatic habitat, surface water and green spaces if turning lane improvements require boulevard or additional property ▪ Air quality may experience minor improvement due to reduced congestion	▪ Major impacts to vegetation and green spaces ▪ Air quality may experience minor improvement due to reduced congestion, but may be offset with more pollutants from greater vehicle volumes
<u>Socio-Economic Impacts</u> ▪ Business Impacts ▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Archaeological / Cultural Heritage Resources ▪ Visual Aesthetics ▪ Accommodation of Planned Development	▪ Future congestion contributes to noise and air quality impacts ▪ No impact to residences, businesses, or institutions except where affected by congestion to gain access ▪ No impact to recreational facilities ▪ No impact to archaeological or cultural heritage features ▪ No change to aesthetics ▪ Planned development may not be achievable without improvements	▪ May potentially reduce some of the congestion, thus reducing noise impacts ▪ Potential for increased transit to improve access to institutional and recreational uses ▪ No impact to archaeological or cultural heritage features ▪ No change to aesthetics ▪ Planned development may not be achievable relying on only TDM measures and improved transit	▪ May potentially reduce congestion, thus reducing noise and air quality impacts ▪ Potential for increased active transportation use to generate more business activity, and particularly more recreational activity ▪ No impact to archaeological or cultural heritage features ▪ Potential for improvements to aesthetics due to larger boulevards and multi-use pathways	▪ Will reduce congestion, thus reducing noise and air quality impacts ▪ Potential to generate more business and recreational activity by providing more capacity for people to reach destinations ▪ potential impact to archaeological or cultural heritage features ▪ Will impact aesthetics at intersections where improvements are necessary.	▪ Noise pollution may experience minor improvement due to reduced congestion, but may be offset by increased volume ▪ Potential to generate more business and recreational activity by providing more capacity for people to reach destinations ▪ Potential impact to archaeological or cultural heritage features ▪ Will impact aesthetics of corridors
<u>Engineering</u> ▪ Capital Costs ▪ Operating Costs ▪ Property Acquisition ▪ Utility Relocation	▪ No impacts to utilities ▪ No capital costs ▪ No change to operating costs ▪ No property acquisition	▪ No impacts to utilities except where new bus stop locations may be installed ▪ Some capital costs for transit fleet and route expansion ▪ No change to operating costs, potential for increased revenue ▪ No property acquisition	▪ Potential impacts to utilities where sidewalks will be widened or multi-use paths or bicycle lanes are constructed ▪ Some capital costs ▪ Minimal maintenance costs ▪ No property acquisition	▪ Potential impacts to utilities depending on the specific improvements required ▪ Capital costs depend on the improvements required ▪ Potential for increased maintenance costs ▪ Property acquisition dependant on improvements required	▪ Utility relocation probable ▪ High capital costs ▪ Increased maintenance costs ▪ Potential property acquisition
Recommendation	***Not Recommended***	***Recommended in Combination***	***Recommended in Combination***	***Recommended in Combination***	***Recommended in Combination***

Colour Scale Legend:

Preference

Least Preferred	*Not Preferred*	*Somewhat Preferred*	*Most Preferred*

6.1.5 Scugog River Bridge Crossing

As previously mentioned, a new crossing of the Scugog River is outside the limits of the Colborne Street study area; however, a new crossing will impact the corridor, specifically intersections along the corridors easterly end as well as nearby intersections peripheral to the study area. This section describes the implications of constructing a bridge crossing using 2031 forecasted traffic volumes even though the bridge crossing is not assumed to be a committed or planned improvement by 2031.

The location of a new bridge along Colborne Street was determined through the Council Report (Scugog River Bridge Crossing) dated September 22, 2015. Specifically, the resolution was that when crossing demands reach 26,800 vehicles per day, additional crossing capacity will be provided by a Colborne Street crossing of the Scugog River. Based on future traffic volume projections, this threshold could be reached around the year 2031.

The intersection on the Colborne Street corridor most affected by the presence of a new bridge would be the intersection of Colborne Street with William Street since new traffic will be attracted to this intersection. Two other intersections will be primarily impacted by the new crossing. The greatest impact is expected at the intersections of William Street and Wellington Street, as well as Lindsay Street and Wellington Street, since these intersections provide direct access to the Wellington Street bridge. The following analysis therefore focuses on these two intersections in addition to Colborne Street at William Street, when comparing the 'with bridge' and 'without bridge' scenarios.

Other intersections to the west along Colborne Street would also be impacted by a diversion of trips. Without the bridge, the northbound approaches at intersections along Colborne Street at Cambridge Street, Victoria Street, Sussex Street, and Albert Street are anticipated to operate with capacity deficiencies and poor level of service during the PM peak hour due to a strong attraction for vehicles to travel from the south-east to north-west (see **Section 4.3.2**). At the intersection of Colborne Street and William Street the northbound left-turn movement is expected to approach capacity with nearly 600 vehicles per hour and a volume to capacity ratio of 0.92 – and this already reflects a diversion of trips to the northbound approaches to the west of William Street (i.e. vehicles continue west along Wellington Street before turning north). Without the diversion, the demand for this movement would be over 600 vehicles per hour.

Providing a bridge at the east end of Colborne Street would likely divert these northbound approach volumes to the new Colborne Street bridge, and the traffic would then pass westbound through these intersections instead of adding demand to the minor northbound approaches. This diversion will provide an overall benefit for the corridor but is not driving the need for an additional crossing. For this reason these less critical intersections were not analyzed to quantify the benefits.

For this exercise the following assumptions were made for the intersection of Colborne Street at William Street:

- the east leg of the intersection continues over the Scugog River and connects Colborne Street West to Colborne Street East;
- the intersection of Colborne Street and William Street is signalized in the future scenario with a 90s cycle length. This is required with or without the bridge from an operational perspective. The projected volumes also meet the Ministry of Transportation of Ontario Book 12 signal warrant justification for projected volumes;
- the northbound and southbound approaches have exclusive left-turn lanes, and shared through-right turn lanes, and, the eastbound and westbound approaches have a shared through-left turn lane, and an exclusive right-turn lane.

In addition to the above, the following assumptions were made:

- background traffic as well as future development traffic will be rerouted or diverted due to the new crossing;
- the intersections of William Street and Wellington Street, as well as Lindsay Street and Wellington Street, will maintain the same cycle lengths and general timing parameters, as well as lane configurations; and,
- signal timing was optimized for all three intersections under each scenario.

A comparison of traffic volumes for the three intersections is shown in **Exhibit 6-1** for the two scenarios as well tabulated in **Table 6-2**.

Table 6-2: Scugog River Bridge Volume Comparison (Impacts of Diversion)

Location	Without Bridge	With Bridge	% Difference
Total Hourly Intersection Volume			
Colborne Street at William Street	1,860	2,320	+25%
William Street at Wellington Street	2,600	1,090	- 58%
Wellington Street at Lindsay Street	3,110	1,960	- 37%
Two-Way Hourly Volume			
Colborne Street Bridge	n/a	1,450	n/a
Wellington Street Bridge	2,100	670	- 68%

The traffic diversion as a result of the bridge being constructed along Colborne Street will attract 25% more traffic to the intersection of William Street and Colborne Street, which is expected. However, the total volumes at the two other intersections will decrease by -37% and -58%. The two-way volumes along the Wellington Street bridge will also be reduced by nearly -70%.

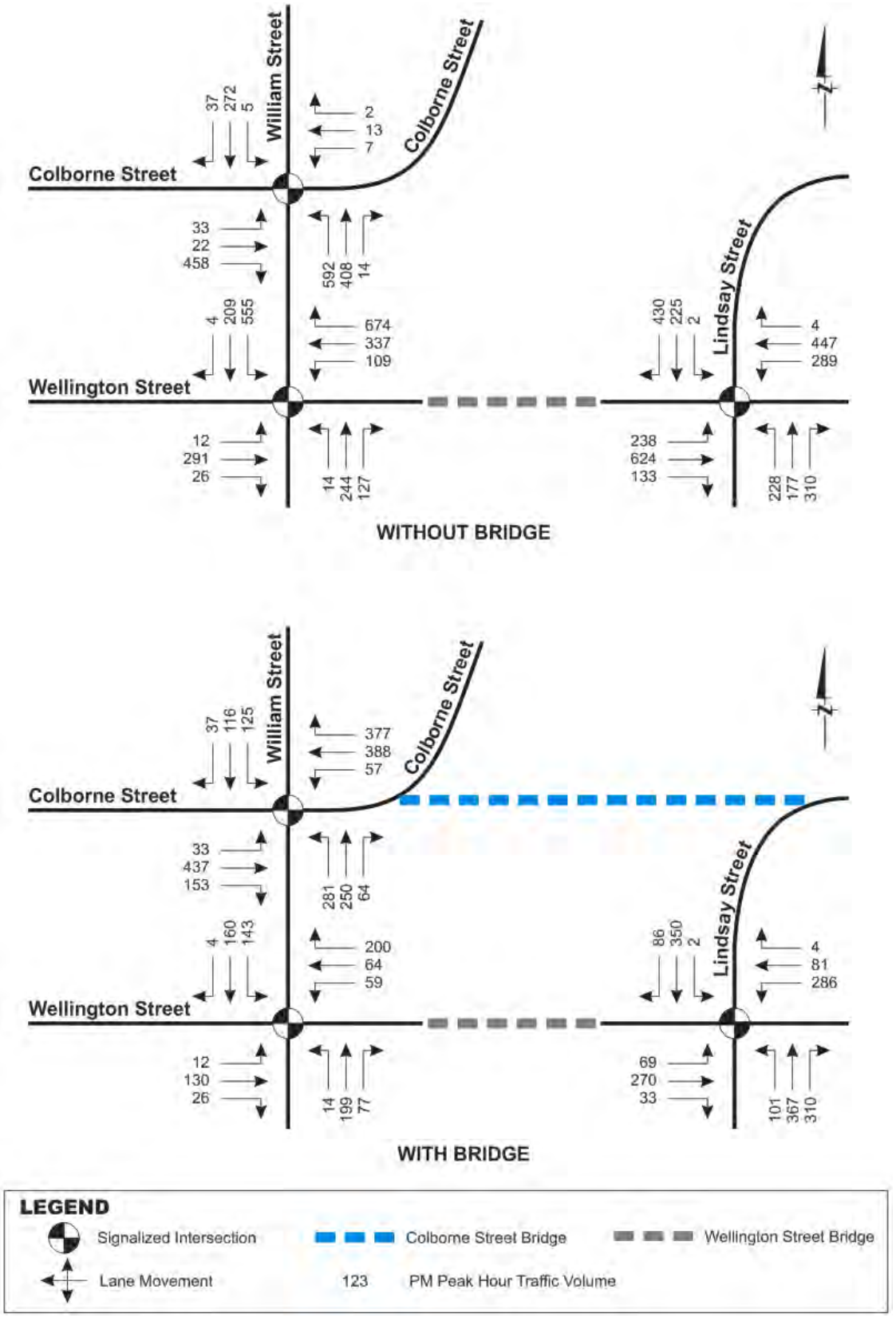


Exhibit 6-1: Scugog River Bridge Volume Comparison (Impacts of Diversion)

Operations for each scenario are summarized in **Table 6-3**.

Table 6-3: Scugog River Bridge (Colborne Street) Operations Comparison

Movement	Without Bridge		With Bridge	
	LOS	v/c	LOS	v/c
Colborne Street at William Street				
Overall	**C**	**0.86**	**C**	**0.93**
Eastbound Left-through	C	0.34	C	0.72
Eastbound Right-turn	C	0.37	B	0.17
Westbound Left-through	C	0.12	D	0.92
Westbound Right-turn	C	0.00	B	0.35
Northbound Left-turn	C	0.92	D	0.84
Northbound Through-right	A	0.38	C	0.55
Southbound Left-turn	C	0.03	D	0.76
Southbound Through-right	D	0.86	C	0.49
William Street at Wellington Street				
Overall	**F**	**1.63**	**C**	**0.46**
Eastbound Left-turn	D	0.16	C	0.07
Eastbound Through-right	F	1.16	D	0.54
Westbound Left-turn	C	0.33	C	0.16
Westbound Through-right	F	1.64	C	0.29
Northbound Left-turn	C	0.05	C	0.05
Northbound Through-right	D	0.82	C	0.58
Southbound Left-turn	F	1.34	B	0.27
Southbound Through-right	B	0.24	B	0.18
Wellington Street at Lindsay Street				
Overall	**F**	**1.24**	**C**	**0.86**
Eastbound Left-through	F	1.47	D	0.81
Eastbound Right-turn	B	0.11	C	0.02
Westbound Left-turn	F	1.41	C	0.82
Westbound Through-right	B	0.47	B	0.12
Northbound Left-turn	D	0.82	B	0.31
Northbound Through-right	D	0.87	D	0.91
Southbound Through-left	C	0.45	B	0.47
Southbound Right-turn	C	0.45	B	0.06

Note that the Wellington Street bridge demand without an additional crossing at Colborne Street is projected to be 2,100 vehicles during the PM peak hour (two-way volume). This is the approximate capacity of the bridge considering it is only one lane per direction and is metered by traffic signals on either side.

As shown in **Table 6-3**, although the bridge will add additional burden to the intersection of Colborne Street at William Street in the amount of 25% additional traffic volume, the overall level of service will remain 'C'. The overall volume to capacity ratio will be 0.93 which is an increase from 0.86 without the bridge at Colborne Street, but all movements will continue to operate with level of service 'D' or better and volume to capacity ratios of 0.92 or better. Overall the impact to this intersection remains within acceptable thresholds.

A comparison of the bridge volumes shows that the diversion resulted in the new Colborne Street bridge carrying 1,450 two-way hourly trips, and the existing Wellington bridge would be reduced to only 670 two-way hourly trips. This diversion is based on the most direct routes. Therefore, there is a tendency for traffic diversion to stabilize so that demand on both bridges is more equivalent. Despite how much traffic is diverted to the new crossing, both bridges would operate with additional capacity, whereas without the bridge the Wellington Street bridge appears to be reaching capacity by 2031 during the PM peak hour.

More importantly, the intersections of William Street at Wellington Street, and Wellington Street at Lindsay Street, will experience significant reductions in overall traffic volumes and major improvements to operations. Overall level of service for both intersections will be improved from 'F' to 'C', and all movements operating at capacity and with level of service 'F' will be improved to acceptable thresholds. Even if the bridge volumes do equalize and result in slightly higher traffic volumes at these two intersections, there will still be major improvements with only minimal impacts to the intersection of Colborne Street at William Street.

This analysis displays the benefit that can be attributed to a new crossing located at Colborne Street in terms of the broader context of overall crossing capacity and other surrounding intersections not directly within the Colborne Street or Kent Street study areas. It also indicates that despite additional traffic being attracted to the intersection of Colborne Street at William Street, this intersection will continue to operate within acceptable thresholds. In general, providing a more refined grid network will help disperse traffic throughout the road network, improving level of service.

7 EVALUATION OF ALTERNATIVE DESIGN CONCEPTS FOR PREFERRED SOLUTION

This section of the report provides a discussion on the development and evaluation of the design concepts considered for the corridor. These concepts further detail the type of improvements that support the balanced approach of providing active transportation, transit, and intersection improvements.

7.1 Development and Evaluation of Design Concepts

The existing Colborne Street corridor has different characteristics through the 2.7 km study area, including different land uses, cross-sections, and right-of-way widths. To address these varying characteristics and the preferred planning solution, the development and evaluation of design concepts for sections of the study area were required. They include:

1. Cross-section of Colborne Street:

   a) West of St. Joseph Road

      - *Option O*: Do Nothing
      - *Option 1*: Widen to four lanes, new sidewalk north side, 2 m sidewalk on both sides
      - *Option 2*: Widen to four lanes, 3 m multi-use path on both sides

   b) East of St. Joseph Road

      - *Option O*: Do Nothing
      - *Option 1*: 3-lane cross-section with centre two-way left-turn lane, multi-use path on both sides
      - *Option 2*: Widen to four lanes, multi-use path on both sides

   c) West of Angeline Street

      - *Option O*: Do Nothing
      - *Option 1*: Multi-use path on south side of street
      - *Option 2*: Multi-use path on south side of street. Exclusive eastbound right-turn lane.
      - *Option 3*: Widen to four lanes including exclusive eastbound left-turn lane. 1.2 m sidewalk on south side

   d) East of Angeline Street

      - *Option O*: Do Nothing

- *Option 1*: Increase sidewalk width on both sides, increase boulevard width on both sides, maintain parking lane on north side
- *Option 2*: Widen to three lanes with centre two-way left-turn lane, multi-use path on both sides of the street
- *Option 3*: Widen to four lanes, multi-use path on south side, sidewalk on north side

e) East of Victoria Street

- *Option O*: Do Nothing
- *Option 1*: Increase sidewalk width on north side, provide sidewalk on south side, boulevard on both sides, maintain parking lane on north side
- *Option 2*: Parking lane on north side, multi-use paths on both sides

f) West of Cambridge Street

- *Option O*: Do Nothing
- *Option 1*: Sidewalk (1.5 m) on south side, bike lanes on both sides
- *Option 2*: Parking lane and multi-use path on north side, 1.5 m sidewalk on south side
- *Option 3*: Parking lane on north side, 2 m sidewalks on both sides of the street

2. Improvements to the Angeline Street Intersection (Includes Angeline Street Widening):
   - *Option O*: Do Nothing
   - *Option A*: Turning lane improvements on Colborne (new exclusive eastbound and westbound right-turn lanes), plus widening to five lanes along Angeline Street including left-turn lanes)
   - *Option B*: Widening both Angeline and Colborne to five-lane cross section
3. Improvements to the Highway 35 Intersection (Includes Colborne Street Widening and Assumed Highway 35 Widening):
   - *Option O*: Do Nothing
   - *Option A*: Widening and improvements
4. Improvements to the Victoria Street Intersection:
   - *Option O*: Do Nothing
   - *Option A*: Geometric improvements

5. Sussex Street Intersection Improvements and Pedestrian Accommodation
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals
6. Albert Street Intersection Improvements and Pedestrian Accommodation
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals
7. William Street Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals, and geometric improvements
8. Cambridge Street Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Conversion to traffic signals
9. Walker Street Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Provide centre two-way left-turn lane along Colborne Street
10. Heritage Way Intersection Improvements
    - *Option O*: Do Nothing
    - *Option A*: Provide centre two-way left-turn lane along Colborne Street
11. Transit Network Improvements
    - *Option O*: Do Nothing
    - *Option A:* Route extensions or alterations, and new routes

Operations reflecting the recommended improvements are provided in **Appendix C.2**.

7.1.1 Evaluation Criteria

The evaluation of the design concepts required the development of evaluation criteria and the formulation of a methodology to evaluate these criteria. The evaluation criteria were developed based on impacts to the natural, social, economic and cultural environments and impacts on transportation. Using the evaluation criteria, where applicable, the advantages and disadvantages of each design concept were identified. The evaluation criteria used in the assessment include:

Transportation Service

- Level of Service
- Traffic Congestion and Delays
- Public Transit Service
- Accommodation of Pedestrians and Cyclists
- Traffic Safety

Socio-Economic Impacts

- Business Impacts
- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Archaeological / Cultural Heritage Impacts
- Visual Aesthetics
- Accommodation of Planned Development

Natural Environment

- Vegetation
- Green Space
- Air Quality

Engineering

- Capital Costs
- Operating Costs
- Property Acquisition
- Utility Relocation

The following sections provide details on the design concepts and identify the resulting recommendation.

7.1.2 Cross-section of Colborne Street

To address the planning solution to incorporate pedestrian and cycling facilities into the Colborne Street corridor, several options were considered for the varying cross-sections along Colborne Street, all accommodated within the existing right-of-way. Due to the variation in the existing cross-section, the corridor was segmented into four parts and options specific to each segment were developed and assessed. The segments where cross-sections were developed for Colborne Street are:

a) West of St. Joseph Road;
b) East of St. Joseph Road;
c) West of Angeline Street;
d) East of Angeline Street;
e) East of Victoria Street; and
f) West of Cambridge Street.

As of January 26, 2016, Council adopted the ***City of Kawartha Lakes Streetscape and Façade Design Guidelines – Lindsay Report***. The purpose of this document is to help develop a consistent aesthetic for specific areas and for the City as a whole, and to correct the apparent lack of identify within some of the Kawartha Lakes communities as identified through public consultation. The guidelines are catered towards non-residential areas and are instead geared towards Business Improvement Areas and tourist areas. Since Colborne Street is predominantly residential these guidelines may have less of an impact, but some of the guiding principles may be applied such as the implementation of consistent lighting standards or sidewalk and multi-use path paving.

Exhibit 7-1 to **Exhibit 7-6** illustrate the alternatives reviewed for each segment. The alternatives include providing wider sidewalks ranging from 1.5 m to 2.0 m in tandem with bicycle lanes, or 3.0 m multi-use paths which would accommodate both cyclists and pedestrians. The alternatives also consider adding lanes on Colborne Street to provide additional capacity. The evaluation of these options is discussed in **Table 7-1** through **Table 7-3**, and a technically preferred recommendation is provided for each segment.

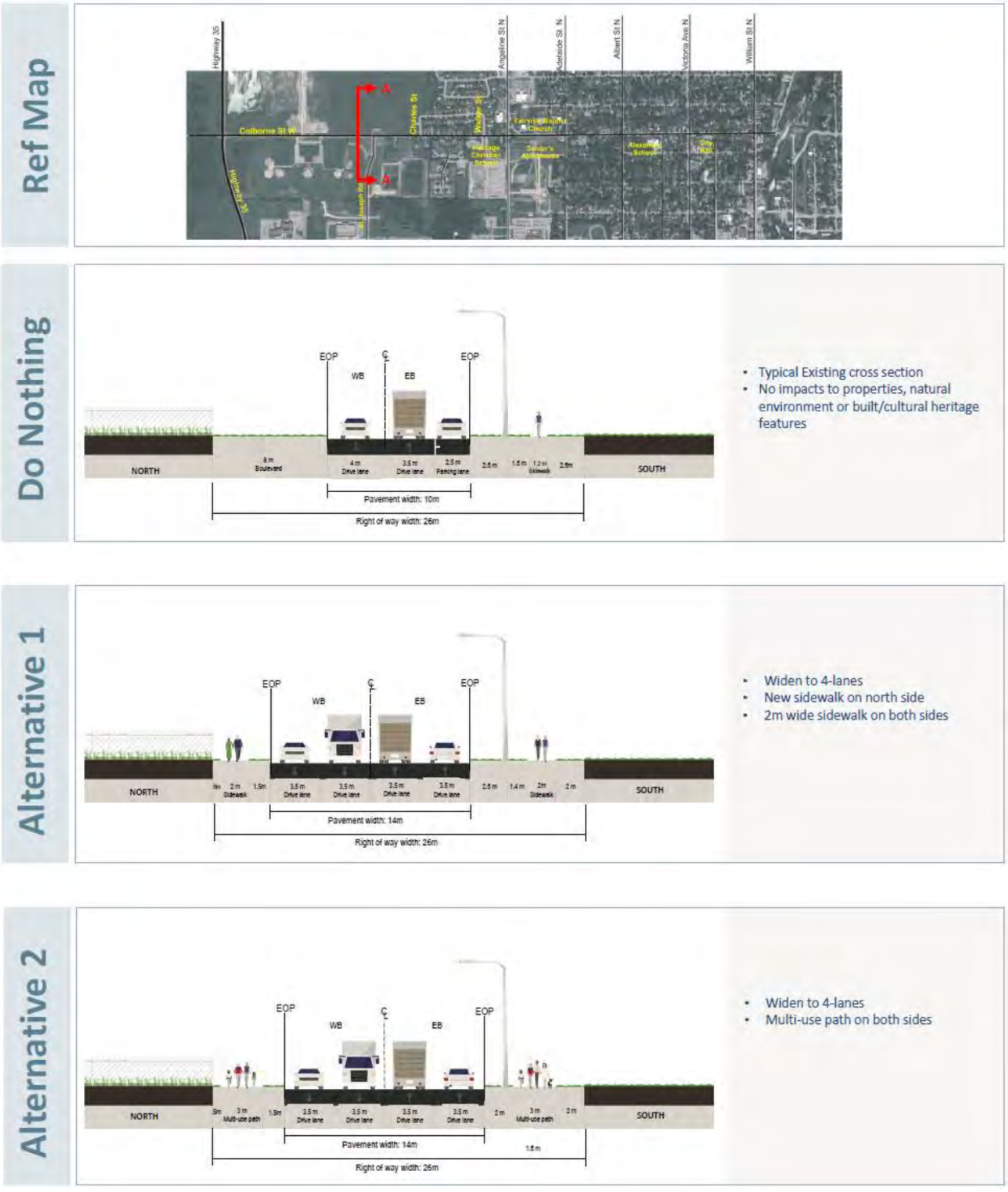


Exhibit 7-1: Segment A: Colborne Street - West of St. Joseph Road

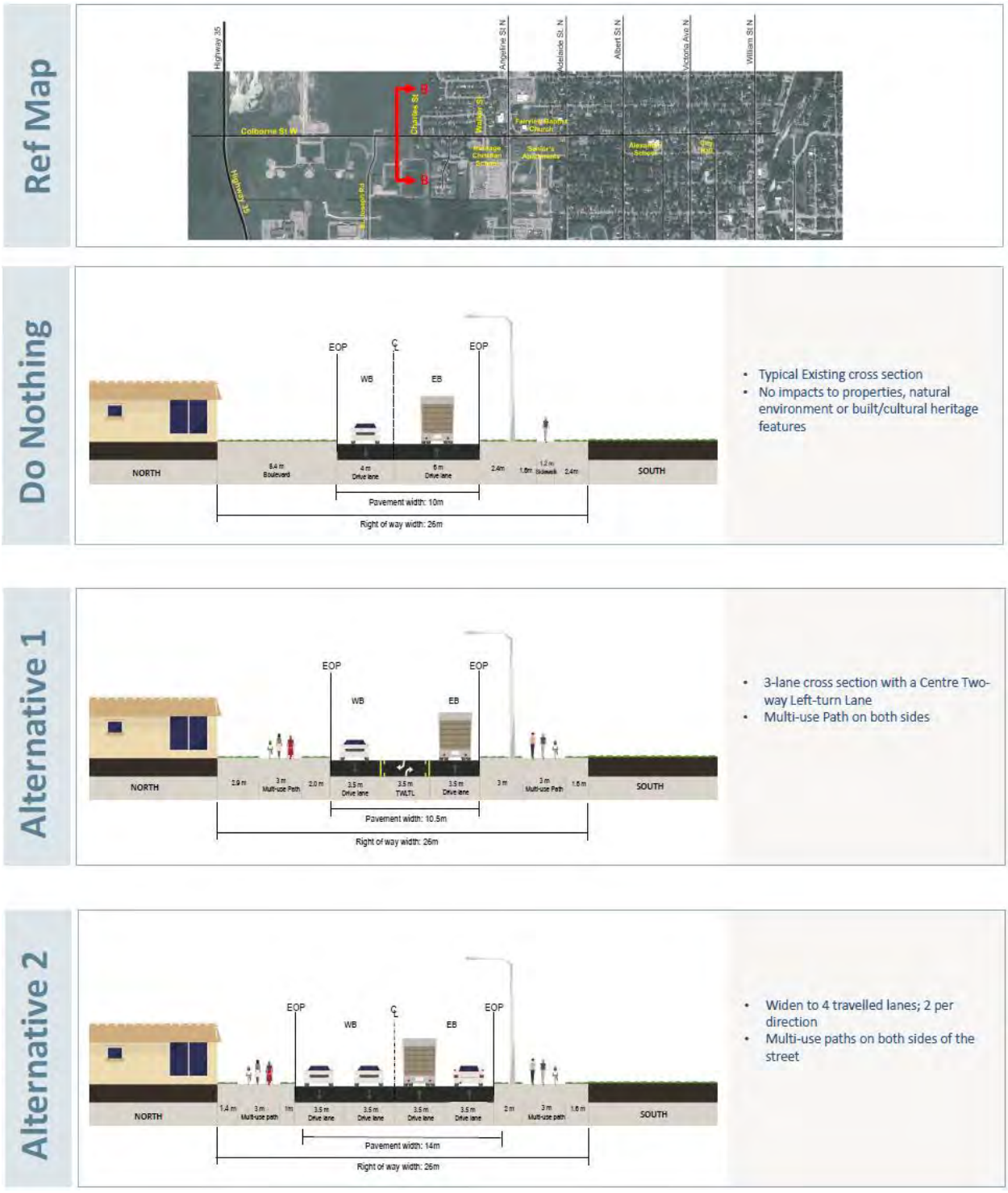


Exhibit 7-2: Segment B: Colborne Street – East of St. Joseph Road

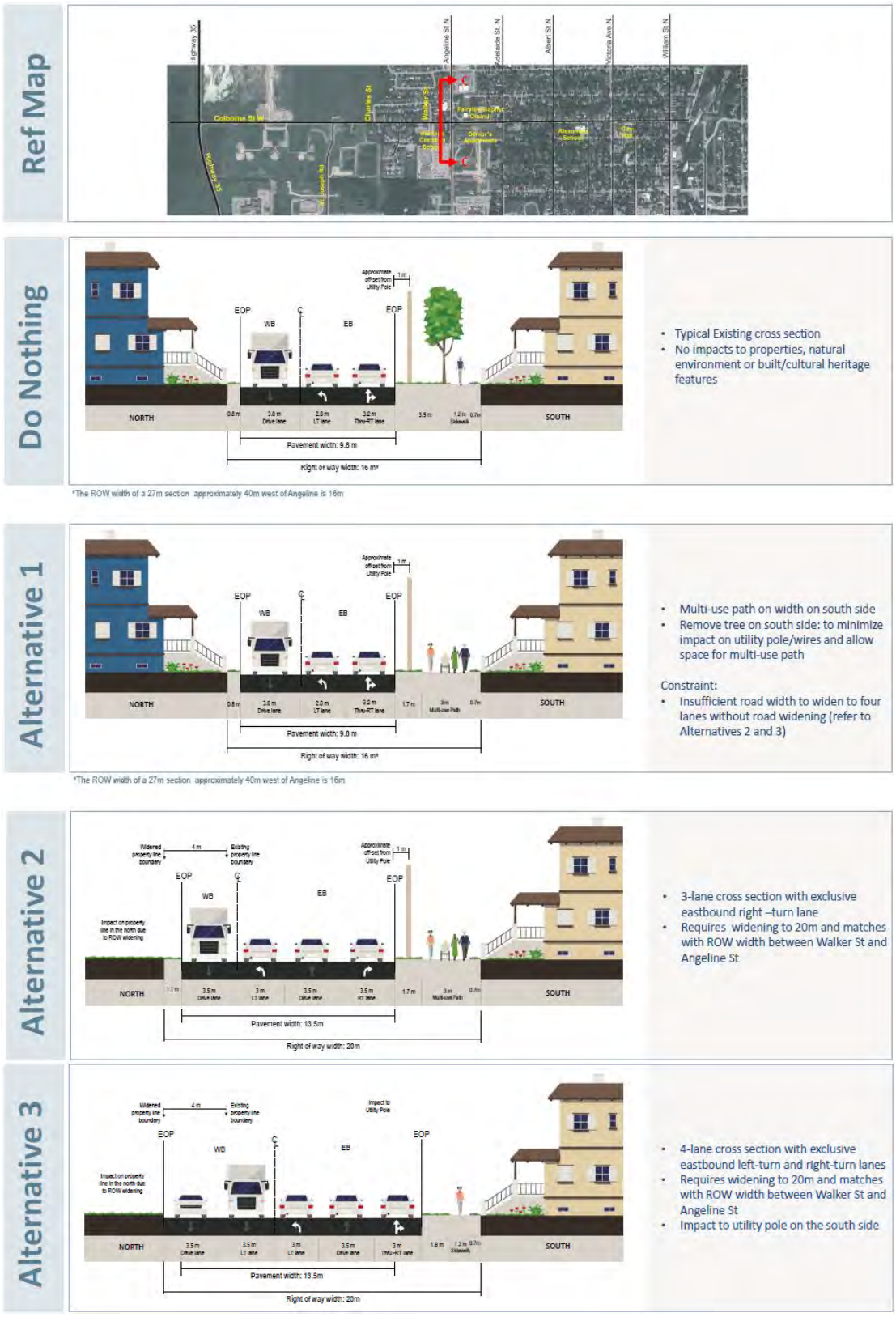


Exhibit 7-3: Segment C: Colborne Street - West of Angeline Street

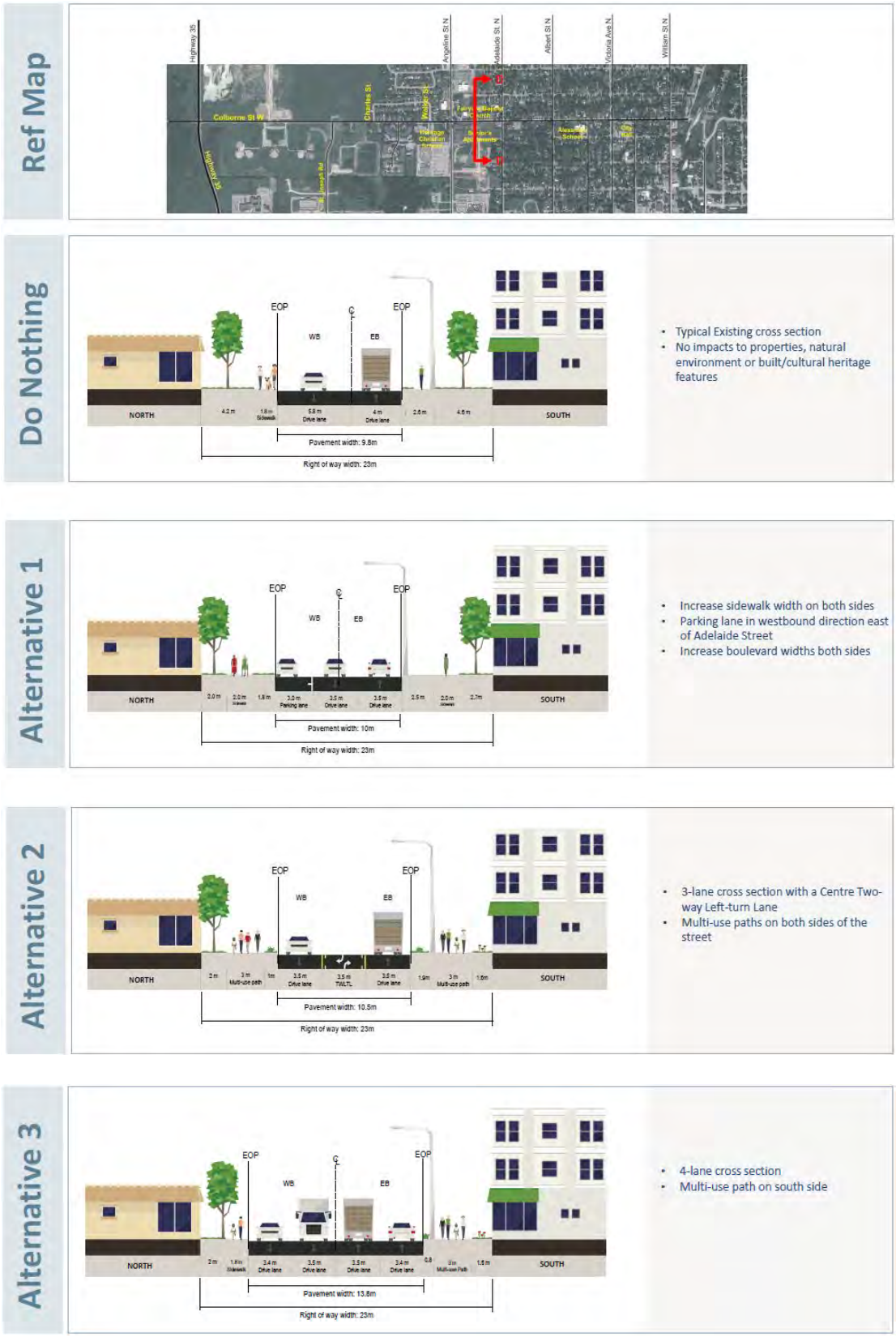


Exhibit 7-4: Segment D: Colborne Street – East of Angeline Street

Exhibit 7-5: Segment E1: Colborne Street – East of Victoria Street

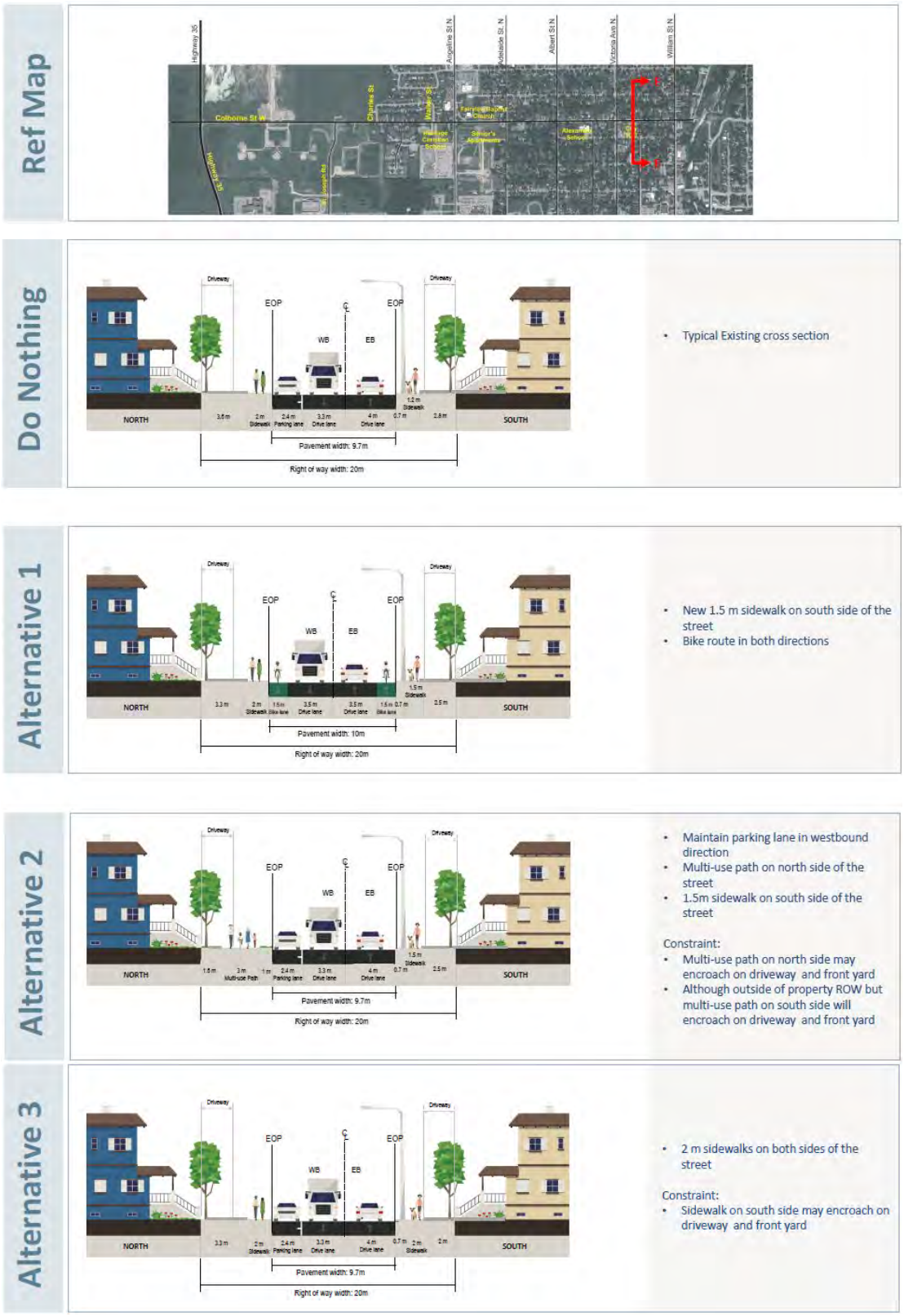


Exhibit 7-6: Segment E2: Colborne Street – West of Cambridge Street

Table 7-1: Evaluation of Alternative Cross-Section of Colborne Street (West of St. Joseph)

Criteria	OPTION O Do Nothing	OPTION 1 - Widen to four lanes - New sidewalk on north side (2 m) - Increase south side sidewalk width to 2 m	OPTION 2 - Widen to four lanes - 3-m Multi-use path on both sides
Transportation			
Level of Service and Capacity	▪ Insufficient roadway capacity by 2031	▪ Will accommodate future traffic volumes	▪ Will accommodate future traffic volumes
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard. No sidewalk on north side	▪ Pedestrian accommodation improved through sidewalk widening ▪ Pedestrian accommodation improved on north side with new sidewalk	▪ Pedestrian accommodation improved with multi-use paths ▪ Pedestrian accommodation on north side due to new multi-use path
Accommodation of Cyclists	▪ No change to existing conditions. Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room ▪ Also accommodated on north side	▪ Cycling is accommodated on both sides of the road due to the multi-use paths
Socio-Economic Impacts			
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Accommodation of Planned Development	▪ Cannot accommodate development of NW Quadrant without capacity deficiencies	▪ Can accommodate NW Quadrant	▪ Can accommodate NW Quadrant
Engineering			
Capital and Operating Costs	▪ No costs	▪ Capital cost of less than $1,047,250	▪ Capital cost of approximately $1,047,250
Property Acquisition	▪ No change	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation
- Traffic Safety
- Public Transit Service

Natural Environment
- Vegetation
- Air Quality

Socio-Economic Impacts
- Resident Impacts
- Business Impacts
- Archaeological / Cultural Heritage Resources
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise

Table 7-2: Evaluation of Alternative Cross-Section of Colborne Street (East of St. Joseph Road)

Criteria	OPTION O Do Nothing	OPTION 1 - 3-lane cross-section with centre two-way left-turn lane - Multi-use path on both sides	OPTION 2 - Widen to four lanes - Multi-use path on both sides
Transportation			
Level of Service and Capacity	▪ Insufficient roadway capacity by 2031	▪ Will accommodate future traffic volumes	▪ Will accommodate future traffic volumes
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard	▪ Pedestrian accommodation improved with multi-use paths ▪ Pedestrian accommodation on north side due to new multi-use path	▪ Pedestrian accommodation improved with multi-use paths ▪ Pedestrian accommodation on north side due to new multi-use path
Accommodation of Cyclists	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cycling is accommodated on both sides of the road due to the multi-use paths	▪ Cycling is accommodated on both sides of the road due to the multi-use paths
Public Transit Service	▪ No Impacts	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home
Socio-Economic Impacts			
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new multi-use paths and potential streetscaping	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Engineering			
Property Acquisition	▪ No impact	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts
▪ Traffic Safety	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development

Table 7-3: Evaluation of Alternative Cross-Section of Colborne Street (West of Angeline Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Maintain 3-lane cross-section - Multi-use path on south side	OPTION 2 - 2-lane cross-section with exclusive turning lanes on Colborne Street - Multi-use path on south side	OPTION 3 - Widen to four lanes - Sidewalk on south side
Transportation				
Level of Service and Capacity	▪ Insufficient roadway capacity by 2031	▪ Insufficient roadway capacity by 2031	▪ Will accommodate future traffic volumes	▪ Will accommodate future traffic volumes ▪ Will invite potentially more through traffic
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard	▪ Pedestrian accommodation improved through provision of multi-use path on south side	▪ Pedestrian accommodation improved through provision of multi-use path on south side	▪ No change to existing conditions. Sidewalk widths are currently substandard
Accommodation of Cyclists	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cyclists will be accommodated on the mutli-use path on the south side	▪ Cyclists will be accommodated on the mutli-use path	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk
Natural Environment				
Vegetation	▪ No impacts	▪ One tree to be removed on the south side	▪ One tree to be removed on the south side	▪ One tree to be removed on the south side
Socio-Economic Impacts				
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ No impacts
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ No impacts
Engineering				
Capital and Operating Costs	▪ No costs	▪ Low cost increase	▪ Relatively high cost increase	▪ Relatively high cost increase
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ More utility relocations will be required	▪ More utility relocations will be required
SUMMARY	**Not Preferred**	**Not Preferred**	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Traffic Safety	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development	▪ Property Acquisition

Table 7-4: Evaluation of Alternative Cross-Section of Colborne Street (East of Angeline Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Increase sidewalk width to 2.0m on both sides - Maintain parking on north side of street, east of Adelaide Street - Increased boulevard widths	OPTION 2 - Widen to 3-lane cross-section with centre two-way left-turn lane - Multi-use paths on both sides	OPTION 3 - Widen to four lanes - Multi-use paths on south side
Transportation				
Level of Service and Capacity	▪ Roadway will provide poor level of service	▪ Roadway will provide poor level of service	▪ Improved level of service with centre two-way left-turn lane	▪ Improved level of service with widening to four lanes
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard on south side	▪ Pedestrian accommodation improved through sidewalk widening	▪ Pedestrian accommodation improved with multi-use paths	▪ Pedestrian accommodation improved with multi-use path on south side only
Accommodation of Cyclists	▪ Sidewalk widths are currently substandard so even more challenging to ride bicycle on sidewalk	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room	▪ Cycling is accommodated on both sides of the road in multi-use paths	▪ Cycling is accommodated on south side of the road in multi-use path
Public Transit Service	▪ No Impacts	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home. South side only.
Natural Environment				
Vegetation	▪ No impacts	▪ One tree to be removed on the south side	▪ Multiple trees may need to be removed on both sides	Multiple trees may need to be removed on both sides
Socio-Economic Impacts				
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use paths and potential streetscaping	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Engineering				
Capital and Operating Costs	▪ No costs	▪ Low cost increase	▪ Intermediate cost increase	▪ High cost increase
Property Acquisition	▪ No impact	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way	▪ Will require property on both sides if boulevards need to be within the public right-of-way
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**PREFERRED**	**Not Preferred**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts
▪ Traffic Safety	▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development

Table 7-5: Evaluation of Alternative Cross-Section of Colborne Street (East of Victoria Street)

Criteria	OPTION O	OPTION 1	OPTION 2
	Do Nothing	**- Sidewalk on both sides with a width of 2.0m. - Maintain parking on north side of street - Boulevard on both sides of the street**	**- Maintain parking lane on north side of the street - Multi-use paths on both sides of the street**
Transportation			
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk widths are currently substandard on south side	▪ New sidewalk provided on south side of road ▪ Sidewalks widened	▪ Pedestrian accommodation improved with multi-use paths on both sides of the road
Accommodation of Cyclists	▪ Sidewalk only provided on the north side of the road	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room	▪ Cycling is accommodated on both sides of the road in multi-use paths
Public Transit Service	▪ No Impacts	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home
Socio-Economic Impacts			
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living
Visual Aesthetics	▪ No change	▪ Improved aesthetics through new sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use paths and potential streetscaping
Engineering			
Capital and Operating Costs	▪ No costs	▪ Low cost increase	▪ Intermediate cost increase
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Traffic Safety ▪ Level of Service and Capacity	▪ Vegetation ▪ Air Quality	▪ Business Impacts ▪ Archaeological / Cultural Heritage Resources ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development	▪ Property Acquisition

Table 7-6: Evaluation of Alternative Cross-Section of Colborne Street (West of Cambridge Street)

Criteria	OPTION O Do Nothing	OPTION 1 - Widen sidewalk on south side (1.5 m), sidewalk on north side to remain (2 m) - Bicycle lanes in both directions	OPTION 2 - Maintain parking lane on north side of the street - Multi-use path on north side - Widen sidewalk on south side (1.5 m)	OPTION 3 - Maintain parking lane on north side of the street - 2 m sidewalks on both sides of the street
Transportation				
Accommodation of Pedestrians	▪ No change to existing conditions. Sidewalk width on south side is currently substandard	▪ Pedestrian accommodation improved through sidewalk widening on the south side	▪ Pedestrian accommodation improved with multi-use path on north side ▪ Pedestrian accommodation improved through sidewalk widening on the south side	▪ Pedestrian accommodation improved through sidewalk widening
Accommodation of Cyclists	▪ No impacts	▪ Bicycles accommodated in bicycle lanes	▪ Cycling is accommodated on north side of the road in multi-use path	▪ Cycling not recommended on sidewalk; however, children on bicycles and seniors on scooters will have a little more room
Public Transit Service	▪ No Impacts	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home	▪ Multi-use path will improve accommodation for pedestrians waiting for transit (including those on scooters) and will improve access to transit from the surrounding residences and seniors home	▪ Increased sidewalk width will improve accommodation for pedestrians waiting for transit and will improve access to transit from the surrounding residences and seniors home
Socio-Economic Impacts				
Resident Impacts	▪ No impacts	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living ▪ Parking will still be provided on-street	▪ Improved pedestrian facilities will help pedestrian traffic throughout the neighbourhood and will promote healthy living ▪ Parking will still be provided on-street
Visual Aesthetics	▪ No change	▪ Improved aesthetics through widened sidewalk and potential streetscaping improvement	▪ Improved aesthetics through new multi-use path and wider sidewalk and potential streetscaping	▪ Improved aesthetics through widened sidewalk and potential streetscaping improvement
Engineering				
Capital and Operating Costs	▪ No costs	▪ Intermediate cost increase	▪ Intermediate cost increase	▪ Low cost increase
Property Acquisition	▪ No impacts	▪ No impacts	▪ Multi-use path and sidewalk may encroach on driveways and front yards	▪ Sidewalk on south side may encroach on driveways and front yards
Utility Relocation	▪ No change	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening	▪ Minor utility relocation may be required if any poles are impeding multi-use path or sidewalk	▪ Minor utility relocation may be required if any poles are impeding the 2 m widening
SUMMARY	**Not Preferred**	**Not Preferred**	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation
- Traffic Safety
- Level of Service and Capacity

Natural Environment
- Vegetation
- Air Quality

Socio-Economic Impacts
- Business Impacts
- Archaeological / Cultural Heritage Resources
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development

7.1.3 Angeline Street at Colborne Street Intersection Improvement

Under future 2031 traffic conditions the additional traffic volumes will result in several movements at this intersection operating well beyond their capacity. Several geometric improvements will be necessary to accommodate the projected 2031 traffic volumes, including widening of Angeline Street from two to four through-lanes in each direction. The necessary intersection improvements are summarized below:

- widening along Angeline Street from a 3-lane cross-section including centre two-way left-turn lane, to 5-lane cross-section including centre two-way left-turn lane
- add exclusive eastbound right-turn lane
- add exclusive westbound right-turn lane

Currently the right-of-way on the west leg of the intersection is too narrow to accommodate the addition of an exclusive eastbound right-turn lane; however, through discussions with the City it appears that the south-west quadrant of the intersection may be redeveloped in the near future, providing the opportunity to purchase land to accommodate this improvement.

Table 7-7: Evaluation of Intersection Improvements (Colborne Street at Angeline Street)

Criteria	OPTION O Do Nothing	OPTION A - Widening along Angeline Street plus intersection improvements along Colborne Street	OPTION B - Widening both Angeline Street and Colborne Street to five lanes
Transportation			
Level of Service and Capacity	▪ Capacity deficiencies and poor level of service	▪ Improved level of service from added capacity along Angeline Street, and for specific movements along Colborne Street	▪ Improved level of service for both Angeline Street and Colborne Street
Traffic Safety	▪ High collisions will continue to occur	▪ Opportunity to address sight line issues and high collisions through re-design of intersection	▪ Opportunity to address sight line issues and high collisions through re-design of intersection
Accommodation of Pedestrians and Cyclists	▪ No sidewalk on north side west of Angeline	▪ Opportunity to incorporate new sidewalk or multi-use path on north side west of Angeline	▪ Opportunity to incorporate new sidewalk or multi-use path on north side west of Angeline
Socio-Economic Impacts			
Institutional and Recreational Facilities Impacts and Access	▪ No impacts	▪ Fairview Baptist Church driveway on Colborne Street may be impacted by the additional westbound right-turn lane but appears as though it can be shifted eastward	▪ Fairview Baptist Church driveway on Colborne Street may be impacted by the additional westbound right-turn lane but appears as though it can be shifted eastward
Residential Impacts	▪ No impacts	▪ Residential homes in the northwest and the apartment on the southeast quadrants will be impacted	▪ Residential homes in the northwest and the apartment on the southeast quadrants will be impacted
Engineering			
Property Acquisition	▪ No impacts	▪ Property will be required on both sides of the road ▪ Property will be required from both sides of the Fairview Baptist Church property to accommodate the westbound right-turn lane as well as the Angeline Street widening ▪ Property will be required form the property on the southwest quadrant of the intersection. Although this property is expected to be redeveloped in the near future	▪ Most property required on both sides of the road ▪ Property will be required from both sides of the Fairview Baptist Church property to accommodate the westbound right-turn lane as well as the Angeline Street widening ▪ Property will be required form the property on the southwest quadrant of the intersection. Although this property is expected to be redeveloped in the near future
Utility Relocation	▪ No impacts	▪ Utilities will have to be moved to accommodate the widening of Angeline Street as well as the additional right-turn lanes along Colborne Street	▪ More utilities will have to be moved to accommodate the widening of Angeline Street as well as the widening of Colborne Street
SUMMARY	**Not Preferred**	**CARRY FORWARD to FUTURE ANGELINE STREET CLASS EA**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Public Transit Service	▪ Vegetation ▪ Air Quality	▪ Archaeological / Cultural Heritage Resources ▪ Visual Aesthetics ▪ Accommodation of Planned Development ▪ Traffic Noise ▪ Business Impacts	▪ Operating Costs ▪ Capital Costs

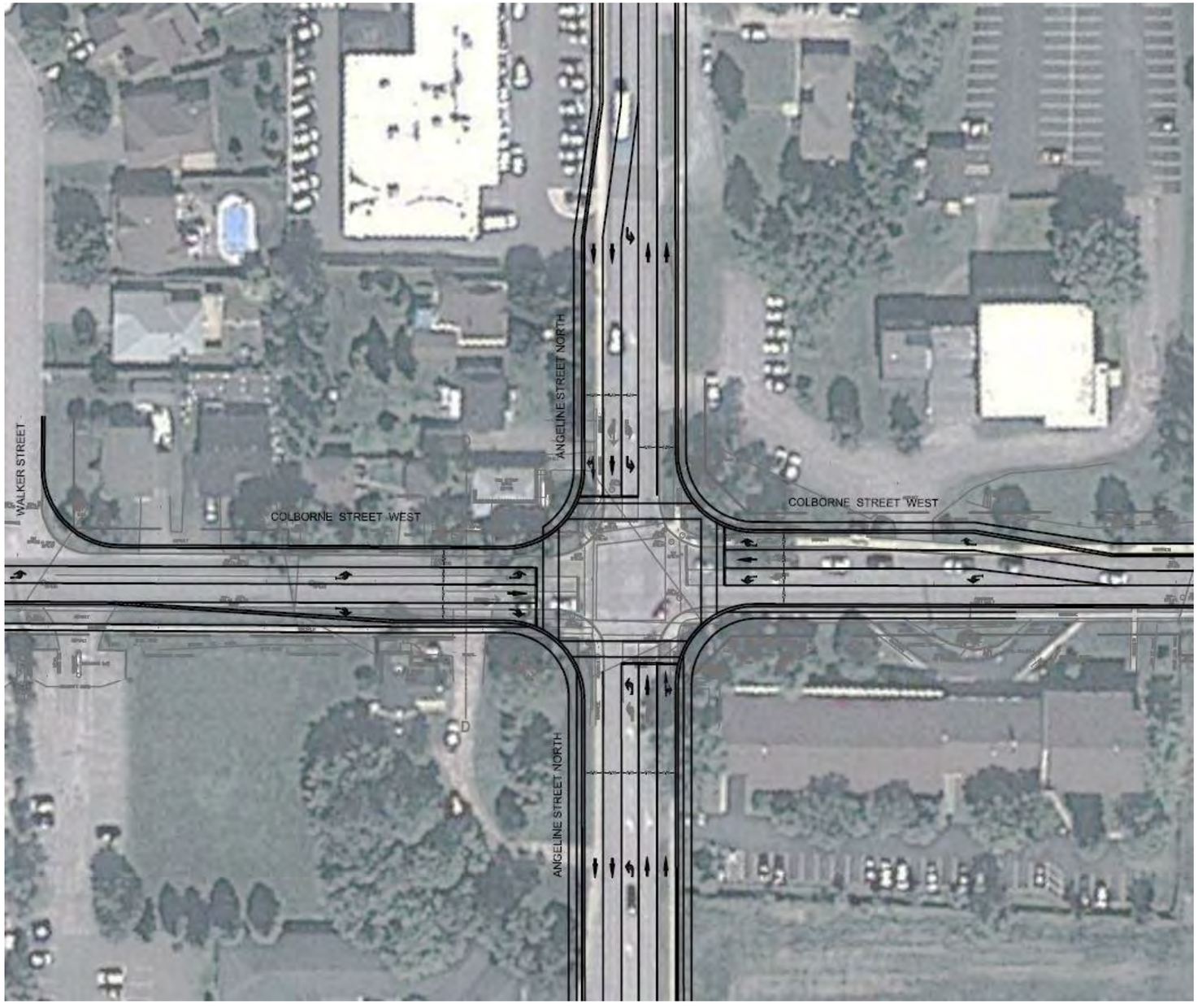


Exhibit 7-7: Conceptual Design of Preferred Colborne Street / Angeline Street Intersection Improvements

7.1.4 Sussex Street Intersection Improvements

There is currently a pedestrian crosswalk on the west side of the intersection which is not signalized; however, a crossing guard supervises the crossing during peak times when student pedestrian volumes are highest (morning and after school). Furthermore, under future 2031 traffic conditions the northbound approach at this intersection will be operating with level of service 'F' and with a volume to capacity ratio well beyond 1.0.

Options for this intersection include signalization to provide acceptable operations and level of service, and also to improve crossing conditions, particularly when a crossing guard is not present. Signalization of this intersection would compete with signalization of the Albert Street intersection due to proximity, and is less preferred since the distance to Victoria Street is only 125 m. If Sussex Street is not signalized with preference to a new signal at Albert Street, then it is likely that vehicles on the northbound approach will utilize Albert Street where level of service for minor approaches will be better. Furthermore, a traffic signal at Albert Street would serve northbound and southbound traffic whereas Sussex Street is a "T" intersection, and thus Albert Street would provide benefit to a higher volume of traffic.

Table 7-8: Sussex Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Conversion to Traffic Signal
Transportation		
Level of Service and Capacity	▪ No impacts	▪ Would produce acceptable operations and level of service; however, spacing to Victoria Street is not ideal.
Traffic Safety	▪ None	▪ Improves safety by providing safe gaps for side street vehicles; however, a signal at Albert street would benefit more vehicles and could divert vehicles from Sussex Street.
Accommodation of Pedestrians	▪ None	▪ Improves safety by providing a safe crossing location and crossing time for pedestrians
Engineering		
Capital Costs	▪ No costs	▪ High
Operating Costs	▪ No costs	▪ Higher
Utility Relocation	▪ No impacts	▪ Some utilities may need to be moved or upgraded
SUMMARY	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists ▪ Public Transit	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition

7.1.5 Albert Street Intersection Improvements

There is currently no pedestrian accommodation at Albert Street. North-south streets are stop-controlled but vehicles along Colborne Street are free-flow. This does not allow for safe north-south crossing. According to discussions with residents and City staff, older students cross at Albert Street in contrast to the younger students at Sussex Street where there is currently a crossing guard during peak times. Furthermore, under future 2031 traffic conditions the northbound and southbound approaches at this intersection will be operating with level of service 'F' and with volume to capacity ratios well beyond 1.0. Options for this intersection include signalization to provide acceptable operations and level of service, and also to facilitate safe crossing. Signalization of this intersection would compete with signalization of the Sussex Street intersection due to proximity.

Table 7-9: Albert Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Conversion to Traffic Signal
Transportation		
Level of Service and Capacity	▪ No impacts	▪ Would produce acceptable operations and level of service
Traffic Safety	▪ None	▪ Improves safety by providing safe gaps for side street vehicles
Accommodation of Pedestrians	▪ None	▪ Improves safety by providing a safe crossing location and crossing time for pedestrians
Engineering		
Capital Costs	▪ No costs	▪ High
Operating Costs	▪ No costs	▪ Higher
Utility Relocation	▪ No impacts	▪ Some utilities may need to be moved or upgraded
SUMMARY	**Not Preferred**	**PREFFERED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	**Natural Environment**	**Socio-Economic Impacts**	**Engineering**
▪ Accommodation of Cyclists ▪ Public Transit	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition

7.1.6 Highway 35 Intersection Improvements

The intersection of Colborne Street at Highway 35 will have several movements operating with volume to capacity ratios greater than 1.0 and with poor level of service under 2031 conditions. The necessary geometric improvements are listed bellow:

- Separate eastbound left-through-right movement into an exclusive left-turn, and through-right-turn lane.
- Separate westbound left-through-right movement into an exclusive left-turn lane, through lane, and through-right lane. Would be in combination with Colborne Street widening west of St. Joseph Road.
- Additional through lane along Highway 35 in both directions.

Table 7-10: Highway 35 Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Geometric Improvements plus Colborne Street Widening and Highway 35 Widening
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would result in acceptable level of service and volume to capacity ratios
Engineering		
Capital Costs	▪ No costs	▪ High
Property Acquisition	▪ None	▪ Some property may need to be acquired
Operating Costs	▪ Lower	▪ Higher
Utility Relocation	▪ No impacts	▪ Existing utilities may have to be moved
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation

- Accommodation of Pedestrians and Cyclists
- Public Transit
- Traffic Safety

Natural Environment

- Aquatic Habitat
- Surface Water
- Vegetation
- Air Quality

Socio-Economic Impacts

- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development
- Business Impacts
- Visual Aesthetics
- Archaeological / Cultural Heritage Resources

7.1.7 William Street Intersection Improvements

The intersection of Colborne Street at William Street will have several movements operating with volume to capacity ratios greater than 1.0 and with poor level of service. Currently, all approaches have shared left-through-right turn lanes. The necessary geometric improvements are listed below, and would be required in combination with signalization of the intersection:

- Eastbound and westbound approaches: left-through lane, plus right-turn lane.
- Northbound and southbound approaches: exclusive left-turn lanes with storage, plus shared through-right turn lane.

Table 7-11: William Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Signalization plus Geometric Improvements
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would result in acceptable level of service and volume to capacity ratios
Engineering		
Capital Costs	▪ No costs	▪ High
Property Acquisition	▪ None	▪ Some property may need to be acquired
Operating Costs	▪ Lower	▪ Higher
Utility Relocation	▪ No impacts	▪ Existing utilities may have to be moved
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation

- Accommodation of Pedestrians and Cyclists
- Public Transit
- Traffic Safety

Natural Environment

- Aquatic Habitat
- Surface Water
- Vegetation
- Air Quality

Socio-Economic Impacts

- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development
- Business Impacts
- Visual Aesthetics
- Archaeological / Cultural Heritage Resources

7.1.8 Victoria Street Intersection Improvements

The intersection of Colborne Street at Victoria Street will operate with the eastbound approach operating with a volume to capacity ratio of 1.0 and the northbound left-turn operating with level of service 'F'. Separation of the eastbound left from the through-right movement, by providing an exclusive eastbound left-turn lane would mitigate these deficiencies. Since the cross-section of Colborne Street in this section includes a parking lane, part of the parking lane could be used to accommodate the left-turn lane.

Table 7-12: Victoria Street Intersection Improvements

Criteria	OPTION O Do Nothing	OPTION A Add Eastbound Left-turn Lane
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would result in acceptable level of service and volume to capacity ratios
Engineering		
Capital Costs	▪ No costs	▪ Low
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation

- Accommodation of Pedestrians and Cyclists
- Public Transit
- Traffic Safety

Natural Environment

- Aquatic Habitat
- Surface Water
- Vegetation
- Air Quality

Socio-Economic Impacts

- Resident Impacts
- Institutional and Recreational Facilities Impacts and Access
- Traffic Noise
- Accommodation of Planned Development
- Business Impacts
- Visual Aesthetics
- Archaeological / Cultural Heritage Resources

Engineering

- Property Acquisition
- Operating Costs
- Utility Relocation

7.1.9 Cambridge Street Improvements

The intersection of Cambridge Street at Colborne Street will operate with the minor northbound approach operating with level of service 'F' and a volume to capacity ratio above 1.0, if the traffic signal at William Street is not installed. However, if the William Street traffic signal is installed, the volume to capacity ratio for the northbound approach at Cambridge Street will be less than 1.0, and level of service will be acceptable, due to the forced gaps in traffic along Colborne Street as a result of the signal to the east.

Furthermore, northbound left-turning vehicles at this intersection are projected to be in the magnitude of 164 vehicles per hour; over 100 of which are new vehicle volumes on top of the existing condition and a large majority are comprised of vehicles by-passing the intersection of William Street and Colborne Street (refer to **Section 6.1.5**) and using Cambridge Street as an alternative. If only 60 of these new vehicles were diverted to the signalized intersection at Victoria Street, then the northbound approach at both Victoria Street and Cambridge Street would be operating with acceptable level of service and with volume to capacity ratios of less than 1.0. It seems very likely that the minor street approach volumes at this intersection are exaggerated due to the reassignment discussed in **Section 6.1.5** and that diversion to Victoria Street is very plausible considering the remaining capacity for that movement.

Assuming the William Street traffic signal is not installed and northbound left-turning vehicles are not diverted to Victoria Street, the potential mitigation measures include signalization. Signalization is not ideal due to proximity to Victoria Street.

Table 7-13: Cambridge Street Improvements

Criteria	OPTION O Do Nothing	OPTION A Signalization
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes unless there is diversion to Victoria Street	▪ Would improve level of service and volume to capacity ratios for northbound approach. Spacing to Victoria Street is not ideal. It is likely that northbound left-turns would be diverted to Victoria Street where there will be capacity.
Engineering		
Capital Costs	▪ No costs	▪ Higher
SUMMARY	**PREFERRED**	**Not Preferred**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists and Pedestrians ▪ Public Transit ▪ Traffic Safety	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition ▪ Operating Costs ▪ Utility Relocation

7.1.10 Walker Street Improvements

The intersection of Walker Street at Colborne Street will operate with the minor southbound approach operating with level of service 'F' and a volume to capacity ratio above 1.0. Potential mitigation measures include provision of a centre two-way left-turn lane along Colborne Street to allow for two-stage left-turns from the minor street onto Colborne Street.

Table 7-14: Walker Street Improvements

Criteria	OPTION O Do Nothing	OPTION A Geometric improvements to provide a centre two-way left-turn lane
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would improve level of service and volume to capacity ratios for northbound approach
Engineering		
Capital Costs	▪ No costs	▪ Low
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists and Pedestrians ▪ Public Transit ▪ Traffic Safety	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development	▪ Property Acquisition ▪ Operating Costs ▪ Utility Relocation

	▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources

7.1.11 Heritage Way Improvements

The intersection of Heritage Way at Colborne Street will operate with the minor northbound approach operating with level of service 'F' and a volume to capacity ratio above 1.0. Potential mitigation measures include provision of a centre two-way left-turn lane along Colborne Street to allow for two-stage left-turns from the minor street onto Colborne Street.

Table 7-15: Heritage Way Improvements

Criteria	OPTION O Do Nothing	OPTION A Geometric improvements to provide a centre two-way left-turn lane
Transportation		
Level of Service and Capacity	▪ Will not accommodate future traffic volumes	▪ Would improve level of service and volume to capacity ratios for northbound approach
Engineering		
Capital Costs	▪ No costs	▪ Low
SUMMARY	**Not Preferred**	**PREFERRED**

The following criteria were also considered; however, no significant differences were found between the alternatives:

Transportation	Natural Environment	Socio-Economic Impacts	Engineering
▪ Accommodation of Cyclists and Pedestrians ▪ Public Transit ▪ Traffic Safety	▪ Aquatic Habitat ▪ Surface Water ▪ Vegetation ▪ Air Quality	▪ Resident Impacts ▪ Institutional and Recreational Facilities Impacts and Access ▪ Traffic Noise ▪ Accommodation of Planned Development ▪ Business Impacts ▪ Visual Aesthetics ▪ Archaeological / Cultural Heritage Resources	▪ Property Acquisition ▪ Operating Costs ▪ Utility Relocation

7.1.12 Transit Network Improvements

As discussed in **Section 3.2.2**, the current transit network is comprised of three routes shown in **Exhibit 3-5** (Green, Blue, and Red) which weave through the Town to provide as much coverage to the entire Town as is possible without adding additional routes. One drawback of this is that the headways are long (1 hour) for each route, not including route overlaps, and there is no direct east-west service.

North of Colborne Street only the Green Route provides service, while east of the Scugog River, service is only provided by the Blue Route. Since the routes weave so much to cover as much area as possible, there may be opportunities to improve the routes or to provide a new route with higher frequency and more direct service. This may be practical under existing conditions, given the ridership, but in the future it is likely that new routes and an increased fleet size would be appropriate especially considering new development in the Jennings Creek Development Plan Area north of Colborne and west of St. Joseph Road.

A new route option, shown in **Exhibit 7-8**, would provide much more direct service with a higher frequency and lower headway and would help link the Town to the commercial area along Kent Street near St Joseph Road as well as the planned commercial area north-west of Colborne Street / St Joseph Road.

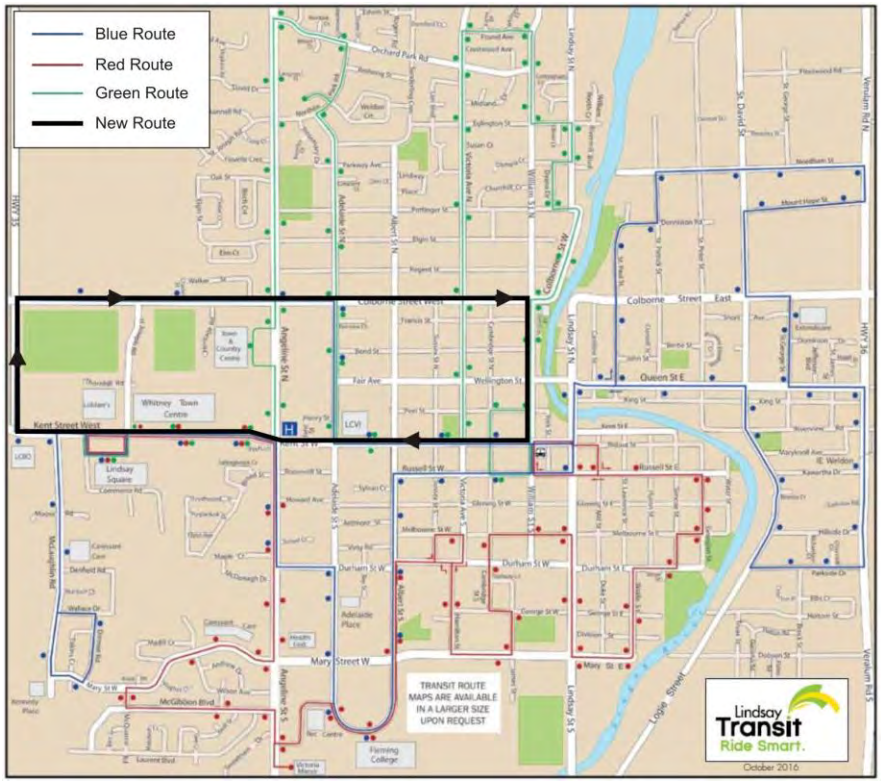


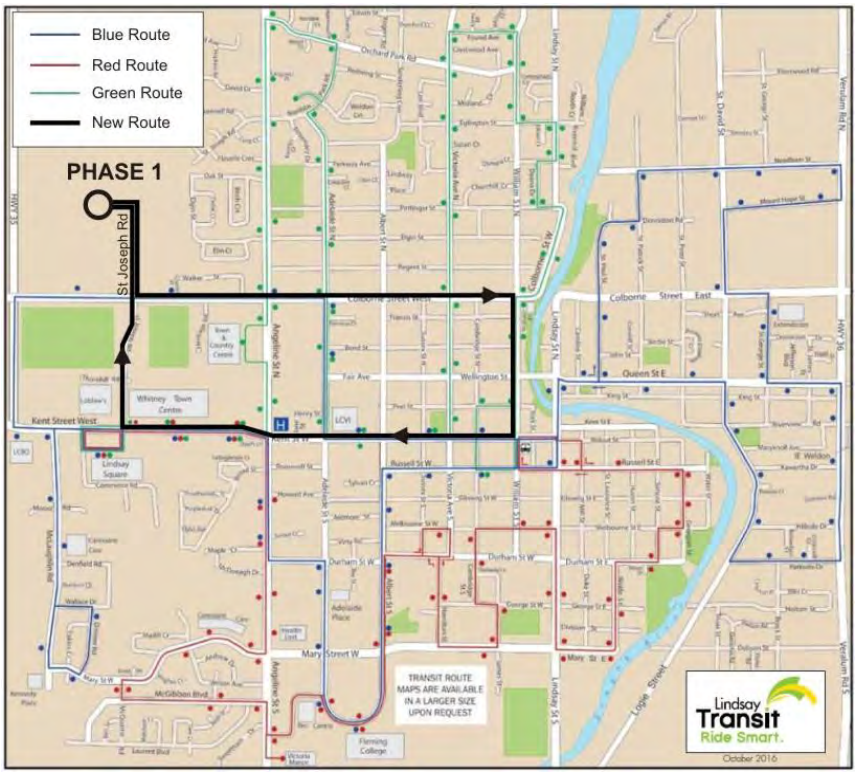
Exhibit 7-8: Potential New Bus Transit Loop Service

Existing routes could also be extended to provide connectivity to other transit services such as Peterborough GO.

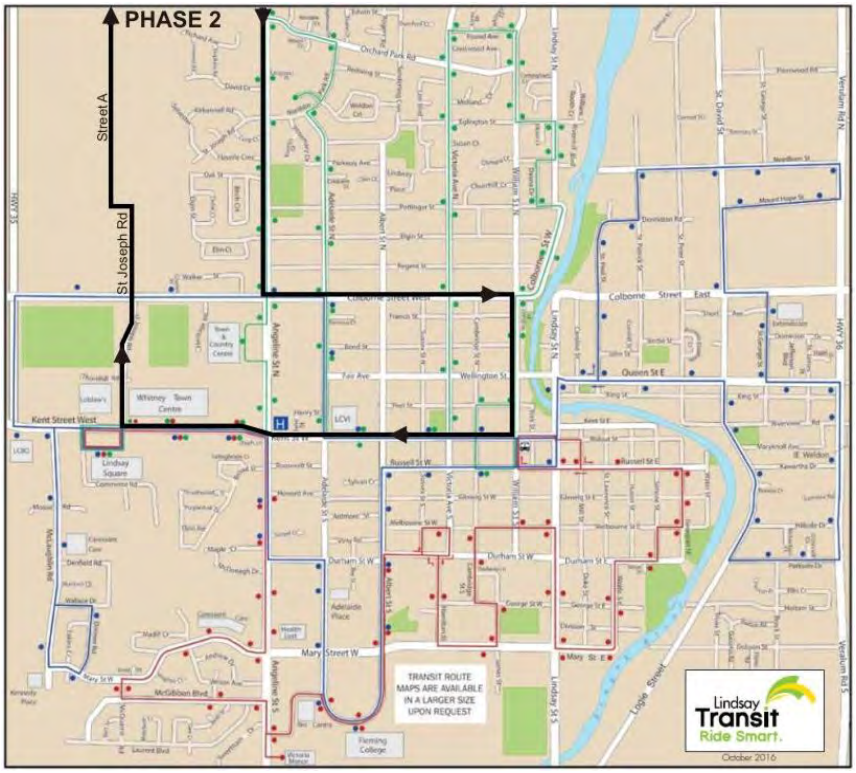
Given the planned commercial node to the north-west of the Colborne Street / St Joseph Road intersection, as well as the new residential development planned within the Jennings Creek Development Plan Area, there is also opportunity to extend the new route to the north to serve these development areas, while maintaining a more direct route structure that will provide more frequent service overall and primarily serve the core area (Colborne Street and Kent Street).

Since the commercial area will be developed before the remainder of Jennings Creek, the new route could be phased as shown in **Exhibit 7-9** with Phase 1 looping back within the commercial node. Phase 2 could continue through the commercial area, travel north along Street A to Jennings Creek SPA and loop back along Angeline Street.

The opportunity to expand transit goes beyond this corridor study and the EA process as a long term transit improvement and should be a city-wide strategic initiative that could be further explored within a Transit Strategy or Transit Master Plan, and would require further discussions with the Transit Board. Furthermore, since the ultimate street network layout for the Jennings Creek SPA is not yet determined, a more detailed study into the opportunities for connecting transit to the Jennings Creek SPA should be undertaken once the road fabric is determined.



Phase 1 (Commercial Area Loop)



Phase 2 (Jennings Creek SPA Route Extension)

Exhibit 7-9: Potential New Bus Transit Loop Service to Jennings Creek SPA

8 CONSULTATION

The consultation process and public input are key components of the Municipal Class EA process and is summarized in this section of the report. Consultation events and activities for the Colborne Street Schedule B Class EA and Corridor Study and the Kent Street Schedule B Class EA and Corridor Study were undertaken jointly. Additional details on the consultation process are contained in **Appendix B.**

8.1 Study Schedule

The study was initiated in August 2013. Key dates in the study were as follows:

- Notice of Study Commencement — September 5th, 2013
- First Stakeholder Meeting — September 17th, 2013
- First Public Open House — September 24th, 2013
- Second Stakeholder Meeting — November 28th, 2013
- Second Public Open House — December 5th, 2013
- Notice of Study Completion — November 2016
- Project File Report on Public Record — December 2016

8.2 Summary of Public Consultation Process

Consultation is a key aspect of the EA process. The ***Municipal Class Environmental Assessment*** (October 2000, as amended in 2007, 2011 and 2015) specifies the requirements for consultation for the various classes of EA. Under the ***Municipal Class Environmental Assessment***, the proponents of Schedule B Class EAs are required to conduct consultation at two points during the EA process:

- at the end of Phase 2 allowing the public and stakeholders the opportunity to provide input on the problem/opportunity and alternative solutions; and
- at the completion of the EA to allow the public and stakeholders to review the completed EA.

As per the ***Municipal Class Environmental Assessment***, each stage of consultation identified above is to be advertised by the publication of a Notice to the public. For Schedule B Class EAs, two published Notices are required for each

stage of consultation: a Notice of Commencement for the first stage; and a Notice of Completion for the second stage.

The City of Kawartha Lakes conducted a consultation program that exceeded the requirements of the ***Municipal Class Environmental Assessment*** including the required notifications, two public consultation events, and stakeholder meetings. The consultation program for the EA included the following components.

- **Newspaper advertisements** – The Notice of Study Commencement & Public Open House was published in the **Kawartha Lakes This Week** newspaper on September 5th, 2013 to announce the commencement of the EA and to invite interested members of the public to attend the first Public Open House. A Notice of Public Open House was published in the **Kawartha Lakes This Week** newspaper on November 28th, 2013 to invite interested members of the public to the second Public Open House. These public notices are provided in **Appendix B.**
- **Project e-mail mailing list –** Residents and interested parties who provided a valid e-mail address at Public Open House #1 or at other points during the study were added to the project e-mail mailing list. The Public Open House and Stakeholder notices were distributed to this e-mail list.
- **Telephone calls –** Two telephone numbers were provided on all newspaper advertisements and on comment sheets to allow members of the public to contact the project team; one number for the City's Project Manager and the other for the Consultant Project Manager.
- **City of Kawartha Lakes website** – The public was invited in the Notices and on all comment sheets to visit the City's website. An e-mail address was also provided for the City's project manager. The website was used to provide updated information on the project, information from the Public Open Houses and stakeholder meetings, and notification of upcoming Public Open Houses and meetings.
- **Two Stakeholder Meetings** – These meetings were held at the City of Kawartha Lake's Public Works offices (12 Peel Street) on September 17th, 2013, and November 28th, 2013. These meetings were staffed by members of the consultant team and City staff. Both meetings consisted of a presentation to the stakeholders by the Consultant as well as discussion on the presentation content. Representatives from the project team were in attendance to answer questions about the study and findings to date. Attendees were asked to sign-in. Stakeholder meeting summaries and display materials are provided in **Appendix B**.
- **Two Public Open Houses** – These meetings were held at City Hall on September 24th, 2013 and December 5th, 2013. These meetings were staffed by members of the consultant team and City staff. These meetings consisted of an informal Public Open House with display panels, where the public could ask questions of the project team on the display panels or on any other study

related topic. The second Public Open House was conducted in the same format with updated display panels reflecting the study progress to date. Representatives from the project team were in attendance to answer questions about the study. As attendees entered the Public Open Houses they were asked to sign-in and were provided with comment forms. These forms provided them with an opportunity to present their feedback on the study and to ask any additional questions. The forms were either dropped off in a comment box or emailed or mailed after the meeting to the City and Consultant Team. Public Open House materials are provided in **Appendix B**.

8.3 Stakeholder and Agency Participation

A list of stakeholders, including public agencies and adjacent landowners, was prepared at the project initiation. Each party on the list of stakeholders was contacted for information or comments. The opportunity for these stakeholders to participate in the project was provided through the notice of study commencement, through announcement of two Stakeholder Meetings, and two Public Open Houses. The following is a summary of the agencies and stakeholders contacted.

Agencies and Authorities

- City of Kawartha Lakes Engineering Services
- City of Kawartha Lakes Planning
- City of Kawartha Lakes Police Services
- City of Kawartha Lakes Fire Services
- City of Kawartha Lakes Clerks Department
- City of Kawartha Lakes Public Works
- City of Kawartha Lakes Accessibility Committee
- City of Kawartha Lakes Development Services
- City of Kawartha Lakes Economic Development
- City of Kawartha Lakes Council Members
- Ontario Ministry of Transportation, East Region
- Haliburton Kawartha Pine Ridge (HKPR) District Health Unit
- Infrastructure Ontario

Landowners / Businesses

- Lindsay Chamber of Commerce
- Lindsay Downtown BIA
- Lindsay Square
- Mason Homes
- Loblaws
- LaSalle Investment Management
- J. Stollar Construction Limited
- The Hi-Rise Group
- Osler, Hoskin & Harcourt
- Canadian Tire
- Boston Pizza
- Counterpoint

Agencies and stakeholders will also be provided another opportunity to review and comment on the EA during the Notice of Completion review period. Key correspondences with agencies and stakeholders are provided in **Appendix B**.

8.4 Correspondence with Indigenous Groups

Indigenous Groups who may have an interest in the study were contacted by e-mail or telephone. The Indigenous Group contact list and correspondence with Indigenous Groups are provided in **Appendix B.**

No questions, comments, issues or concerns have been raised by the Indigenous groups to-date.

The following Indigenous groups were contacted:

- Alderville First Nation;
- Beausoleil First Nation;
- Chippewas of Georgina Island;
- Chippewas of Rama First Nation;
- Curve Lake First Nation;
- Hiawatha First Nation;
- Kawartha Nishnawbe First Nation;
- Metis Nation of Ontario;
- Mississaugas of the New Credit First Nation;
- Northumberland Metis Council;
- The Mississaugas of Scugog Island; and
- Williams Treaty First Nation.

8.5 Stakeholder Meetings and Public Open Houses

The public consultation process involved the following events:

Meetings with Stakeholders

Two stakeholder meetings were held on September 17th and November 28th, 2013. The purpose of the meetings was to introduce and present to the stakeholders the existing conditions on Colborne Street, the opportunities and challenges for the study, and to discuss stakeholder concerns about the Colborne Street and Kent Street Schedule B Class EAs and Corridor Studies. The meetings were structured around a presentation by the consultant in a boardroom setting, followed by an open discussion and question and answer period.

A summary of the concerns identified is documented in **Section 8.6**. Summaries of these meetings are provided in **Appendix B**.

Public Open House #1 (POH#1)

The first Public Open House (POH#1) was held on Tuesday September 24th, 2013 at City Hall. The purpose of POH#1 was to present members of the community with an introduction to the project, the existing conditions, and to receive feedback. The format was an informal open house from 3:30pm to 6:30pm. A presentation was given, followed by a question and answer period. Representatives from the City of Kawartha Lakes and the project team were also in attendance.

The public was notified of POH#1 by advertisements published in the local newspaper and a notice on the City's website. The advertisements informing the public of the Study Commencement and POH#1 were placed in the **Kawartha Lakes This Week** newspaper on September 5th, 2013. Public agencies and stakeholders were also notified of the study by letter, email or phone call.

Upon arrival at the POH#1, attendees were asked to sign a visitor registration sheet. Four comment sheets were collected.

Twenty panels were displayed. The information panels included the following:

- Welcome;
- Study Area and Study Objectives;
- Study Background;
- Municipal Class Environmental Assessment Process;
- Existing Conditions;
- Problem Statement;
- Next Steps; and
- Contact Information.

A copy of the POH#1 display panels were posted to the project website after the Public Open House. Drawings showing the existing conditions survey of the study area, and existing aerial photography of the study area were also shown.

Public Open House #2 (POH#2)

The second Public Open House (POH#2) was held on December 5th, 2013, also at City Hall. The purpose of POH#2 was to present members of the community with future conditions, preliminary alternatives and findings, and to receive feedback. The format was an informal Public Open House from 5:00pm to 8:00pm, with residents observing the boards and asking questions of the consultant and City staff.

The public was notified of POH#2 by advertisements published in the **Kawartha Lakes This Week** newspaper on November 28th, 2013 and a notice on the City's website. Agencies and stakeholders were also notified of the study by letter, email or phone call.

Upon arrival at POH#2, attendees were asked to sign a visitor registration sheet. Five comment sheets were collected.

Twenty-eight panels were displayed. The information panels included the following:

- Welcome;
- Study Area and Study Objectives;
- Study Background;
- Municipal Class Environmental Assessment Process;
- Existing Conditions;
- Public Input from POH#1;
- Problem Statement;
- Future Traffic Operations;
- Alternatives;
- Evaluation Criteria;
- Next Steps; and
- Contact Information.

A copy of the POH#2 display panels were posted to the City's website after the Public Open House. Drawings showing the existing conditions survey of the study area, and existing aerial photography of the study area were also shown.

A summary of issues and questions received from the public is documented in **Section 8.6**. The complete summary of both Public Open Houses, including the Project Team's responses is provided in **Appendix B**.

8.6 Public and Stakeholder Comments

The consultant team compiled comments and questions received from the public and stakeholders via comment sheets, verbal questions, letters, e-mails, and telephone calls. The comments received and responses are provided in **Appendix B**. Key public comments received via Public Open Houses and Stakeholder Meetings are summarized as follows:

Principle comments raised by the public during both Public Open Houses include:

- **Colborne Street Corridor**

  - Pedestrian safety (students and seniors). J-walking is prevalent;
  - Reduce conflict points;
  - Traffic signal at Adelaide Street is “not working”;
  - Town Hall has parking issues, specifically for staff and events; and
  - Measures which the public thought could help included: more pedestrian crossings, increased police presence, and traffic calming measures.
- **Queen Street Bridge** – Existing capacity deficiencies; some people indicated the need for another crossing to the north; capacity deficiencies are short lived throughout the day.
- **Transit** – The public generally agreed that transit service was insufficient, especially inter-city.

Principal comments raised by stakeholders during both Stakeholder Meeting #1 and Stakeholder Meeting #2 include:

- **St. Joseph Road Extension** – Stakeholders expressed concerns that the St. Joseph Road extension to the north of Colborne Street would not be utilized at its full capacity, thus furthering the potential for blight in the west commercial area on Kent Street.
- **Future Road Network** – Stakeholders expressed general concerns with the approved road improvements, versus those which had not yet been approved. The St. Joseph Road extension was a major contributor to this concern, as well as the general future road layout in the currently vacant lands between Highway 35 and Angeline Street, north of Colborne Street. It was agreed that St. Joseph is to be extended to the north towards Angeline Street, as a collector roadway.
- **Scugog River Bridge** – Stakeholders expressed concerns that the future traffic volumes projected using the Scugog River bridge, and nearby roads, were too high, and not reflective of the projected land uses to the east of the river. It was agreed that a bridge could be assumed at the Thunderbridge Road location, to determine if the bridge would mitigate future capacity deficiencies at the existing bridge (Queen Street).
- **Active Transportation –** Stakeholders agreed that active transportation network needed improvements to facilitate travel to and from the west commercial area and the downtown area. Dedicated bike lanes on Kent Street may not be the best option though given the traffic volumes. The opportunity to accommodate active transportation needs could be better on Colborne.

The above comments and issues were considered in the analysis and evaluation of alternative solutions for the Colborne Street corridor.

8.7 Notice of Completion

The last component of the Consultation for an EA is the Notice of Completion. A Notice of Completion is issued to identify completion of the Class EA and is mailed to anyone who expressed an interest in the study.

Under the *Environmental Assessment Act*, members of the public, interest groups, agencies, and other stakeholders may submit a written request to the Minister of the Environment to require the proponent (the City of Kawartha Lakes) to comply with Part II of the *Environmental Assessment Act* before proceeding with the proposed undertaking.

By requesting a Part II Order the public or agencies may request the Minister of the Environment to elevate the project to a Schedule C project or an Individual EA. The request for a Part II order must also be copied to the proponent at the same time it is submitted to the Minister. As per the ***Municipal Class Environmental Assessment***, written requests for a Part II order must be submitted to the Minister within the 30-calendar day review period after the proponent has filed the Project File Report and has issued the Notice of Completion of the Project File Report. As previously noted, the City of Kawatha Lakes is voluntarily extending the review period to 45 calendar days. Requests received after the 45-calendar day review period will not be considered.

If no new or outstanding concerns are brought forward during the review period, the City of Kawartha Lakes may complete detail design and construction of the preferred solutions.

9 SELECTION OF PREFERRED ALTERNATIVE

9.1 Description of Preferred Solutions for Colborne Street

Based on the analysis of existing and future traffic conditions, the evaluation of alternatives and design concepts, and the consideration of existing constraints, the preferred solution for the Colborne Street corridor will be to:

- widen to four through-lanes from Highway 35 to east of St. Joseph Road, with multi-use paths on both sides of the road;
- transition to a 3-lane cross-section with centre two-way left-turn lane west of Charles Street, with a multi-use path on the south side of the road;
- maintain the 3-lane cross-section to Angeline Street with the centre two-way left-turn lane becoming an exclusive eastbound left-turn lane at Angeline Street, and also provide an exclusive eastbound right-turn lane and a multi-use path on the south side;
- provide a 2-lane cross-section from Angeline Street to William Street, widen sidewalks on both sides of the road and provide a new sidewalk on the south side of the road between Victoria Avenue and Cambridge Street, increase boulevard, and maintain a parking lane on the north side of the road from Adelaide Street continuing to the east;
- separate the eastbound left-turn lane at the intersection of Victoria Street, which should be able to be accomplished through restriping;
- install a new traffic signal at Albert Street;
- undertake geometric improvements at William Street intersection including installation of a new traffic signal;
- coordinate geometric improvements at the intersection of Colborne Street and Highway 35 with the Mason Homes / Jennings Creek Traffic Impact Study, including potential widening of approaches on Highway 35 and Colborne Street to 4-lane cross-sections; and,
- improve transit service in line with future development (including Jennings Creek Development Plan Area) and coordinate improvements through a town-wide or city-wide Transit Strategy or Transit Master Plan.

The proposed solution to improve the operations to the intersection of Colborne Street at Angeline Street involves the widening of Angeline Street from two lanes to four travel lanes in each direction. Due to the overlap, these improvements would have to be considered in a separate EA for the widening of Angeline Street intersection and therefore pending the results of the Angeline Street EA, the ultimate intersection configuration to meet 2031 demands cannot be finalized.

Recommendations are summarized in **Exhibit 9-1**.

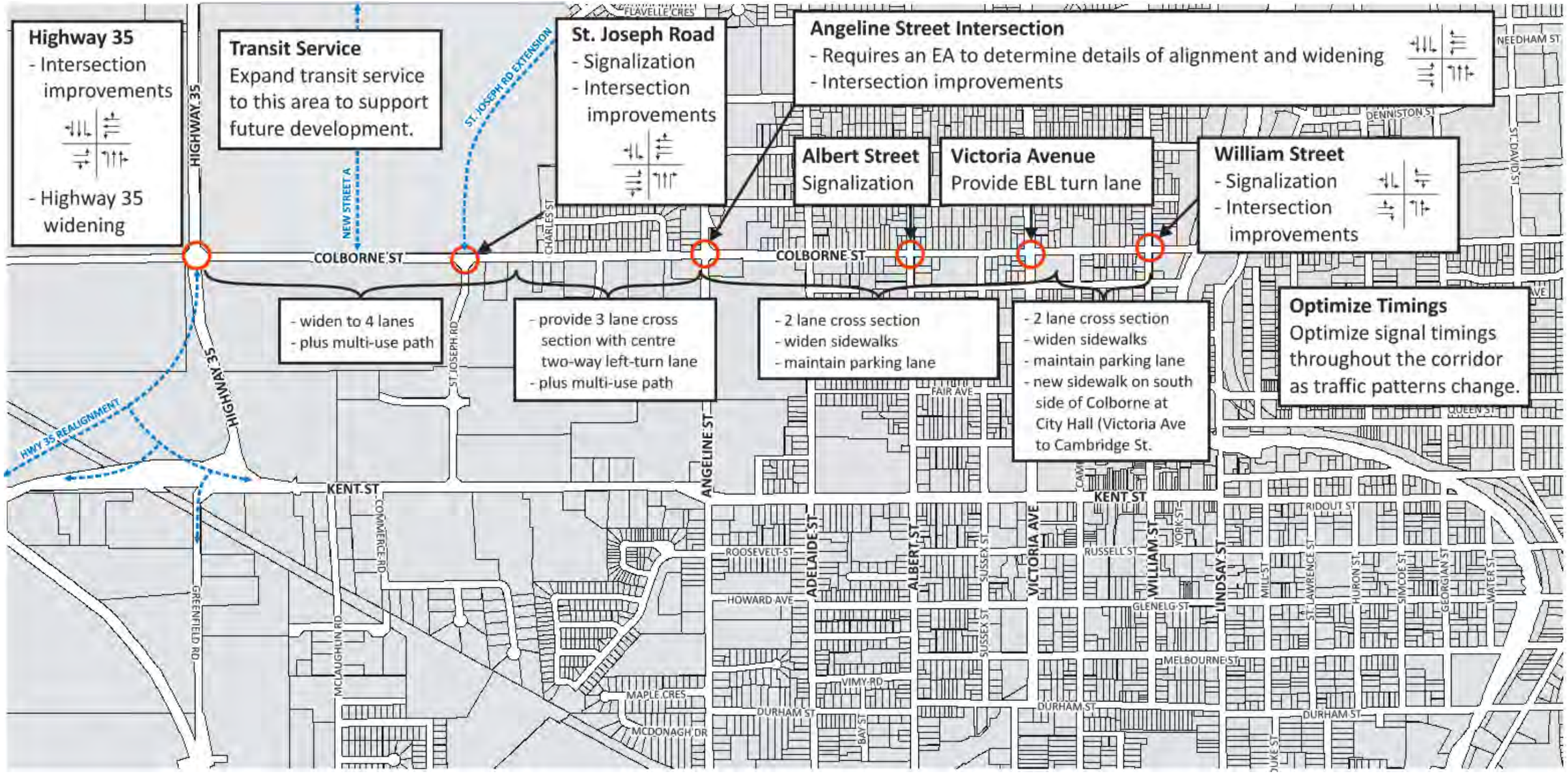


Exhibit 9-1: Recommended Road Network Improvements for Colborne Street

9.1.1 Property Requirements

No significant property requirements are identified to implement the preferred solutions for the Colborne Street corridor as most of the proposed work is anticipated to occur within the existing road right-of-way with the exception of west of Angeline Street where additional property may be required due to a bottleneck in the right-of-way, and also due to the construction of intersection improvements at Colborne/Angeline. Property impacts and requirements are to be reviewed and confirmed during detail design and the future Angeline Street EA.

9.1.2 Timing of Improvements

The proposed solutions cannot all be implemented at once and a potential schedule for implementation is provided below based on categorizing the improvements to short term (0-5 years) and medium to long term (beyond 5 years) timeframes.

Short Term 0-5 years

- Increase existing sidewalk widths 2 m along the entire corridor east of Angeline Street.
- Implement new sidewalk on south side in the vicinity of City Hall.
- Add eastbound left-turn lane at Victoria Street.
- Protect for future traffic signals where the need has been identified and monitor for warrants (St. Joseph Road, William Street, Albert Street).
- Improve transit service on Colborne Street in line with future development in the northwest (Mason Homes and Jennings Creek) and coordinate improvements through a town-wide or city-wide Transit Strategy or Transit Master Plan.
- Optimize signal timing plans and increase cycle lengths where necessary and as required by monitoring.
- Carry out Angeline Street Widening EA.

Medium-Long Term: Beyond 5 Years

- As development north of Colborne and west St. Joseph Road occurs, install a traffic signal at the intersection of St. Joseph Road and Colborne Street and widen Colborne Street to four lanes between Highway 35 and west of Charles Street. At the same time, convert the section between west of Charles Street and just west of Angeline Street to a 3-lane cross-section with centre two-way left-turn lane. Also provide multi-use paths from Highway 35 to Angeline Street.
- Signalize intersections previously protected for signalization (William Street, Albert Street).

- Coordinate with MTO for widening of Highway 35 to a 4-lane cross-section.

The City will review and confirm the timing of the improvements based on their capital budget processes and based on discussions with adjacent landowners.

9.1.3 Preliminary Cost Estimate

Cost estimates for major items are provided below. Not all improvements will result in capital costs.

Improvement	Cost Estimate
Widening of Colborne Street from Highway 35 to west of Charles Street plus installation of multi-use path	$1,047,250
Install new traffic signal at St. Joseph Road / Colborne Street Intersection plus geometric improvements	$247,750
Install new traffic signal at Albert Street / Colborne Street	$173,500
Install new traffic signal at William Street / Colborne Street Intersection plus geometric improvements	$305,000
Restriping between west of Charles Street and Angeline Street to provide centre two-way left-turn lane	$10,000
Restriping to provide eastbound left-turn lane at Victoria Street	$5,000
Colborne / Angeline Intersection Improvements	$420,000
2.0 m sidewalk east of Angeline Street (excludes any costs for potential streetscaping or utility relocation)	$159,500
Total	**$2,368,000**

Notes: Includes contract administration, contingency, and engineering and excludes property acquisition costs.

9.2 Environmental Effects and Mitigation Measures

9.2.1 Summary of Identified Concerns and Mitigation Measures

The road improvement construction activities to implement these solutions are to occur within the City's existing road right-of-way; however temporary construction easements may be required to facilitate the construction. Temporary construction easements will be minimized to the greatest extent possible. Any areas disturbed as part of the construction that are not required for the work are to be restored to their original state where feasible.

Locations where private land outside of the right-of-way that may be impacted are west of Angeline Street, the William/Colborne intersection, the Colborne/Angeline intersection improvements where significant property will be impacted on all four quadrants depending on the alignment of the Angeline Street 4-lane widening.

Mitigation measures for these two impacted areas will be part of the commitment to future work.

9.2.2 Commitments to Future Work

The following items will be addressed during detail design:

- verify of utility impacts from sidewalk widening;
- undertake Archaeological Assessment (if required);
- undertake Angeline Street Class EA;
- develop and evaluate intersection improvement alternatives as part of Angeline Street Class EA; and
- upon selection of preferred intersection improvements, verify property acquisition and utility impacts.

APPENDIX A

Existing Conditions Report

City of Kawartha Lakes
Kent Street and Colborne Street Corridor Study
Environmental Assessment

Existing Conditions Report

September 2013
HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8

HDR

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EXECUTIVE SUMMARY

Introduction

The City of Kawartha Lakes is undertaking corridor studies in the Town of Lindsay for two of its primary east-west spines, namely Kent Street and Colborne Street, to address current and future concerns. This report documents a detailed review of existing 2013 traffic conditions for Kent Street and Colborne Street which will confirm existing operations, capacity deficiencies, and safety issues.

Kent Street is a high-volume corridor with a varying cross section that serves the Town of Lindsay's commercial centre at the west end of the corridor, and the historic downtown at the east end of the corridor. The commercial west end has a five-lane cross section including centre two-way left turn lane, and many driveways and conflict points. The historic downtown area has a two-lane cross section with turn lanes provided at intersections, angled parking, and high pedestrian volumes.

In contrast, the Colborne Street corridor is lower volume and has a more consistent two-lane cross section, surrounded with primarily residential uses. Schools and retirement homes are also located along Colborne Street.

Findings

Traffic Operations

Our analysis has indicated that there is currently excess capacity within the study area during both the weekday AM and PM peak hours. Operations are similar to those summarized in the **Transportation Master Plan**, but have improved slightly in some instances due to decreases in traffic volumes. We do not currently identify any areas where there are capacity deficiencies.

Collision History

Kent Street:

- The predominant impact types on the corridor are rear-end and turning movement collisions
- The two collision prone intersections are at Angeline Street and Adelaide Street
  - The predominant impact type on Angeline Street is turning and rear end with one pedestrian collision
  - The predominant impact type on Adelaide Street is angle with one pedestrian collision
- A number of turning movement collisions occurred along the western commercial strip at driveway accesses

Colborne Street:

- The predominant impact types on the corridor are rear-end, angle and turning movement collisions
- The two collision prone intersections are Angeline Street and Albert Street
  - The predominant impact type on Angeline Street is rear end collisions
  - One pedestrian collision on Angeline Street
  - The predominant impact type on Albert Street is angle collisions
  - Two pedestrian collisions on Albert Street caused by inattentive drivers

Pavement Markings and Signage

Pavement markings in both corridors are generally in good condition. However, there are some locations where the pavement markings are beginning to fade or have mostly faded and need to be repainted. Faded lines do not currently result in imminent hazards. We have found that on both the Colborne Street and Kent Street corridors signage is generally correctly placed and in good condition. There are some instances where non-**OTM** signs have been installed. These issues should be rectified. However, the non-**OTM** signs do not currently result in imminent hazards.

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Appendix B: Existing Traffic Operations
Appendix C: Collision History Data

1. INTRODUCTION

1.1 Background

Based on the recommendations of the **City of Kawartha Lakes Growth Management Strategy and Municipal Master Plan Project – Volume 3: Transportation Master Plan** ("TMP", February 2012), the City is undertaking corridor studies in the Town of Lindsay for two of its primary east-west spines, namely Kent Street and Colborne Street, to address current and future concerns. The TMP had identified existing and long term deficiencies along Kent Street between Highway 35 and Victoria Avenue, and along Colborne Street from Highway 35 to Albert Street. This report documents a detailed update of existing 2013 traffic conditions for Kent Street and Colborne Street which will confirm existing operations, capacity deficiencies, and safety issues.

Kent Street is a high-volume corridor with a varying cross section that serves the Town of Lindsay's commercial centre at the west end of the corridor, and the historic downtown at the east end of the corridor. The mid-section of the Kent Street corridor is a mixture of residential and commercial uses, but is also the location of Ross Memorial Hospital and Lindsay Collegiate and Vocational Institute. The commercial west end has a five-lane cross section including centre two-way left turn lane, and many driveways and conflict points. The historic downtown area has a two-lane cross section with turn lanes provided at intersections, angled parking, and high pedestrian volumes.

In contrast, the Colborne Street corridor is lower volume and has a more consistent two-lane cross section, surrounded with primarily residential uses. Schools and retirement homes are also located along Colborne Street. Parking is permitted on the north side of the street, east of Angeline Street. There are no posted parking restrictions west of Angeline Street. Colborne Street currently does not cross the Scugog River.

1.2 Study Area

The study area limits are depicted in **Exhibit 1**.

The Colborne Street corridor limits are from Highway 35 to William Street. The Kent Street corridor limits are from Highway 35 to Lindsay Street.

Exhibit 1: Study Area Limits

1.3 Scope of Work

This study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) public process. A key component of the study will be consultation with stakeholders and the general public. Two Public Open Houses will be held during the study to present findings and receive public input. This study will be carried out in compliance with the City's Transportation Master Plan.

This report represents Phase 1 of the EA process.

2. EXISTING ROAD NETWORK

The field investigation included a detailed inventory of the road network and lane configuration, signage, and pavement markings. Traffic operations from a capacity and safety perspective were also observed. The Kent Street corridor is discussed first, followed by the Colborne Street corridor.

2.1 Kent Street

2.1.1 Road Network and Lane Configuration

The field investigation included an inventory of the road network and lane configurations for all study intersections. The lane configuration for the Kent Street corridor is shown in **Exhibit 3** and **Exhibit 4**.

2.1.2 Pavement Markings

The condition of the pavement markings on the Kent Street corridor ranged from good to fair. In most instances, pavement markings are well delineated and are in accordance with the **Ontario Traffic Manual (OTM)**.There are a few locations where pavement markings are worn and faded. Some locations have tire marks that have contributed to the fading – or covering up – of pavement markings, such as the westbound lane of Kent Street East, at Lindsay Street. Examples of pavement markings condition on the Kent Street corridor can be found in **Appendix A**.

2.1.3 Regulatory and Warning Signs

During the field investigation, an inventory of regulatory and warning signs was carried out on the Kent Street corridor. The placement of the signs, their size, and condition, were generally excellent. The corridor was noted as having consistent regulatory and warning signs that are in conformance with the OTM. Generally, no issues were identified with respect to drivers' ability to detect, identify, and react to the signs along the corridor. All signs were clearly visible well in advance for drivers to process their intended message. Spacing of the signs also assured that that there were no locations where signs obscured each other.

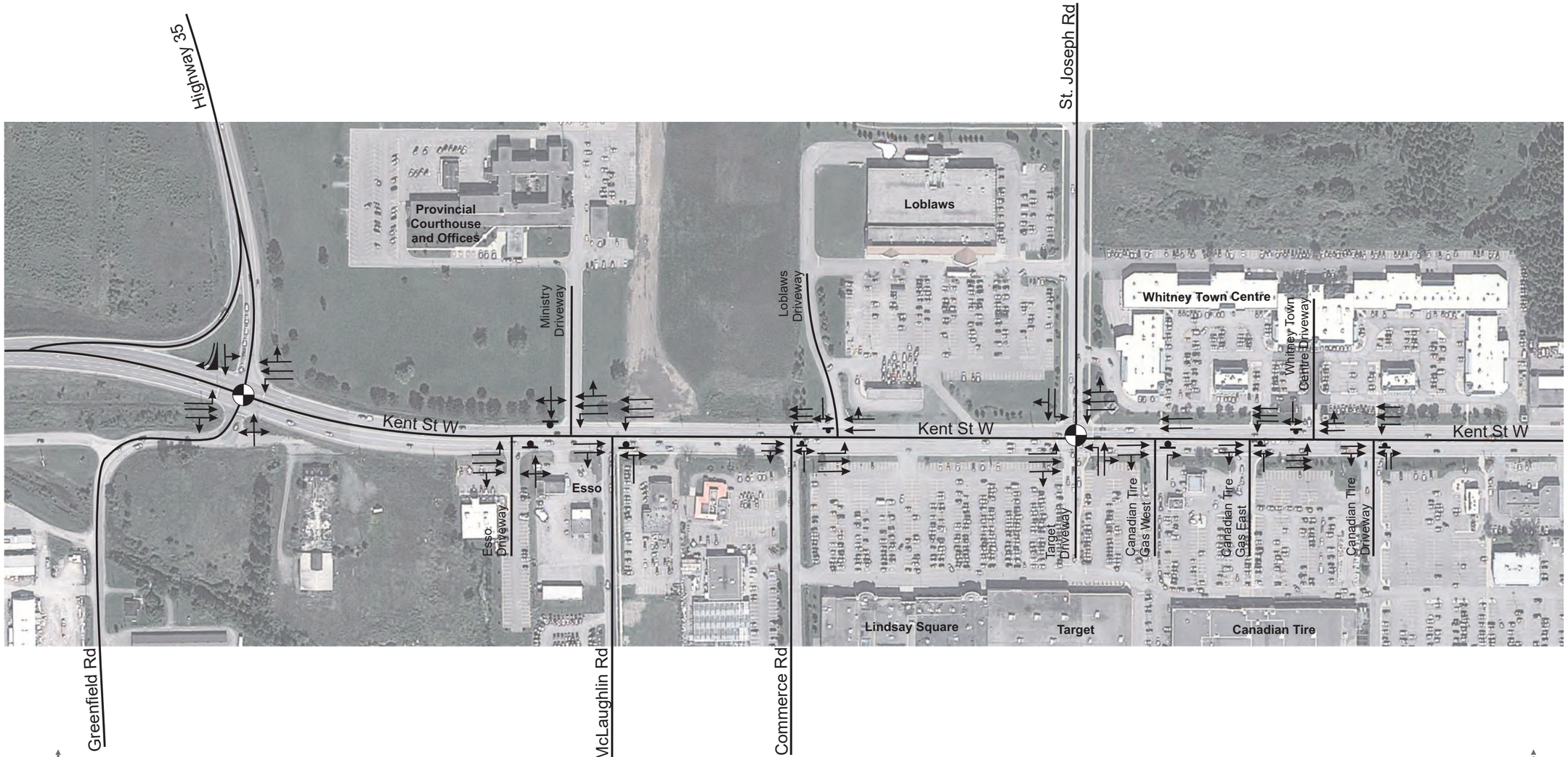
One issue noticed during field observations was a turn control sign located on Ridout Street at Lindsay Street, for the westbound approach.

This is a left turn only sign with a green annular band as shown in **Exhibit 2**. The sign indicates a permissive left turn. This sign does not clearly indicate that right-turns are prohibited. It seems to be redundant with the left turn arrow signal head already in place.

Exhibit 2: Left-Turn Only Sign on Ridout Street

2.1.4 Guide and Information

The corridor was noted as having consistent street name and information signs that are in conformance with the **OTM**. All signs are clearly legible and placed sufficiently in advance of intersections. They were clearly visible well in advance for drivers to process their intended message. Spacing of the signs also assured that that there were no locations where signs obscured each other.



Not to Scale

0 50 100 150 200 metres

Legend

- Signalized Intersection
- Stop Sign
- Lane Configuration
- Channelized Right Turn

Exhibit 3
Existing Road Network
Kent Street (West Commercial Area)

Not to Scale

0 50 100 150 200 metres

Legend

- Signalized Intersection
- Stop Sign
- Lane Configuration
- Posted Turn Restriction

Exhibit 4
Existing Road Network
Kent Street (Middle Commercial Area & Downtown)

HDR

September 2013

2.1.5 Safety Review

Some safety concerns were noted during site observations of the corridor, which included a review of mid-block locations and intersections. Safety issues on the Kent corridor are discussed in three sections:

a. Commercial Strip (west of Angeline Street),
b. Middle Section (Angeline to Victoria), and
c. Downtown Area (east of Victoria Avenue).

2.1.5.1 Commercial Strip, West of Angeline Street

There are a number of potential conflict areas where driveways are closely spaced along the Kent Street corridor. Gaps in eastbound through traffic on Kent Street are tight, resulting in vehicles exiting plazas conflicting with through traffic. This implies a higher likelihood of turning movement or angle collisions. Eastbound traffic was observed braking for vehicles suddenly exiting a driveway.

Examples of these operations along Kent Street west of Angeline are provided in **Exhibit 5** to **Exhibit 8**.

Pedestrian Safety

This section of the Kent Street corridor has sidewalks on both sides of the street, and crosswalks with pedestrian facilities at the St. Joseph Road intersection.

Typically most municipalities are using 1.5 m sidewalks to provide sufficient space for two people to comfortably walk. However, the existing sidewalks on this corridor are found to be too narrow for two pedestrians.

The narrow boulevard between the sidewalks and adjacent vehicular traffic affects the comfort level of pedestrians. This creates conflicts between the pedestrians and vehicles exiting the driveways when the sidewalk can be blocked by the vehicle stopped on top of the sidewalk, as presented in **Exhibit 5**.

Exhibit 5: Vehicles Turning In/Out of Plaza (at the McDonald's driveway)

Exhibit 6: Vehicle-Pedestrian Interaction (at the McDonald's driveway)

Exhibit 7: Small Gaps for Exiting Vehicles (Near McDonald's driveway)

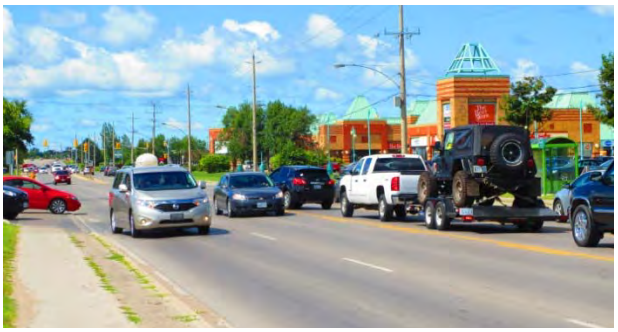


Exhibit 8: Overlapping INs/OUTs at Driveways (east of plaza with Canadian Tires, Food Basics)

In addition, there were many occasions where pedestrians J-walking across the east section of Kent Street were observed as shown in **Exhibit 9**. In the absence of pedestrian crossings along the commercial area, pedestrians crossed illegally to get to retail plazas on both sides of the street.

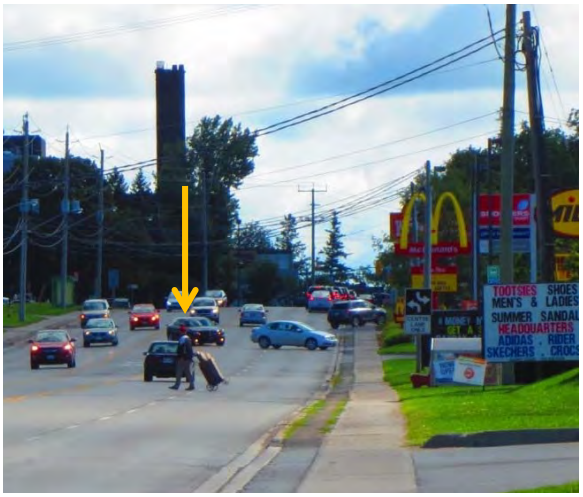


Exhibit 9: Illegal Pedestrian Crossing on Kent Street East in West Commercial Area

2.1.5.2 Commercial Strip, Angeline Street to Victoria Avenue

No safety concerns were observed in this section of the Kent Street corridor.

2.1.5.3 Downtown Area

East of Victoria Avenue on Kent Street is the downtown area with angled parking along both sides of the street. No major safety issues were observed during our field visit; however, there were several instances where traffic needed to stop for vehicles reversing out of the angled parking spaces. **Exhibit 10** shows a vehicle backing out from angle parking stall on Kent Street, and **Exhibit 11** shows traffic stopping for a car backing out from parking space during a green phase for through traffic on Kent Street.

Parking was observed to be mostly short term (less than 30 minutes) as people visit the banks or retail shops. The highest parking demand was observed during mid-day from around 11:00am to 2:00pm.

There is higher pedestrian activity along this section of Kent Street, and several instances of people J-walking were observed. This can create safety issues when driver sightlines might be blocked with angled parking. Thus, drivers may be unable to react in time if a pedestrian walks across the street in between parked vehicles.

The intersection of Lindsay Street and Kent Street is a T-intersection, with Ridout Street offset to the south and extending to the east from Kent Street. This unusual road alignment might create confusion when vehicles going eastbound through to enter Ridout Street need to make a right then immediately turn left. **Exhibit 12** shows the intersection of Lindsay Street / Ridout Street and Kent Street (looking westbound).

Exhibit 10: Vehicle Backing Out from Angled Parking Space on Kent Street (East of William Street)

Exhibit 11: Traffic Stopped for Vehicle Backing Out From Angled Parking Stall (East of Cambridge Street)

Exhibit 12: View of Lindsay Street and Victoria Avenue (Westbound)

2.2 Colborne Street

2.2.1 Road Network and Lane Configurations

The field investigation included an inventory of the road network and lane configurations for all study intersections. The Colborne Street lane configuration is shown in **Exhibit 14**.

2.2.2 Pavement Markings

The pavement markings on Colborne ranged from good to fair. In most instances, pavement markings were well delineated and are in accordance with the **OTM**. Typical locations with faded pavement markings are included in **Appendix A**. There are faded white pavement markings along Colborne near Adelaide Street, as shown in **Exhibit 13.** As there is no bike route along this corridor; this faded line might confuse cyclists and drivers.

Exhibit 13: Faded White Marking West of Colborne and Adelaide intersection

2.2.3 Regulatory and Warning Signs

Observations of regulatory and warning signs were carried out on the Colborne Street corridor. The placement of the signs, their size, and condition were excellent. The corridor was noted as having consistent regulatory and warning signs that are in conformance with the **OTM**.

Generally no issues were identified with respect to drivers' ability to detect, identify, and react to the signs at intersections. There were no signs that could potentially be considered unnecessary or confusing that should be removed. All signs were clearly visible well in advance for drivers to process their intended message. Spacing of the signs also assured that there were no locations where signs obscured each other.

Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Lane Configuration

Exhibit 14
Existing Road Network
Colborne Street

Alexandra Public school is located in the southwest corner of Colborne Street and Sussex Street. School area and crossing warning signs are in accordance with the **OTM**. The visibility and clarity of school crossing signs are adequate except there was one school area sign located west of Sussex Street which has tabs that do not conform with the OTM as illustrated in **Exhibit 15**.

Exhibit 15: School Area Sign (Wc-1) (Internally Illuminated With Maximum Speed, 100m West Of Sussex Street)

2.2.4 Safety Review

Some safety concerns were noted during site observations along the corridor including at mid blocks and intersections. Any safety issues are discussed below.

2.2.4.1 Colborne Street and Angeline Street Intersection

The Colborne Street and Angeline Street intersection has vertical and horizontal curves on the west approach as illustrated in **Exhibit 16.** This intersection experienced mostly rear end and turning movement collisions based on a collision analysis discussed in **Section 4.** The slope approaching the intersection might restrict sightlines to oncoming westbound traffic for eastbound left-turning vehicles, and vice versa.

Most vehicles were traveling according to the posted speed limit during site observations. However, tight traffic gaps were observed during site investigation and the vertical slope might make it difficult for vehicles to stop in time if the road surface conditions are wet (e.g. snow, slush, rain, etc.); increasing the chance for rear end collisions.

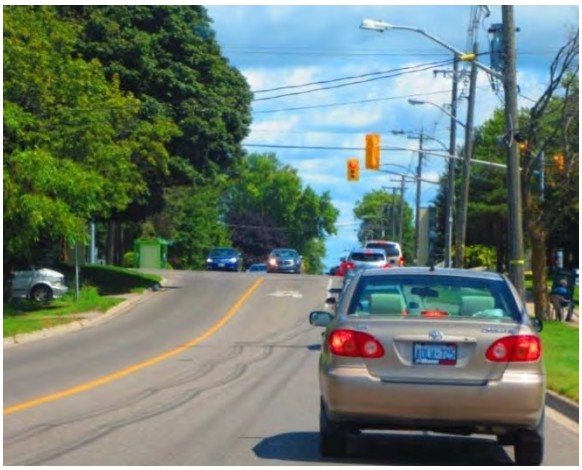


Exhibit 16: Colborne Street Looking Eastbound (Approaching Angeline Street)

This intersection has high left-turning volumes on Colborne Street during the PM peak period. An eastbound left-turn queue was observed as shown in **Exhibit 17.** Eastbound left turn volumes in the PM are about three times the AM volumes according to traffic counts conducted on Wednesday August 14th, 2013. The high left turning volumes might contribute to the over representation of angle collisions at this intersection.

Exhibit 17: Eastbound Left-turn Queue on Colborne Street-during the PM Peak Period

2.2.4.2 Sightlines

The vegetation along William Street creates sightline issues in which a large tree obstructs driver's view as illustrated in **Exhibit 18**. From a driver's perspective, it is difficult to observe on-coming northbound and southbound traffic when travelling eastbound and westbound through the Colborne Street and William Street intersection.

Exhibit 18: Vegetation on East Approach at Colborne Street and Wiliam Street

2.2.4.3 Pedestrian Safety

No major safety issues related to pedestrian facilities were identified. Colborne Street has buffered sidewalks and crosswalks at major intersections. However, there were a couple of instances where a pedestrian illegally crossed Colborne Street at a mid-block location.

Exhibit 19 shows a pedestrian with a bicycle crossing the street. However, no conflicts were observed due to the low traffic volumes and rural/ residential land use along this corridor.

Exhibit 19: Illegal Pedestrian Crossing On Colborne Street (Orange Arrow)

3. TRAFFIC OPERATIONS

3.1 Turning Movement Counts

Traffic counts were undertaken on behalf of HDR by the Traffic Information Group during the weekday AM and PM peak periods, between 7:00AM to 9:00AM and 4:00PM to 6:00PM, respectively. A list of the count locations is provided in **Table 1**.

Table 1: Turning Movement Count Locations

Kent Street Corridor
1. Highway 35 / Greenfield
2. Ministry Driveway / Esso Driveway
3. McLaughlin Road
4. Commerce Road
5. Loblaws Driveway
6. St. Joseph Road
7. Canadian Tire Gas Bar West Driveway
8. Canadian Tire Gas Bar East Driveway
9. Whitney Town Centre Driveway
10. Canadian Tire / Staples Driveway
11. Angeline Street
12. Jane Street
13. Adelaide Street
14. Albert Street
15. Sussex Street
16. Victoria Avenue
17. Cambridge Street
18. William Street
19. York Street
20. Lindsay Street
Colborne Street Corridor
1. Highway 35
2. St. Joseph Road
3. Charles street
4. Heritage Way
5. Walker Street
6. Angeline Street
7. Adelaide Street
8. Albert Street
9. Sussex Street
10. Victoria Avenue
11. Cambridge Street
12. William Street

The Kent Street counts were undertaken on Tuesday August 13th, 2013. The Colborne Street counts were undertaken on Wednesday August 14th, 2013.

Existing traffic volumes are depicted in **Exhibit 20,** and **Exhibit 21** and **Exhibit 22,** for Kent Street and Colborne Street corridors, respectively.

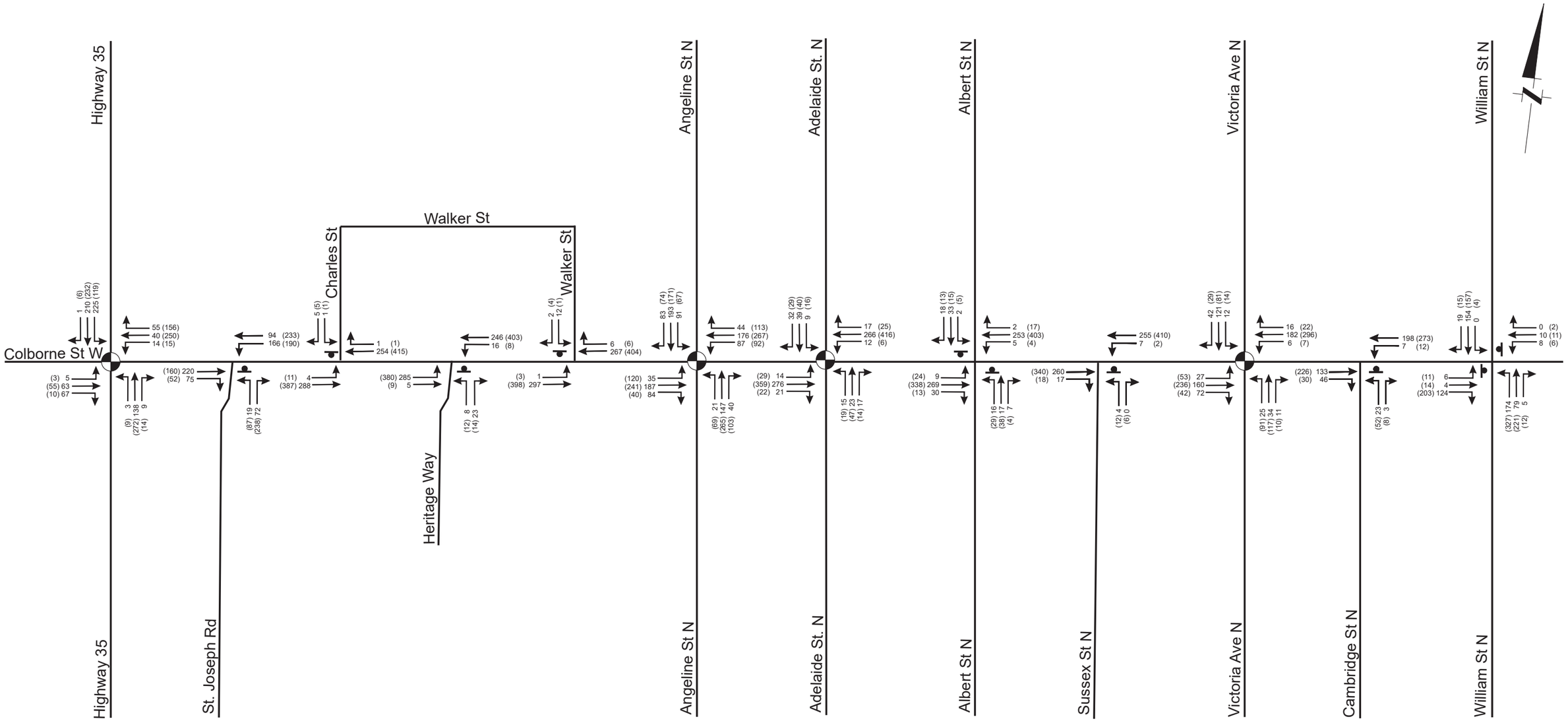
3.1.1 Seasonal Variations & Comparison with the TMP

A review of historic traffic volumes available on the Ministry of Transportation of Ontario website, along Highway 35 and Highway 7 in the vicinity of Lindsay, shows that the summer season (July to August) historically has notably higher traffic volumes than the winter season (September to June).

The traffic counts used in the TMP were undertaken during the month of September. The most recent counts were undertaken during the month of August, which is expected to result in higher traffic volumes due to summer traffic (which includes cottage traffic and tourist traffic). However, in some cases through volumes along Kent Street were higher in the TMP, specifically near the intersection of Angeline Street.

3.2 Analysis Methodology

Intersection operations were assessed for intersections in the study area using the software program Synchro 8 (Build 804), which employs methodology from the ***Highway Capacity Manual (HCM 2000 and 2010)*** published by the Transportation Research Board National Research Council. Synchro 8 can analyze both signalized and unsignalized intersections in a road corridor or network taking into account the spacing, interaction, queues and operations between intersections.

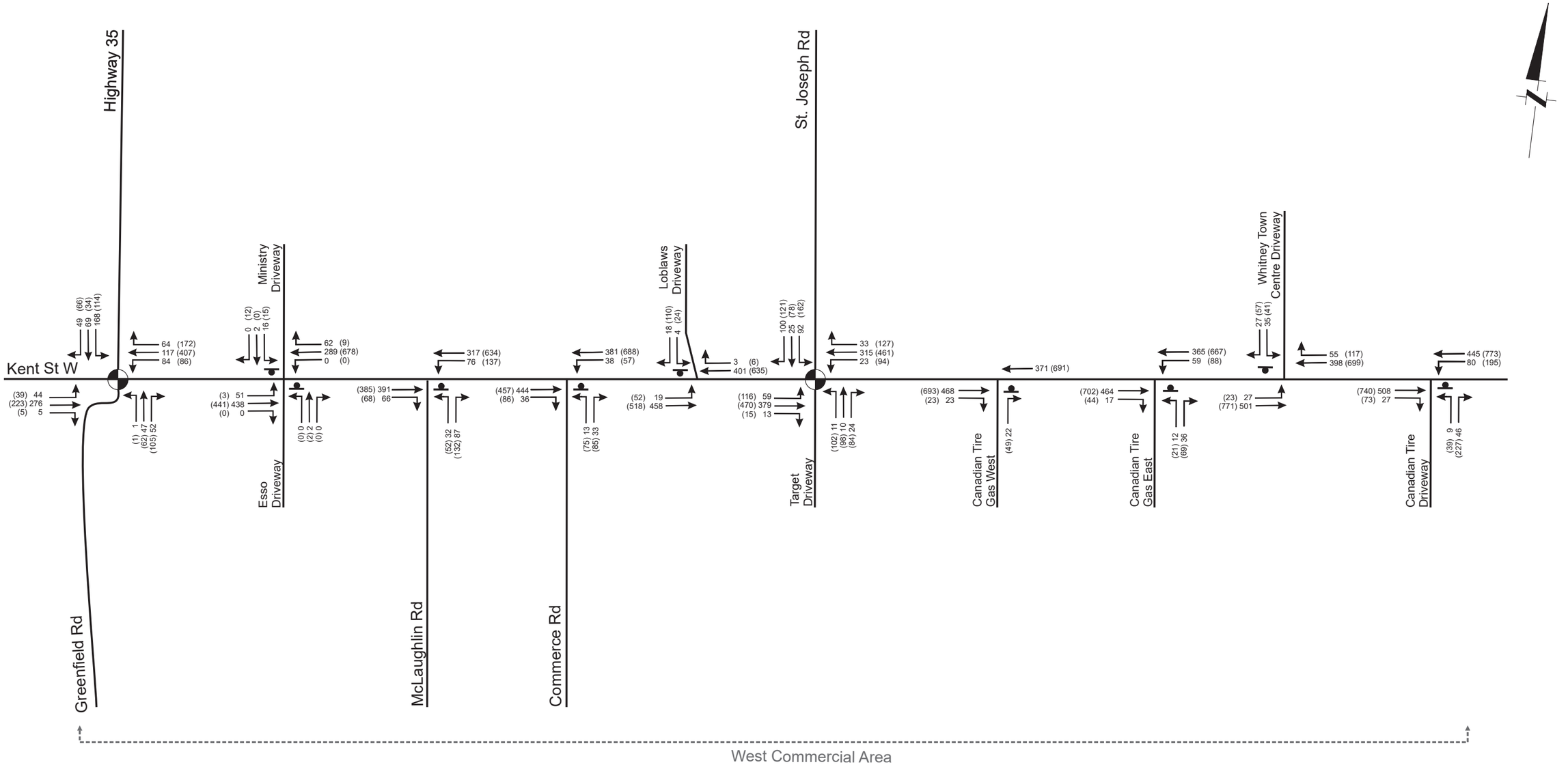


Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Turning Movement
- 122 (456) Weekday AM (PM) Peak Hour Traffic Volumes

Exhibit 20
Existing Traffic Volumes
Colborne Street



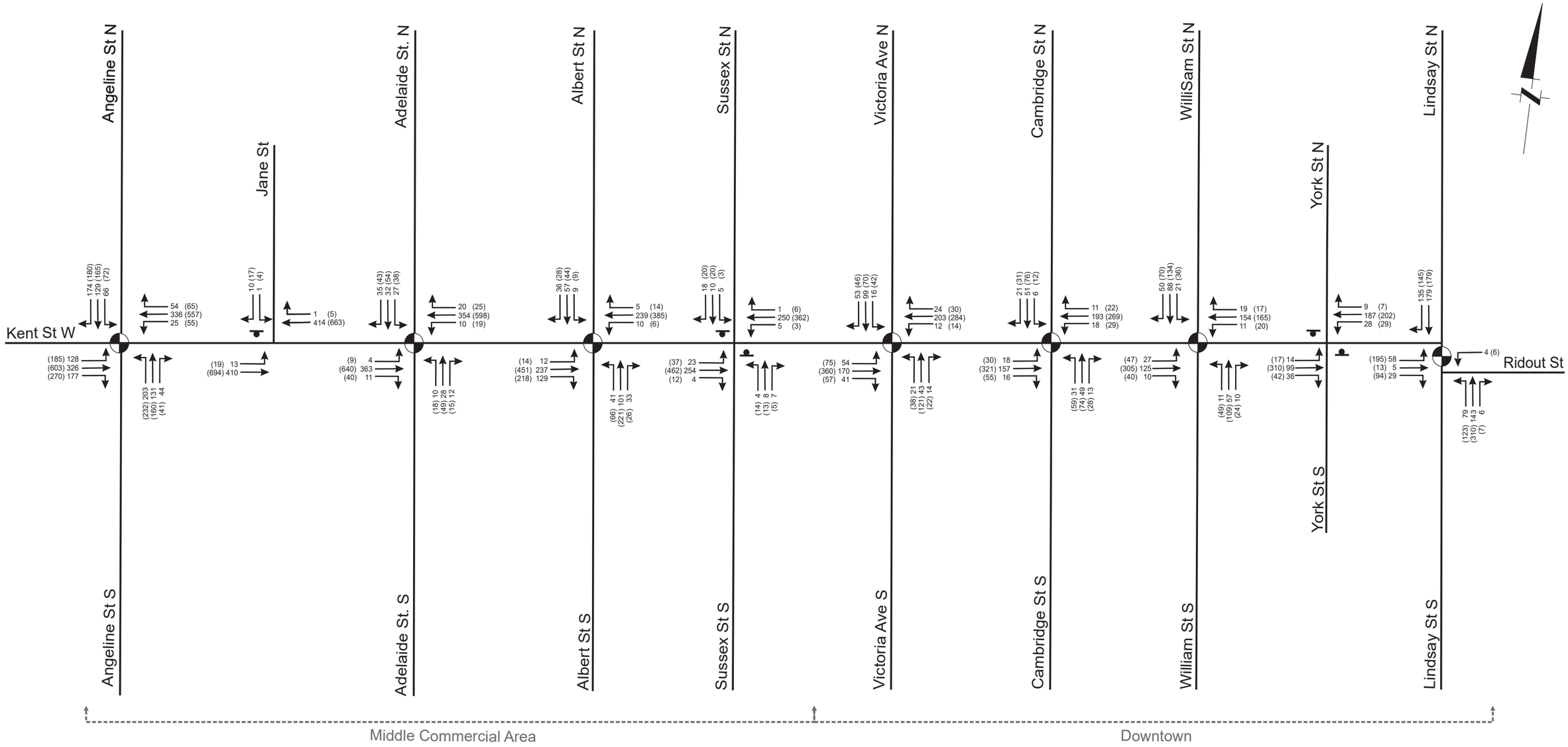
Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Turning Movement
- 122 (456) Weekday AM (PM) Peak Hour Traffic Volumes

Exhibit 21
Existing Traffic Volumes
Kent Street (West Commercial Area)

HDR



Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Turning Movement
- 122 (456) Weekday AM (PM) Peak Hour Traffic Volumes

Exhibit 22
Existing Traffic Volumes
Kent Street (Middle Commercial Area & Downtown)

HDR

The signalized intersection analysis considers two separate measures of performance:

- the capacity of all intersection movements, which is based on a volume to capacity ratio; and
- the level of service for all intersection movements, which is based on the average control delay per vehicle for the various movements through the intersection and overall.

The two-way unsignalized intersection analysis considers two separate measures of performance:

- the capacity of the critical movements, which is based on a volume to capacity ratio; and
- the level of service for the critical movements, which is based on the average control delay per vehicle for the various critical movements within the intersection.

Level of service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. The volume to capacity (v/c) ratio is a measure of the degree of capacity utilized at an intersection.

3.3 Analysis Adjustments and Calibration

Synchro software provides opportunities to reflect actual conditions by adjusting the saturated flow rates and other parameters as needed. A saturated flow rate is defined as the number of vehicles which can be served per lane per hour of green time. A reduced saturated flow rate directly results in reduced capacity.

The analysis assumes a Central Business District ("CBD") in the downtown area along Kent Street, between Victoria Street and Lindsay Street. A central business district is characterized by high pedestrian activity, high parking turnover, and narrow short-block roadways. In addition, adjacent parking lanes have also been coded in this section of Kent Street (for approaches on Kent Street). Both of these calibration techniques reduce the saturated flow rate.

Adjacent parking lanes have also been coded into the Synchro model along Colborne Street, between Albert Street and William Street. This was coded for westbound approaches only since parking is only provided on the north side of the road. There are no parking restrictions along Colborne Street west of Angeline Street, however, we have not coded adjacent parking lanes for this section since we did not observe any parking in this area.

3.4 Capacity Thresholds

The TMP employed the following thresholds to indicate possible capacity deficiencies:

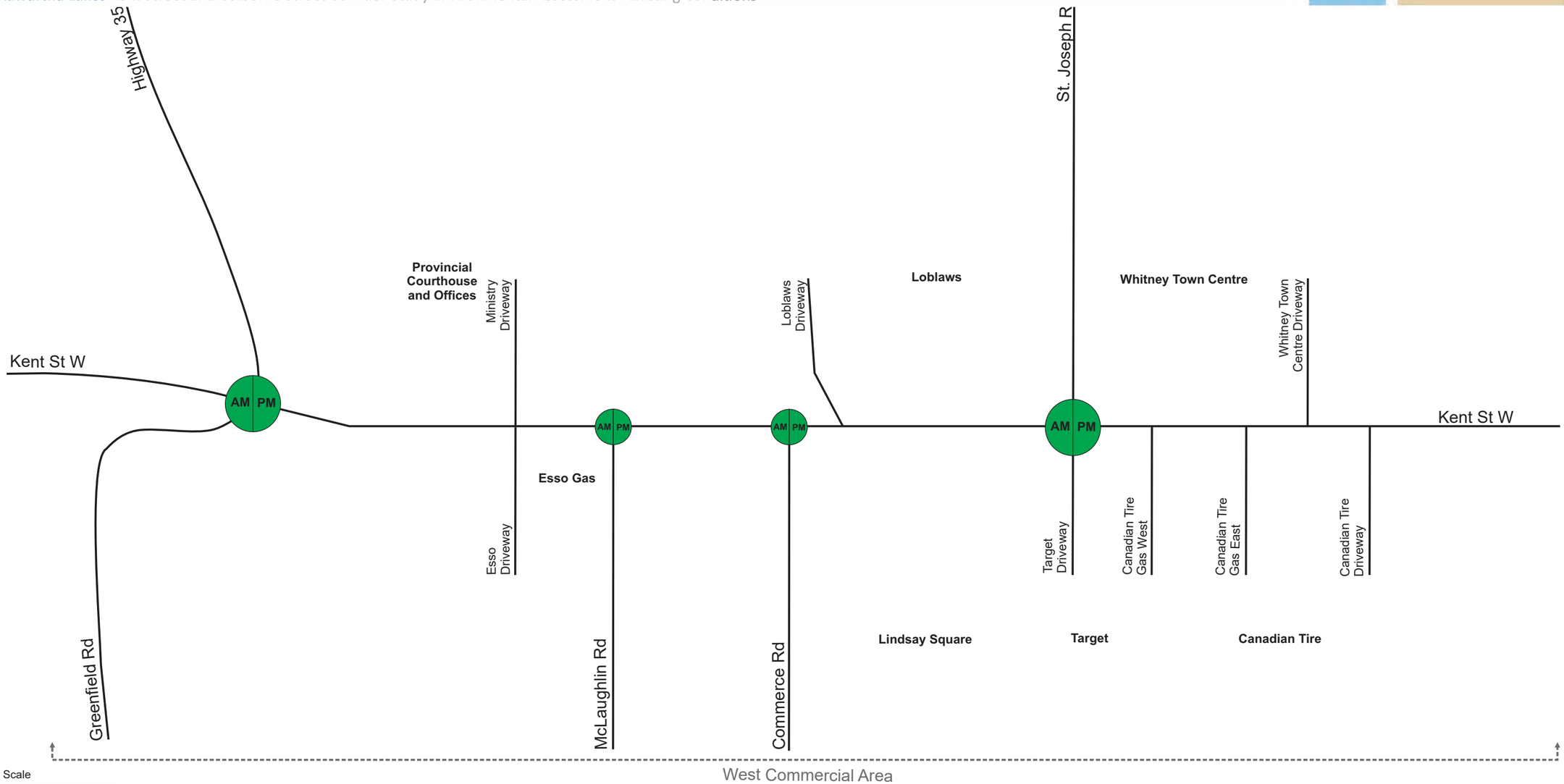
- v/c ratios greater than 1.0 indicate overall intersection capacity deficiencies,
- v/c ratios greater than 0.85 indicate through-lane capacity deficiencies, and
- v/c ratios greater than 0.95 indicate exclusive turn lane capacity deficiencies.

These thresholds have been adopted for the purposes of intersection operations analysis in this study.

3.5 Existing Intersection Operations

3.5.1 Kent Street Corridor

We have assessed intersection operations based on the lane configurations depicted in **Exhibit 3** and **Exhibit 4**, and the existing traffic volumes shown in **Exhibit 21** and **Exhibit 22**. Operations are depicted in **Exhibit 23** and **Exhibit 24** for the Kent Street Corridor.



Not to Scale

Legend

AM | PM — Signalized Intersection
Overall Intersection Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

AM | PM — Unsignalized Intersection
Worst Movement Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

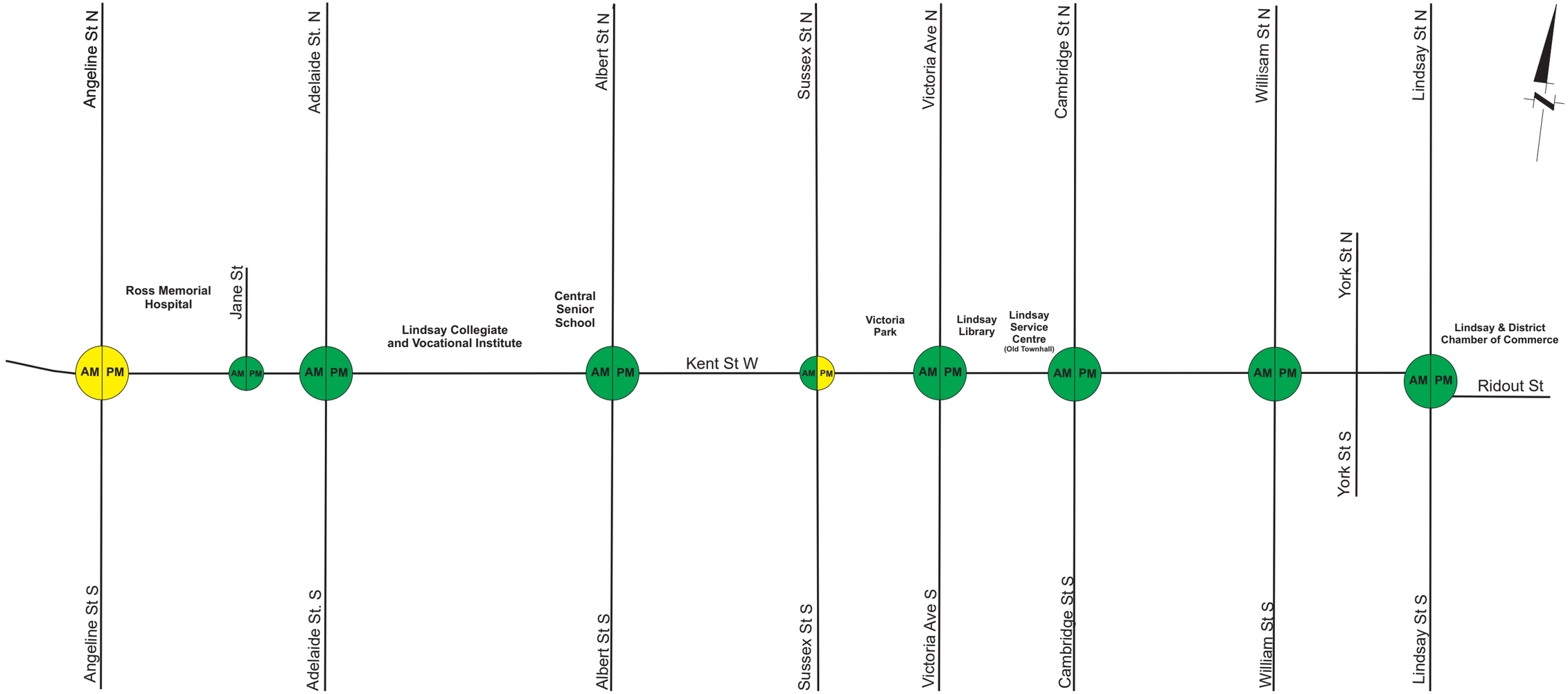
Level of Service (LOS) Colour Scale

- LOS A to LOS B: Very Little Delay
- LOS C to LOS D: Some Delay
- LOS E to LOS F : Higher Delay

Note:

Operations shown for signalized and unsignalized intersections only. Driveway operations are not shown.

Exhibit 23
Existing Traffic Operations
Kent Street (West Commercial Area)



Not to Scale

Legend

AM | PM — Signalized Intersection
Overall Intersection Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

AM | PM — Unsignalized Intersection
Worst Movement Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

Level of Service (LOS) Colour Scale

- LOS A to LOS B: Very Little Delay
- LOS C to LOS D: Some Delay
- LOS E to LOS F : Higher Delay

Note:

Operations shown for signalized and unsignalized intersections only. Driveway operations are not shown.

Exhibit 24
Existing Traffic Operations
Kent Street (Middle Commercial Area & Downtown)

Under existing conditions study intersections are operating well. The intersection of Kent Street and Angeline Street is the only intersection with overall level of service 'C' during both peak hours. Otherwise all intersections are operating with overall level of service 'B' or better. Northbound and southbound movements at the unsignalized intersection of Kent Street and Sussex Street will operate with level of service 'C' during the weekday PM peak hour. There is excess capacity at all study intersections along the Kent Street corridor.

Detailed operations are provided in **Appendix B**.

3.5.2 Colborne Street Corridor

We have assessed intersection operations based on the lane configurations depicted in **Exhibit 14**, and the existing traffic volumes shown in **Exhibit 20**. Operations are depicted in **Exhibit 25** for the Colborne Street Corridor.

Under existing conditions study intersections are operating well. The intersection of Colborne Street and Angeline Street is the only intersection with overall level of service 'C' during the PM peak hour. Otherwise all intersections are operating with overall level of service 'B' or better. Some movements at unsignalized intersections along Colborne Street will operate with level of service 'C'. One exception is the westbound left-through-right movement at the intersection of Colborne Street and William Street, which is operating with level of service 'F' during the weekday PM peak hour. There is excess capacity at all study intersections along the Kent Street corridor.

Detailed operations are provided in **Appendix B**.

3.5.3 Comparison with the Transportation Master Plan

The Transportation Master Plan (TMP) assessed existing 2009 traffic conditions. The traffic counts were undertaken during the month of September; therefore, it is possible that some traffic patterns, or the magnitude of traffic volumes, may differ as a result of summer/fall season variations.

The TMP found that the vast majority of studied intersections within our study area were operating with excess capacity under existing conditions. The main intersection identified as being a concern was the "gateway" intersection of Kent Street and Angeline Street. Critical movements were identified as the westbound through movement and the northbound left-turn movement. We have not identified any concerns based on the capacity thresholds discussed in **Section 3.4**, and we do not identify these movements as currently being deficient.

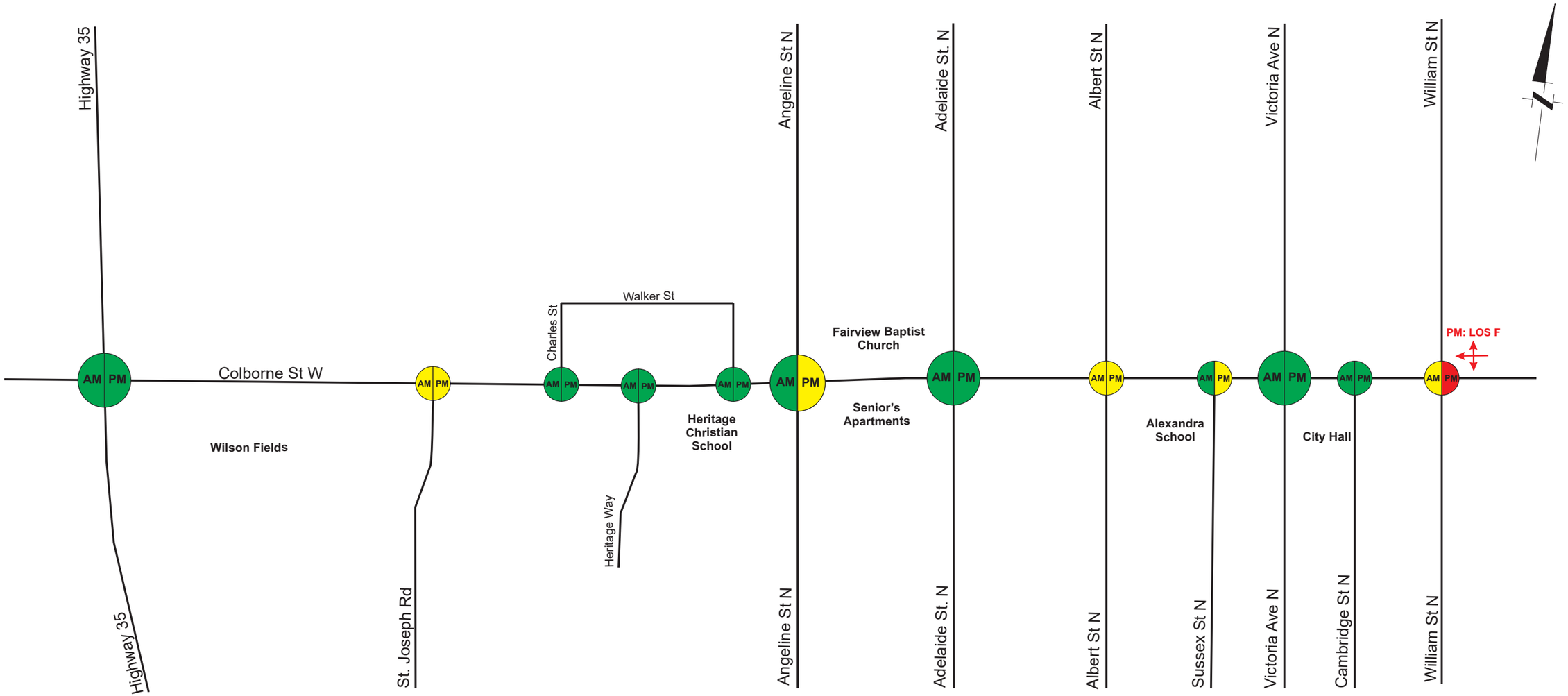
The TMP also noted that the closely spaced intersections of Lindsay Street and Kent Street, and Lindsay Street and Ridout Street were of operational concern due to the close proximity and geometrics. However, our analysis indicates that there are no deficiencies here from a capacity standpoint.

The TMP did not indicate any other capacity or operational concerns within either corridor.

3.6 Travel Time Runs

HDR performed travel time runs to determine the locations along each corridor where delays are occurring, and the extent of the delays. The travel time runs also provided us with average speeds and travel times for the entirety of each corridor, as well as for sections of the corridor.

Generally we did not see much variation between runs. The AM peak hour travel time runs generally had a higher average speed, fewer stops, and lower overall corridor travel time. Detailed results are provided in **Appendix B**.



Not to Scale

Legend

AM | PM — Signalized Intersection
Overall Intersection Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

AM | PM — Unsignalized Intersection
Worst Movement Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

Level of Service (LOS) Colour Scale

- LOS A to LOS B: Very Little Delay
- LOS C to LOS D: Some Delay
- LOS E to LOS F : Higher Delay

Note:

Operations shown for signalized and unsignalized intersections only. Driveway operations are not shown.

Exhibit 25
Existing Traffic Operations
Colborne Street

3.7 Transit Operations

Lindsay Transit operates three routes within the Town: Red Route, Blue Route, and Green Route. All three routes operate between 7:00AM and 7:00PM, Monday to Saturday. Each route operates between the downtown area (William Street at Kent Street) and Lindsay Square Mall (Kent Street at St. Joseph Road). Headways for the Green and Red Routes are 1 hour, and headways for the Blue Route are 30 minutes.

The Red Route generally serves the south end of the Town. The Blue Route generally serves the middle and east end of the Town and the Green Route generally serves the north end of the town. All three routes overlap each other in some locations. These bus routes are shown in **Exhibit 26**.

3.8 River Crossings

In the vicinity of the study area there are two crossings of the Scugog River. They are both located between Kent Street and Colborne Street, near Lindsay Street. One of the bridges is an east-west crossing on Wellington Street, while the second bridge is a north-south crossing on Lindsay Street. A third bridge is located to the south of the study area along Lindsay Street.

The river generally runs north-south, thus all east-west traffic in the Town must use one of these crossings even though the Lindsay bridge crossing is a north-south roadway. Lindsay Street turns eastward, north of Wellington Street, and continues as an extension of Colborne Street to the east of the river.

During our initial field investigation we did not observe any river crossing capacity deficiencies. We did however note a strong traffic pattern between Colborne Street, William Street, and the Wellington Street crossing.

3.9 Pedestrian and Cycling Network

The TMP reference the **City of Kawartha Lakes Trails Master Plan (March 2006)** in its discussions about active transportation facilities. The **Trails Master Plan** does not show any active transportation facilitates within the study area.

Existing pedestrian and bicycle volumes are shown in **Exhibit 27** for the Colborne Street corridor, and **Exhibit 28** and **Exhibit 29** for the Kent Street corridor.

Pedestrian and bicycle volumes are higher in the downtown area than in any other part of the study area. Furthermore, the PM peak hour had many more pedestrians than the AM peak hour, and the difference was most drastic in the downtown area. Bicycle volumes also increased during the weekday PM peak hour, however, the increase with respect to the AM peak hour was not as drastic as we have found with the pedestrian volumes.

If the counts had been taken during the school year, we would anticipate higher pedestrian volumes around schools and institutional uses, such as Alexandra School on Colborne Street.

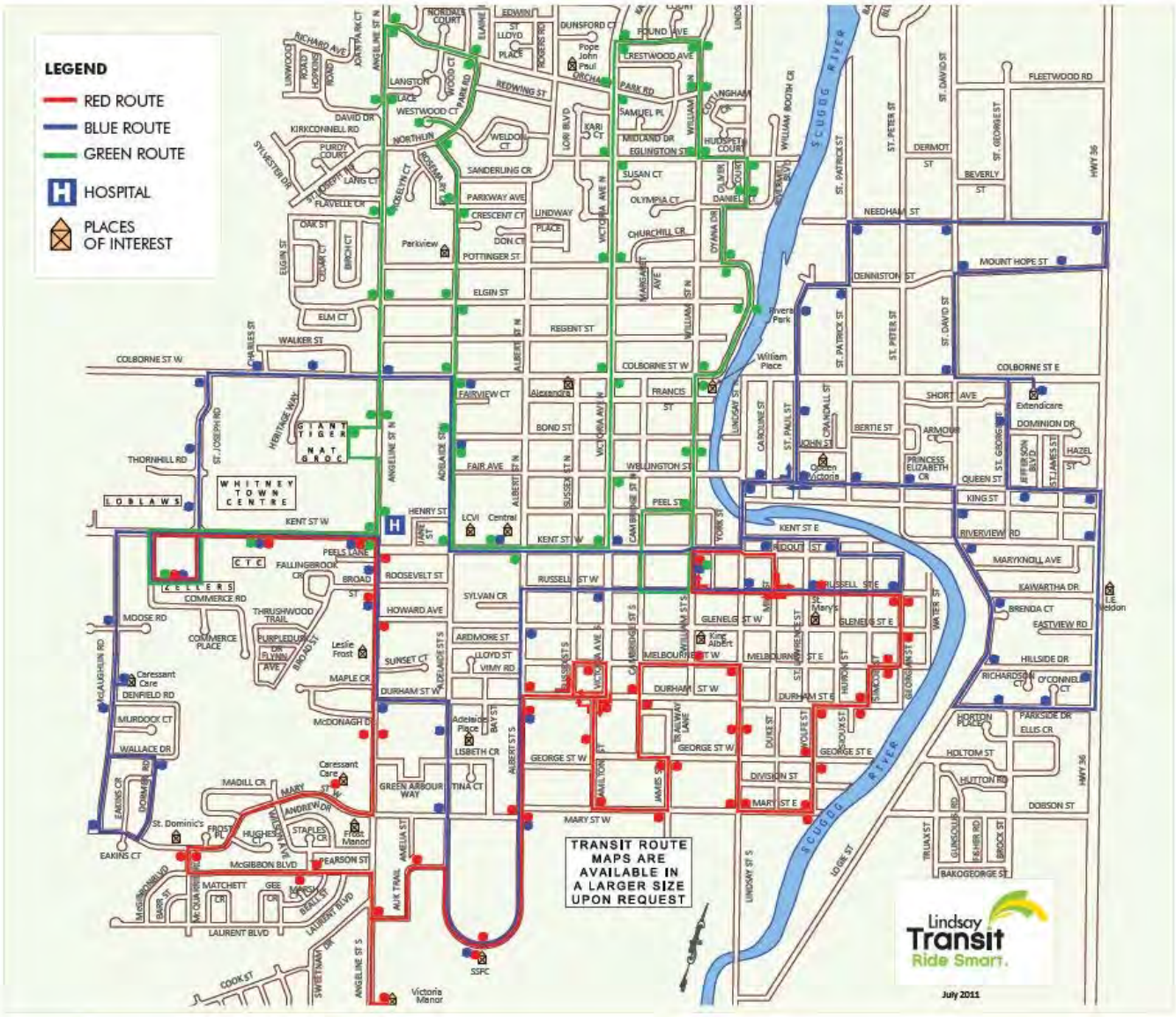
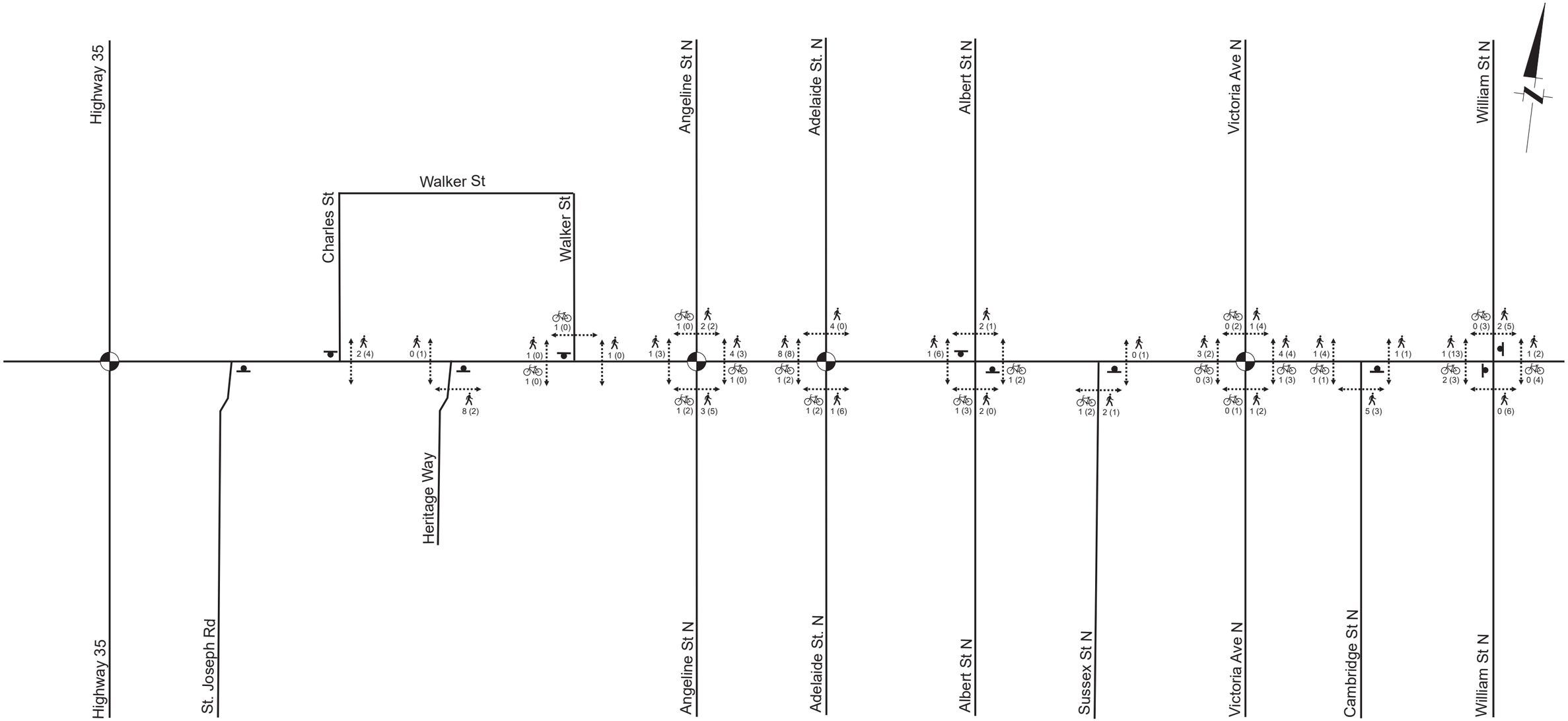


Exhibit 26: Lindsay Transit Bus Routes



Not to Scale

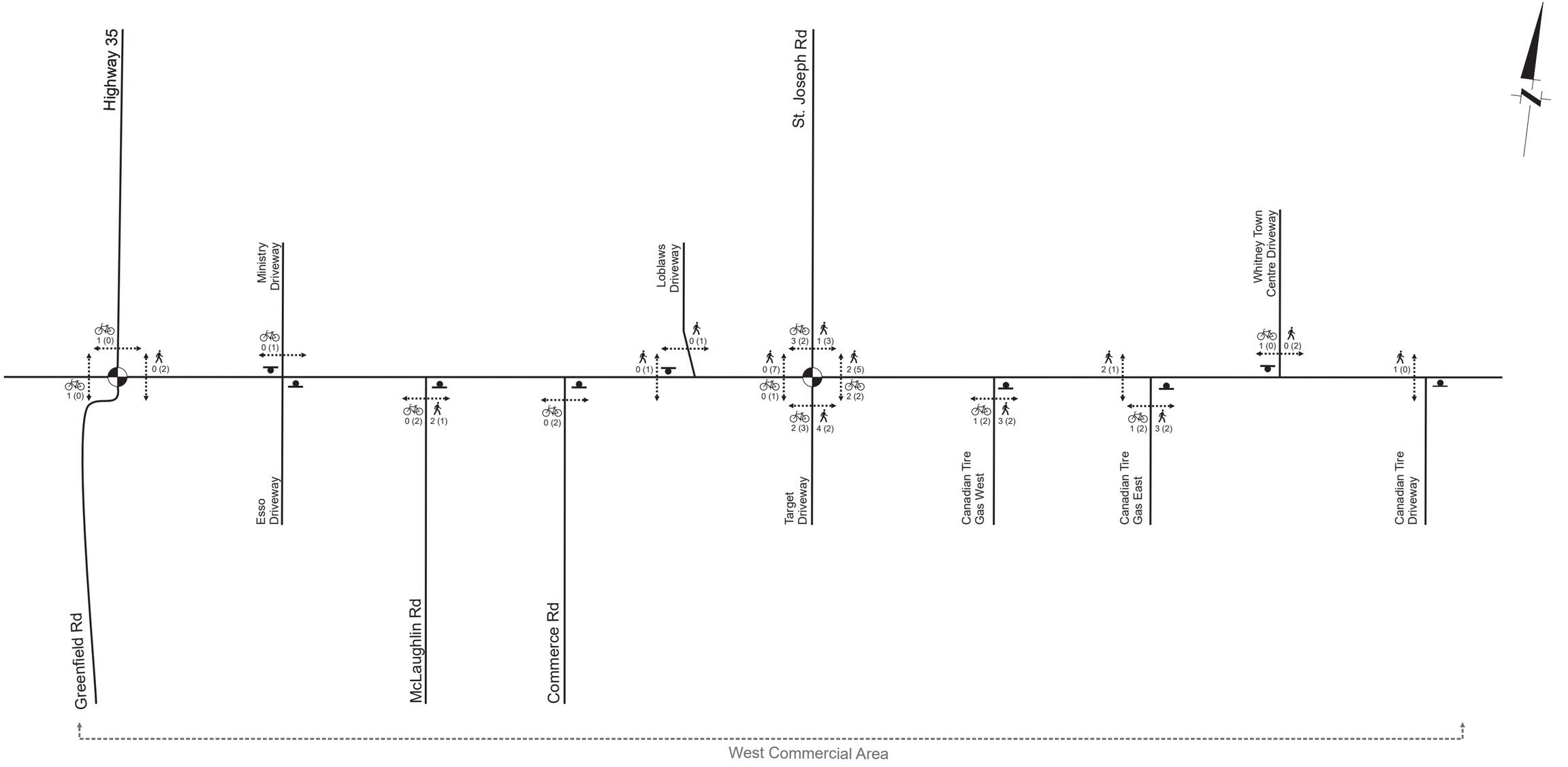
Legend

- Signalized Intersection
- Stop Sign
- Pedestrian Volumes
- Bicycle Volumes
- 12 (34) Weekday AM (PM) Peak Hour Volumes

Exhibit 27
Existing Pedestrian & Bicycle Volumes
Colborne Street

HDR

September 2013

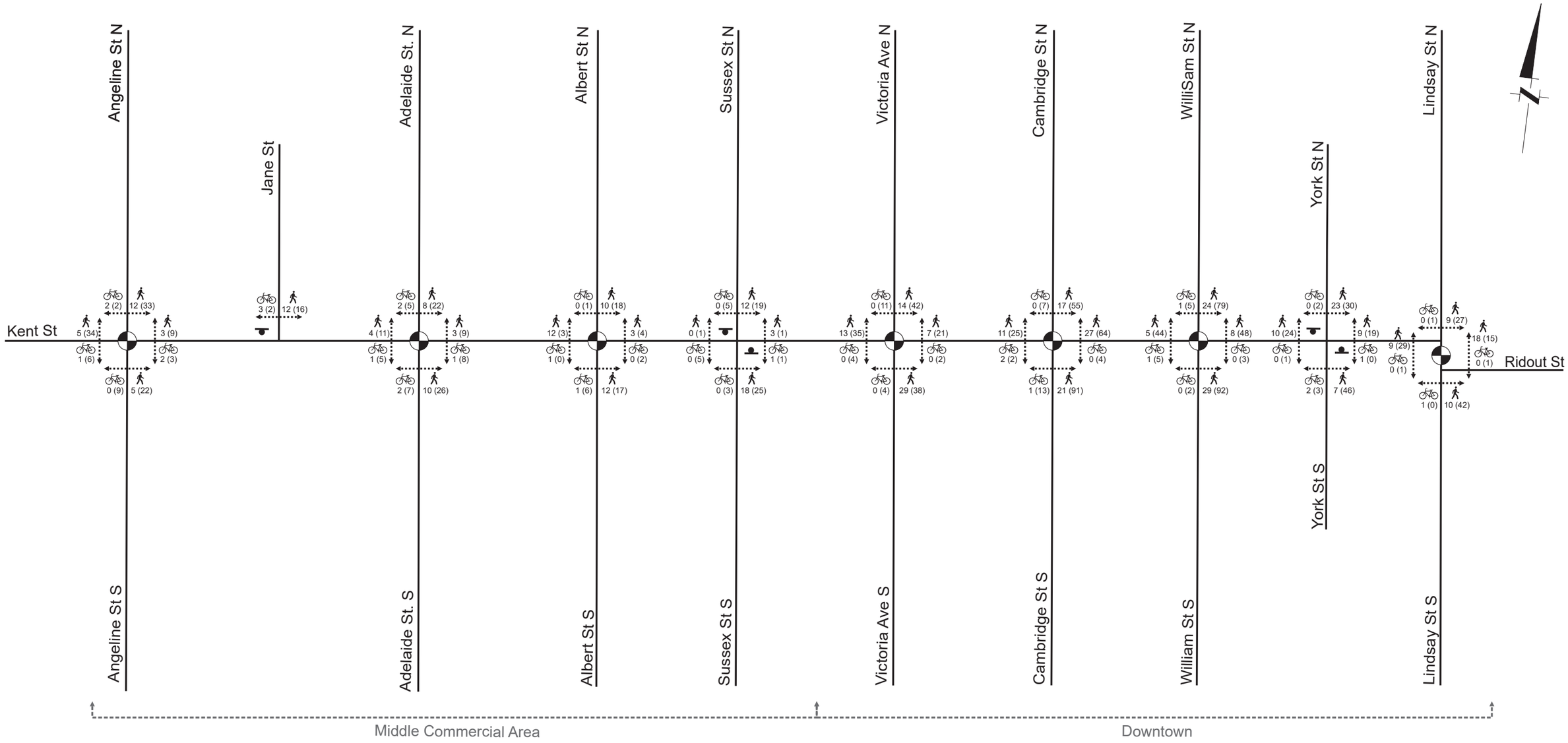


Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Pedestrian Volumes
- Bicycle Volumes
- 12 (34) Weekday AM (PM) Peak Hour Volumes

Exhibit 28
Existing Pedestrian & Bicycle Volumes
Kent Street (West Commercial Area)



Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Pedestrian Volumes
- Bicycle Volumes
- 12 (34) Weekday AM (PM) Peak Hour Volumes

Exhibit 29
Existing Pedestrian & Bicycle Volumes
Kent Street (Middle Commercial Area & Downtown)

HDR

4. COLLISION DATA ANALYSIS

4.1 Data Source

A high level collision analysis was undertaken to evaluate the overall safety performance of the two corridors and to identify collision locations, types, and frequency, and any potential causes.

The City provided HDR with the following data:

- Colborne Street collision history from January 2004 to August 2012
- Kent Street collision history from January 2003 to April 2013

The provided data was given in an amalgamated format; HDR deciphered the collision data based on available information. As a result, no accurate information was obtained on some key elements including severity, environment condition, time of day, and road surface. The collision history data is provided in **Appendix C.**

The collision analysis adopted a Macro and Micro approach where the macro analysis reviewed the corridors as a whole. Through the macro analysis, collision prone intersections are identified. These locations are then further analysed at a more detailed level through a micro analysis. The collision data of the two corridors is discussed separately in the following sections.

4.2 Kent Street

Collision records spanning a nine year period (January 2004 to August 2012) period were obtained from the City. The most recent five year period collision data was analyzed to review the safety conditions. Since the collision dataset for 2012 was partially complete, the collision data between 2007 and 2011 was defined as the study period. Kent Street provides access to a commercial strip west of Angeline Street including Loblaws, Staples, Canadian Tires and a Target store. This section of the corridor has a center two-way left turn lane to serve closely spaced driveways. Most collisions occurred in mid-block locations and at driveways.

There were a total of 443 reported collisions during the five year period; sixty-one percent of the collisions were intersection-related, 30% mid-block and 9% driveway related. This corridor experienced a rapid increase in collision from 2007 to 2008 and collision frequencies were generally consistent in the following four years. On average the corridor experienced 88.6 collisions per year over the study period. No fatal collision was recorded in the provided data. The highest number of collisions occurred during winter months (November and December). The majority of collisions occurred during weekdays with Thursday experiencing the most collisions. A low percentage occurred on weekends.

4.2.1 Collisions by Impact Type

The predominant impact type is turning movement collisions which accounted for 48% (212 out of 443) of all collisions, followed by rear-end at 27% (120 out of 444). There is an increasing pattern of turning movement collisions in the study period for all years. This impact type also accounted for over 50% of all collisions in years 2010 and 2011. Additionally, there are 16 collisions that involved pedestrians on this corridor.

4.2.2 Collision Prone Locations

Intersection-related collisions on Kent Street are illustrated in **Exhibit 30**. The two intersections that exhibited more than thirty collisions are Angeline Street (76) and Adelaide Street (30). These two intersections are further reviewed to identify any collision patterns.

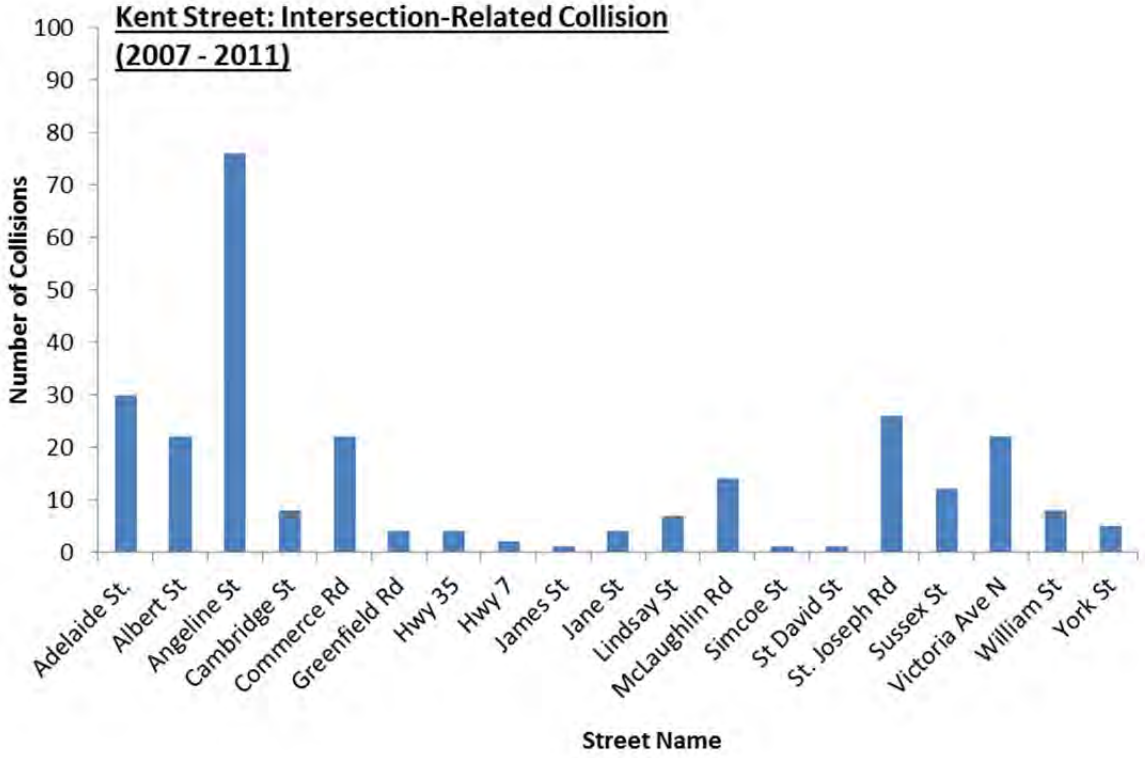


Exhibit 30: Collision Locations on Kent St (2007-2011)

4.2.2.1 Kent Street & Angeline Street

Angeline Street and Kent Street is a signalized intersection east of the commercial strip with a hospital situated at the northeast corner. This intersection experienced 76 collisions within the five-year study period. The two predominant impact types are rear-end and turning movement collisions.

The likely contributing factor for rear-end collisions are speed or tight traffic gaps between vehicles (drivers following too closely) during congested traffic conditions or poor road surface conditions (e.g. wet, icy or snow). This can reduce the acceptable driver reaction time.

Turning movement and angle collision are typical at signalized intersections. There was one reported pedestrian collision at this intersection in 2009 when a northbound vehicle attempted to turn right on Angeline Street, failed to check blind spot, and struck cyclist crossing the road at the south approach.

4.2.2.2 Kent Street & Adelaide Street

Adelaide Street and Colborne Street is a signalized intersection situated east of Angeline Street surrounded by rural residential development with an institution at the north east corner. The predominant impact type is turning movement collision. There was one reported pedestrian collision at this intersection in 2011 when a driver traveling westbound attempted to veer left and struck a pedestrian on the sidewalk.

4.2.2.3 Other Collisions: Driveways and Angled Parking

In the total of 174 mid-block collisions, 41 collisions are driveway-related along Kent corridor. Thirty (30) out of the 41 collisions resulted in turning movement collisions. Based on the collision descriptions, approximately 85% (35 out of 41) occurred along the commercial strip with high driveway activity.

There are a few records of collisions involving vehicles reversing out of angle parking spaces in the downtown area (east of Victoria Street), but there is too little information to identify any consistent pattern.

4.3 Collision Analysis: Colborne Street

The same study period (2007-2011) as the Kent Street safety review was used. In total, there were 127 reported collisions during the five-year study period. There was an increasing trend of collisions from 2007 to 2010 and a slight decrease in 2011. 2010 experienced the highest number of collisions (40) followed by 2011 (33) and 2009 (30). On average the corridor experienced 25.4 collisions per year over the study period. No fatal collision was recorded in the provided data.

The summer months (July and August) and September showed the highest number of collisions throughout the year. November and December exhibited a generally high frequency of collisions as well. The highest number of collisions occurred during Mondays and Tuesdays; while, a low percentage occurred during other days of the week.

4.3.1 Collisions by Impact Type

Rear-end collisions were the most recorded impact type which accounted for 30% (38 out of 127) of all collisions, followed by angle at 28% (35 out of 127), and turning movement at 16% (20 out of 127). There is an increasing pattern of rear-end collisions in the study period where 2010 experienced an increase in the numbers of collisions for all of the three aforementioned impact types. Additionally, there are five collisions that involved pedestrians on this corridor.

4.3.2 Collision Prone Locations

Colborne Street has 82 collisions that occurred at an intersection or were intersection related, while 45 collisions occurred at mid-blocks. **Exhibit 31** illustrates the locations of intersection-related collisions on Colborne Street. The intersections that experienced more than 10 collisions are at Angeline Street (26) and Albert Street (17). These two intersections are further reviewed to identify any collision patterns.

4.3.2.1 Colborne Street & Angeline Street

Angeline Street and Colborne Street is a signalized intersection situated east of Highway 35, with adjacent rural residential land uses, a church, and senior apartments. This intersection experienced 27 collisions within the five-year study period. The predominant impact types are rear-end, turning movement and angle collisions.

The likely contributing factor for rear-end collisions are speed or tight traffic gaps between vehicles (drivers following too closely) during congested traffic conditions or poor road surface conditions (e.g. wet, icy or snow). This can reduce the acceptable driver reaction time.

Turning movement and angle collision are typical at signalized intersections. There was one reported pedestrian collision at this intersection in 2010 when an eastbound vehicle struck a pedestrian crossing the street while turning left to northbound on Angeline Street.

4.3.2.2 Colborne Street & Albert Street

Albert Street and Colborne Street is a two-way stopped controlled intersection situated east of Adelaide Street surrounded by rural residential uses at all four approaches. The predominant impact type at this intersection is angle collision. Angle collision at this intersection involved drivers that had failed to yield right-of-way at the stop sign. In the absence of data, it is unknown if these violations are result of driver inattention or aggressive driving behaviour.

There were two reported pedestrian collisions at this intersection in 2009 and 2011. The descriptions for both pedestrian collisions are provided below:

- February 24th 2009: Pedestrian attempted to cross Colborne Street at the west approach where a westbound vehicle failed to stop and struck pedestrian.
- May 11th 2011: Northbound on Albert St N proceeded through intersection after stopping at the stop sign and struck pedestrian crossing Albert Street on the north approach.

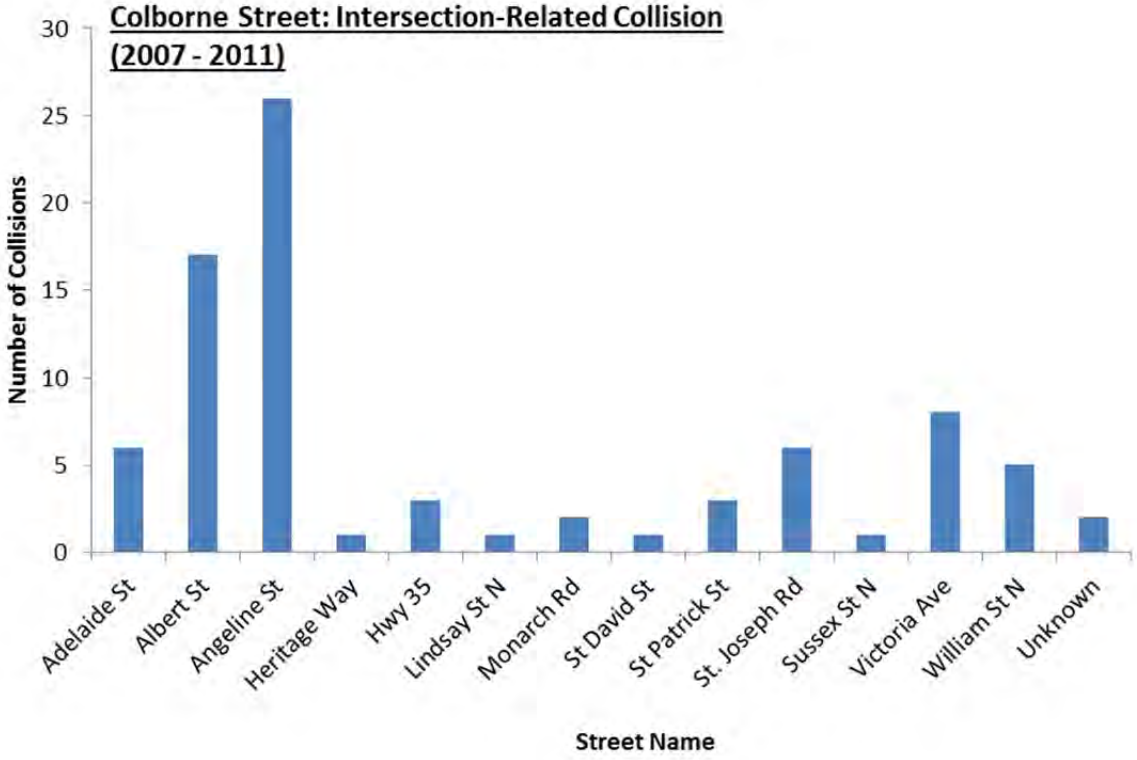


Exhibit 31: Intersection-related Collisions on Colborne Street (2007-2011)

5. FINDINGS

5.1 Traffic Operations

Our analysis has indicated that there is currently excess capacity within the study area during both the weekday AM and PM peak hours.

Operations are similar to those summarized in the **Transportation Master Plan**, but have improved slightly in some instances. We do not currently identify any areas where there are capacity deficiencies.

5.2 Collision History

Below is a summary of collision patterns on both corridors.

Kent Street:

- The predominant impact types on the corridor are rear-end and turning movement
- The two collision prone intersections are Angeline Street and Adelaide Street
  - The predominant impact type on Angeline Street is turning and rear end with one pedestrian collision
  - The predominant impact type on Adelaide Street is angle with one pedestrian collision
- Number of turning movement collisions occurred along commercial strip at driveway accesses

Colborne Street:

- The predominant impact types on the corridor are rear-end, angle and turning movement
- The two collision prone intersections are Angeline Street and Albert Street
  - The predominant impact type on Angeline Street is rear end
  - One pedestrian collision on Angeline Street
  - The predominant impact type on Albert Street is angle
  - Two pedestrian collisions on Albert Street caused by inattentive drivers

5.3 Pavement Markings & Signage

Pavement markings in both corridors are generally in good condition. However, there are some locations where the pavement markings are beginning to fade or have mostly faded and need to be repainted. However, the faded lines do not currently result in imminent hazards.

We have found that on both the Colborne Street and Kent Street corridors signage is generally correctly placed and in good condition. There are some instances where not **OTM** standard signs have been installed. These issues should be rectified. However, the non-standard signs do not currently result in imminent hazards.

Appendix A
Examples of Pavement Marking Conditions

Pavement Markings on Kent Street

Exhibit A: Pavement Markings at Kent / Victoria Street (north leg)

Exhibit B: Pavement Markings on Kent Street, west of Victoria Street

Exhibit C: Faded Stop bar at Lindsay / Kent Street (north leg)

Exhibit D: Faded stop bar and cracking in pavement at Angeline / Kent Street (north leg)

Exhibit E: Faded pavement marking at St. Joseph / Kent (west leg)

Pavement Markings on Colborne Street

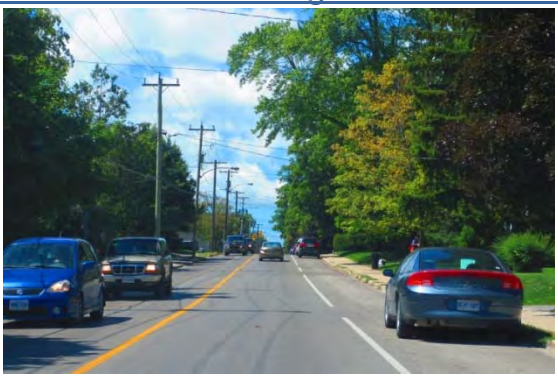


Exhibit F: Pavement Markings in Good Condition On Colborne (West of William Street)

Exhibit G: Pavement Marking for Stop Bar and Crosswalk in Good Condition (at Colborne Street / Victoria Avenue)

Appendix B
Existing Traffic Operations

Kent Street

We have assessed intersection operations based on the lane configurations depicted in **Exhibit 3** and **Exhibit 4**, and the existing traffic volumes shown in **Exhibit 21** and **Exhibit 22**. Operations are summarized in **Table A** and **Table B** for signalized and unsignalized intersections, respectively.

Table A: Kent Street Existing Signalized Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
	LOS	v/c	95th % Queue	LOS	v/c	95th % Queue
Kent Street @ St. Joseph Road	B	0.30		B	0.45	
Eastbound Left-turn	A	0.12	6.7	A	0.26	13.1
Eastbound Through-right	A	0.29	28.4	B	0.34	37.1
Westbound Left-turn	A	0.05	3.4	A	0.18	10.9
Westbound Through-right	B	0.27	24.6	B	0.41	42.7
Northbound Left-turn	B	0.05	5.0	C	0.39	24.9
Northbound Through-right	B	0.06	7.5	C	0.34	30.4
Southbound Left-turn	B	0.35	22.8	C	0.60	38.8
Southbound Through-right	B	0.15	15.0	C	0.31	27.4
Kent Street @ Angeline Street	C	0.55		C	0.76	
Eastbound Left-turn	B	0.30	25.1	B	0.55	33.4
Eastbound Through-right	B	0.33	45.8	C	0.65	91.5
Westbound Left-turn	B	0.08	7.0	B	0.25	12.0
Westbound Through-right	B	0.30	40.8	C	0.48	64.1
Northbound Left-turn	D	0.79	50.2	D	0.86	54.3
Northbound Through-right	C	0.42	44.7	C	0.42	48.9
Southbound Left-turn	C	0.19	16.1	C	0.19	16.4
Southbound Through-right	D	0.73	70.9	D	0.77	81.0
Kent Street @ Adelaide Street	A	0.25		A	0.39	
Eastbound Left-through and Through-right	A	0.22	16.5	A	0.36	35.6
Westbound Left-through and Through-right	A	0.23	16.7	A	0.35	33.3
Northbound Left-through-right	C	0.20	11.0	C	0.29	16.4
Southbound Left-through-right	C	0.35	16.1	C	0.48	23.8
Kent Street @ Albert Street	B	0.21		B	0.36	
Eastbound Left-through	B	0.19	20.4	B	0.34	37.7
Eastbound Right-turn	B	0.10	8.0	B	0.16	11.8
Westbound Left-through and Through-right	B	0.20	20.6	B	0.29	32.3
Northbound left-turn	B	0.10	8.9	B	0.12	13.0
Northbound Through-right	B	0.20	21.0	B	0.34	41.8
Southbound Left-through-right	C	0.23	22.3	C	0.15	18.0
Kent Street @ Victoria Avenue	B	0.23		B	0.35	
Eastbound Left-turn	B	0.14	9.4	B	0.18	12.3
Eastbound Through	B	0.25	23.1	B	0.46	47.1
Eastbound Right-turn	A	0.03	3.8	A	0.04	5.4
Westbound Left-through	B	0.19	13.7	B	0.23	17.6
Westbound Right-turn	A	0.02	1.6	A	0.02	2.3
Northbound Left-turn	B	0.06	5.4	B	0.09	8.1
Northbound Through-right	B	0.09	9.3	B	0.21	20.4
Southbound Left-through	B	0.21	18.7	B	0.20	19.2
Southbound Right-turn	B	0.04	5.3	B	0.03	4.8

Intersection & Critical Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
	LOS	v/c	95th % Queue	LOS	v/c	95th % Queue
Kent Street @ Cambridge Street	A	0.27		A	0.44	
Eastbound Left-turn	A	0.03	2.7	A	0.07	4.9
Eastbound Through	A	0.19	14.1	A	0.40	37.9
Eastbound Right-turn	A	0.01	1.3	A	0.07	5.6
Westbound Left-turn	A	0.03	2.7	A	0.07	4.9
Westbound Through	A	0.24	17.2	A	0.33	30.7
Westbound Right-turn	A	0.01	0.8	A	0.02	2.3
Northbound Left-through	C	0.40	15.9	C	0.59	24.1
Northbound Right-turn	B	0.01	2.0	B	0.02	4.4
Southbound Left-through	B	0.26	12.0	B	0.35	16.5
Southbound Right-turn	B	0.02	3.6	B	0.03	4.6
Kent Street @ William Street	B	0.28		B	0.41	
Eastbound Left-turn	A	0.06	3.8	A	0.09	7.0
Eastbound Through	A	0.17	12.0	A	0.36	35.7
Eastbound Right-turn	A	0.01	0.7	A	0.04	4.4
Westbound Left-turn	A	0.02	2.0	A	0.04	3.8
Westbound Through	A	0.21	14.5	A	0.20	18.8
Westbound Right-turn	A	0.02	1.7	A	0.02	1.9
Northbound Left-through	B	0.35	13.3	B	0.52	27.6
Northbound Right-turn	B	0.01	1.3	B	0.02	3.8
Southbound Left-through	C	0.56	19.5	B	0.51	28.7
Southbound Right-turn	B	0.05	5.1	B	0.05	7.2
Kent Street @ Lindsay Street	B	0.20		B	0.52	
Eastbound Left-turn	C	0.18	16.3	C	0.62	45.5
Eastbound Right-turn	C	0.06	5.9	C	0.20	13.6
Northbound Left-through	A	0.22	0.6	A	0.58	3.8
Southbound Through-right	C	0.30	22.1	C	0.39	23.5
Lindsay Street @ Ridout Street	A	0.14		B	0.29	
Westbound Left-turn	C	0.02	3.0	C	0.03	4.4
Northbound Through-right	B	0.17	18.1	B	0.39	40.3
Southbound Left-through	A	0.13	1.7	A	0.22	1.6
Kent Street @ Highway 35 / Greenfield Road	B	0.41		B	0.40	
Eastbound Left-turn	B	0.11	6.4	A	0.12	5.6
Eastbound Through-right	B	0.26	22.8	B	0.17	17.7
Westbound Left-turn	A	0.18	10.3	A	0.15	10.1
Westbound Through-right	B	0.13	11.7	B	0.36	36.9
Northbound Left-through-right	B	0.15	14.5	B	0.27	20.5
Southbound Left-through	C	0.64	50.9	B	0.48	28.2
Southbound Right-turn	B	0.04	5.2	B	0.05	7.2

Notes: v/c – volume to capacity ratio, LOS – level of service, 95th % Queue –queue which is only exceeded by 5% of queues

Under existing conditions all movements at signalized intersections along the Kent Street corridor are operating with level of service 'D' or better and volume to capacity ratios of 0.86 or better, during both peak hours. Overall intersections are operating with level of service 'B' or better during both peak hours, except for the intersection of Kent Street and Angeline Street which is operating with level of service 'C' during both peak hours.

Table B: Kent Street Existing Unsignalized Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
	LOS	v/c	95th % Queue	LOS	v/c	95th % Queue
Kent Street @ Jane Street						
Eastbound Left-through	A	0.01	0.3	A	0.02	0.5
Southbound Left-right	B	0.02	0.4	B	0.03	0.8
Kent Street @ Sussex Street						
Eastbound Left-through	A	0.02	0.6	A	0.04	0.9
Westbound Left-through	A	0.01	0.1	A	0.00	0.1
Northbound Left-through-right	B	0.06	1.4	C	0.13	3.3
Southbound Left-through-right	B	0.08	2.0	C	0.15	3.9
Kent Street @ Canadian Tire / Staples Driveway						
Westbound Left-turn	A	0.08	2.1	B	0.24	7.0
Northbound Left-turn	B	0.03	0.6	C	0.15	4.0
Northbound right-turn	B	0.07	1.7	B	0.35	12.0
Kent Street @ Whitney Town Centre Driveway						
Eastbound Left-turn	A	0.03	0.6	A	0.03	0.7
Southbound Left-right	B	0.11	2.8	B	0.22	6.2
Kent Street @ Loblaws Driveway						
Eastbound Left-turn	A	0.02	0.4	A	0.06	1.4
Southbound Left-right	B	0.03	0.8	B	0.21	6.0
Kent Street @ Commerce Road						
Westbound Left-turn	A	0.04	0.9	A	0.07	1.6
Northbound Left-right	B	0.08	1.9	B	0.32	10.4
Kent Street @ McLaughlin Road						
Westbound Left-turn	A	0.08	2.1	A	0.14	3.6
Northbound Left-right	B	0.21	6.1	B	0.34	11.3
Kent Street @ Ministry Driveway / Esso						
Eastbound Left-turn	A	0.05	1.1	A	0.00	0.1
Westbound Left-turn	-	-		-	-	-
Northbound Left-through-right	B	0.01	0.1	B	0.01	0.1
Southbound Left-through-right	B	0.04	1.0	B	0.06	1.5
Kent Street @ Canadian Tire Gas East Driveway						
Westbound Left-turn	A	0.06	1.5	A	0.10	2.5
Northbound Left-right	B	0.07	1.8	B	0.15	3.9
Kent Street @ Canadian Tire Gas West Driveway						
Northbound Right-turn	A	0.03	0.6	A	0.06	1.5

Notes: v/c – volume to capacity ratio, LOS – level of service, 95th % Queue –queue which is only exceeded by 5% of queues
Operations shown for critical movements only.

Under existing conditions all movements at unsignalized intersections along the Kent Street corridor are operating with level of service 'C' or better and volume to capacity ratios of 0.35 or better, during both peak hours.

Colborne Street

We have assessed intersection operations based on the lane configurations depicted in **Exhibit 14**, and the existing traffic volumes shown in **Exhibit 20**. Operations are summarized in **Table C** and **Table D** for signalized and unsignalized intersections, respectively.

Table C: Colborne Street Existing Signalized Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
	LOS	v/c	95th % Queue	LOS	v/c	95th % Queue
Colborne Street @ Highway 35	B	0.38		B	0.58	
Eastbound Left-through-right	A	0.16	15.2	A	0.09	10.4
Westbound Left-through-right	A	0.13	12.7	B	0.57	60.4
Northbound Left-turn	B	0.01	1.4	B	0.04	3.5
Northbound Through-right	B	0.29	20.2	B	0.59	48.2
Southbound left-turn	B	0.67	35.9	B	0.45	24.1
Southbound Through-right	B	0.43	28.9	B	0.51	40.4
Colborne Street @ Angeline Street	B	0.46		C	0.60	
Eastbound Left-turn	C	0.12	11.6	C	0.47	32.4
Eastbound Through-right	C	0.58	60.5	C	0.58	62.6
Westbound Left-turn	B	0.27	17.8	B	0.28	18.1
Westbound Through-right	B	0.33	39.8	B	0.54	68.5
Northbound Left-turn	B	0.06	7.3	B	0.19	17.5
Northbound Through-right	C	0.33	38.2	C	0.62	74.8
Southbound left-turn	B	0.20	16.3	B	0.20	12.4
Southbound Through-right	B	0.34	42.5	B	0.29	35.4
Colborne Street @ Adelaide Street	A	0.29		A	0.38	
Eastbound Left-through-right	A	0.29	23.3	A	0.37	33.0
Westbound Left-through-right	A	0.28	22.2	A	0.39	35.9
Northbound Left-through-right	C	0.22	11.6	C	0.32	16.3
Southbound Left-through-right	C	0.26	14.2	C	0.29	15.3
Colborne Street @ Victoria Avenue	B	0.34		B	0.38	
Eastbound Left-through-right	A	0.32	26.8	A	0.37	40.0
Westbound Left-through-right	A	0.27	23.2	A	0.37	39.8
Northbound Left-turn	B	0.10	6.9	C	0.42	18.8
Northbound Through-right	B	0.11	9.0	C	0.38	22.7
Southbound left-turn	B	0.05	4.1	B	0.07	4.8
Southbound Through-right	B	0.40	25.6	C	0.30	17.9

Notes: v/c – volume to capacity ratio, LOS – level of service, 95th % Queue –queue which is only exceeded by 5% of queues

Under existing conditions all movements at signalized intersections along the Colborne Street corridor are operating with level of service 'C' or better and volume to capacity ratios of 0.67 or better, during both peak hours. Overall intersections are operating with level of service 'B' or better during both peak hours, except for the intersection of Colborne Street and Angeline Street which is operating with level of service 'C' during the PM peak hour.

Table D: Colborne Street Existing Unsignalized Intersection Operations

Intersection & Critical Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
	LOS	v/c	95th % Queue	LOS	v/c	95th % Queue
Colborne Street @ St. Joseph Road						
Westbound Left-through	A	0.15	3.9	A	0.14	3.8
Northbound Left-turn	C	0.07	1.6	C	0.30	9.4
Northbound Right-turn	B	0.10	2.6	B	0.28	8.9
Colborne Street @ Charles Street						
Eastbound Left-through	A	0.00	0.1	A	0.01	0.2
Southbound Left-right	B	0.01	0.2	B	0.01	0.3
Colborne Street @ Heritage Way						
Westbound Left-through	A	0.01	0.3	A	0.01	0.2
Northbound Left-right	B	0.06	1.3	B	0.06	1.6
Colborne Street @ Walker Street						
Eastbound Left-through	A	0.00	0.0	A	0.00	0.1
Southbound Left-right	B	0.04	0.8	B	0.01	0.2
Colborne Street @ Albert Street						
Eastbound Left-through-right	A	0.01	0.2	A	0.02	0.5
Westbound Left-through-right	A	0.00	0.1	A	0.00	0.1
Northbound Left-through-right	C	0.12	3.0	C	0.26	7.6
Southbound Left-through-right	B	0.13	3.4	C	0.10	2.4
Colborne Street @ Sussex Street						
Westbound Left-through	A	0.01	0.1	A	0.00	0.0
Northbound Left-right	B	0.01	0.2	C	0.06	1.3
Colborne Street @ Cambridge Street						
Westbound Left-through	A	0.01	0.1	A	0.01	0.2
Northbound Left-right	B	0.05	1.1	B	0.14	3.7
Colborne Street @ William Street						
Eastbound Left-through-right	B	0.19	5.3	D	0.63	31.8
Westbound Left-through-right	C	0.07	1.8	F	0.34	9.6
Northbound Left-through-right	A	0.14	3.6	A	0.33	11.3
Southbound Left-through-right	-	0.00	0.0	A	0.00	0.1

Notes: v/c – volume to capacity ratio, LOS – level of service, 95th % Queue –queue which is only exceeded by 5% of queues

Under existing conditions all movements at unsignalized intersections along the Colborne Street corridor are operating with level of service 'D' or better and volume to capacity ratios of 0.30 or better, during both peak hours. One exception is the westbound left-through-right movement at the intersection of Colborne Street and William Street, which will be operating with level of service 'F' and a volume to capacity ratio of 0.34 during the weekday PM peak hour.

Kent Street and Colburne Street Corridors

Travel Time Summary - Weekday PM Peak Hour

Travel Time Surveys occurred on Wednesday August 14, 2013

EASTBOUND										Average All Runs		
	Distance (km)	Travel Time	Stopped Delay	Distance (km)	Travel Time	Stopped Delay	Distance (km)	Travel Time	Stopped Delay	Distance (km)	Travel Time	Stopped Delay
Colburne St.	*Run #1 - 16:30*			*Run #2 - 17:10*			*Run #3 - 17:46*					
Corridor	2.58	04:11	00:33	2.58	04:32	01:09	2.58	03:57	00:02	2.58	04:13	00:35
Hwy 35 to Angeline St.	1.36	01:50	00:12	1.39	02:08	00:32	1.38	01:34	00:00	1.38	01:51	00:15
Angeline St. to Lindsay St.	1.2	02:18	00:21	1.19	02:23	00:37	1.18	02:21	00:02	1.19	02:21	00:20
Kent St.	*Run #1 - 16:09*			*Run #2 - 16:46*			*Run #3 - 17:26*					
Corridor	3.41	07:17	02:07	3.43	07:19	02:01	3.43	07:57	02:28	3.42	07:31	02:12
Hwy 35 to Angeline St.	2.01	03:30	00:52	2.04	02:54	00:18	2.04	03:18	00:39	2.03	03:14	00:36
Angeline St. to Lindsay St.	1.39	03:49	01:15	1.41	04:27	01:43	1.39	04:40	01:49	1.40	04:19	01:36

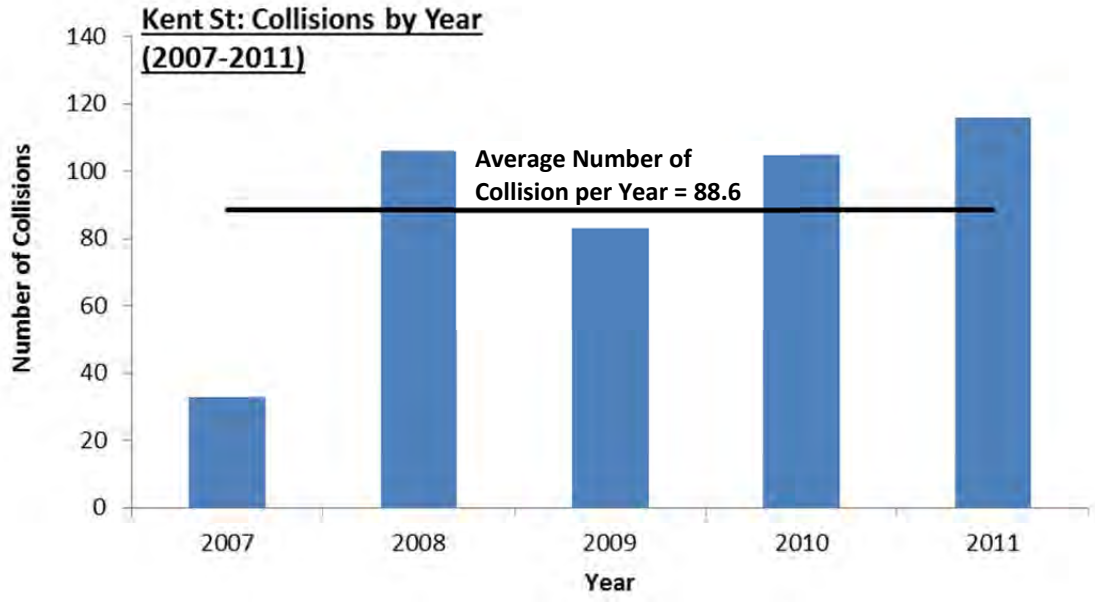
WESTBOUND										Average All Runs		
	Distance (km)	Travel Time	Stopped Delay	Distance (km)	Travel Time	Stopped Delay	Distance (km)	Travel Time	Stopped Delay	Distance (km)	Travel Time	Stopped Delay
Colburne St.	*Run #1 - 16:01*			*Run #2 - 16:37*			*Run #3 - 17:17*					
Corridor	2.61	04:59	01:05	2.6	05:40	01:49	2.6	05:30	01:42	2.60	05:23	01:32
Hwy 35 to Angeline St.	1.39	02:06	00:20	1.37	02:02	00:19	1.37	01:40	00:01	1.38	01:56	00:13
Angeline St. to Lindsay St.	1.21	02:47	00:41	1.19	02:54	00:50	1.21	03:17	01:12	1.20	02:59	00:54
Kent St.	*Run #1 - 16:18*			*Run #2 - 16:56*			*Run #3 - 17:35*					
Corridor	3.43	07:58	02:54	3.42	08:08	03:02	3.41	06:43	01:26	3.42	07:36	02:27
Hwy 35 to Angeline St.	2.05	02:36	00:19	2.03	03:57	01:15	2.03	03:23	00:46	2.04	03:19	00:47
Angeline St. to Lindsay St.	1.41	05:26	02:35	1.41	04:16	01:48	1.39	03:23	00:40	1.40	04:22	01:41

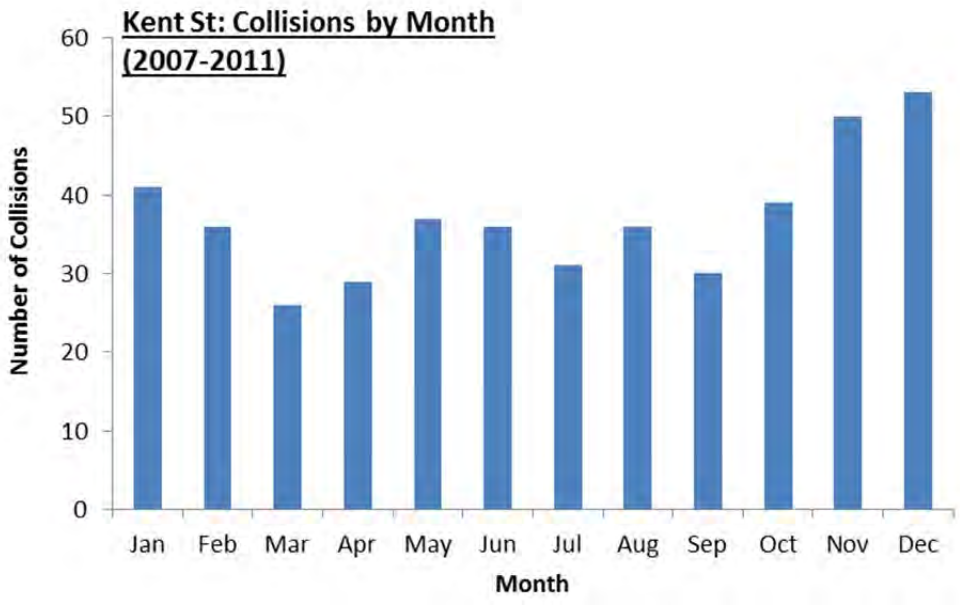
Appendix C
Collision History Data

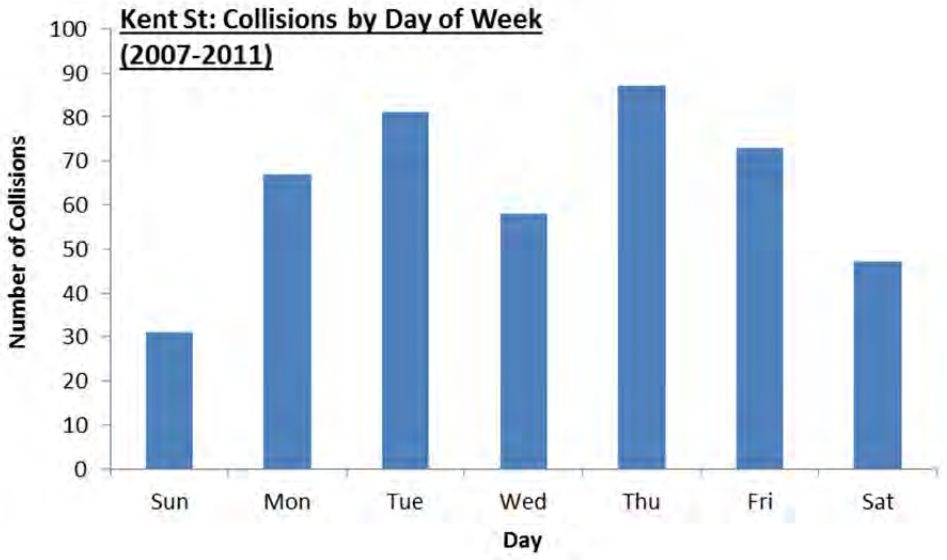
Kent Street

Collisions by Year on Kent St (2007 - 2011)

	2007	2008	2009	2010	2011	Total
Total	33	106	83	105	116	**443**
Percentage	7%	24%	19%	24%	26%	**100%**



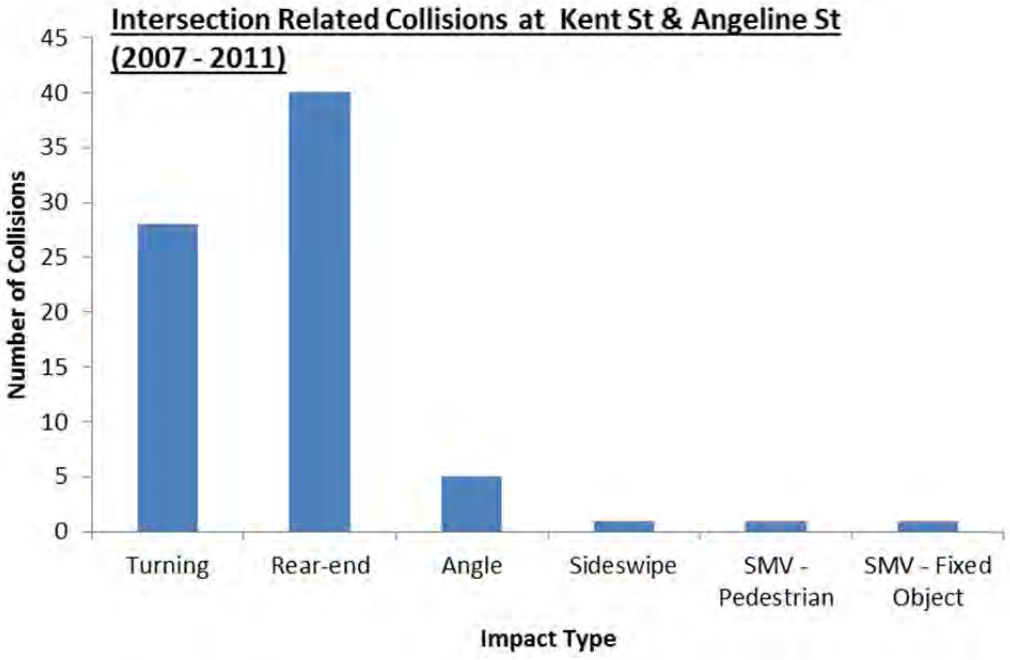


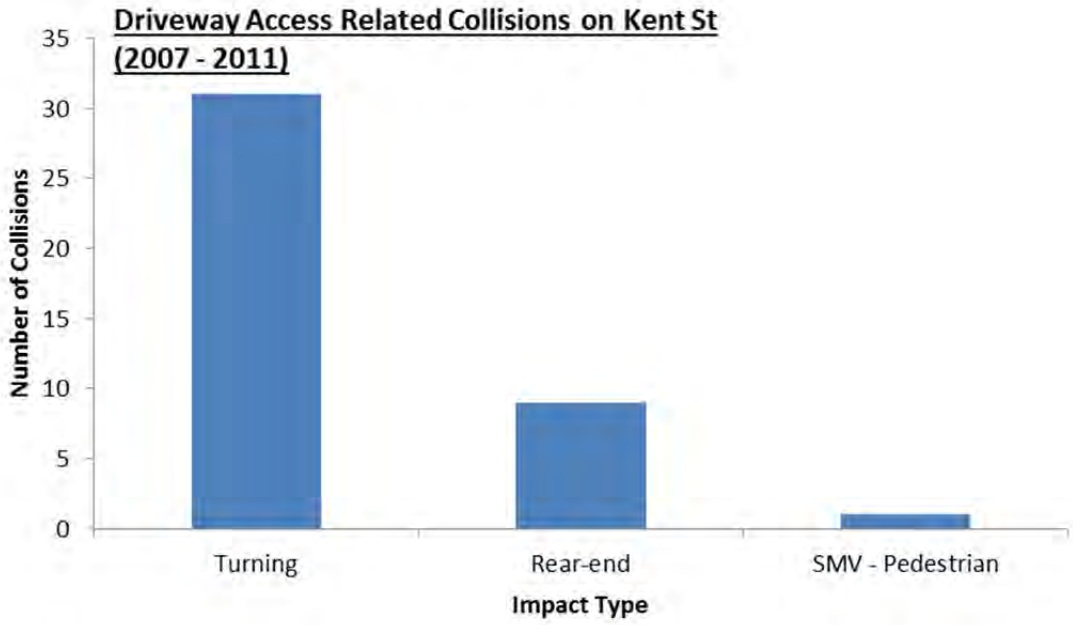


Collisions by Impact Type on Kent St (2007 - 2011)

	2007	2008	2009	2010	2011	Total	Percentage
Rear-end	9	34	25	27	25	120	**27%**
Turning	13	41	37	57	64	212	**48%**
Sideswipe	2	13	7	12	13	47	**11%**
Angle	7	9	10	5	8	39	**9%**
Other			2		2	4	**1%**
SMV - Pedestrian	1	7	1	3	4	16	**4%**
SMV - Fixed Object	1	2	1	1		5	**1%**
Total	**33**	**106**	**83**	**105**	**116**	**443**	**100%**
Percentage	**7%**	**24%**	**19%**	**24%**	**26%**	**100%**	

NOTE: '-' indicates no collisions

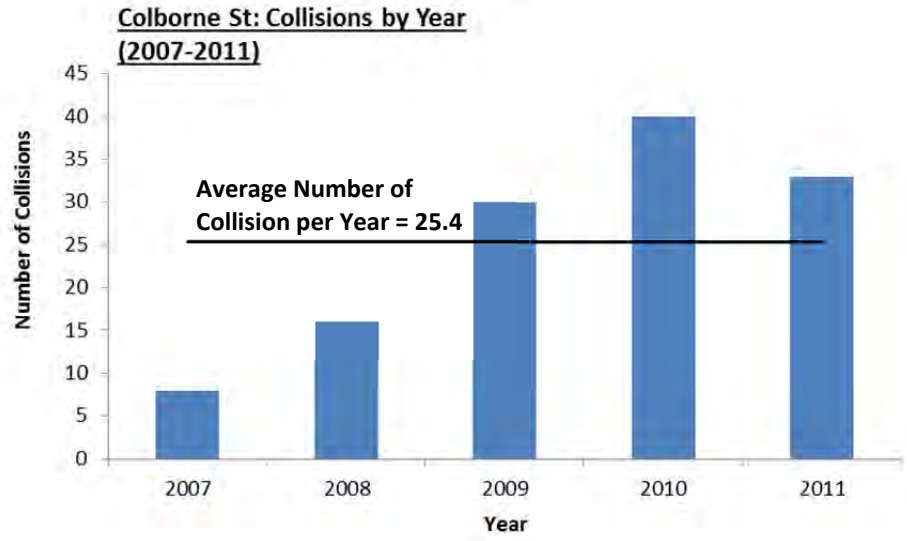

Intersection Related Collisions at Kent St & Angeline St (2007 - 2011)
Number of Collisions
45
40
35
30
25
20
15
10
5
0
Turning
Rear-end
Angle
Sideswipe
SMV - Pedestrian
SMV - Fixed Object
Impact Type

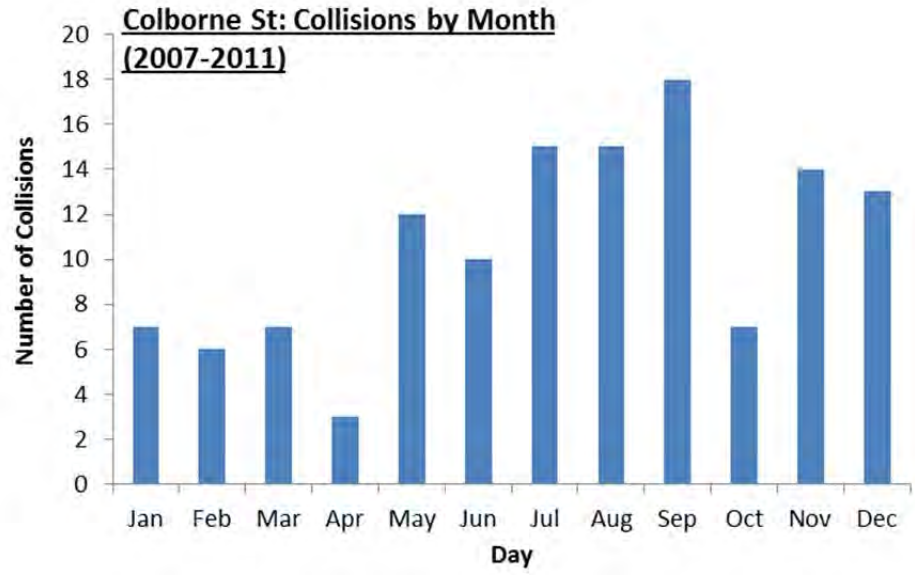

Driveway Access Related Collisions on Kent St (2007 - 2011)
Number of Collisions
35
30
25
20
15
10
5
0
Turning
Rear-end
SMV - Pedestrian
Impact Type

Colborne Street

Collision by Year on Colborne St (2007 - 2011)

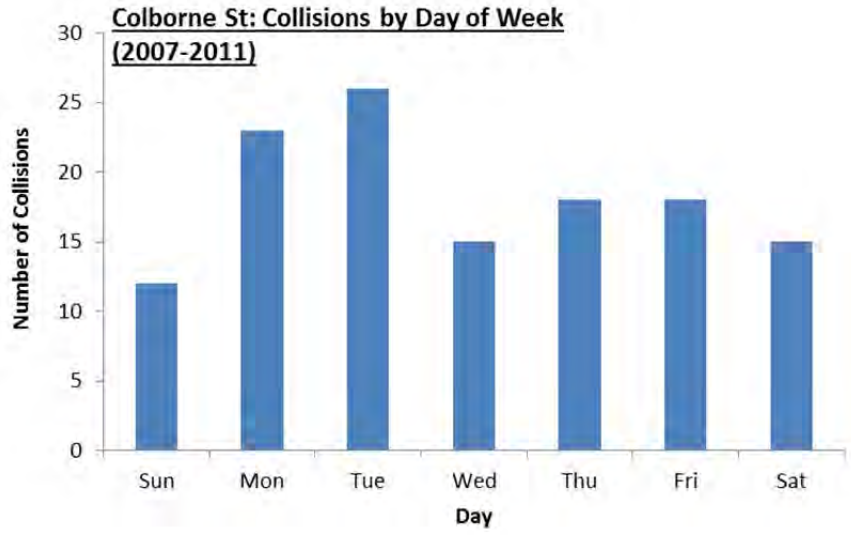
	2007	2008	2009	2010	2011	Total
Total	8	16	30	40	33	**127**
Percentage	6%	13%	24%	31%	26%	**100%**





Collision by Day of Week on Colborne St (2007 – 2011)

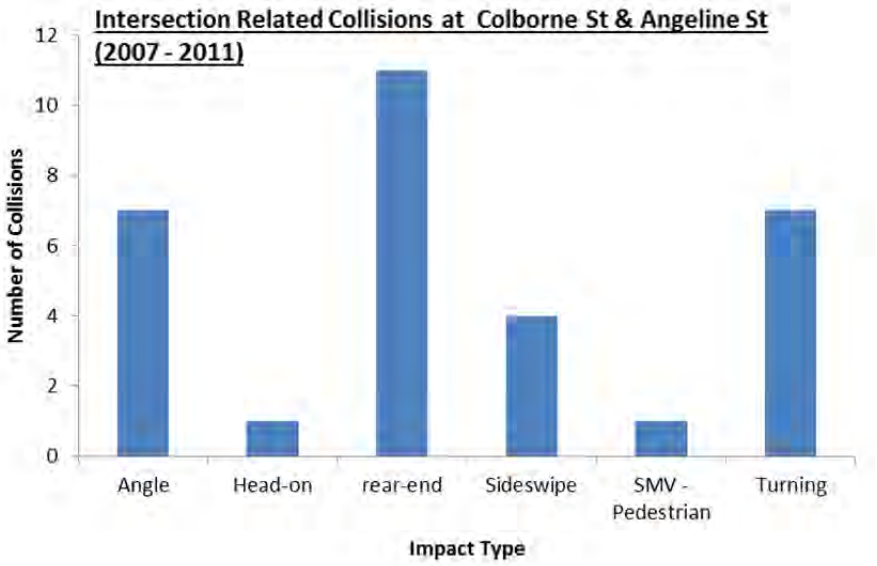
	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
Total	12	23	26	15	18	18	15	**127**
Percentage	9%	18%	20%	12%	14%	14%	12%	**100%**

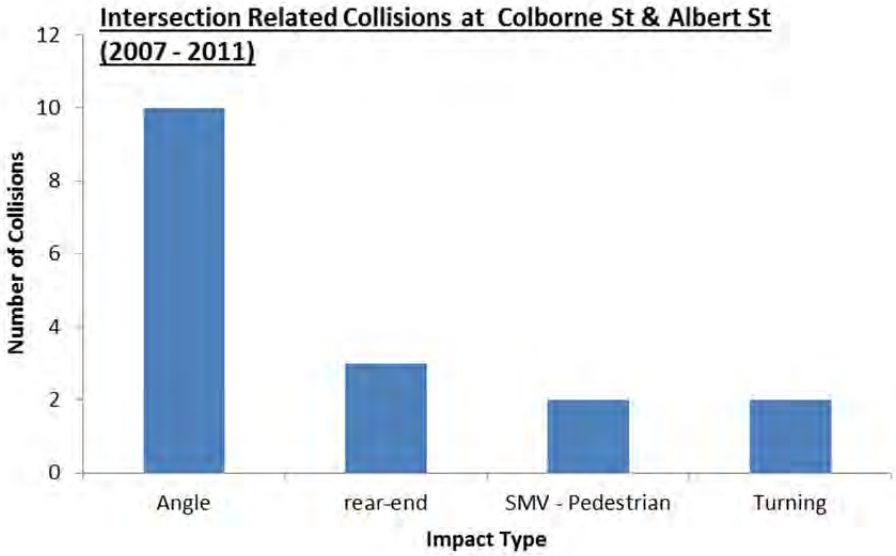


Collisions by Impact Type on Colborne St (2007 - 2011)

	2007	2008	2009	2010	2011	Total	Percentage
Rear-end	2	6	6	11	13	**38**	**30%**
Angle	3	4	11	11	6	**35**	**28%**
Turning	1	2	4	10	3	**20**	**16%**
Sideswipe		2	3	4	4	**13**	**10%**
SMV - Fixed Object	-	1	3	3	3	**10**	**8%**
Head-on	1	-	1			**2**	**2%**
SMV - Pedestrian	-	-	1	1	3	**5**	**4%**
SMV - Animal	-	1	1	-	1	**3**	**2%**
Other	1	-	-	-		**1**	**1%**
Total	**8**	**16**	**30**	**40**	**33**	**127**	**100%**
Percentage	**6%**	**13%**	**24%**	**31%**	**26%**	**100%**	

NOTE: '-' indicates no collisions


Intersection Related Collisions at Colborne St & Angeline St (2007 - 2011)
Number of Collisions
0
2
4
6
8
10
12
Angle
Head-on
rear-end
Sideswipe
SMV - Pedestrian
Turning
Impact Type


Intersection Related Collisions at Colborne St & Albert St (2007 - 2011)
Number of Collisions
0
2
4
6
8
10
12
Angle
rear-end
SMV - Pedestrian
Turning
Impact Type

APPENDIX B

Agency and Public Consultation

B.1 Correspondence with Indigenous Groups
B.2 Public Open House / Stakeholder Meeting Materials & Comments

APPENDIX B.1
Correspondence with Indigenous Groups

Indigenous Group Contact List

Indigenous Group	Prefix	First Name	Last Name	Address 1	Address 2	City	Postal Code	Email
~~Alderville First Nation~~	~~Chief~~	~~James R.~~	~~Marsden~~	~~11696 Second Line~~	~~P.O. Box 46~~	~~Roseneath, ON~~	~~K0K 2X0~~	~~sanderson@alderville.ca~~ ~~k.a.sandy-mckenzie@rogers.com~~
Alderville First Nation	Chief	Dave	Mowat	11696 Second Line Rd.		Roseneath, ON	K0K 2X0	dmowat@alderville.ca k.a.sandy-mckenzie@rogers.com
~~Beausoleil First Nation~~	~~Chief~~	~~Mary~~	~~McCue-King~~	~~11 O'Gemaa Miikaan~~		~~Christian Island, ON~~	~~L9M 0A9~~	~~fnadmin@chimnissing.ca~~ ~~k.a.sandy-mckenzie@rogers.com~~
Beausoleil First Nation	Chief	Guy	Monague	11 O'Gemaa Miikaan		Christian Island, ON	L9M 0A9	fnadmin@chimnissing.ca k.a.sandy-mckenzie@rogers.com
Chippewas of Georgina Island	Chief	Donna	Big Canoe	R.R. #2	Box N-13	Sutton West, ON	L0E 1R0	donna.bigcanoe@georginaisland.com k.a.sandy-mckenzie@rogers.com
Chippewas of Rama First Nation	Chief	Rodney	Noganosh	5884 Rama Road	Suite 200	Rama, ON	L3V 6H6	chief@ramafirstnation.ca k.a.sandy-mckenzie@rogers.com
~~Curve Lake First Nation~~	~~Chief~~	~~Phyllis~~	~~Williams~~	~~22 Winookeedaa Road~~		~~Curve Lake, ON~~	~~K0L 1R0~~	~~chief@curvelakefn.ca~~ ~~k.a.sandy-mckenzie@rogers.com~~
Curve Lake First Nation	Chief	Emily	Whetung	22 Winookeedaa Road		Curve Lake, ON	K0L 1R0	emilyw@curvelake.ca k.a.sandy-mckenzie@rogers.com
~~Hiawatha First Nation~~	~~Chief~~	~~Greg~~	~~Cowie~~	~~123 Paudash Street~~		~~Hiawatha, ON~~	~~K9J 0E6~~	~~lloucks@hiawathafn.ca~~ ~~k.a.sandy-mckenzie@rogers.com~~
Hiawatha First Nation	Chief	Laurie	Carr	123 Paudash Street		Hiawatha, ON	K9J 0E6	chiefcarr@hiawathafn.ca k.a.sandy-mckenzie@rogers.com
Kawartha Nishnawbe First Nation	Chief	Kris	Nahrgang	257 Big Cedar Lake Rd.		Big Cedar, ON	K0L 2H0	rknahrgang@gmail.com
Metis Nation of Ontario				66 Slater St.	Suite 1100	Ottawa, ON	K1P 5H1	consultations@metisnation.org
Mississaugas of the New Credit First Nation	Chief	R. Stacey	LaForme	2789 Mississauga Road	RR 6	Hagersville, ON	N0A 1H0	Stacey.LaForme@mncfn.ca
The Mississaugas of Scugog Island	Chief	Kelly	LaRocca	22521 Island Road		Port Perry, ON	L9L 1B6	klarocca@scugogfirstnation.com consultation@scugogfirstnation.com k.a.sandy-mckenzie@rogers.com
Williams Treaties First Nations		Karry	Sandy McKenzie	8 Keswick Court		Barrie, ON	L4M 2S7	k.a.sandy-mckenzie@rogers.com

LEGEND: ~~ = contact removed/replaced

DEVELOPMENT SERVICES
Land Management
Box 9000, 12 Peel St., Lindsay, Ontario, K9V 5R8
Phone: (705) 324-9411 Ext. 1279 Fax: (705) 324-2982
Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Kawartha Nishnawbe First Nation
P.O. Box 1432
Lakefield, Ontario
K0L 2H0

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors
EA Study, Lindsay

We are writing to advise that the City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors.

The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors

Enclosed herewith is a copy of the Notice of Study and we would like to confirm that this study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) public process. Once scheduled, we will provide you a minimum of 30 days' notice of any public information centre.

Also, we would like to provide assurance that any archeological studies or findings will be shared with your community and we are open to receiving any comments, information or suggestions that stakeholders have regarding the study for the subject area in Lindsay.

We appreciate your time; the Project Manager and I are available to meet with you at your convenience to discuss this matter. Should you require any further information please do not hesitate to contact either myself at extension 1279, or the Administrative Assistant to Land Management at extension 1261.

We look forward to hearing from you.

Sincerely,

The Corporation of the City of Kawartha Lakes

Diane McFarlane, SR/WA
Land Management Co-ordinator
DM:nw
Encls. Notice of Study

DEVELOPMENT SERVICES
Land Management
Box 9000, 12 Peel St., Lindsay, Ontario, K9V 5R8
Phone: (705) 324-9411 Ext. 1279 Fax: (705) 324-2982
Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

sent by e-mail: k.a.sandy-mckenzie@rogers.com

Williams Treaty First Nation
8 Keswick Court
Barrie, ON L4M 2S7

Attention: Karry Sandy-McKenzie

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

---

We are writing to advise that the City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors.

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The Corporation of the City of Kawartha Lakes

Diane McFarlane, SR/WA
Land Management Co-ordinator
DM:nw
Encls. Notice of Study

DEVELOPMENT SERVICES
Land Management
Box 9000, 12 Peel St., Lindsay, Ontario, K9V 5R8
Phone: (705) 324-9411 Ext. 1279 Fax: (705) 324-2982
Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Curve Lake First Nation
22 Winookeeda Road
Curve Lake, Ontario K0L 1R0

Sent by e-mail: chief@curvelakefn.ca
cc k.a.sandy-mckenzie@rogers.com

Attention: Chief Phyllis Williams

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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We appreciate your time; the Project Manager and I are available to meet with you at your convenience to discuss this matter. Should you require any further information please do not hesitate to contact either myself at extension 1279, or the Administrative Assistant to Land Management at extension 1261.

We look forward to hearing from you.

Sincerely,

The Corporation of the City of Kawartha Lakes

Diane McFarlane, SR/WA
Land Management Co-ordinator
DM:nw
Encls. Notice of Study

DEVELOPMENT SERVICES
Land Management
Box 9000, 12 Peel St., Lindsay, Ontario, K9V 5R8
Phone: (705) 324-9411 Ext. 1279 Fax: (705) 324-2982
Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Beausoleil First Nation
1 O-Gema Street
Christian Island, Ontario L0K 1C0

Sent by e-mail: *dgraham@chimnissing.ca*
cc: k.a.sandy-mckenzie@rogers.com

Attention: Chief Roland Monague

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

---

We are writing to advise that the City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors.

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e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Chippewas of Rama First Nation
5884 Rama Road
Suite 200
Rama, Ontario L3V 6H6

Sent by e-mail: chief@ramafirstnation.ca
cc k.a.sandy-mckenzie@rogers.com

Attention: Chief Sharon Stinson Henry

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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Sincerely,

The Corporation of the City of Kawartha Lakes

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Land Management Co-ordinator
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e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Northumberland Metis Council
140 Elder Road
R.R. #4
Roseneath, Ontario K0K 2X0

Sent by e-mail: w_trudeau@yahoo.ca

Attention: Wayne Trudeau, President

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

---

We are writing to advise that the City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors.

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e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Mississaugas of the New Credit First Nation
The Band Office
2789 Mississauga Road
Hagersville, Ontario N0A 1H0

Sent by e-mail:
bryanlaforme@newcreditfirstnation.com
cc: carolyn.king@newcreditfirstnation.com

Attention: Chief Bryan LaForme

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

---

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Land Management Co-ordinator
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e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

The Mississaugas of Scugog Island
22521 Island Road
Port Perry, Ontario
L9L 1B6

Sent by e-mail: msanford@scugogfirstnation.com

Attention: Chief Tracy Gauthier

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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The Corporation of the City of Kawartha Lakes

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Land Management Co-ordinator
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e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Metis Nation of Ontario
500 Old St. Patrick St.
Unit 3
Ottawa, Ontario
K1N 9G4

Sent by e-mail: consultations@metisnation.org

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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The Corporation of the City of Kawartha Lakes

Diane McFarlane, SR/WA
Land Management Co-ordinator
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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Hiawatha First Nation
123 Paudash Street
Hiawatha First Nation, Ontario
K9J 0E6

Sent by e-mail: dsheridan@hiawathafn.ca & lloucks@hiawathafn.ca

Attention: Chief Greg Cowie

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Chippewas of Georgina Island
R.R.#2
Box N 13
Sutton West, Ontario L0E 1R0

Sent by e-mail: dbigcanoe@georginaisland.com

Attention: Chief Donna Big Canoe

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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Land Management Co-ordinator
DM:nw
Encls. Notice of Study

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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

October 20, 2014

Alderville First Nation
11696 Second Line
P.O. Box 46
Roseneath, Ontario K0K 2X0

Sent by e- mail: dsimpson@aldervillefirstnation.ca

Attention: Chief James R. Marsden

Re: City of Kawartha Lakes – Kent Street and Colborne Street Corridors EA Study, Lindsay

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Land Management Co-ordinator
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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL sanderson@alderville.ca

Alderville First Nation
11696 Second Line
P.O. Box 46
Roseneath, Ontario K0K 2X0

Attention: Chief James R. Marsden

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

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Diane McFarlane, SR/WA
Manager, Realty Services
DM:nw

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e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL fnadmin@chimnissing.ca
k.a.sandy-mckenzie@rogers.com

Beausoleil First Nation
1 O-Gema Street
Christian Island, Ontario L0K 1C0

Attention: Chief Mary McCue King

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

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Manager, Realty Services
DM:nw

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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL donna.bigcanoe@georginaisland.com

Chippewas of Georgina Island
Box N 13
R.R. #2
Sutton West, Ontario L0E 1R0

Attention: Chief Donna Big Canoe

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

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Manager, Realty Services
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e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL chief@ramafirstnation.ca
k.a.sandy-mckenzie@rogers.com

Chippewas of Rama First Nation
5884 Rama Road
Suite 200
Rama, Ontario L3V 6H6

Attention: Chief Rodney Noganosh

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

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Manager, Realty Services
DM:nw

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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL chief@curvelakefn.ca
k.a.sandy-mckenzie@rogers.com

Curve Lake First Nation
22 Winookeeda Road
Curve Lake, Ontario K0L 1R0

Attention: Chief Phyllis Williams

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

This shall further our letter to you dated October 20, 2014.

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Diane McFarlane, SR/WA
Manager, Realty Services
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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL lloucks@hiawathafn.ca

Hiawatha First Nation
123 Paudash Street
Hiawatha First Nation, Ontario K9J 0E6

Attention: Chief Greg Cowie

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

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e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA REGULAR MAIL

Kawartha Nishnawbe First Nation
P.O. Box 1432
Lakefield, Ontario K0L 2H0

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

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Diane McFarlane, SR/WA
Manager, Realty Services
DM:nw

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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL consultations@metisnation.org

Metis Nation of Ontario
500 Old St. Patrick Street
Unit 3
Ottawa, Ontario K1N 9G4

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Diane McFarlane, SR/WA
Manager, Realty Services
DM:nw

REALTY SERVICES
Legal Services
Box 9000, 12 Peel St., Lindsay, Ontario, K9V 5R8
Phone: (705) 324-9411 Ext. 1279 Fax: (705) 324-2982
Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL stacey.laforme@newcreditfirstnation.com

Mississaugas of the New Credit First Nation
The Band Office
2789 Mississauga Road
Hagersville, Ontario N0A 1H0

Attention: Chief R. Stacey LaForme

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

This shall further our letter to you dated October 20, 2014.

We are writing to advise that City of Kawartha Lakes staff will be presenting a final draft of the Kent Street Corridor EA Study to City Council on November 22, 2016 with recommendations for improvements within the corridor. If the recommendations are approved by Council a notice of study completion will go out and the project file will be on display for 30 days and you will be notified of same.

Should you wish to view the project file, have any questions or require any additional information please do not hesitate to contact myself at the above email address or at extension 1279.

Sincerely,

The Corporation of the City of Kawartha Lakes

Diane McFarlane, SR/WA
Manager, Realty Services
DM:nw

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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA REGULAR MAIL &
EMAIL klarocca@scugogfirstnation.com
consultation@scugogfirstnation.com

The Mississaugas of Scugog Island
22521 Island Road
Port Perry, Ontario L9L 1B6

Attention: Chief Kelly LaRocca

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

This shall further our letter to you dated October 20, 2014.

We are writing to advise that City of Kawartha Lakes staff will be presenting a final draft of the Kent Street Corridor EA Study to City Council on November 22, 2016 with recommendations for improvements within the corridor. If the recommendations are approved by Council a notice of study completion will go out and the project file will be on display for 30 days and you will be notified of same.

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Sincerely,

The Corporation of the City of Kawartha Lakes

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Toll Free: 1-888-822-2225
e-mail: dmcfarlane@city.kawarthalakes.on.ca

November 7, 2016

VIA EMAIL k.a.sandy-mckenzie@rogers.com

Williams Treaty First Nation
8 Keswick Court
Barrie, Ontario L4M 2S7

Attention: Karry Sandy-McKenzie

Dear Sir/Madam:

Re: City of Kawartha Lakes – Kent Street Corridor EA Study, Lindsay

This shall further our letter to you dated October 20, 2014.

We are writing to advise that City of Kawartha Lakes staff will be presenting a final draft of the Kent Street Corridor EA Study to City Council on November 22, 2016 with recommendations for improvements within the corridor. If the recommendations are approved by Council a notice of study completion will go out and the project file will be on display for 30 days and you will be notified of same.

Should you wish to view the project file, have any questions or require any additional information please do not hesitate to contact myself at the above email address or at extension 1279.

Sincerely,

The Corporation of the City of Kawartha Lakes

Diane McFarlane, SR/WA
Manager, Realty Services
DM:nw

APPENDIX B.2

Public Open House / Stakeholder Meeting Materials & Comments

Notices

City of Kawartha Lakes
Catch the Kawartha spirit

MUNICIPAL BULLETIN

(705) 324-9411• (888) 822-2225 www.city.kawarthalakes.on.ca

PUBLIC NOTICE

Kent Street and Colborne Street Corridors EA Study

NOTICE OF STUDY COMMENCEMENT & PUBLIC OPEN HOUSE

The City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street West, Lindsay corridors. The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

This notice signals the commencement of the EA Study. This study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) public process.

A key component of the study will be consultation with stakeholders and the general public. Anyone with an interest in this study has the opportunity to get involved and provide input. Two Public Open Houses will be held during the study to present findings and receive public input.

The first Public Open House will be held on:

Tuesday, September 24th, 2013
4:00 to 7:00pm
Victoria Room at City Hall
26 Francis Street, Lindsay

If you require additional information, would like to be placed on the project mailing list, or if you represent an agency, organization, ratepayers group, or special interest group and would like to be added to the study contact list, please contact one of the individuals below:

Michael Farquhar
Supervisor, Technical Services
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department
P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Phone: (705) 324-9411 ext 1156
Email: mfarquhar@city.kawarthalakes.on.ca

Carl Wong, P.Eng.
Consultant Project Manager
HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Phone: 905-882-4100 ext. 5234
Email: carl.wong@hdrinc.com

NOTICE OF INTENT TO ADOPT THE 2014 CAPITAL BUDGET FOR THE CITY OF KAWARTHA LAKES

The City of Kawartha Lakes Council intends to adopt the 2014 Capital Budget at a special council meeting on Tuesday October 1st 2013 starting at 9:30 am, in the Council Chambers located at 26 Francis Street in Lindsay.

The Proposed 2014 Capital Budget document is available for public viewing on the City website: **http://www.city.kawarthalakes.on.ca.**

If you wish to make written comments on the draft 2014 Capital budget, you may submit them electronically to Mary-Anne Dempster by email to **mdempster@city.kawarthalakes.on.ca** clearly marked in the subject line "2014 Capital Budget Comments", or drop them off at any Municipal Service Centre or mail to City of Kawartha Lakes, P.O. Box 9000, Lindsay, ON K9V 5R8 - clearly marked – "2014 Capital Budget Comments".

The October 1st, 2013 Council Meeting agenda will be available at the Clerk's Office after 1:00 p.m. on Wednesday, September 25th, 2013 or on the City website. If you wish to be placed on the agenda, you must submit a written request to appear before Council and submit it to the Clerk's Office or send electronically to **agendaitems@city.kawarthalakes.on.ca** by Monday September 23rd, 2013 at 12 noon. If you wish to view the rules and procedures for becoming a deputation, this information can be obtained from the Clerk's Office or visiting the web site listed above – Section "City Hall – Clerk's Office – Information for Deputants.

DATED AT THE CITY OF KAWARTHA LAKES THIS 12th DAY OF SEPTEMBER 2013

Sara Beukeboom,
Corporate Services Manager – Financial Services,
City of Kawartha Lakes,
26 Francis Street, P. O. Box 9000,
Lindsay, ON K9V 5R8 (705) 324-9411 Ext 1348

City of Kawartha Lakes
Catch the Kawartha spirit

MUNICIPAL BULLETIN

(705) 324-9411• (888) 822-2225 www.city.kawarthalakes.on.ca

PUBLIC NOTICE

Notice of Intent to Consider Licensing By-law

Please be advised that the Council of the City of Kawartha Lakes intends to consider the Kennel Licensing By-law at the **December 10, 2013** regular council meting held at City Hall, 26 Francis St., Lindsay, beginning at 2:00pm.

If you wish to be placed on the agenda to appear before Council at the time of the by-law you must submit a written request to the Clerk's Offi ce or send electronically to agendaitems@city. kawarthalakes. on.ca by Monday, December 9, 2013 at 12:00 noon. If you wish to view the rules and procedures for becoming a deputation, this information can be obtained from the Clerk's Offi ce or by visiting the website listed below – under the City Hall tab – Agendas and Minutes – Notes to Assist Deputants.

Should you require any further information with respect to this matter, please contact:

John Paul Newman, Deputy Clerk
26 Francis St. Lindsay, ON K9V 5R8
Phone: 705.324.9411 Ext. 1322
Fax: 705.324.8110
Email: **jnewman@city.kawarthalakes.on.ca**
Website: **www.city.kawarthalakes.on.ca**

PROPOSED SHORELINE ROAD CLOSURE AND SALE

TAKE NOTICE that, pursuant to By-laws 2010-118 and 2008-065, both as amended, the Council of The Corporation of the City of Kawartha Lakes has declared that Part of the Original Shore Road Allowance along Head Lake lying in front of Lot 10, Concession 5, designated as Part 3 on Plan 57R-10254, in the Geographic Township of Laxton, City of Kawartha Lakes, surplus to its needs and at its meeting to be held on the 14th day of January, 2014, at 2:00 p.m. in the Council Chambers, City Hall, 26 Francis Street, Lindsay, Ontario, intends to pass a by-law to stop up and close that part of the shoreline road allowance and to authorize the sale of the land to the adjacent property owners.

A Reference plan showing that part of the shoreline road allowance to be stopped up and closed is on file and may be examined at the office of the Land Management Co-ordinator of the City of Kawartha Lakes at 12 Peel Street, Lindsay, Ontario.

AND TAKE FURTHER NOTICE that at the said meeting the Council shall hear in person or by their Counsel, Solicitor or Agent any person who claims that his or her land would be prejudicially affected by the by-law and who applies to be heard.

If you have any questions about the property that is involved in this transaction please do not hesitate to contact the Land Management Office at (705) 324-9411 extension 1261.

Persons interested in making deputations on this matter are requested to notify the Deputy Clerk at (705) 324-9411 extension 1266 by noon on the 20th day of December, 2013.

DATED at the City of Kawartha Lakes, this 21st day of November, 2013.

Diane McFarlane, Land Management Co-ordinator
City of Kawartha Lakes
P.O. Box 9000, 12 Peel Street
Lindsay, Ontario K9V 5R8

Lindsay Transit
Ride Smart.

HOLIDAY HOURS

There will be NO BUS SERVICE

Wednesday, December 25th
-and-
Wednesday, January 1st, 2014
***Regular Hours on Christmas Eve & New Year's Eve**

Everyone from Lindsay Transit, Limo Specialized Transit & Rural Transit (Dial-A-Ride), wish you a safe and happy holiday season!

Kent Street and Colborne Street Corridors EA Study

NOTICE OF STUDY COMMENCEMENT & PUBLIC OPEN HOUSE

The City of Kawartha Lakes will be holding a 2nd PIC for Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors. The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

This study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) public process.

A key component of the study will be consultation with stakeholders and the general public. Anyone with an interest in this study has the opportunity to get involved and provide input. Two Public Open Houses will be held during the study to present findings and receive public input.

The 2nd Public Open House will be held on:

Thursday 5, December
4:00 to 7:00pm
Victoria Room at City Hall
26 Francis Street, Lindsay

If you require additional information, would like to be placed on the project mailing list, or if you represent an agency, organization, ratepayers group, or special interest group and would like to be added to the study contact list, please contact one of the individuals below:

Michael Farquhar
Project Manager
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department
P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Phone: (705) 324-9411 ext 1156
Email: mfarquhar@city.kawarthalakes.on.ca

Carl Wong, P.Eng.
Consultant Project Manager
HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Phone: 905-882-4100 ext. 5234
Email: carl.wong@hdrinc.com

Public Open House #1
Display Panels

PUBLIC OPEN HOUSE

KENT STREET AND COLBORNE STREET

CORRIDOR STUDY

ENVIRONMENTAL ASSESSMENT

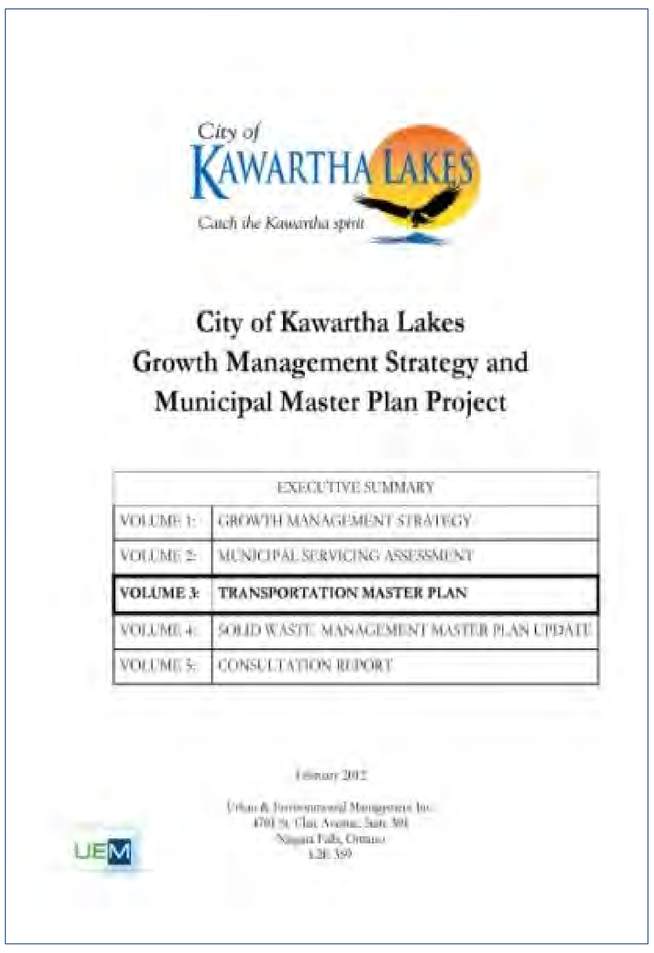
Tuesday, September 24th, 2013, 4pm – 7pm

Victoria Room at City Hall, 26 Francis Street, Lindsay

POLICY FRAMEWORK

The City's Transportation Master Plan 2012:

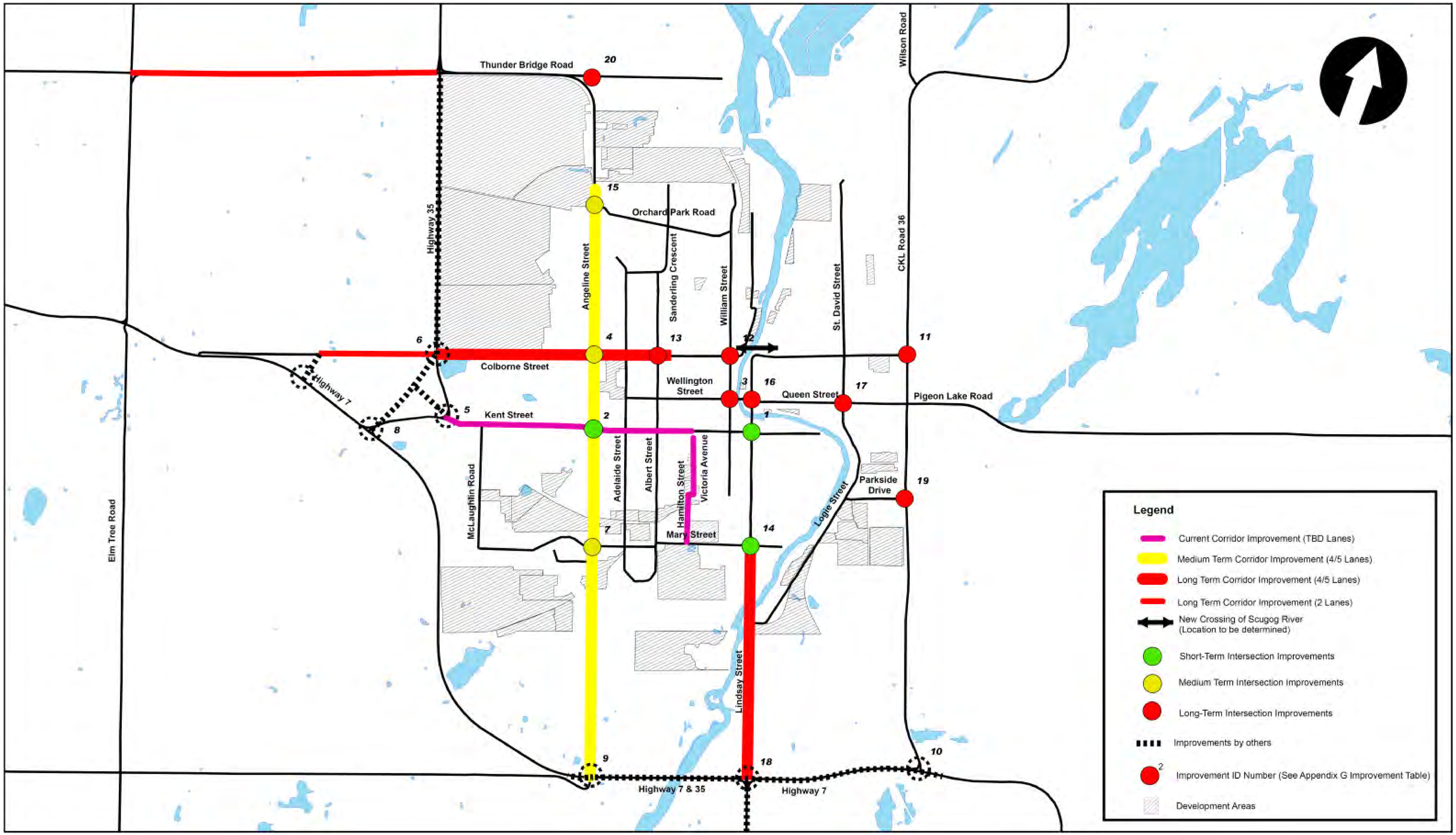
- Sets forth the long term transportation vision to 2031 for Lindsay and the subject two corridors.
- Identifies the following suggested improvements requiring further study on Kent Street and Colborne Street
  - Kent Street
    - Highway 35 to Victoria Avenue: Current corridor improvements
    - Intersection with Angeline Street: Short term intersection improvements
    - Intersection with Lindsay Street: Short term intersection improvements
  - Colborne Street
    - Highway 35 to Albert Street: Long term corridor improvements (4/5 lanes)
    - Intersection with Angeline Street: Medium term intersection improvements
    - Intersection with Albert Street: Long term intersection improvements
    - Intersection with William Street: Long term intersection improvements
- Identifies the need for a second east-west bridge crossing of the Trent River within the neighbourhood of Colborne Street
- Identifies a need to review on-street parking


City of Kawartha Lakes
Growth Management Strategy and Municipal Master Plan Project

EXECUTIVE SUMMARY	
VOLUME 1:	GROWTH MANAGEMENT STRATEGY
VOLUME 2:	MUNICIPAL SERVICING ASSESSMENT
VOLUME 3:	**TRANSPORTATION MASTER PLAN**
VOLUME 4:	SOLID WASTE MANAGEMENT MASTER PLAN UPDATE
VOLUME 5:	CONSULTATION REPORT

February 2012

Urban & Environmental Management Inc.
4701 St. Clair Avenue, Suite 301
Niagara Falls, Ontario
L2E 3S9



Source: City of Kawartha Lakes Transportation Master Plan (2012)

PROBLEM AND OPPORTUNITY STATEMENT

The City of Kawartha Lakes is projected to be home to an estimated **100,000 residents by 2031** with Lindsay experiencing the bulk of this growth.

The 2012 Transportation Master Plan identified existing transportation **capacity constraints on Kent and Colborne Streets** with recommended improvements in the short, medium and long term.

The two corridors require more detailed examination and a review of the TMP's recommendations. There is an opportunity to not only improve vehicular capacity to respond to travel demand, but also improve the multi-modal mobility needs of existing and future residents, employees and businesses.

KENT COLBORNE CORRIDOR STUDY EA GUIDING PRINCIPLES:

- **Sustainable and multi-modal** transportation corridors
- Transportation network planned to **minimize impact on local businesses and residents**
- Corridors designed to **consider and accommodate all users**: Pedestrians, cyclists, transit buses, autos and trucks
- Opportunity for **streetscape / landscape enhancements**
- **On-street parking** in support of mixed-use, main street areas

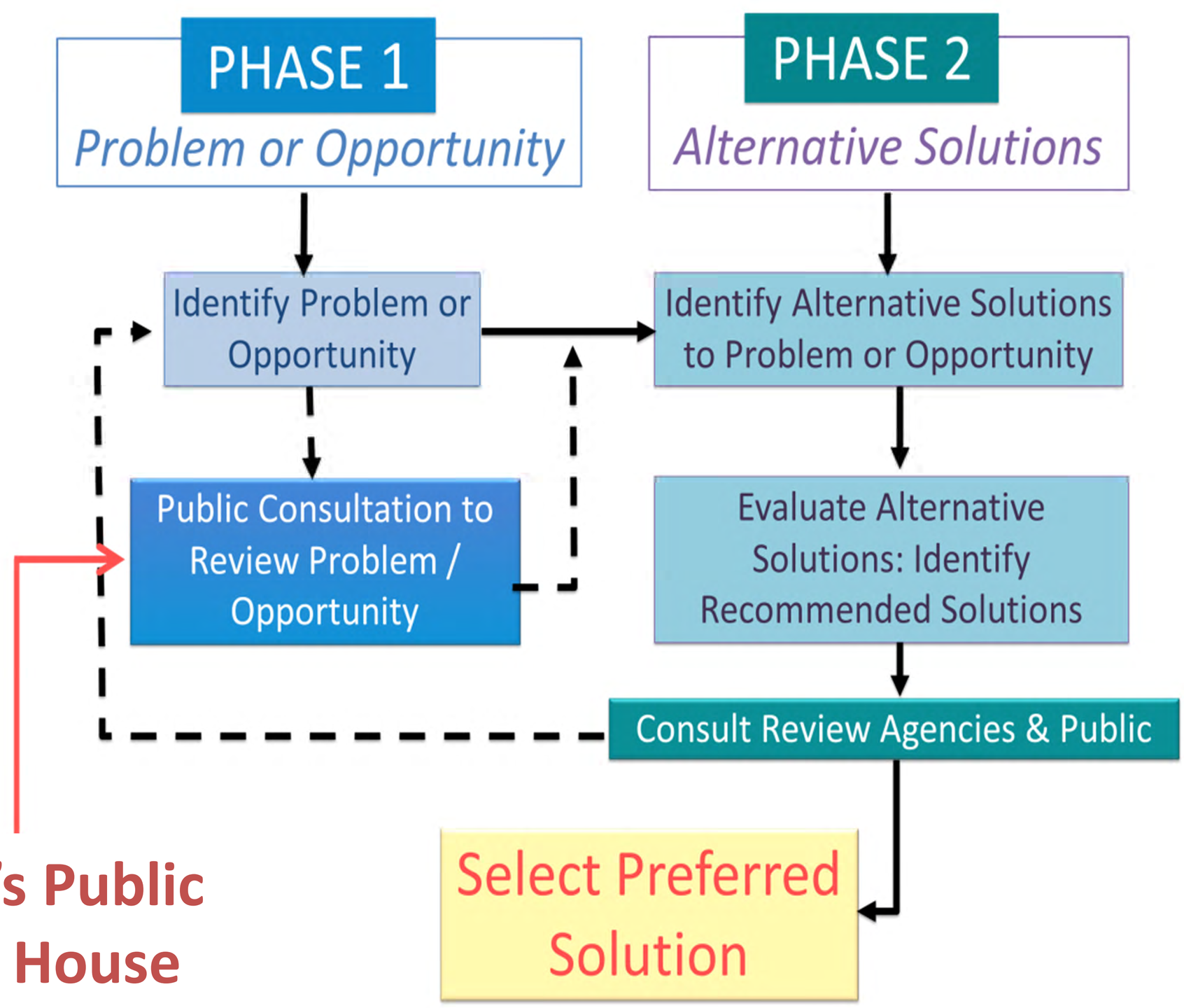
KENT COLBORNE CORRIDOR STUDY EA

Study Goal:

- Develop sustainable and multimodal transportation corridors on Kent Street and Colborne Street capable of supporting the City's growth objectives.

Study Process:

- Environmental Assessment Process as defined by Phase 1 and 2 of the Municipal Class Environmental Assessment Schedule B (October 2000, as amended in 2011).



EA Process

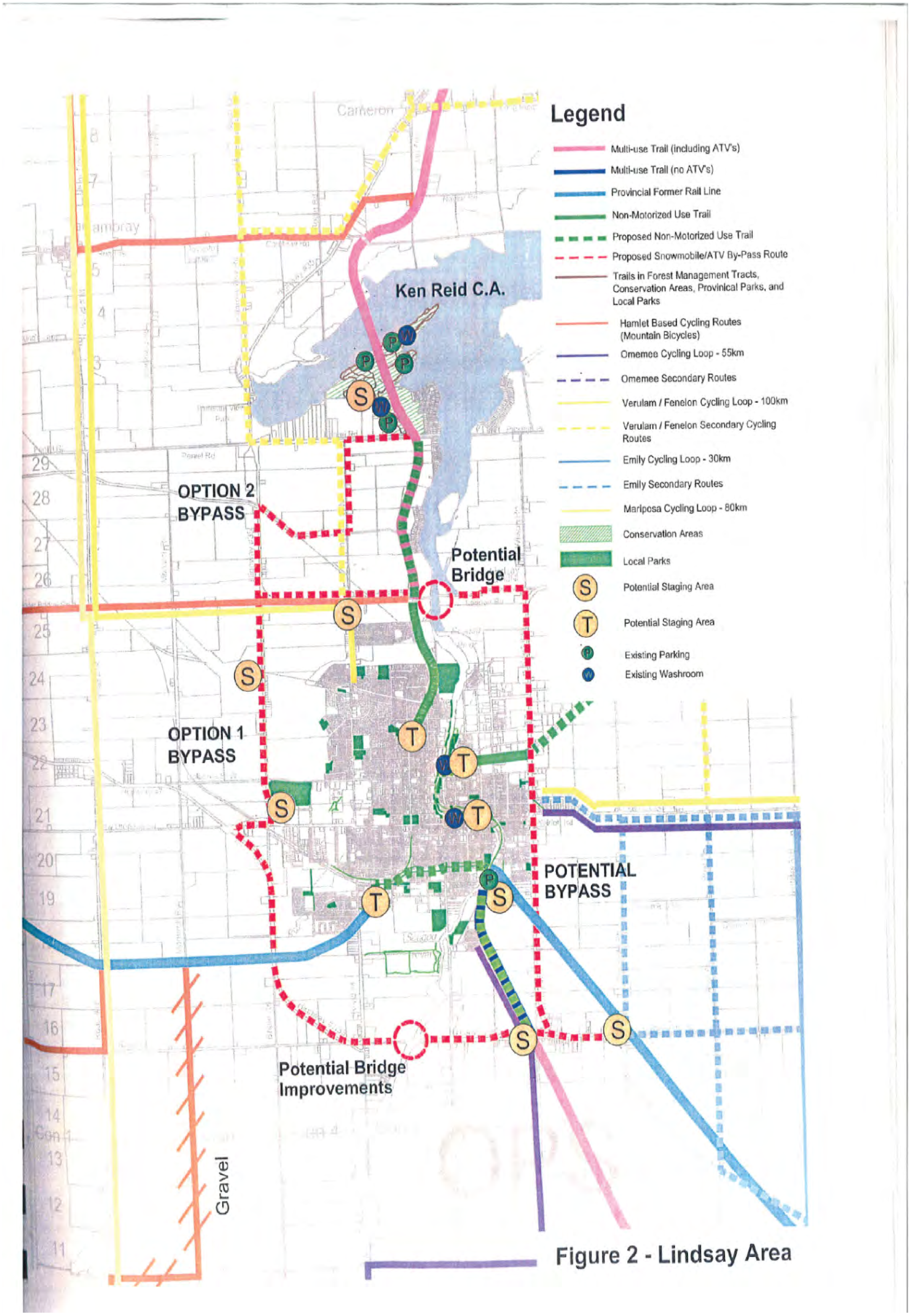
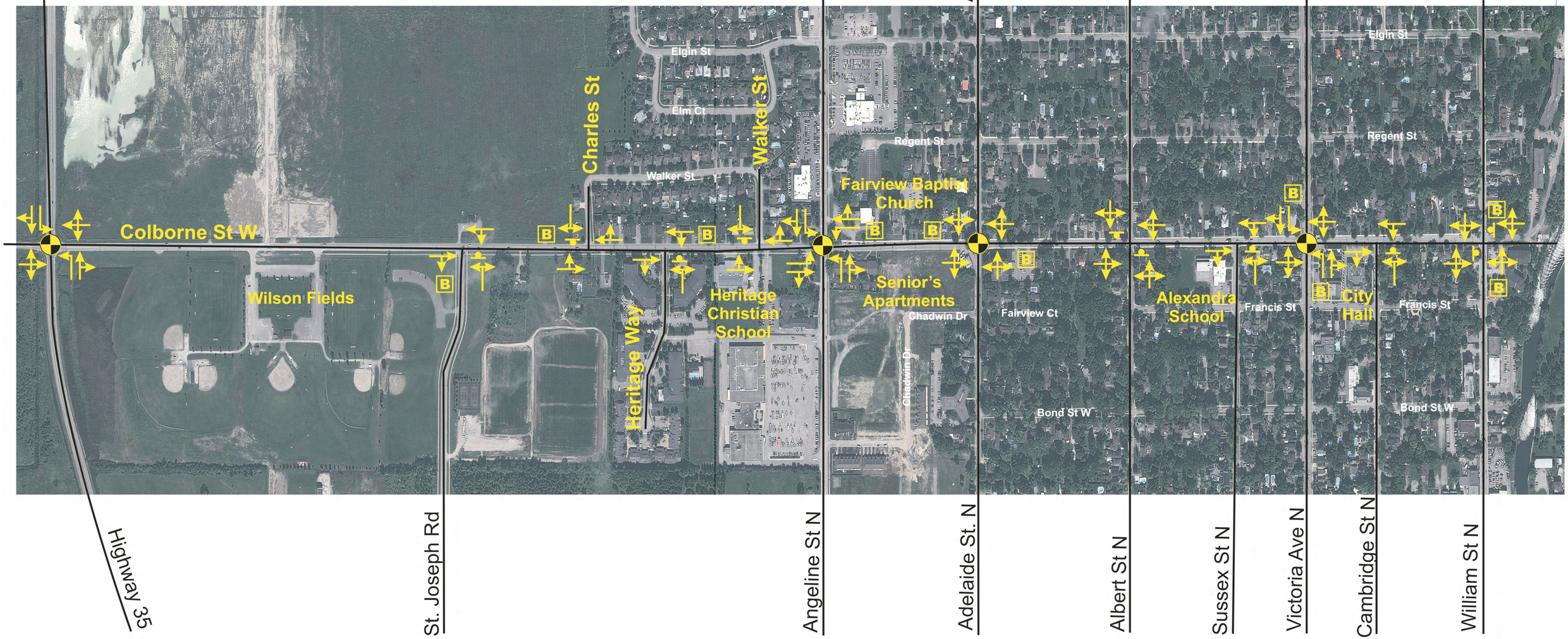


Figure 2 - Lindsay Area

Source: Kawartha Lakes Trails Master Plan (March 2006) Figure 2



Not to Scale

0 100 200 300 400 metres

Legend

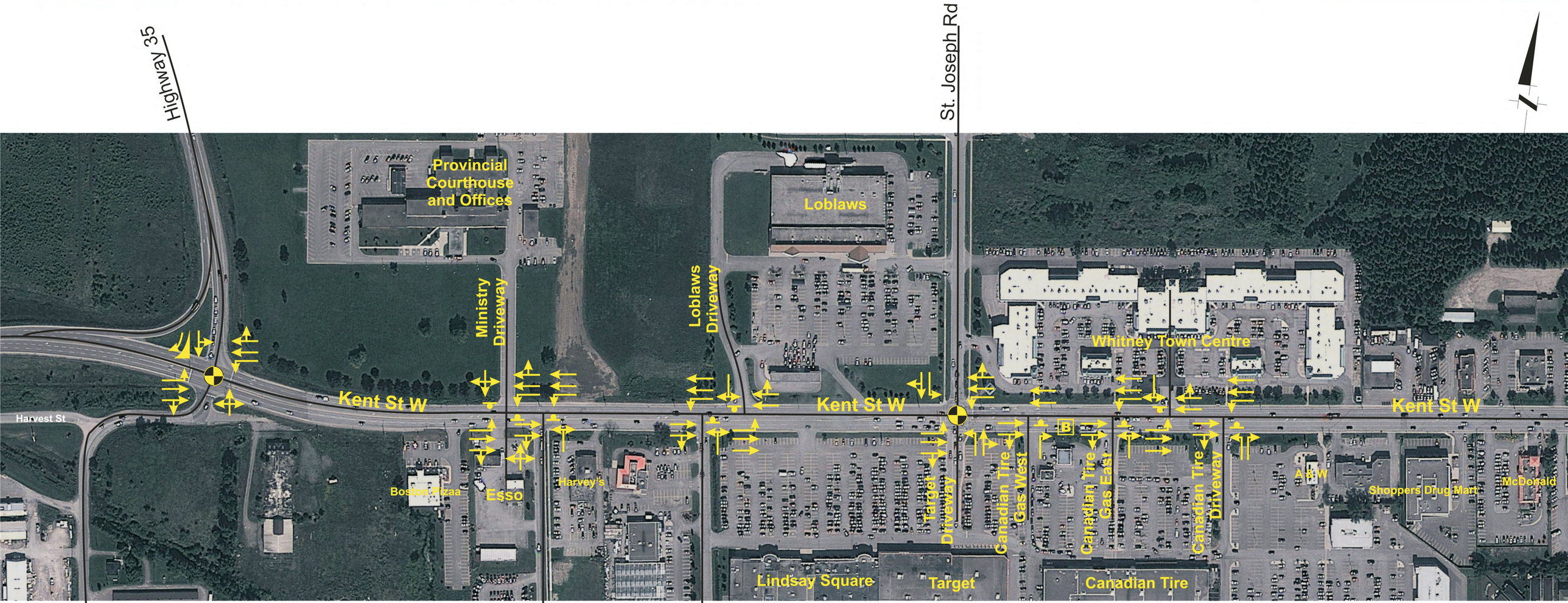
- B — Bus Stop (Approximate Location)
- Signalized Intersection
- Stop Sign
- Lane Configuration

Existing Road Network

Colborne Street

HDR

September 2013



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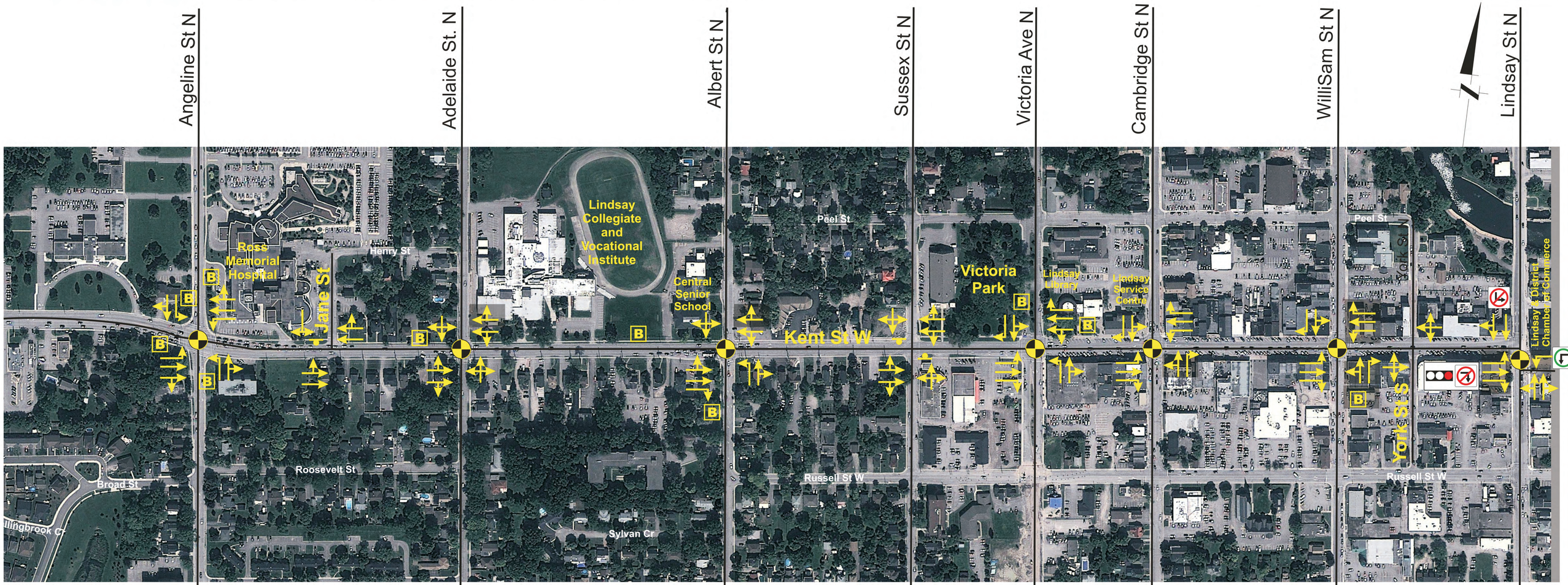
Legend

- B — Bus Stop (Approximate Location)
- Signalized Intersection
- Stop Sign
- Lane Configuration
- Channelized Right Turn

Existing Road Network

Kent Street (West Commercial Area)



Not to Scale

Middle Commercial Area

Downtown

0 50 100 150 200 metres

Legend

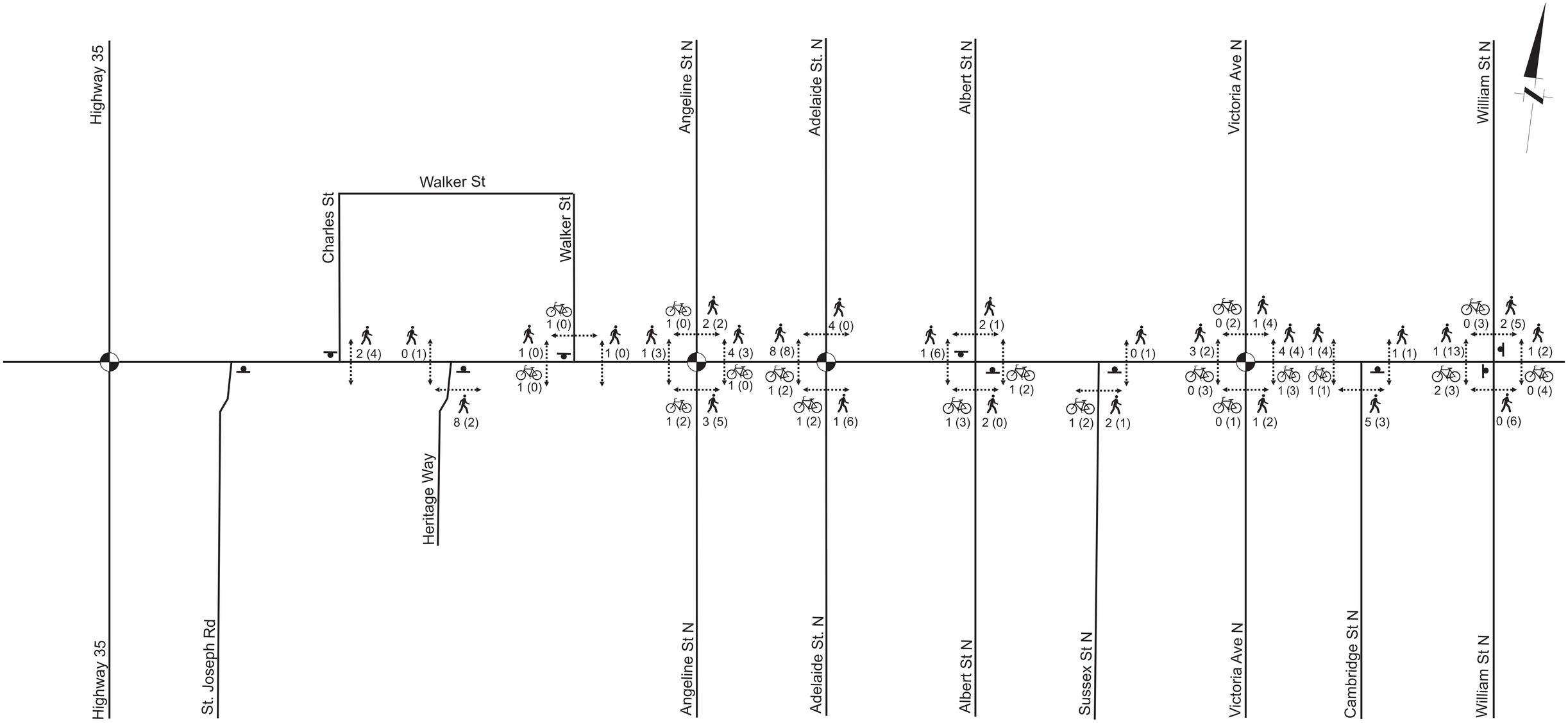
- B — Bus Stop (Approximate Location)
- Signalized Intersection
- Stop Sign
- Lane Configuration
- Posted Turn Restriction

Existing Road Network

Kent Street (Middle Commercial Area & Downtown)

HDR

September 2013



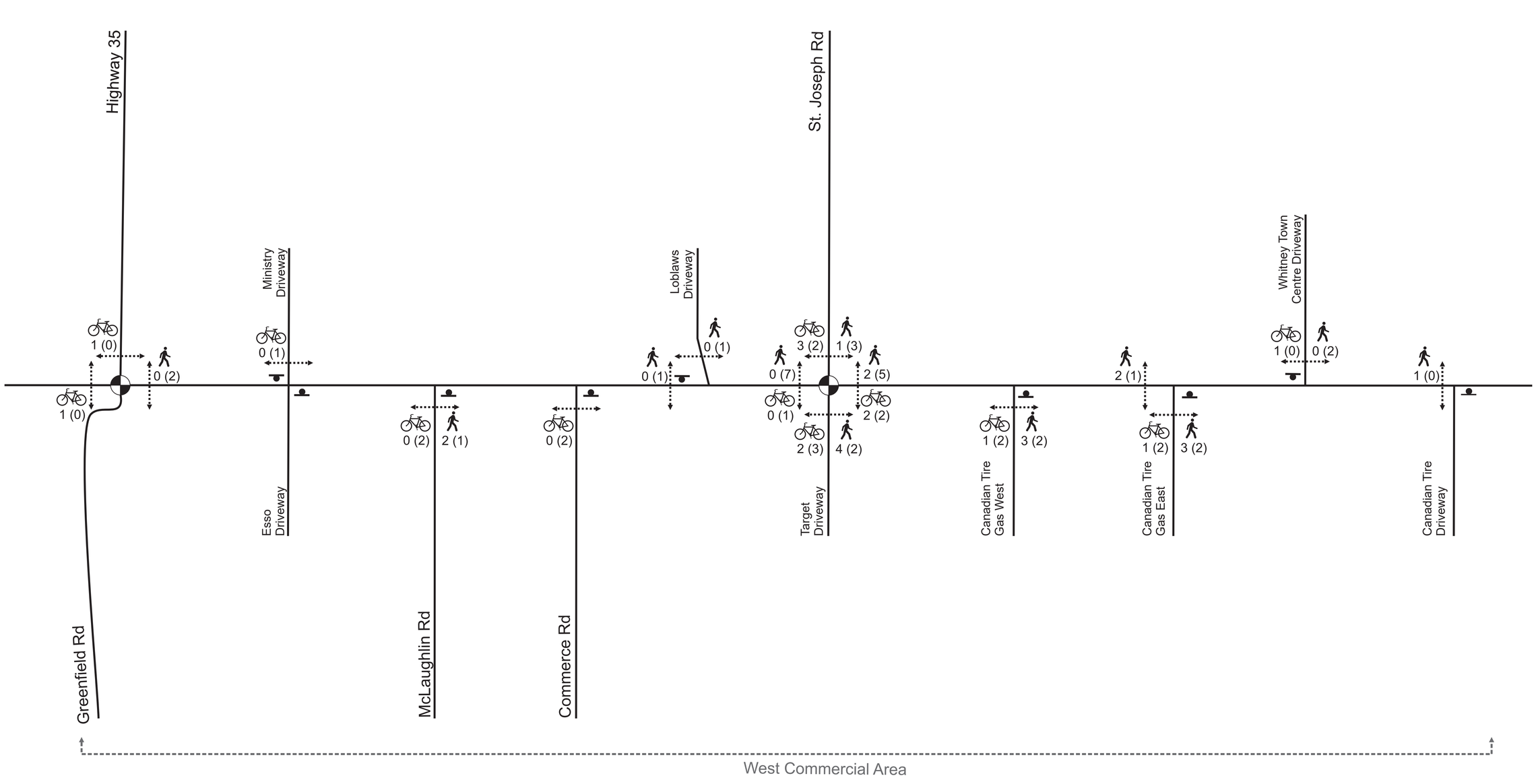
Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Pedestrian Volumes
- Bicycle Volumes
- 12 (34) Weekday AM (PM) Peak Hour Volumes

Existing Pedestrian & Bicycle Volumes

Colborne Street



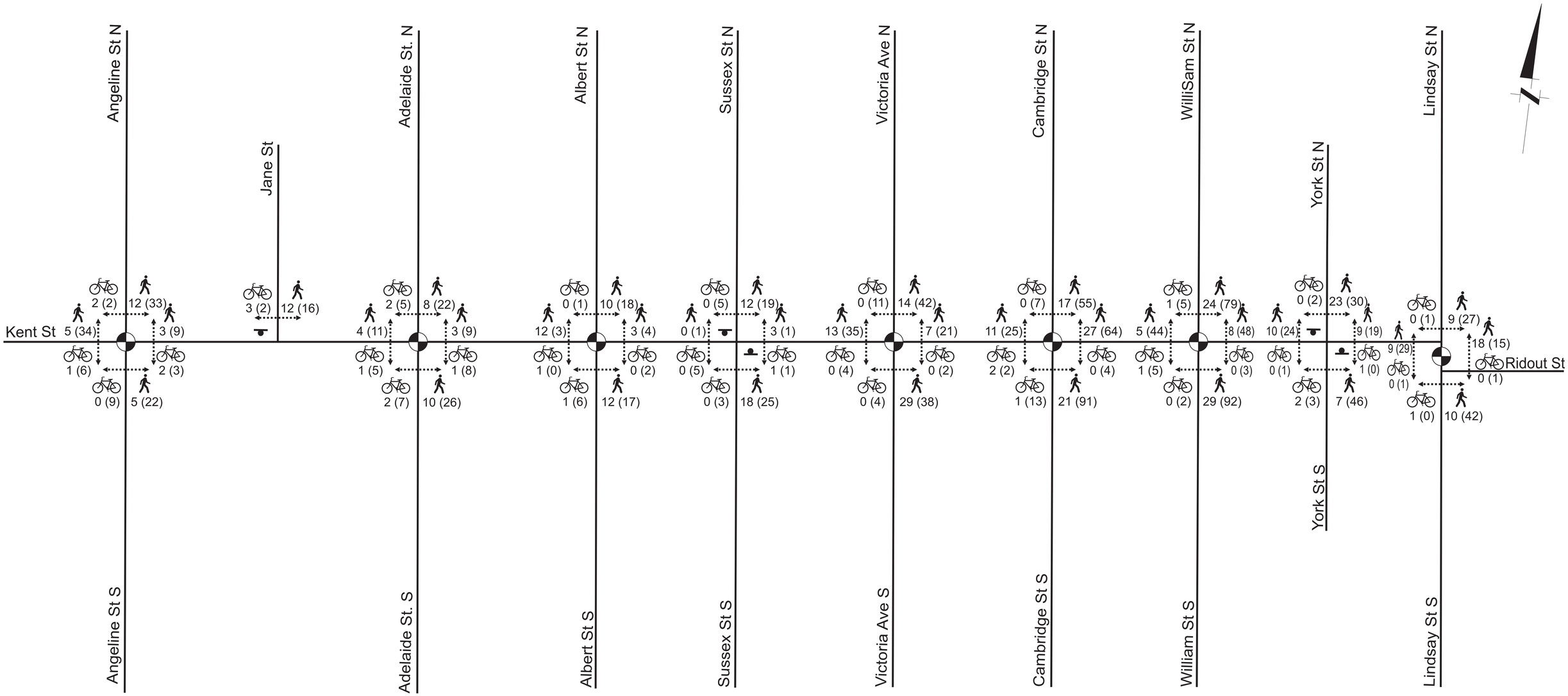
Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Pedestrian Volumes
- Bicycle Volumes
- 12 (34) Weekday AM (PM) Peak Hour Volumes

Existing Pedestrian & Bicycle Volumes

Kent Street (West Commercial Area)



Not to Scale

Legend

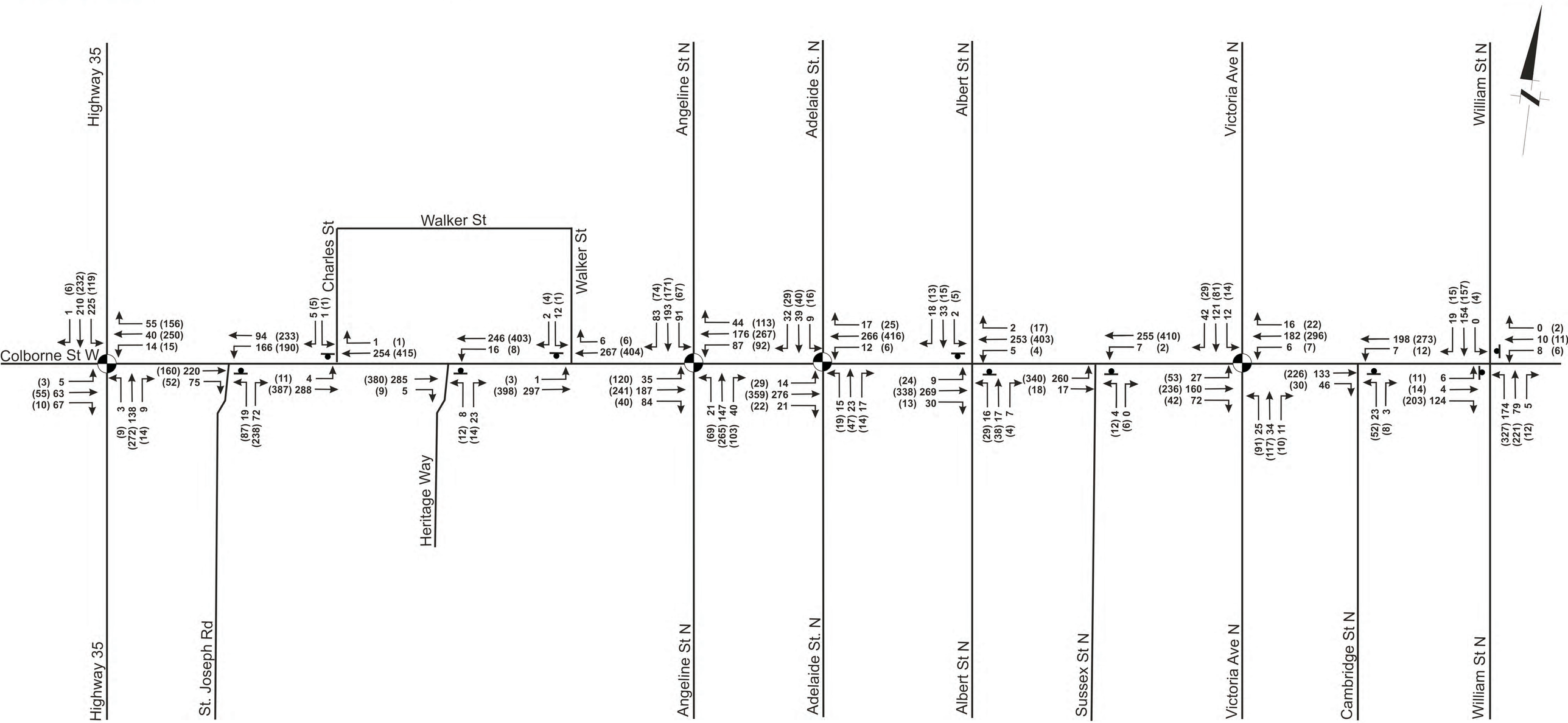
- Signalized Intersection
- Stop Sign
- Pedestrian Volumes
- Bicycle Volumes
- 12 (34) Weekday AM (PM) Peak Hour Volumes

Existing Pedestrian & Bicycle Volumes

Kent Street (Middle Commercial Area & Downtown)

HDR

September 2013



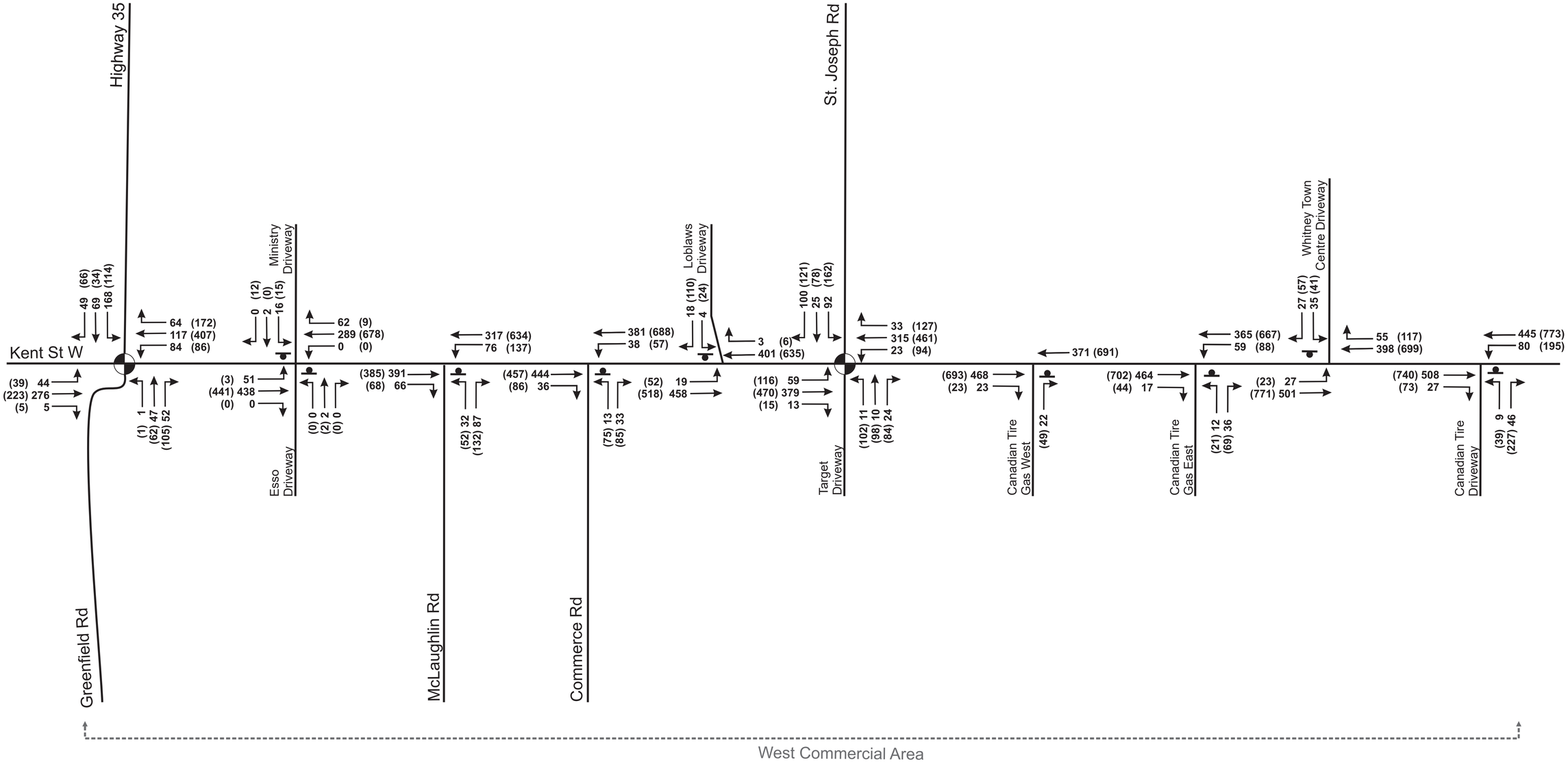
Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Turning Movement
- 122 (456) Weekday AM (PM) Peak Hour Traffic Volumes

Existing Traffic Volumes

Colborne Street



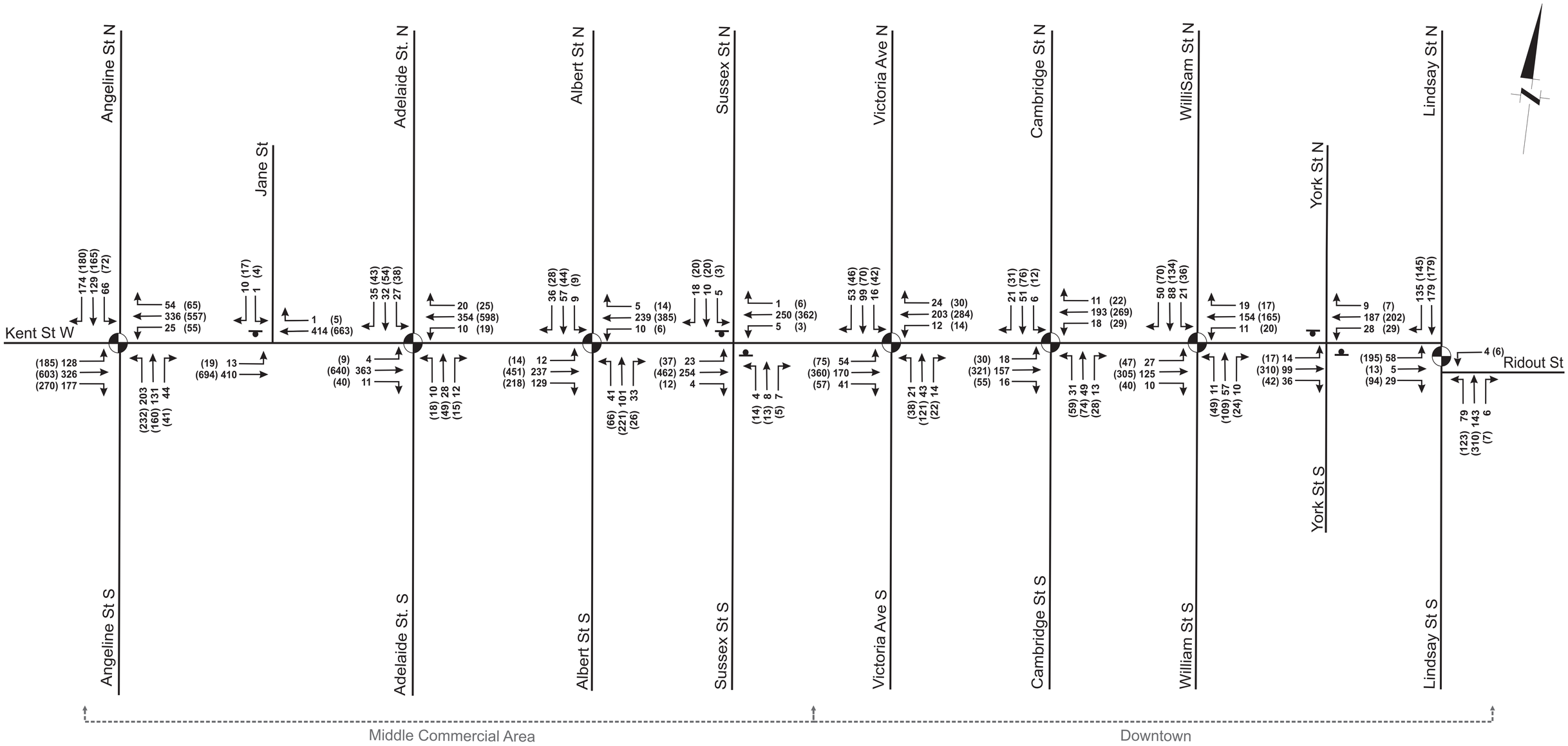
Not to Scale

Legend

- Signalized Intersection
- Stop Sign
- Turning Movement
- 122 (456) Weekday AM (PM) Peak Hour Traffic Volumes

Existing Traffic Volumes

Kent Street (West Commercial Area)



Not to Scale

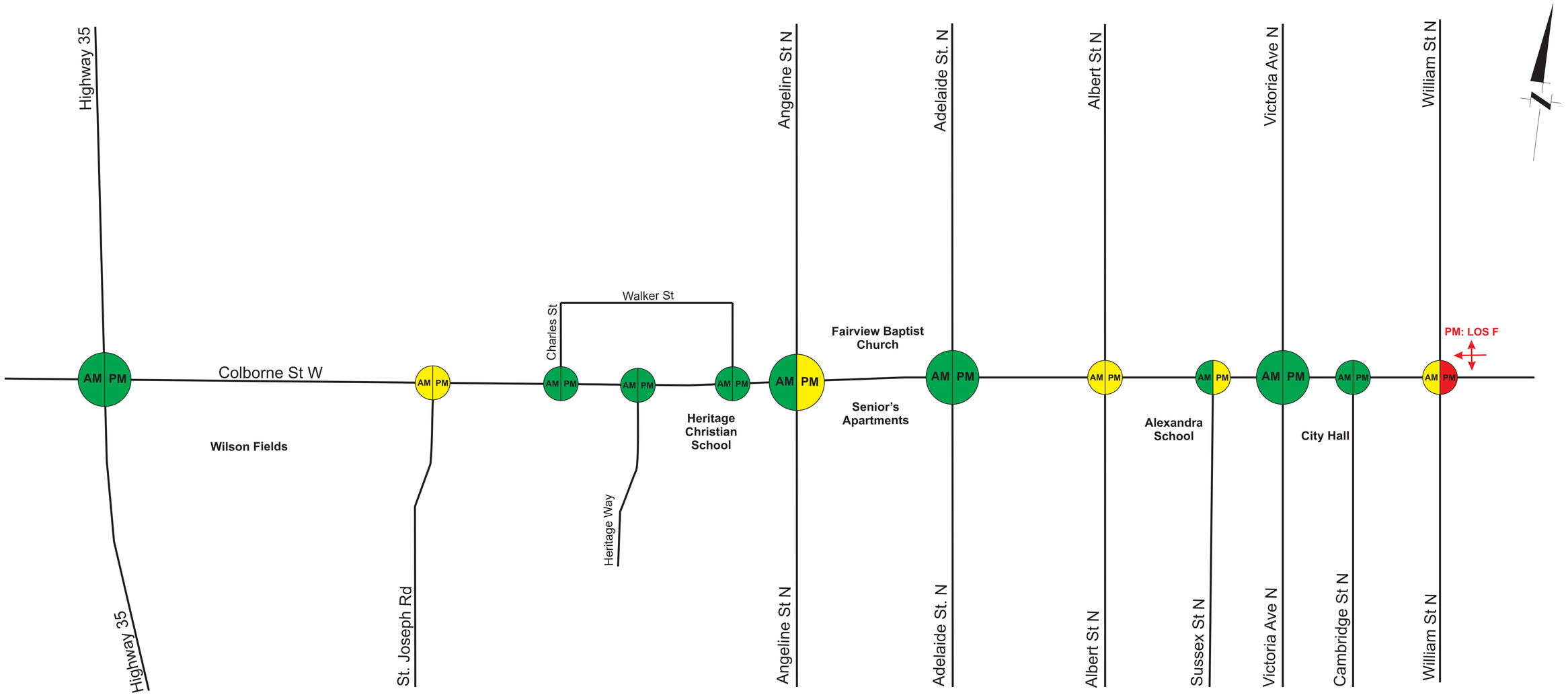
Legend

- Signalized Intersection
- Stop Sign
- Turning Movement
- 122 (456) Weekday AM (PM) Peak Hour Traffic Volumes

Existing Traffic Volumes

Kent Street (Middle Commercial Area & Downtown)

HDR



Not to Scale

Legend

AM | PM — Signalized Intersection
Overall Intersection Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

AM | PM — Unsignalized Intersection
Worst Movement Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

Level of Service (LOS) Colour Scale

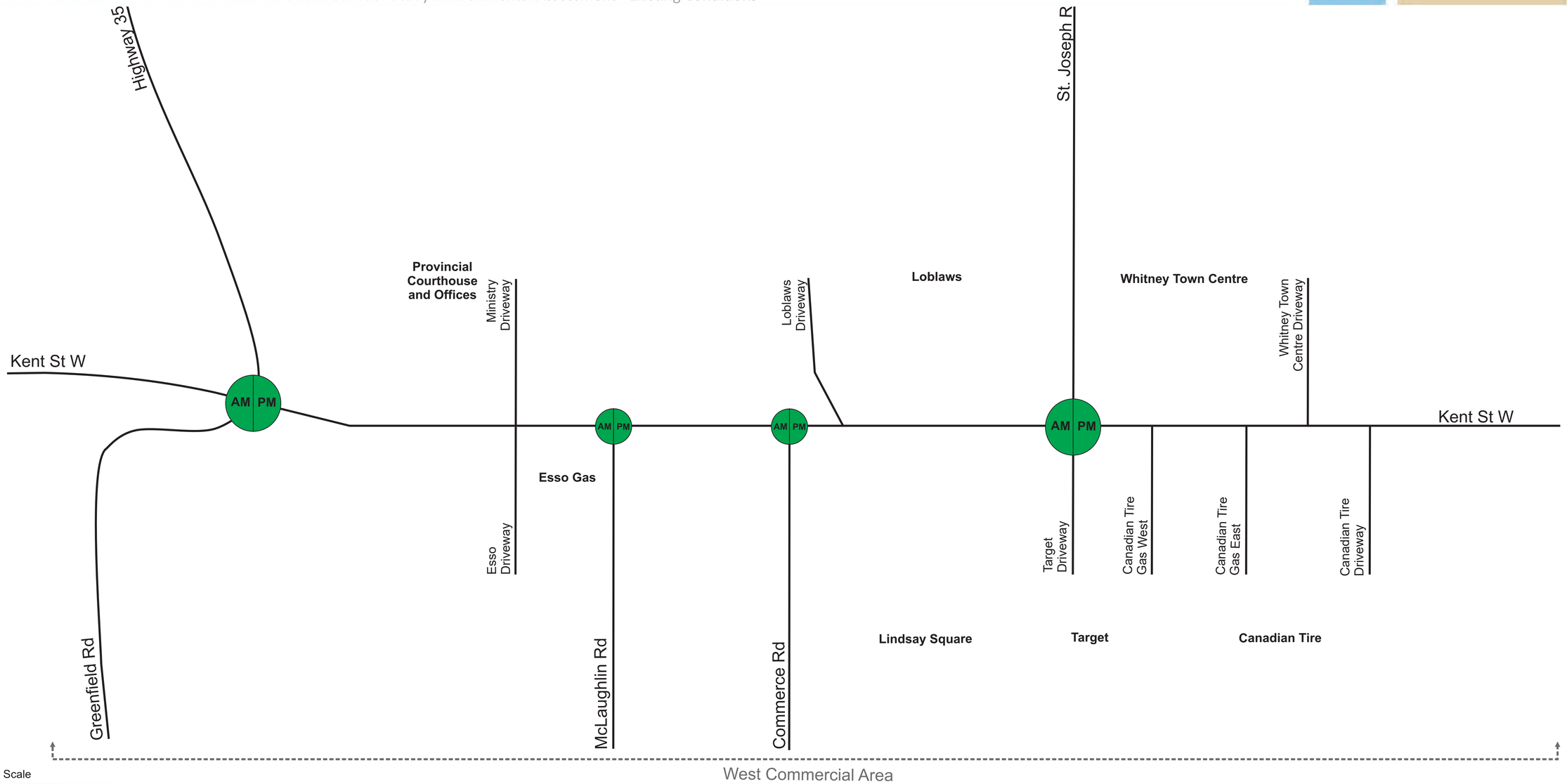
- LOS A to LOS B: Very Little Delay
- LOS C to LOS D: Some Delay
- LOS E to LOS F : Higher Delay

Note:

Operations shown for signalized and unsignalized intersections only. Driveway operations are not shown.

Existing Traffic Operations

Colborne Street



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Legend

AM | PM — Signalized Intersection
Overall Intersection Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

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Worst Movement Level of Service (LOS)
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Note:

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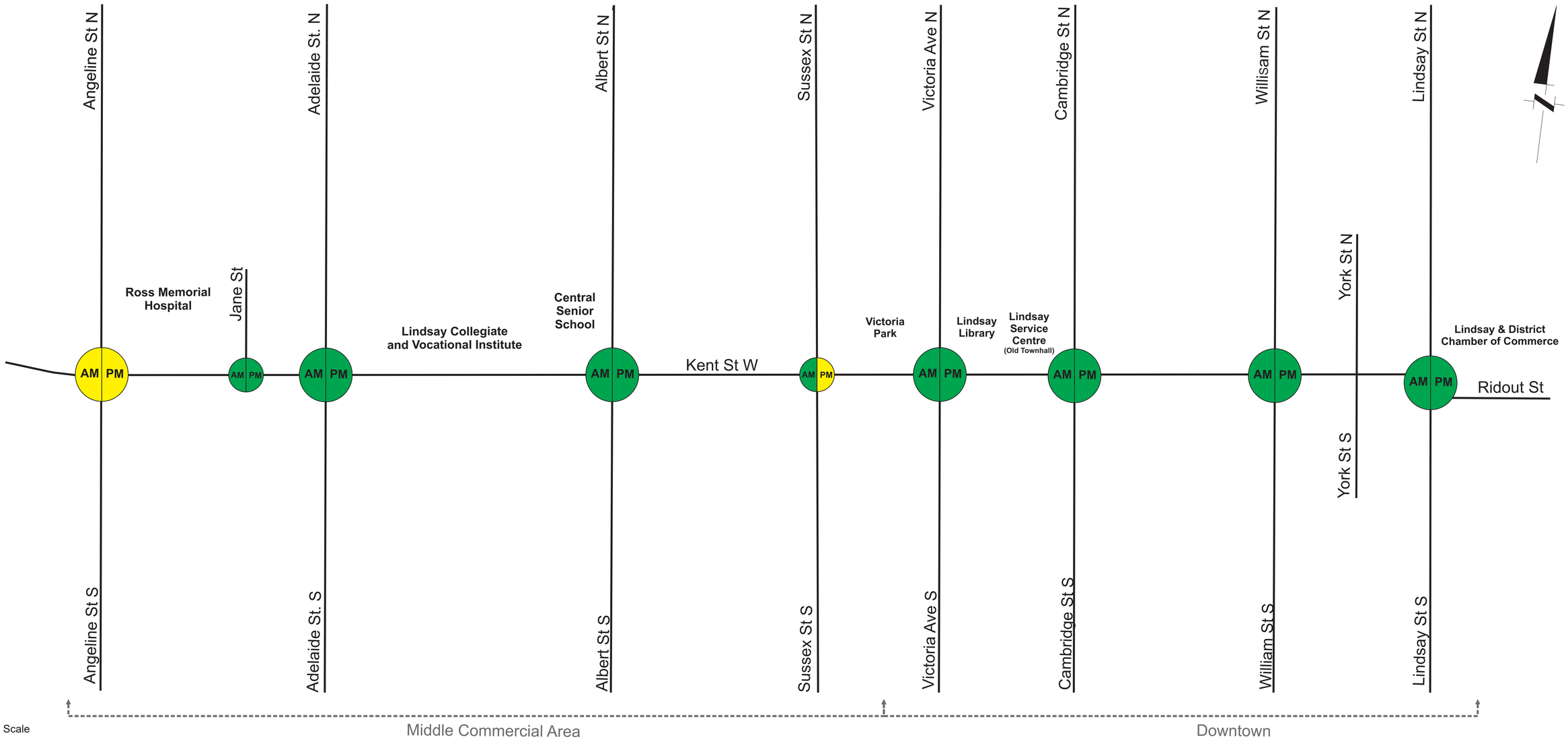
Existing Traffic Operations

Kent Street (West Commercial Area)



Not to Scale

Legend

AM | PM — Signalized Intersection
Overall Intersection Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

AM | PM — Unsignalized Intersection
Worst Movement Level of Service (LOS)
(AM Peak Hour | PM Peak Hour)

Level of Service (LOS) Colour Scale

- LOS A to LOS B: Very Little Delay
- LOS C to LOS D: Some Delay
- LOS E to LOS F : Higher Delay

Note:

Operations shown for signalized and unsignalized intersections only. Driveway operations are not shown.

Existing Traffic Operations

Kent Street (Middle Commercial Area & Downtown)

Colborne Street at Angeline Street
- higher historical collision frequency

Colborne Street at Albert Street
- higher historical collision frequency

Colborne Street at William Street
- westbound movement level of service C under existing conditions, during weekday PM peak hour

Kent Street West Commercial Area
- close driveway spacing
- high pedestrian activity (potential safety concerns)

Kent Street at Angeline Street
- overall intersection level of service C under existing conditions
- higher historical collision frequency

Kent Street at Adelade Street
- higher historical collision frequency

Kent Street Downtown Area
- angled parking
- high pedestrian activity (potential safety concerns)

Kent Street at Lindsay Street
- offset intersection geometry (potential safety concerns)

Kent Street at William Street
- transit buses queuing on-street

Existing Concerns

Kent Street & Colborne Street Corridors

NEXT STEPS

- Second Stakeholder Meeting and Public Open House #2 in November 2013
- Draft report in December 2013
- Final report in January 2014
- EA Study completion in February 2014

CONTACT US!

Michael Farquhar, Project Manager
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department
P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Phone: (705) 324-9411 ext 1156
Email: mfarquhar@city.kawarthalakes.on.ca

Carl Wong, P.Eng.
Consultant Project Manager
HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Phone: 905-882-4100 ext. 5234
Email: carl.wong@hdrinc.com

Thank you!

Your comments and suggestions are greatly appreciated.

Public Open House #1
Comment Sheets

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

Question & Comment Form **Public Open House** - September 24th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street	✓	Colborne Street	

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations	✓	Vehicle Operations	✓
Vehicle Safety		Vehicle Safety	
Pedestrian Operations		Pedestrian Operations	
Pedestrian Safety	✓	Pedestrian Safety	✓
Cyclist Operations	✓	Cyclist Operations	
Cyclist Safety		Cyclist Safety	

Other: _____ Other: _____

_____ _____

_____ _____

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts		Roundabouts	
More Pedestrian Crossings	✓	More Pedestrian Crossings	
Bicycle Lanes		Bicycle Lanes	
More On-Street Parking		More On-Street Parking	
Transit Route Changes / Expansion		Transit Route Changes / Expansion	
Increased Police Presence	✓	Increased Police Presence	✓
Traffic Calming Measures		Traffic Calming Measures	

Other: _____ Other: _____

_____ _____

_____ _____

HDR

Question #2

Do you believe there is a need for an additional east-west river crossing within the Town?

Yes ☑ No ☐

Explain: E.M.S SERVICE

General Comments:

Please leave this form with staff when you are finished, or send it to the following contacts by mail or e-mail:

Michael Farquhar
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department

P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Email: mfarquhar@city.kawarthalakes.on.ca
Phone: (705) 324-9411 ext. 1156

Carl Wong, P.Eng.
HDR Corporation
Consultant Project Manager

100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Email: carl.wong@hdrinc.com
Phone: (289) 695-4634

Name: [redacted]

Address: [redacted]

E-Mail Address: _____

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HDR

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

Question & Comment Form **Public Open House** - September 24th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street		Colborne Street	X

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations		Vehicle Operations	X
Vehicle Safety		Vehicle Safety	X
Pedestrian Operations		Pedestrian Operations	
Pedestrian Safety		Pedestrian Safety	
Cyclist Operations		Cyclist Operations	
Cyclist Safety		Cyclist Safety	

Other: _____ Other: PARKING for TOWN HALL EVENTS & STAFF

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts		Roundabouts	
More Pedestrian Crossings		More Pedestrian Crossings	
Bicycle Lanes		Bicycle Lanes	
More On-Street Parking		More On-Street Parking	
Transit Route Changes / Expansion		Transit Route Changes / Expansion	
Increased Police Presence		Increased Police Presence	
Traffic Calming Measures		Traffic Calming Measures	

Other: _____ Other: DEAL WITH EXSTING TRAFFIC SIGNAL

HDR

Question #2

Do you believe there is a need for an additional east-west river crossing within the Town?

Yes ☐ No ☒

Explain: - Traffic should be to the North of Lindsay
- Deal with the Queen St Bridge
-

General Comments:

- Deal with Queen St Bridge Traffic
- Deal with Town Hall Parking
- Light at Adelaide St ~~lights~~ do not work.

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City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

Question & Comment Form **Public Open House** - September 24th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street	☐	Colborne Street	☑

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations	☐	Vehicle Operations	☑
Vehicle Safety	☐	Vehicle Safety	☐
Pedestrian Operations	☐	Pedestrian Operations	☐
Pedestrian Safety	☐	Pedestrian Safety	☑
Cyclist Operations	☐	Cyclist Operations	☐
Cyclist Safety	☐	Cyclist Safety	☐

Other: _____ Other: _____

_____ _____

_____ _____

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts	☐	Roundabouts	☐
More Pedestrian Crossings	☐	More Pedestrian Crossings	☑
Bicycle Lanes	☐	Bicycle Lanes	☐
More On-Street Parking	☐	More On-Street Parking	☐
Transit Route Changes / Expansion	☐	Transit Route Changes / Expansion	☐
Increased Police Presence	☐	Increased Police Presence	☐
Traffic Calming Measures	☐	Traffic Calming Measures	☑

Other: _____ Other: _____

_____ _____

_____ _____

HDR

Question #2

Do you believe there is a need for an additional east-west river crossing within the Town?

Yes ☑ No ☐

Explain: SOMEWHERE AROUND THUNDERBRIDGE Rd.

General Comments:

Please leave this form with staff when you are finished, or send it to the following contacts by mail or e-mail:

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City of Kawartha Lakes
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HDR

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

Question & Comment Form **Public Open House** - September 24th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street [X] Colborne Street [X]

Please place a check mark beside the factor(s) involved in your concern:

	Kent Street	Colborne Street
Vehicle Operations		
Vehicle Safety		
Pedestrian Operations	X	X
Pedestrian Safety		
Cyclist Operations	↘ ? Are Allowed ??	↘ ? Are Allowed ??
Cyclist Safety	↗	↗

Other: School Kids at Lunch; J-Walkers

Other: City Hall Traffic; J-Walkers

Please place a check mark beside the countermeasures you feel may be appropriate:

	Kent Street	Colborne Street
Roundabouts		
More Pedestrian Crossings		
Bicycle Lanes		
More On-Street Parking		
Transit Route Changes / Expansion		
Increased Police Presence	X	X
Traffic Calming Measures		

Other: Combine Laneways to Direct Traffic

Other: Combine Laneways to Direct Traffic.

HDR

Question #2

Do you believe there is a need for an additional east-west river crossing within the Town?

Yes ☐ No ☒

Explain: One Bridge Helps Control Traffic Flow through Rest of Town. Only Few Minutes per Day 8:00 AM 9:00 AM Lunch 3:00 PM 5:00 PM.

General Comments:

- High/Senior Students at Adelaide Kent
- Canadian Tire / Food Basics Stop Light Crossing.

Please leave this form with staff when you are finished, or send it to the following contacts by mail or e-mail:

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City of Kawartha Lakes
Development Services
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HDR

Public Open House #2
Display Panels

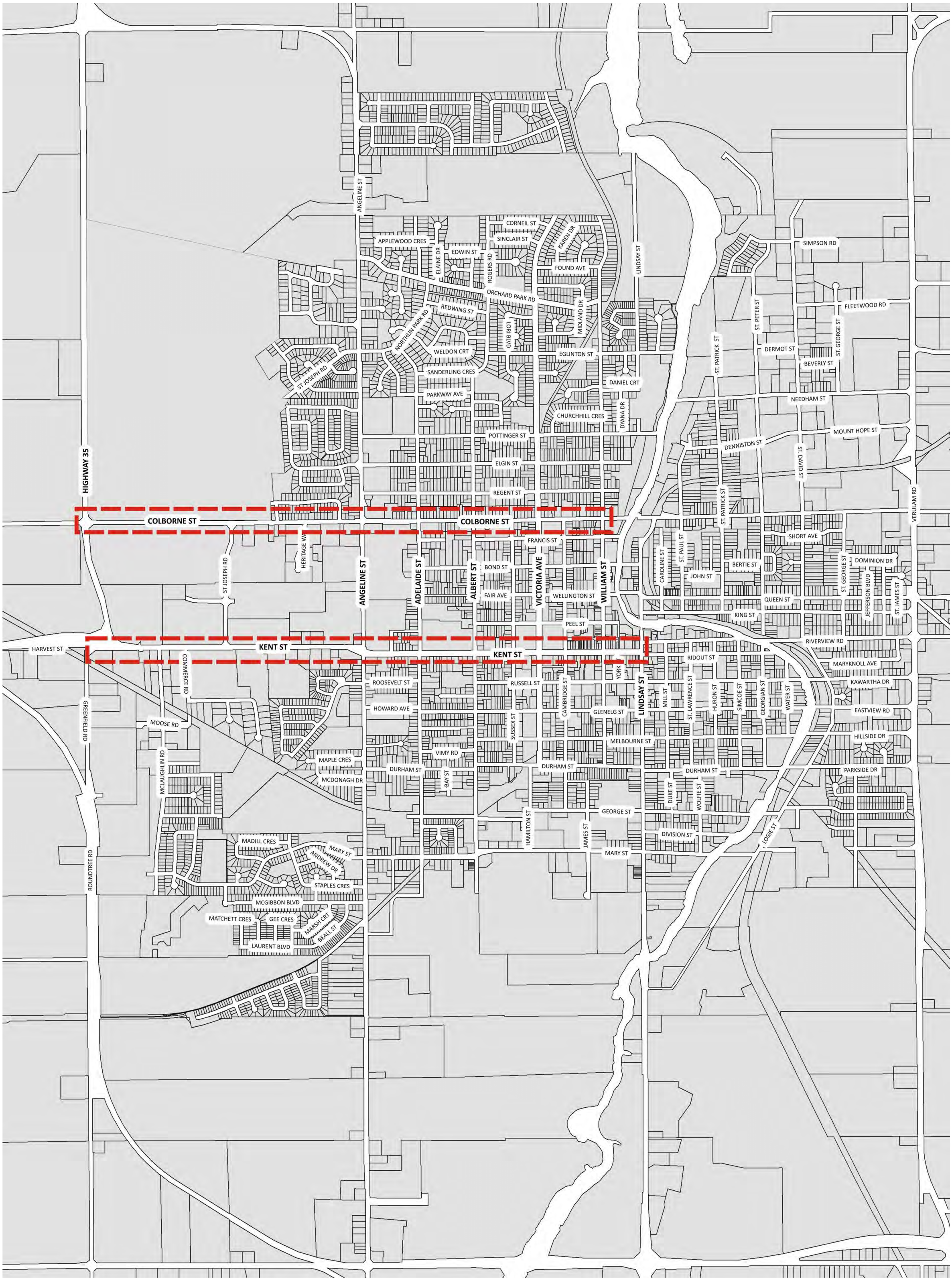
Welcome to the 2nd Public Meeting

for the

Kent Street and Colborne Street Corridor Study Environmental Assessment

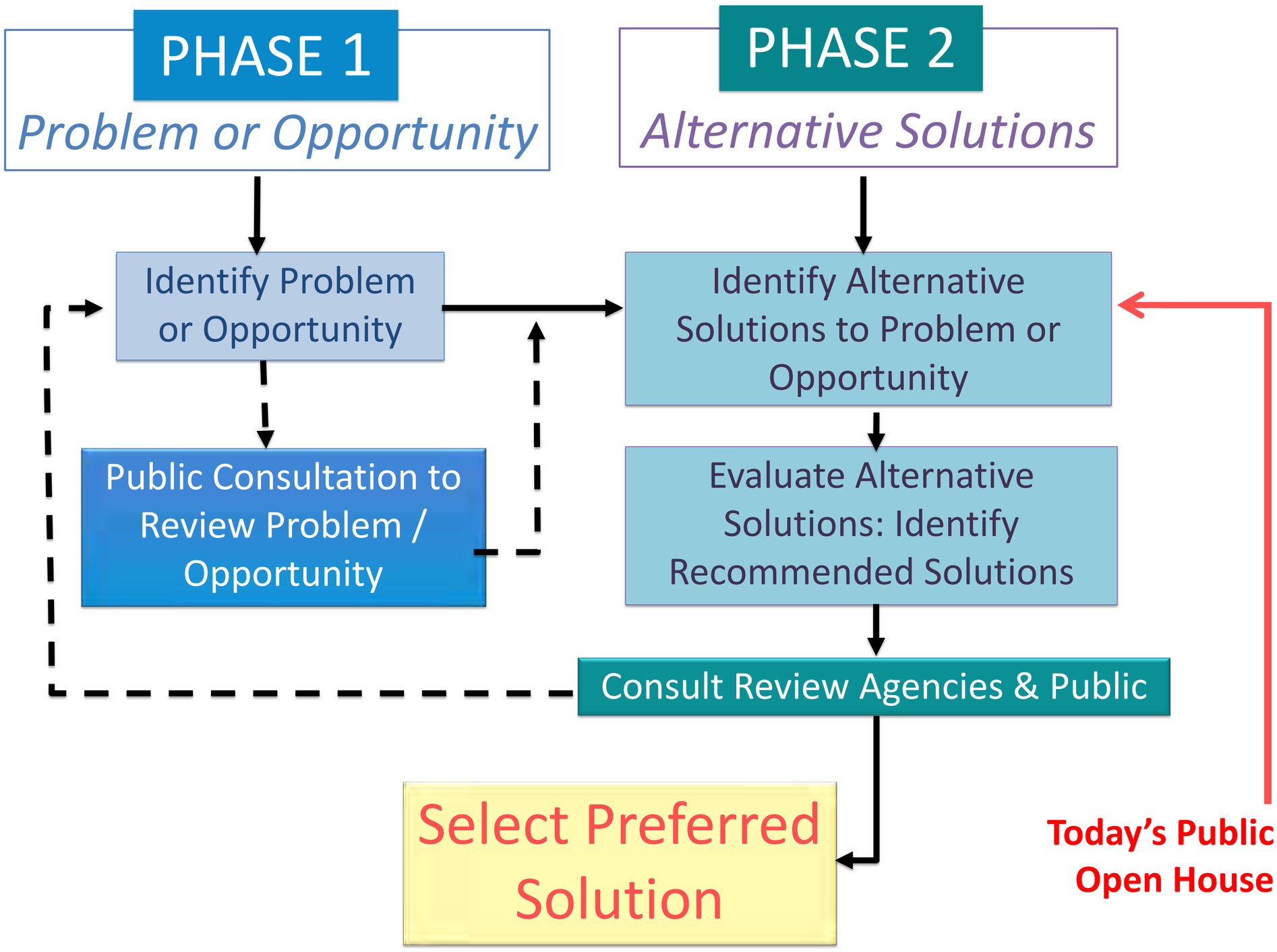
December 5th, 2013

STUDY AREA


HIGHWAY 35
COLBORNE ST
KENT ST
ANGELINE ST
ADELAIDE ST
ALBERT ST
VICTORIA AVE
WILLIAM ST
LINDSAY ST
VERULAM RD
ST JOSEPH RD
HERITAGE WAY
COMMERCE RD
GREENFIELD RD
ROUNDTREE RD
MCLAUGHLIN RD
HARVEST ST
MOOSE RD
ROOSEVELT ST
HOWARD AVE
VIMY RD
DURHAM ST
MAPLE CRES
MCDONAGH DR
MADILL CRES
MARY ST
ANDREW DR
STAPLES CRES
MCGIBBON BLVD
MATCHETT CRES
GEE CRES
MARSH CRT
BEALL ST
LAURENT BLVD
APPLEWOOD CRES
EDWIN ST
ELAINE DR
CORNEIL ST
SINCLAIR ST
KAREN DR
ROGERS RD
FOUND AVE
ORCHARD PARK RD
REDWING ST
NORTHLIN PARK RD
LORI BLVD
MIDLAND DR
WELDON CRT
SANDERLING CRES
ST JOSEPH RD
PARKWAY AVE
EGLINTON ST
DANIEL CRT
CHURCHHILL CRES
DYANA DR
POTTINGER ST
ELGIN ST
REGENT ST
FRANCIS ST
BOND ST
FAIR AVE
WELLINGTON ST
PEEL ST
SIMPSON RD
FLEETWOOD RD
ST. PETER ST
ST. GEORGE ST
ST. PATRICK ST
DERMOT ST
BEVERLY ST
NEEDHAM ST
MOUNT HOPE ST
DENNISTON ST
ST. DAVID ST
SHORT AVE
DOMINION DR
JEFFERSON BLVD
ST. JAMES ST
CAROLINE ST
ST. PAUL ST
JOHN ST
BERTIE ST
QUEEN ST
KING ST
RIVERVIEW RD
RIDOUT ST
MARYKNOLL AVE
KAWARTHA DR
EASTVIEW RD
HILLSIDE DR
PARKSIDE DR
RUSSELL ST
YORK
CAMBRIDGE ST
SUSSEX ST
GLENELG ST
MELBOURNE ST
DURHAM ST
MILL ST
ST. LAWRENCE ST
HURON ST
SIMCOE ST
GEORGIAN ST
WATER ST
DUKE ST
WOLFIE ST
GEORGE ST
DIVISION ST
MARY ST
HAMILTON ST
JAMES ST
LOGIE ST
BAY ST

WHAT IS A CORRIDOR STUDY EA?

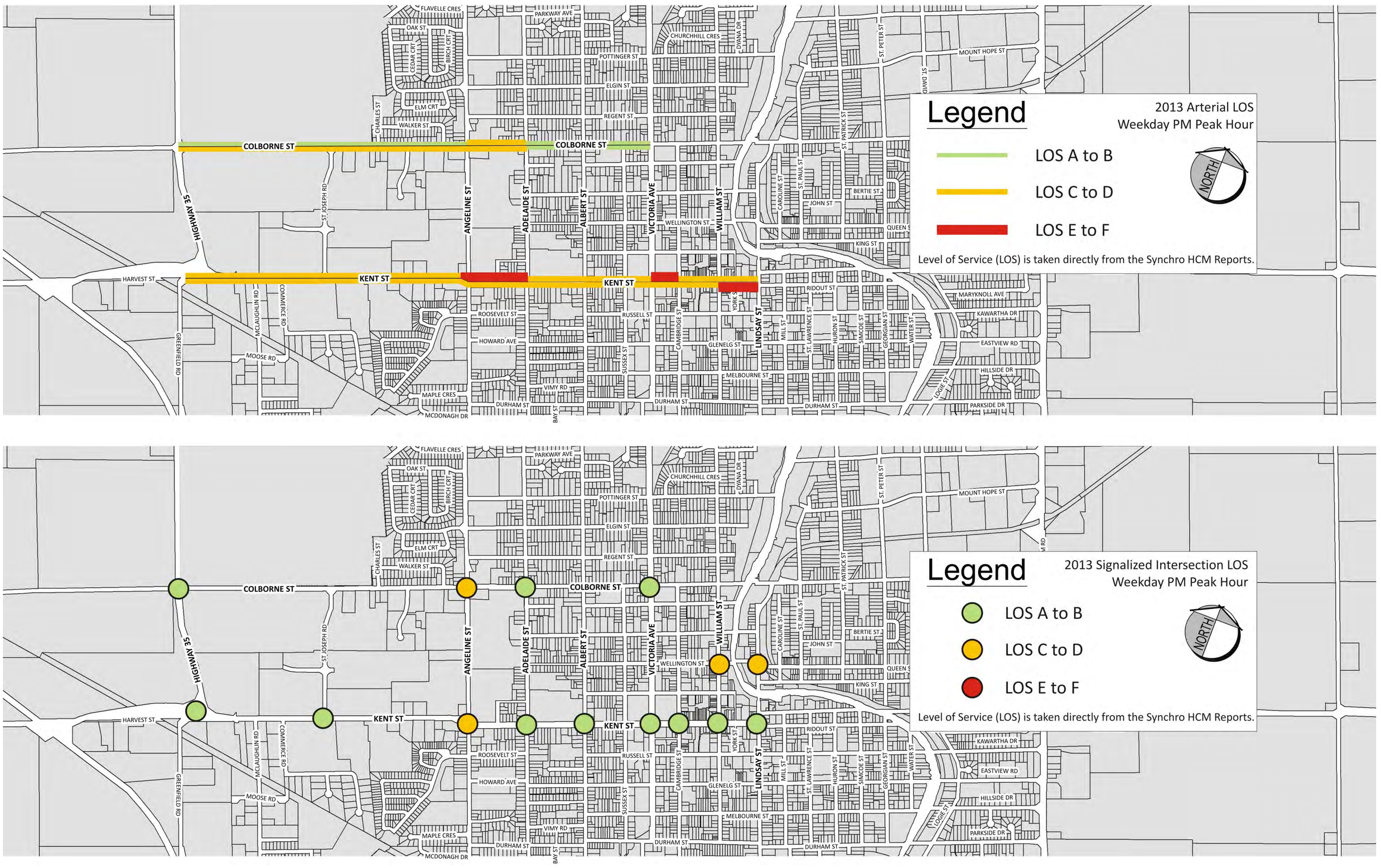
- More detailed examination of a particular corridor than the 2012 Transportation Master Plan
- Specific short to long term recommendations;
- Planning for drivers, pedestrians, cyclists and transit users with an emphasis on a multi-modal approach;
- In conformity to the Strategic Plan and the Official Plan;
- Will allow the City to make informed decisions on transportation issues affecting the community; and
- Follows Phase 1 and 2 of the *Municipal Class Environmental Assessment Process.*



EA Process

RECAP OF EXISTING 2013 TRAFFIC OPERATIONS

Level of Service for Road Links



Overall Level of Service at Signalized Intersections

What is Level of Service (LOS)?

LOS A to B – Little to No Delay

LOS C to D – Moderate Delay and Queues during Peak Times

LOS E to F – High Delay, “Stop and Go” Conditions, and Long Queues during Peak Times

Level of Service is measured over the hour so it may not capture short delays, queues, or congestion periods of less than 15 minutes.

Have we missed anything?

Please let us know your questions or comments.

WHAT HAVE WE HEARD FROM THE PUBLIC?

Angeline Street at Kent Street

Cut-through traffic using Peel Lane (eastbound to southbound)
Implementation of pedestrian signal heads could help improve existing safety concerns
Student and senior pedestrian volumes are particularly high at this intersection

Kent Street at McLaughlin Road

A new traffic signal is needed

Queen Street Bridge

Existing capacity deficiencies; some people indicated the need for another crossing to the north
Capacity deficiencies are short lived throughout the day, and affect only the peak periods

Colborne Street Corridor

Pedestrian safety (students and seniors). J-walking is prevalent
Reduce conflict points
Traffic signal at Adelaide Street is “not working”
Town Hall has parking issues, specifically for staff and events

Kent Street Corridor

Pedestrian safety (students and seniors). J-walking is prevalent
Reduce conflict points
Bicycle access to the commercial area near St. Joseph Street should be improved
Pedestrian crossing volume near Canadian Tire / Food Basics is high
Downtown angled parking concerns
Belleville Downtown along Front Street could be a template for Lindsay's historic downtown

What were your concerns?

Mode	Concern	Kent St Corridor	Colborne St Corridor
Vehicular	Operations	✓	✓
	Safety		✓
Pedestrian	Operations	✓	✓
	Safety	✓	✓
Cyclist	Operations	✓	✓
	Safety	✓	✓

What measures do you feel may help?

Countermeasure	Kent St Corridor	Colborne St Corridor
Roundabouts		
More Pedestrian Crossings	✓	✓
Bicycle Lanes		
More On-Street Parking		
Transit Route Changes / Expansion		
Increased Police Presence	✓	✓
Traffic Calming Measures		✓

Note: Results based on comment form responses from Public Information Centre #1. Four (4) response forms were received.

Have we missed anything?

Please let us know your questions or comments.

TRANSPORTATION MASTER PLAN RECOMMENDATIONS

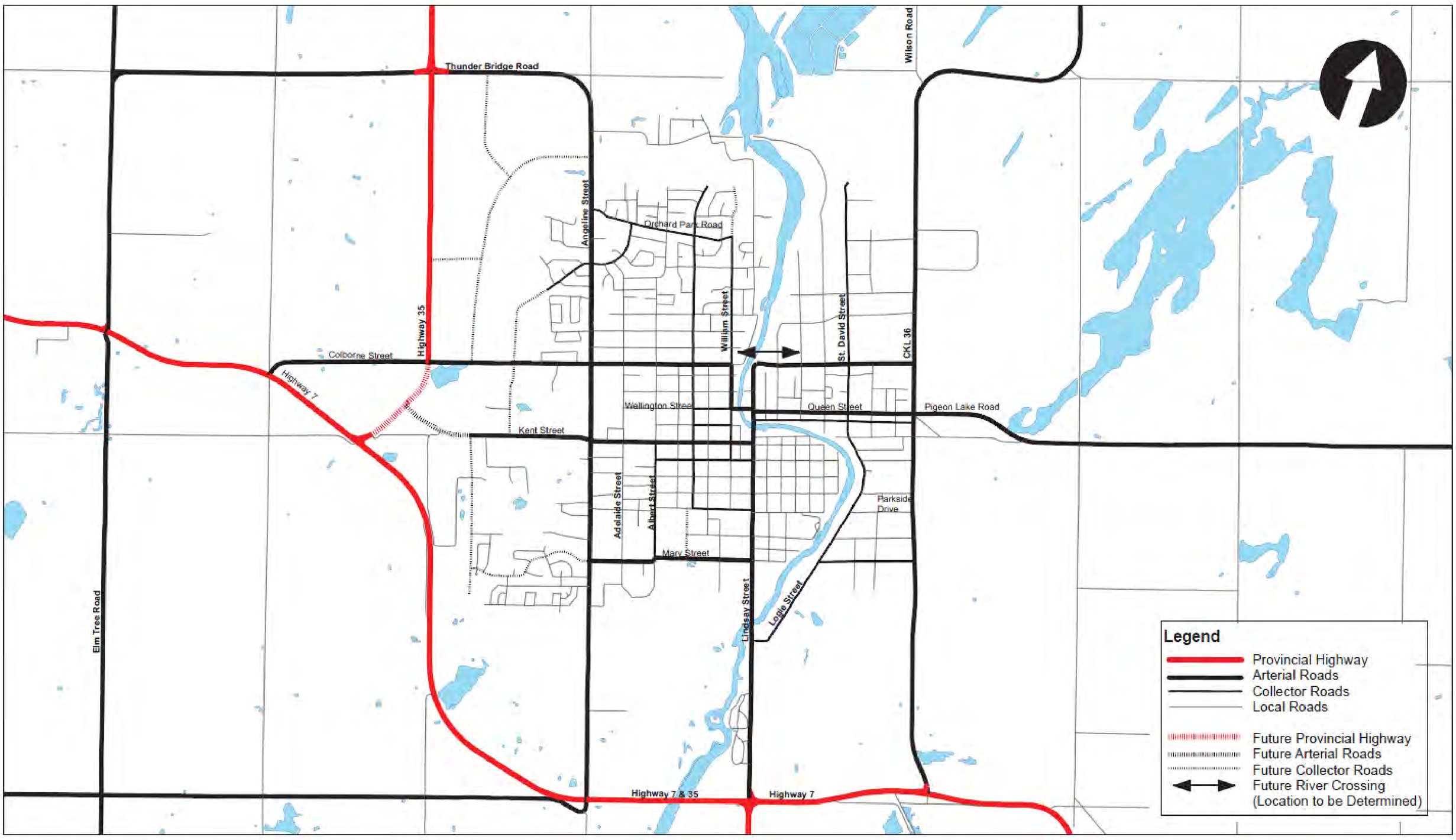
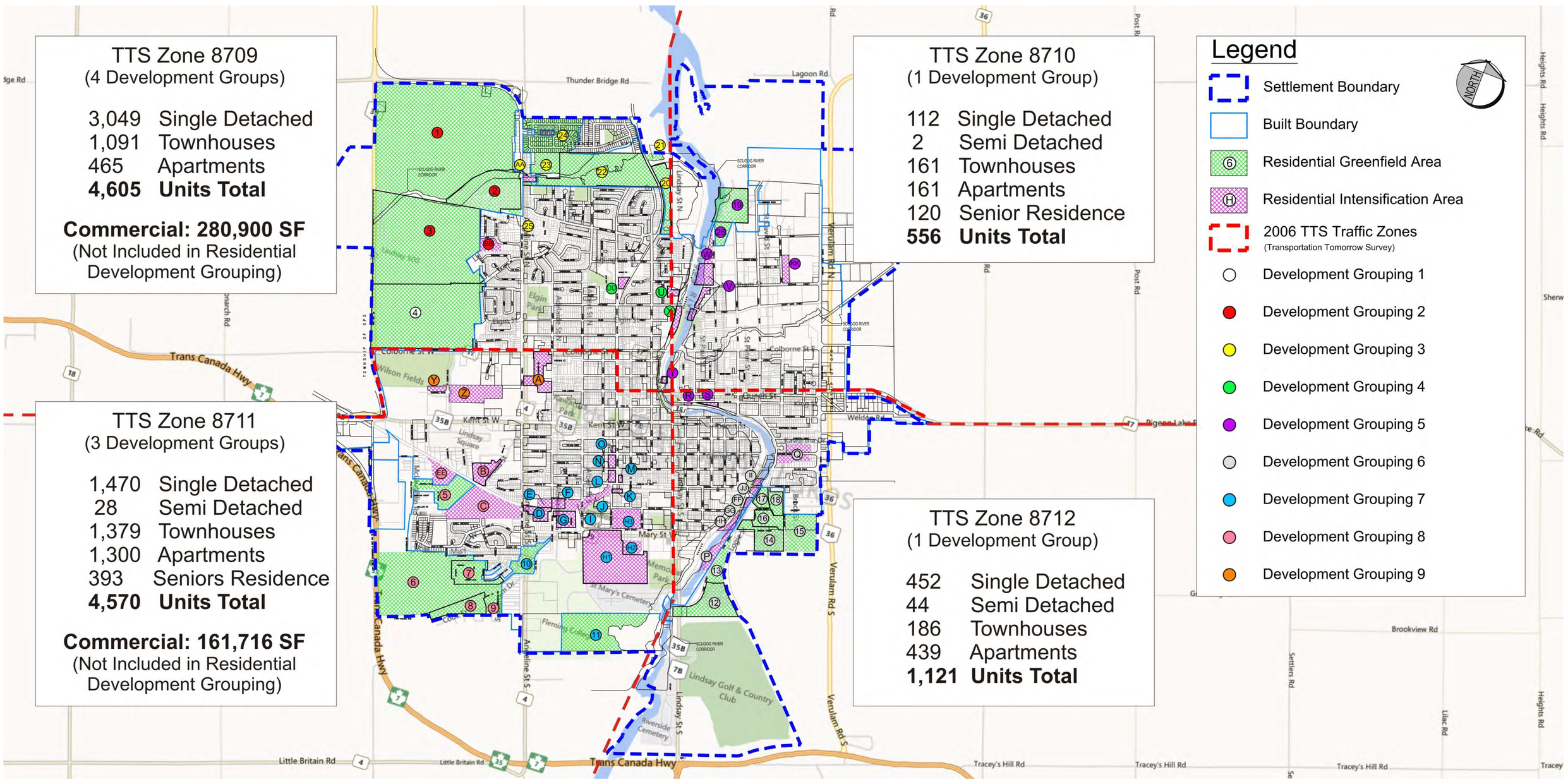
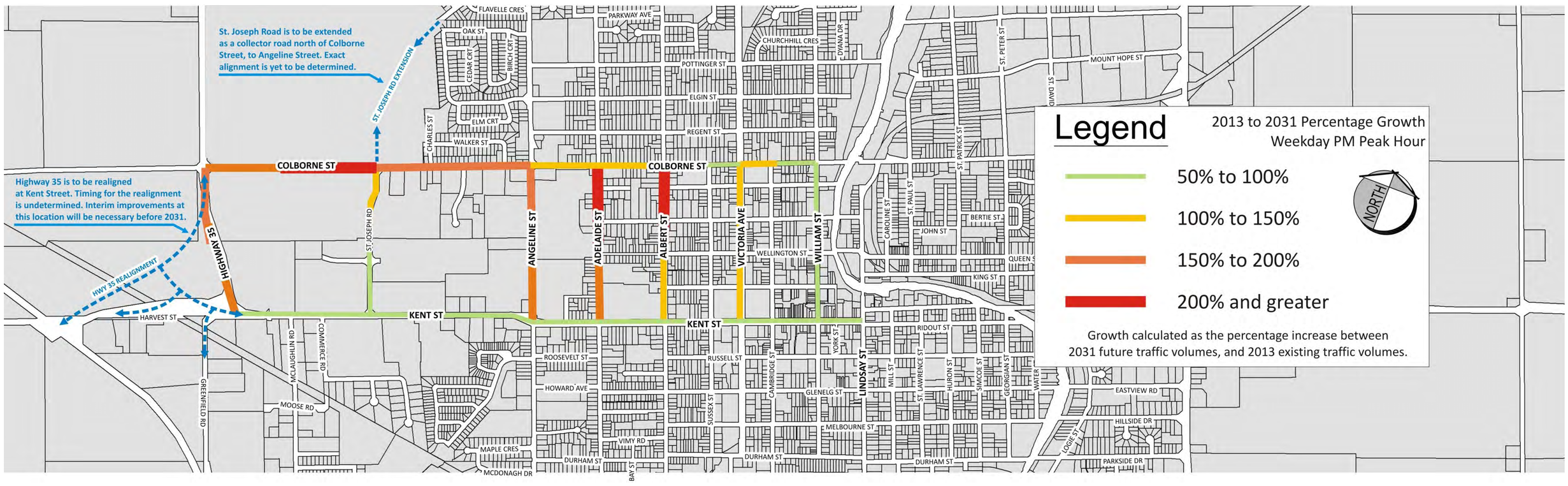


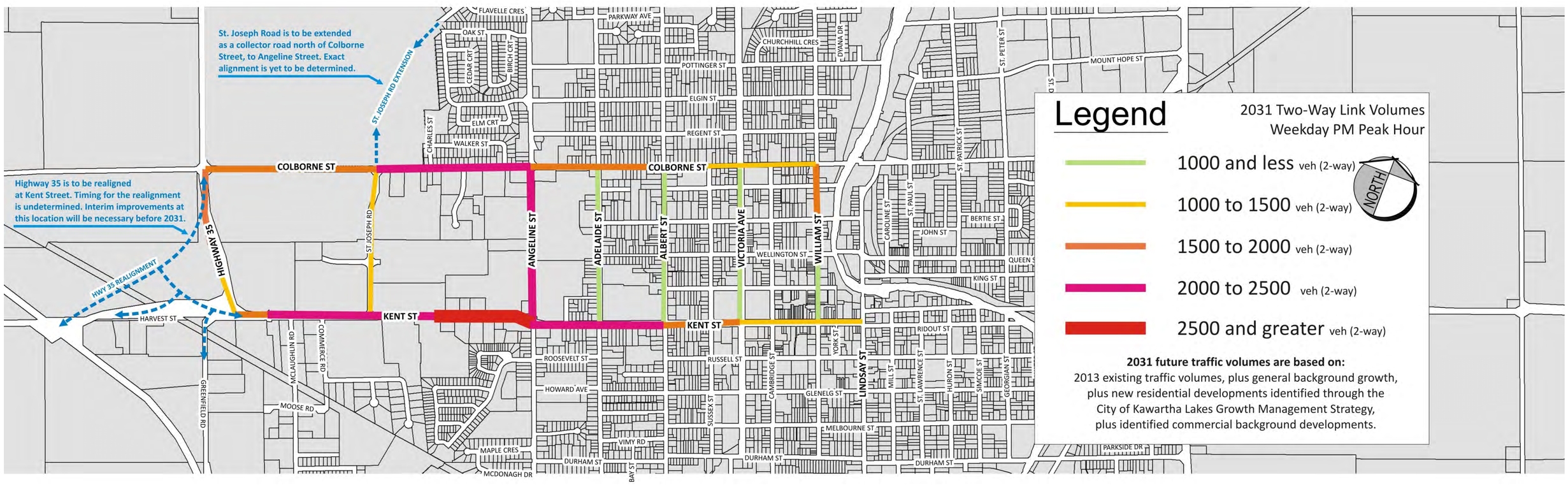
Figure 9-2
Proposed Lindsay Roadway Functional Classification

DEVELOPMENT GROWTH PROJECTIONS

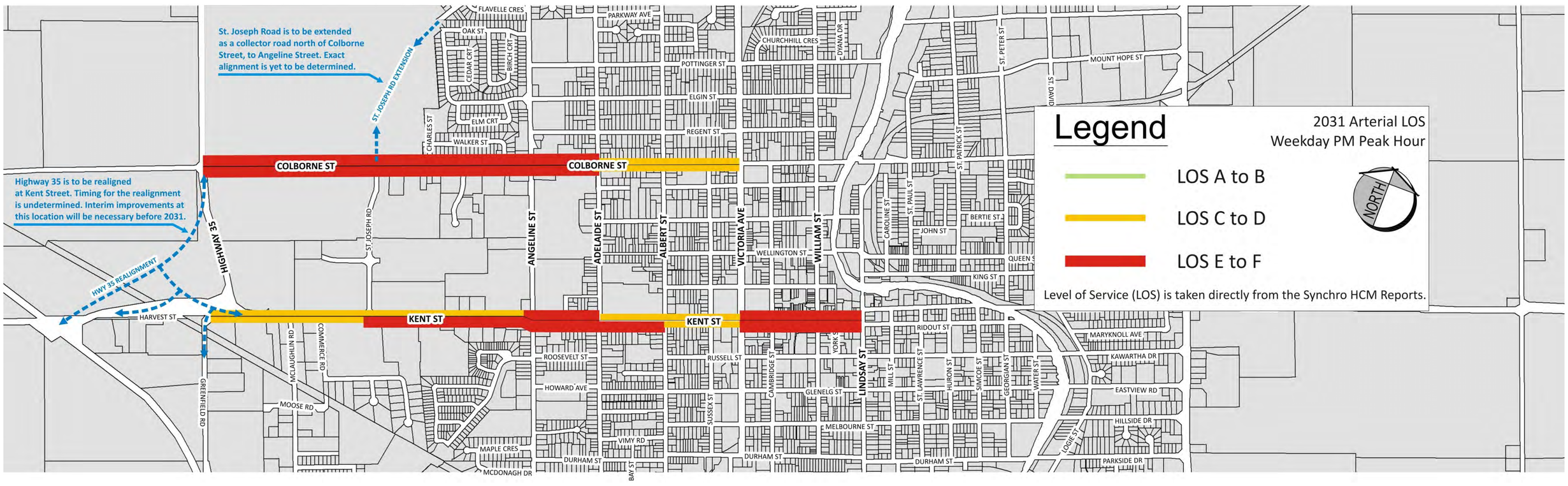


2031 TRAFFIC FORECAST





FUTURE 2031 TRAFFIC OPERATIONS



PROBLEM AND OPPORTUNITY STATEMENT

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. This is a population increase of approximately 33% from 2011 (last Census).

The bulk of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 200% compared to 2013 traffic volumes.

As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes.

Kent Street and Colborne Street will require mitigation measures and improvements to either accommodate or manage this traffic growth.

Transit services, and pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must also be addressed through improvement alternatives and opportunities that will provide a balanced approach.

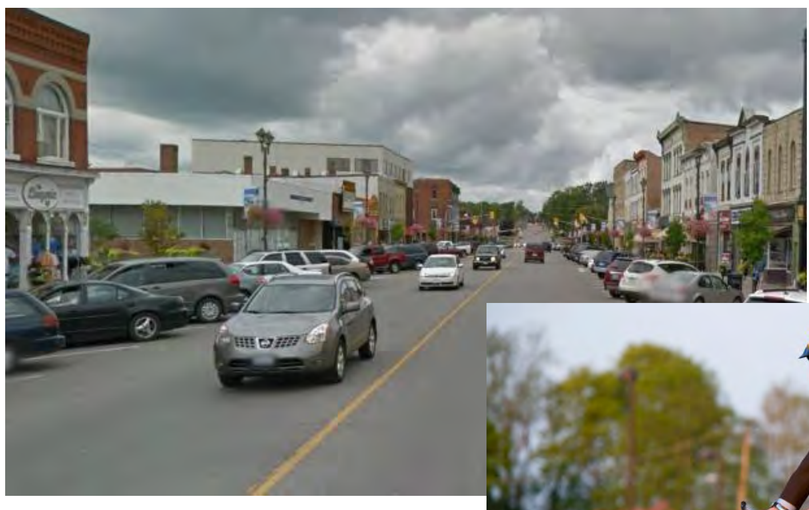
WHAT ALTERNATIVES AND OPPORTUNITIES ARE AVAILABLE?

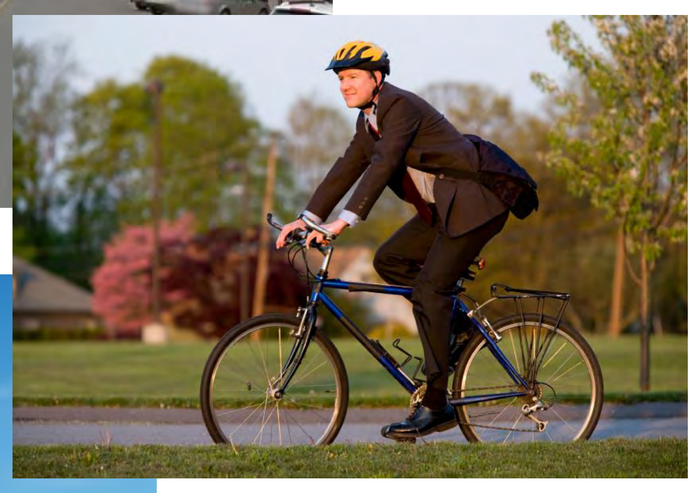
1. **Do Nothing** – No improvements to Kent or Colborne
2. **Travel Demand Management Measures** – Encourage reduction of vehicle trips on Kent or Colborne
3. **Improve Transit** – New routes or better service on Kent or Colborne
4. **Improve Active Transportation Network Connections** – New sidewalk, pedestrian crossings, and cycling lanes
5. **Improve Intersections –** New Signal Timings & Turning Lanes
6. **Improve Road Network –** Widen Kent or Colborne

Have we missed anything?
Please let us know your questions or comments.

TRAVEL DEMAND MANAGEMENT MEASURES

Strategies that help to reduce traffic by reducing auto-dependency: carpooling, bike-to-work programs, flexible work hours, working from home, transit pass incentives, mixed use developments etc..





IMPROVE TRANSIT NETWORK

- Opportunities to develop a Local Transit System to improve mobility / access as well as connectivity to neighbouring towns and municipalities

- Could include new bus stops, new routes, extension or modification of existing routes

- Future opportunities such as GO bus service, or extension of existing services:
  - Route options to connect with Whitby and Oshawa GO stations, as well as to Peterborough. The preferred option was a connection to Oshawa GO via Highway 35, Highway 115, and Highway 401

Lindsay Transit
Ride Smart.

IMPROVE ACTIVE TRANSPORTATION NETWORK AND CONNECTIONS

- Invest in Active Transportation infrastructure (sidewalks, trails, bike lanes, multi-use paths) to provide mobility and safety for non-motorists

- Connectivity within the sidewalk network; improve environment for pedestrians

- On-road bicycle lanes to improve safety and accommodate multiple modes

INTERSECTION IMPROVEMENTS

- Explore opportunities to improve traffic flow at critical intersections

- Improve efficiency (e.g. signal timing optimization, additional turn lanes)

- Assess the feasibility of installing roundabouts or traffic calming measures

- Provide for controlled pedestrian crossings

ROAD NETWORK IMPROVEMENTS

- Road widening (added lanes) to accommodate traffic growth along links
- Results in improved traffic flow throughout the road network
- New intersections and road connections to improve traffic flow and provide access to future developments

Colborne St – West of St. Joseph (Alternative)

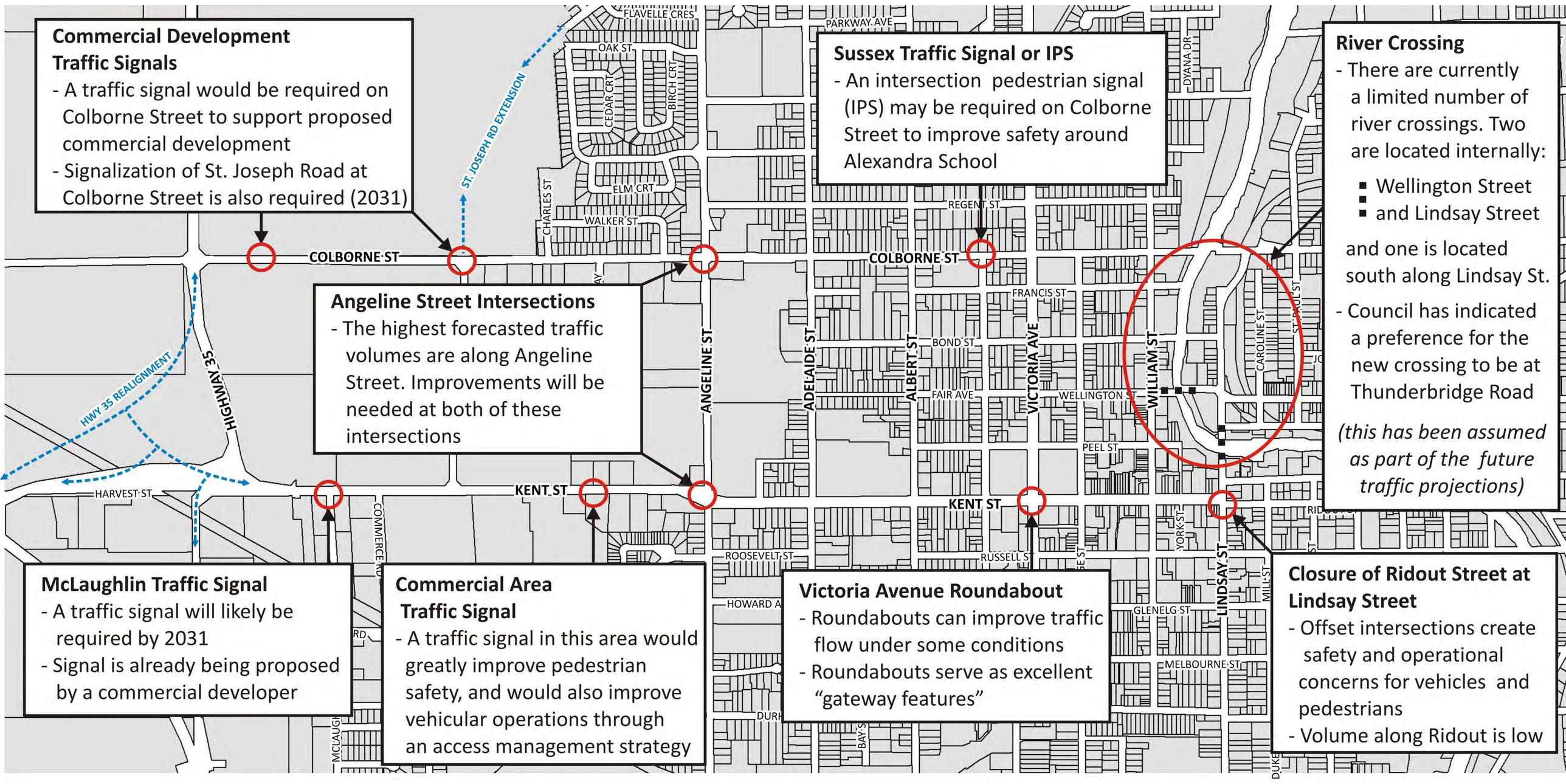
HOW DO WE EVALUATE ALTERNATIVES?
WE USE THE FOLLOWING CRITERIA

Transportation Service	Socio-Economic Environnent
• Level of Service • Traffic Congestion & Delays • Public Transit Service • Accommodation of Pedestrians and Cyclists • Traffic Safety	• Business Impacts • Residents Impacts • Institutional and Recreational Facilities Impacts and Access • Traffic Noise • Archaeological / Cultural Heritage Resources • Visual Aesthetics • Accommodation of Planned Development
Natural Environnent	**Engineering**
• Vegetation • Aquatic Habitat • Surface Water • Air Quality	• Capital Costs • Operating Costs • Property Acquisition • Utility Relocation

Have we missed anything?

Please let us know your questions or comments.

2031 FUTURE ISSUES & CONCERNS



Commercial Development Traffic Signals
- A traffic signal would be required on Colborne Street to support proposed commercial development
- Signalization of St. Joseph Road at Colborne Street is also required (2031)

Angeline Street Intersections
- The highest forecasted traffic volumes are along Angeline Street. Improvements will be needed at both of these intersections

Sussex Traffic Signal or IPS
- An intersection pedestrian signal (IPS) may be required on Colborne Street to improve safety around Alexandra School

River Crossing
- There are currently a limited number of river crossings. Two are located internally:
  - Wellington Street
  - and Lindsay Street

  and one is located south along Lindsay St.
- Council has indicated a preference for the new crossing to be at Thunderbridge Road

(this has been assumed as part of the future traffic projections)

McLaughlin Traffic Signal
- A traffic signal will likely be required by 2031
- Signal is already being proposed by a commercial developer

Commercial Area Traffic Signal
- A traffic signal in this area would greatly improve pedestrian safety, and would also improve vehicular operations through an access management strategy

Victoria Avenue Roundabout
- Roundabouts can improve traffic flow under some conditions
- Roundabouts serve as excellent "gateway features"

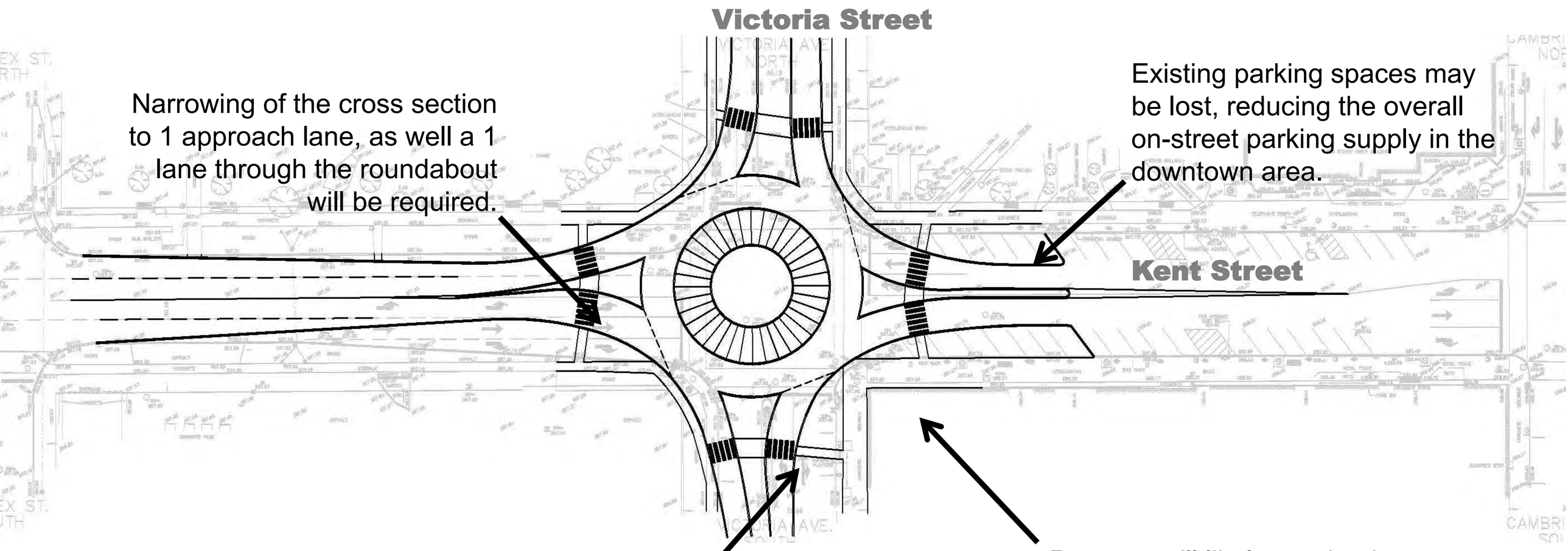
Closure of Ridout Street at Lindsay Street
- Offset intersections create safety and operational concerns for vehicles and pedestrians
- Volume along Ridout is low

Have we missed anything?

Please let us know your questions or comments.

POTENTIAL ROUNDABOUT AT KENT AND VICTORIA

Although the existing traffic signals at Victoria will handle future traffic, a potential roundabout could be constructed as a gateway feature



Do you support the potential roundabout?

Please let us know your questions or comments.

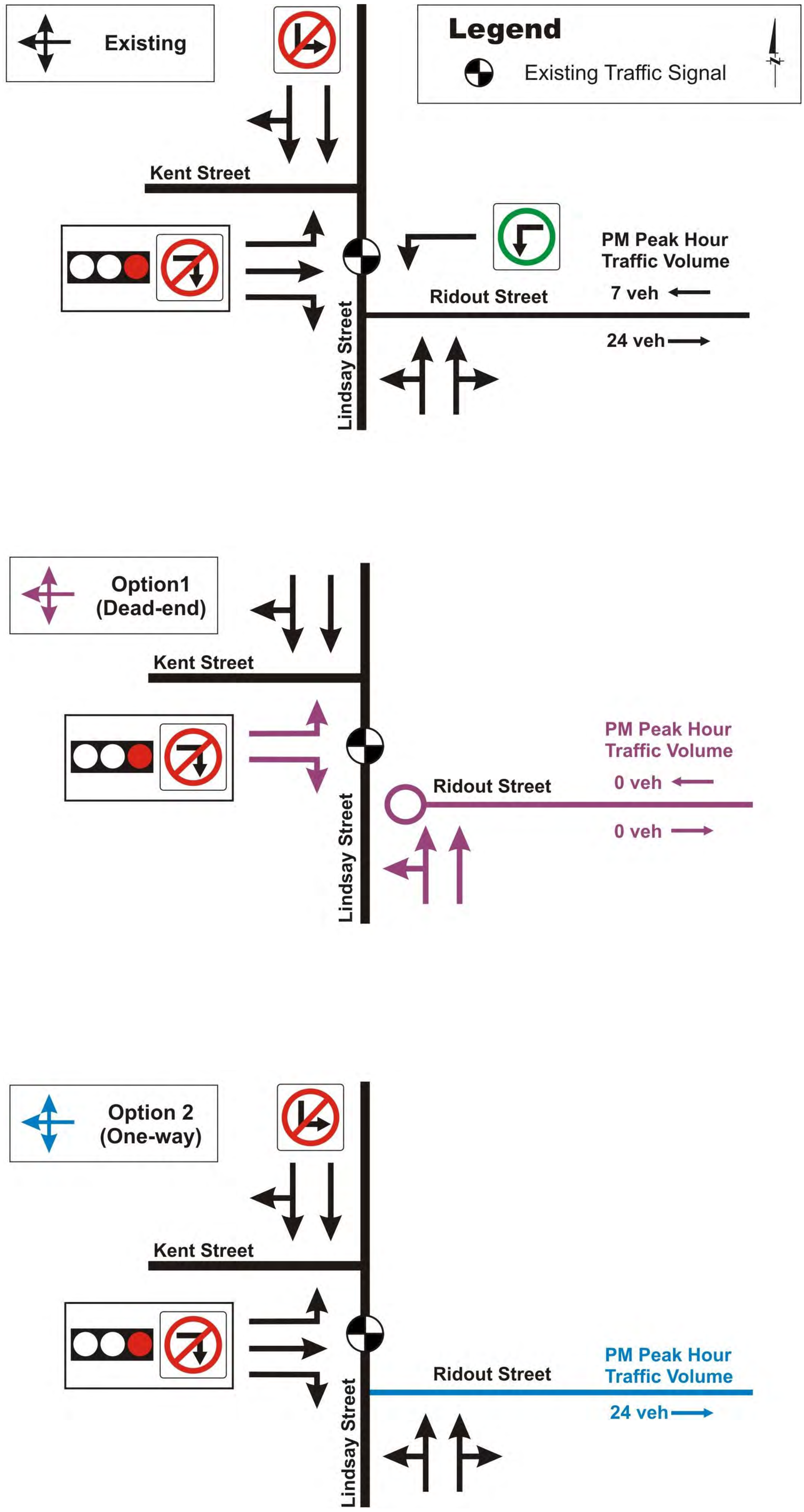
SHOULD RIDOUT STREET BE CLOSED TO IMPROVE KENT / LINDSAY INTERSECTION?

- The current configuration of the Kent Street / Lindsay Street / Ridout Street intersection is jogged such that the east leg is offset south by 20 metres

- This offset has resulted in the following turn restrictions due to safety and operational concerns with respect to both pedestrian and vehicle flow:
  - Southbound left-turns are not permitted
  - Eastbound right-turns are not permitted on red
  - Westbound right-turns are not permitted (westbound left-turns only on green)

- Removal of these restrictions can be achieved by eliminating the jog. This can be achieved through:
  - **Option 1** - Closure of Ridout Street at Lindsay Street
  - **Option 2** – Conversion of Ridout Street to one-way operations in the eastbound direction

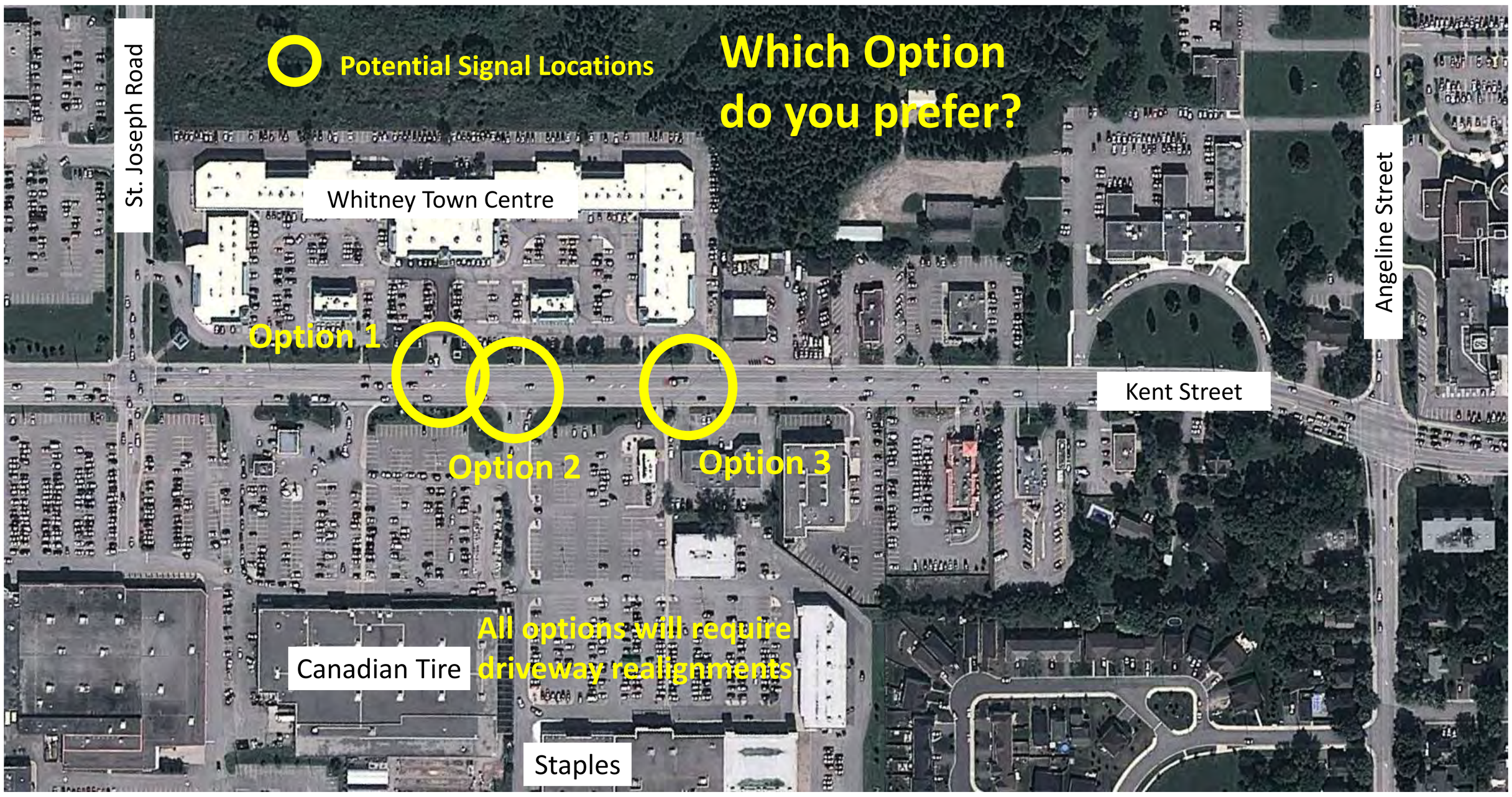
- Under existing conditions only 31 vehicles are using Ridout Street during the weekday PM peak hour



Have we missed anything?

Please let us know your questions or comments.

NEW TRAFFIC SIGNALS (TO ACCOMMODATE A MID-BLOCK PEDESTRIAN CROSSING) EAST OF ST. JOSEPH ROAD



Option 1

- Approximately 170m east of St. Joseph Road – very close spacing
- Westbound queue at St. Joseph Road will not extend to Option 1 location.
- Eastbound queue at Option 1 location will not extend to St. Joseph Road.
- Signal serves both Whitney Town Centre and Staples and Canadian Tire Plaza.
- Major parking lot layout modification for Staples and Canadian Tire Plaza or implement left turn out restrictions at the unsignalized driveways
- Driveway will be operating with a Level of Service of C - No significant impact to the road network.

Option 2

- Approximately 210m east of St. Joseph Road.
- Eastbound queue at Option 1 location will not extend to St. Joseph Road.
- Signal serves both Whitney Town Centre and Staples and Canadian Tire Plaza.
- Main access and parking lot layout modification required for Whitney Town Centre.
- Driveway will be operating with a Level of Service of C - No significant impact to the road network.

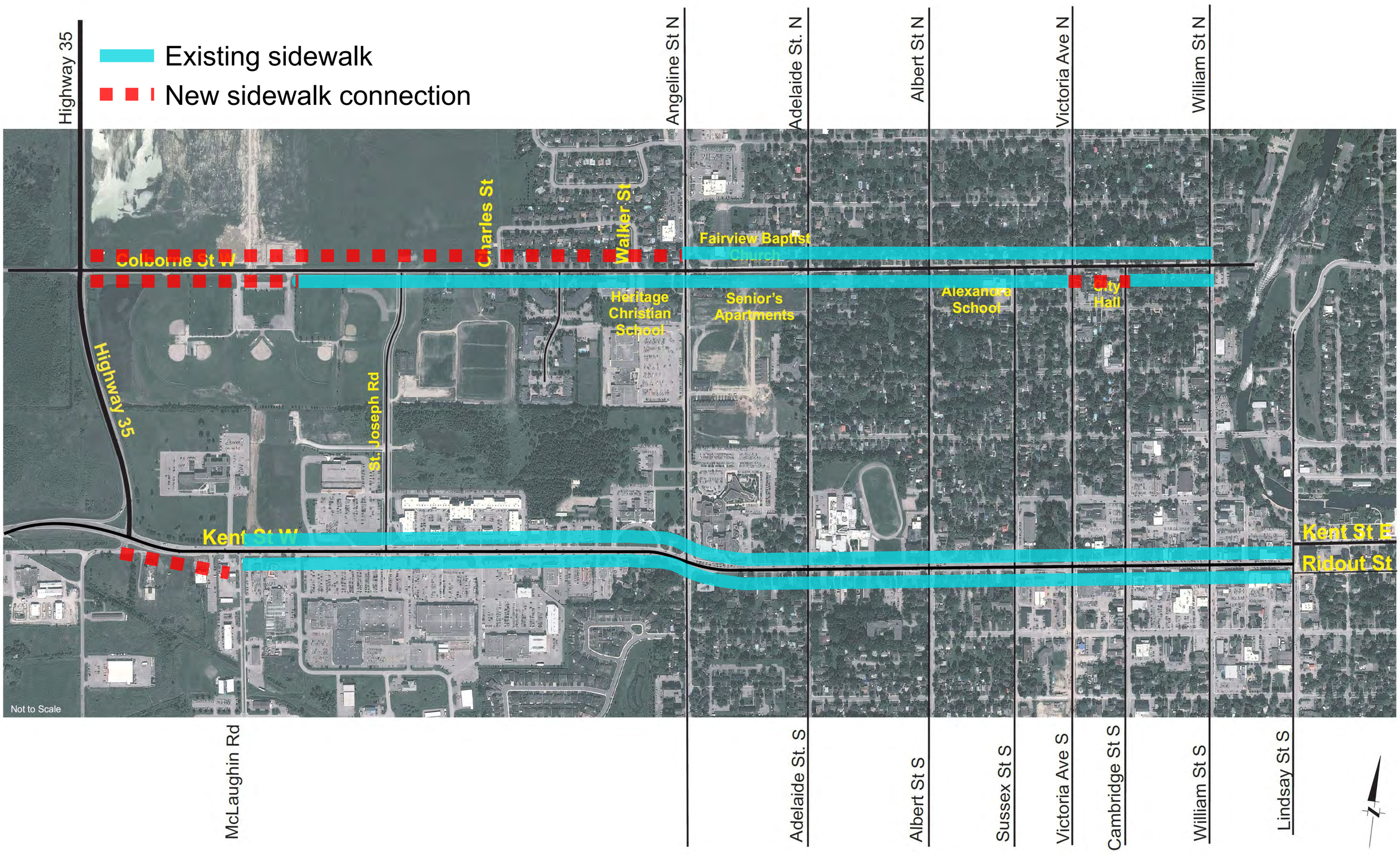
Option 3

- Approximately 310m east of St. Joseph Road – best spacing
- Minor parking lot layout modification required on either side.
- Serve less traffic since the signal will be unable to serve Staples and Canadian Tire Plaza.
- A portion of the enter/exit volumes from the Whitney Town Centre main driveway may shif to the Option 3 location.

Do you have another option?

Please let us know your questions or comments.

IMPROVE SIDEWALK NETWORK



IMPROVE TRANSIT NETWORK

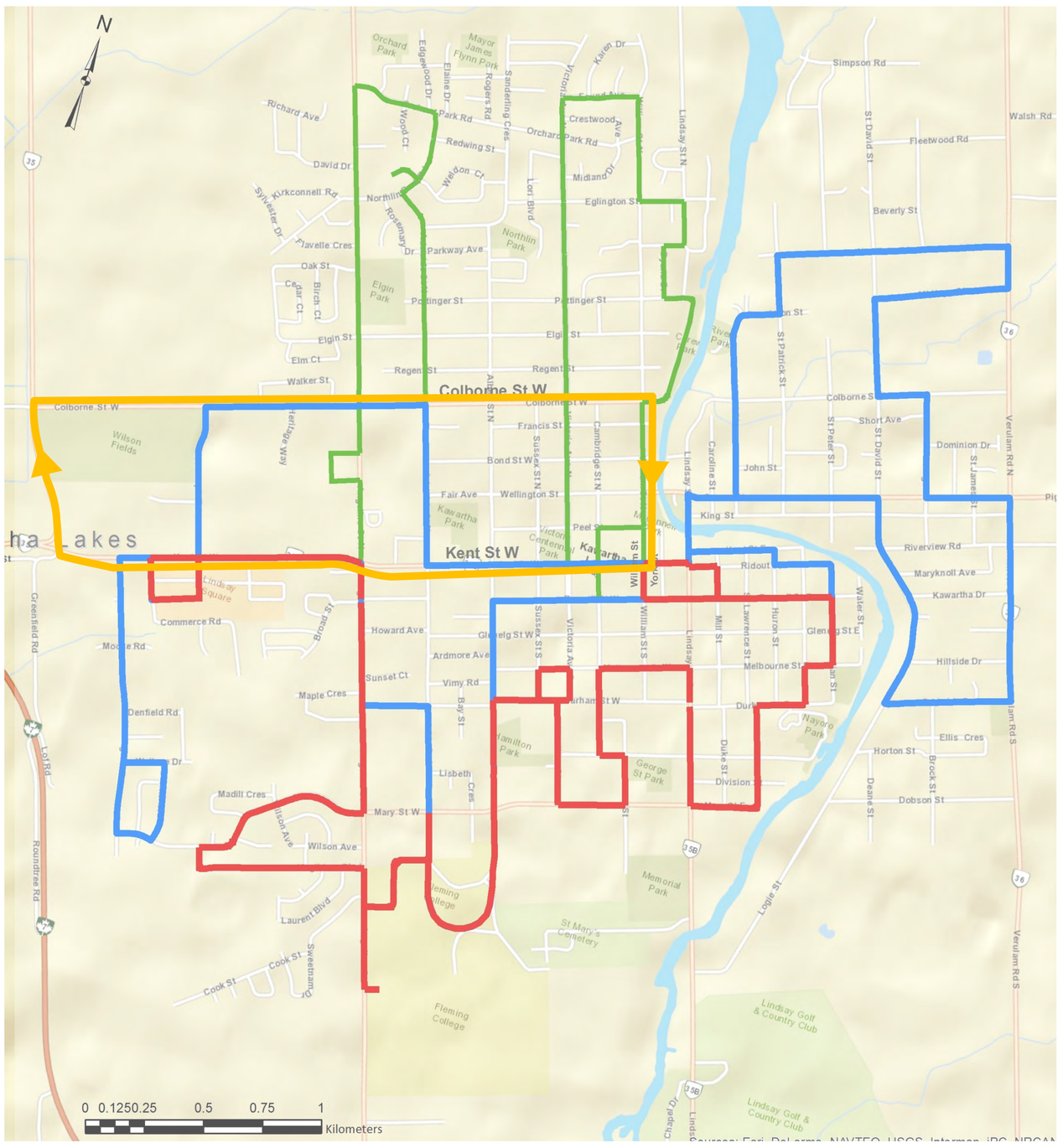
Opportunities for

- **New Loop Service:** Runs on Kent and Colborne via William St and Hwy 35

- **Route Extension:** Extension of local bus route to improve connectivity to other transit services such as Peterborough GO bus Service

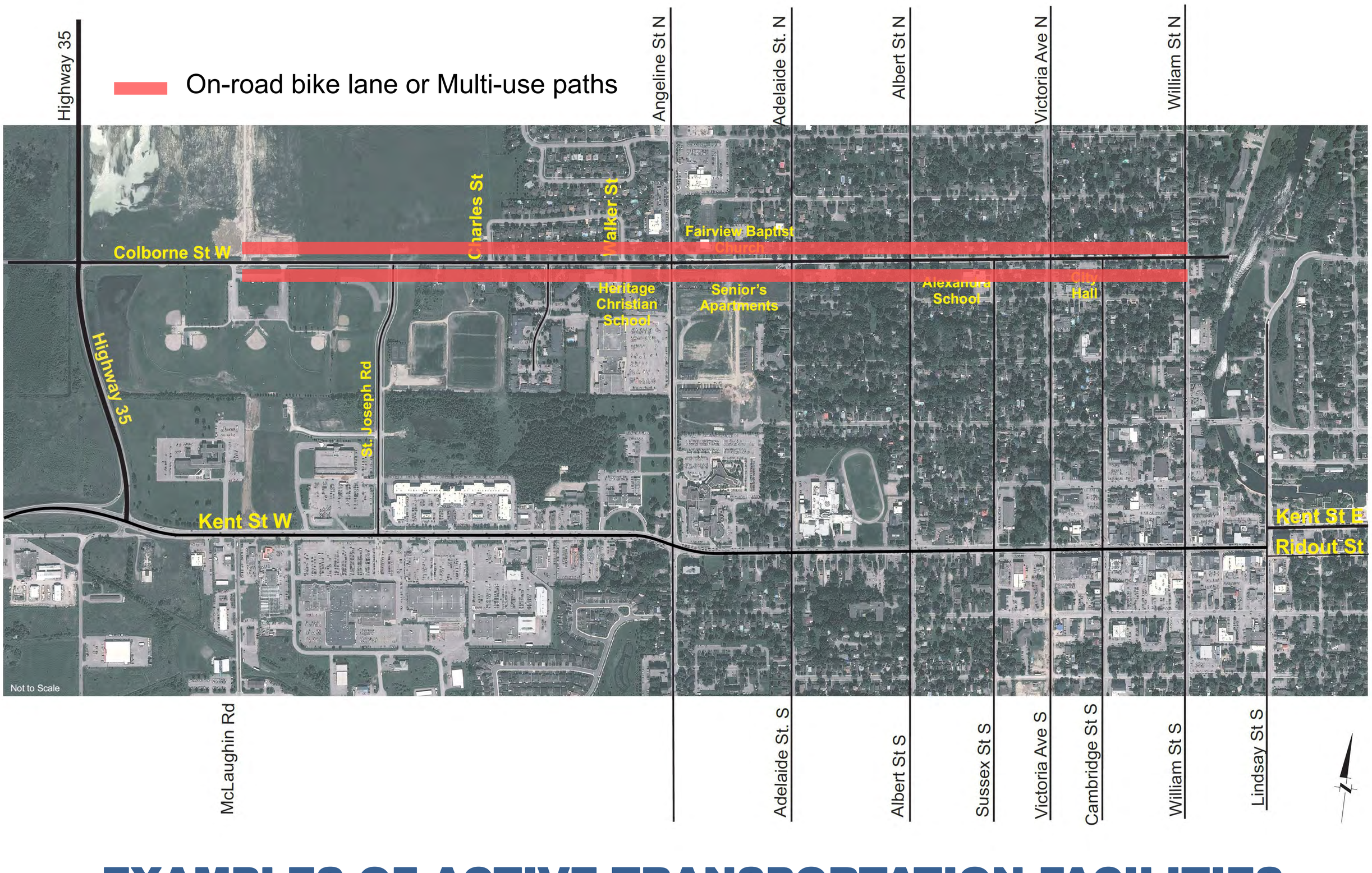
Transit service improvements will require further discussion with City's Transit Board.

What improvements would you like to see?

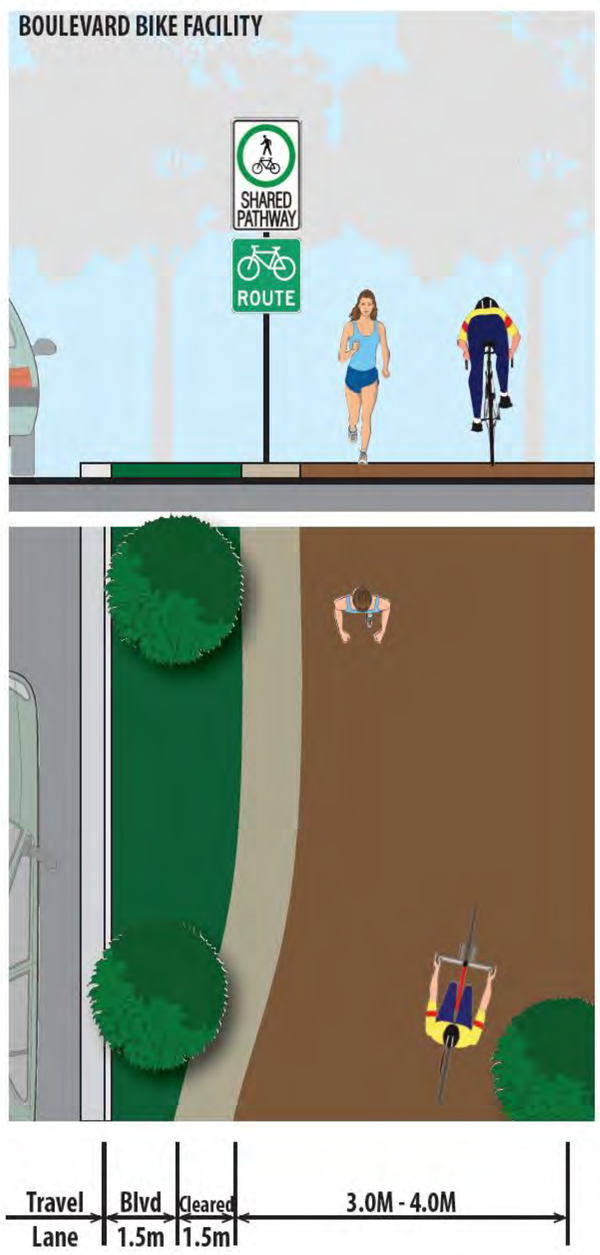


Existing Transit Routes (Green, Blue, Red)
Potential New loop service

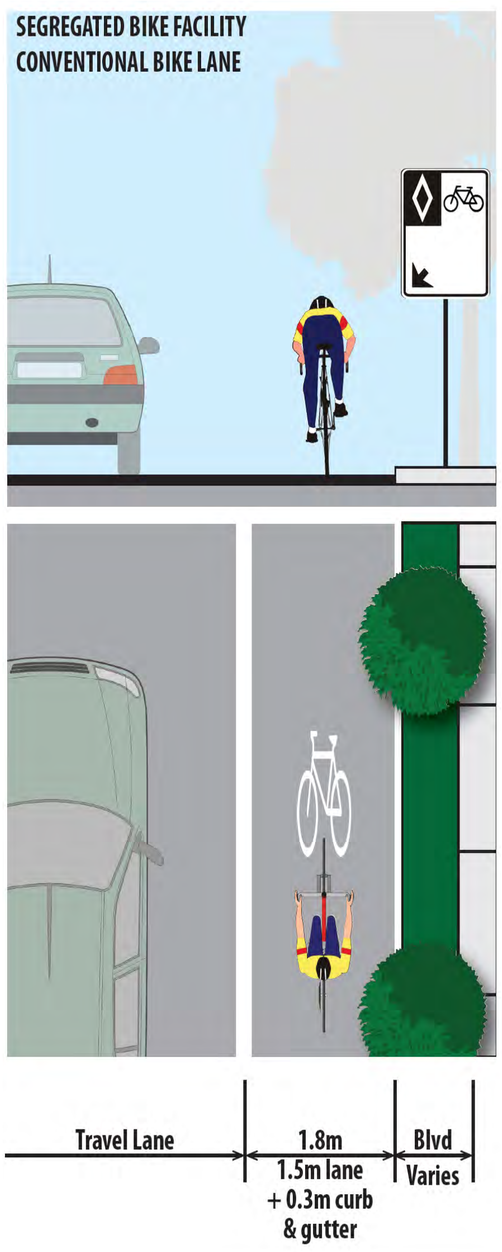
IMPROVE BIKE CONNECTIONS



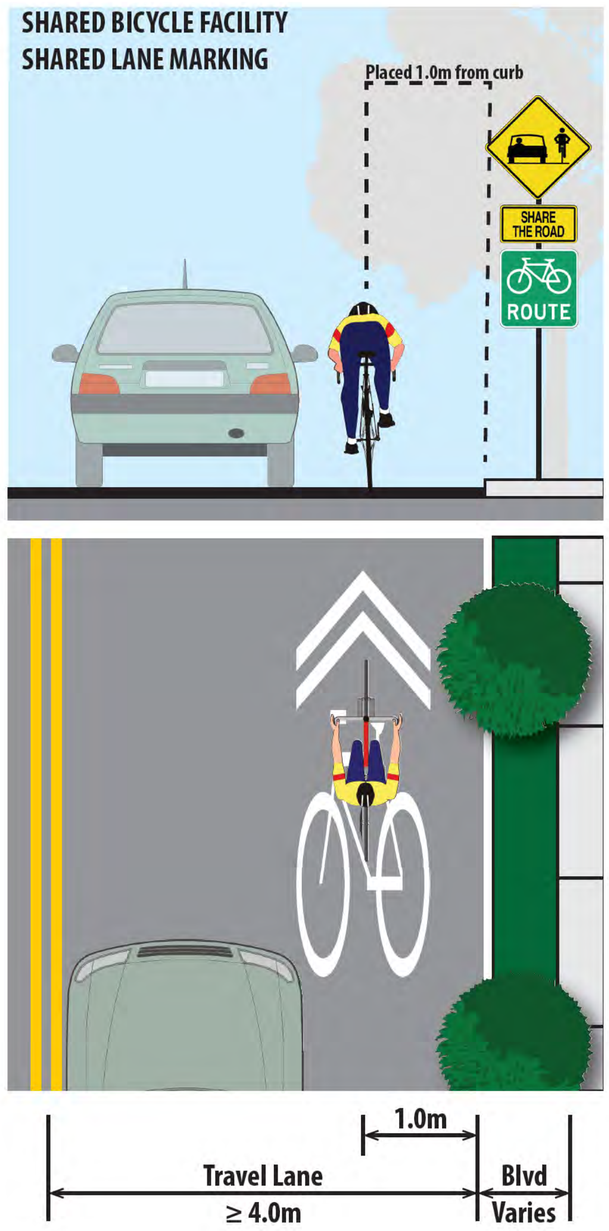
EXAMPLES OF ACTIVE TRANSPORTATION FACILITIES



Designated Boulevard Bike Facility



Segregated Bike Facility (or A Conventional Bike Lane)



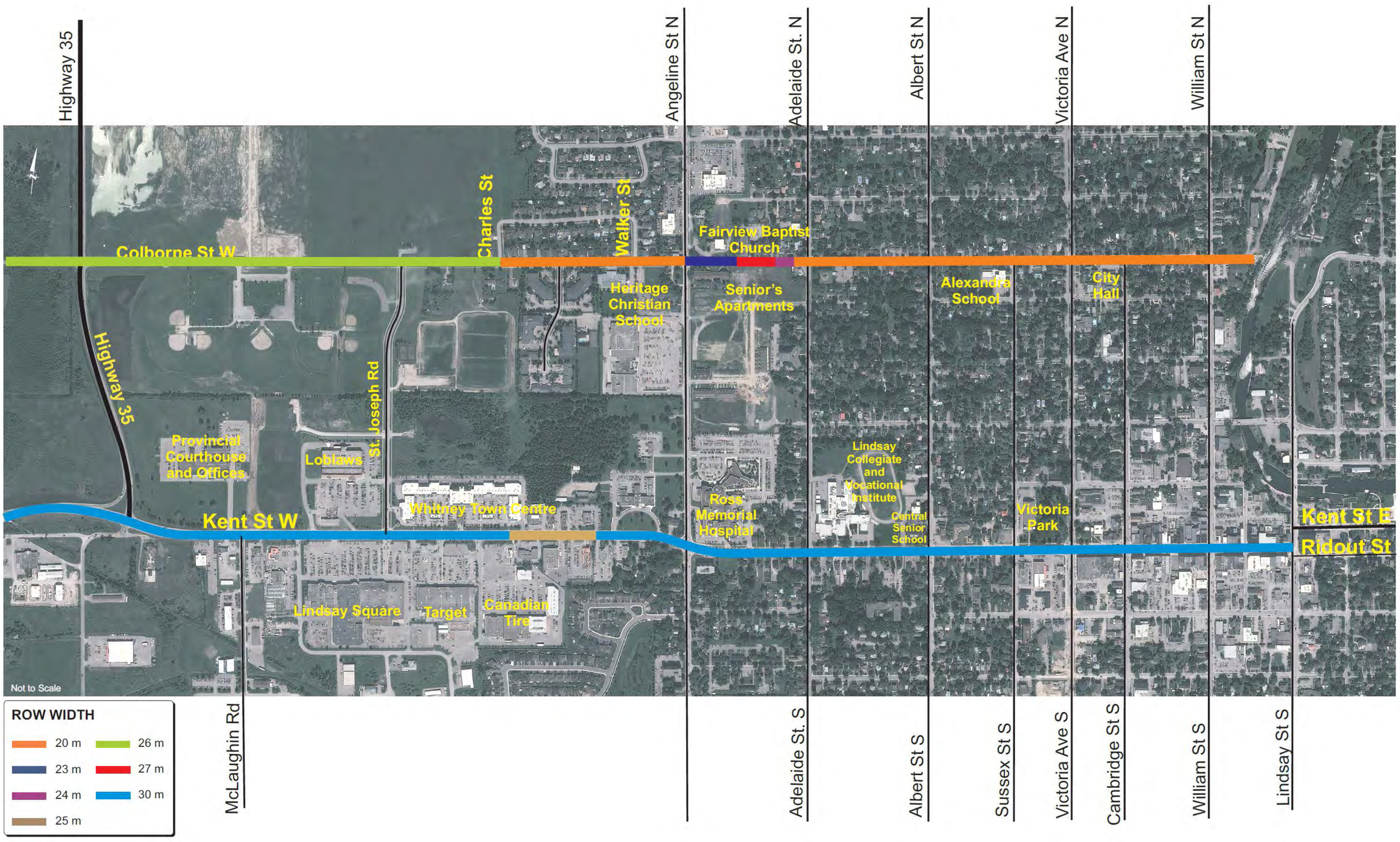
Shared Bike Facility (A Shared Lane)

Have we missed anything?

Please let us know your questions or comments.

WHAT ARE THE CONSTRAINTS TO IMPROVING KENT AND COLBORNE STREETS?

AVAILABLE RIGHT-OF-WAY WIDTHS



IN THE FOLLOWING BOARDS, WE ILLUSTRATE POTENTIAL IMPROVEMENT OPTIONS ON KENT AND COLBORNE TO DEMONSTRATE IF THE FOLLOWING CAN BE ACCOMMODATED

- New sidewalks
- Wider sidewalks
- New Bike lanes
- New Multi-use paths
- Widening to three or four lanes on Colborne
- Narrowing the pavement width

- **Did we miss any options? Please let us know!**

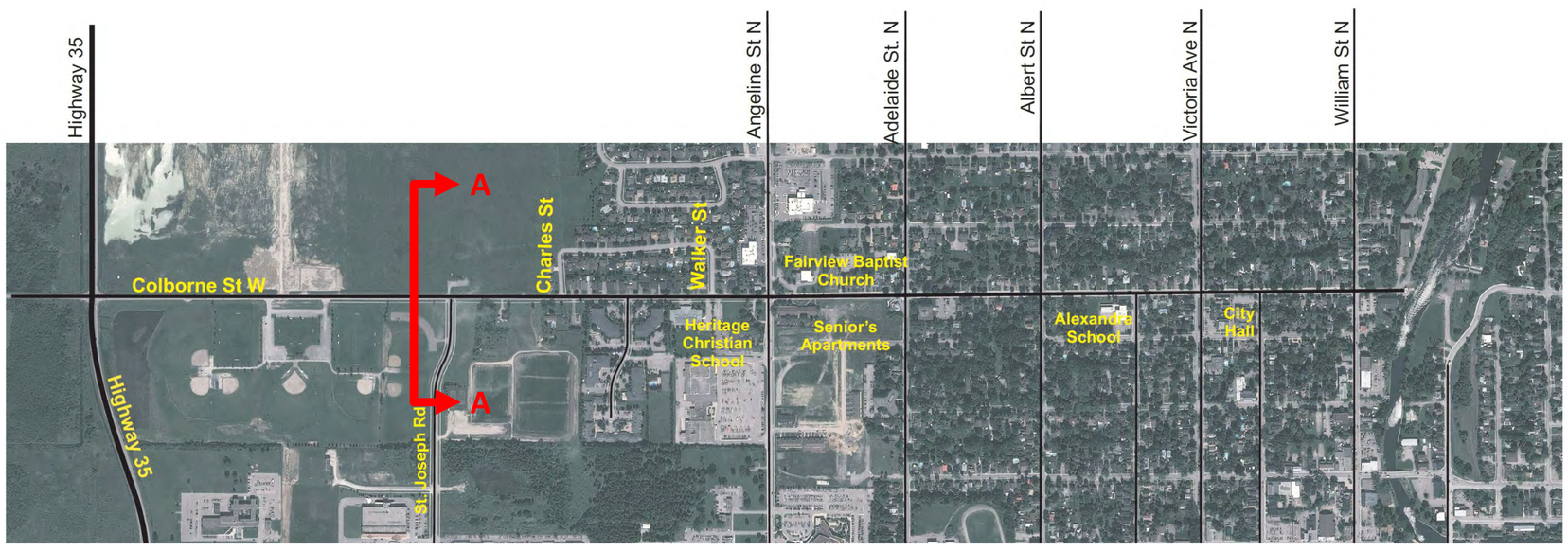
Have we missed anything?

Please let us know your questions or comments.

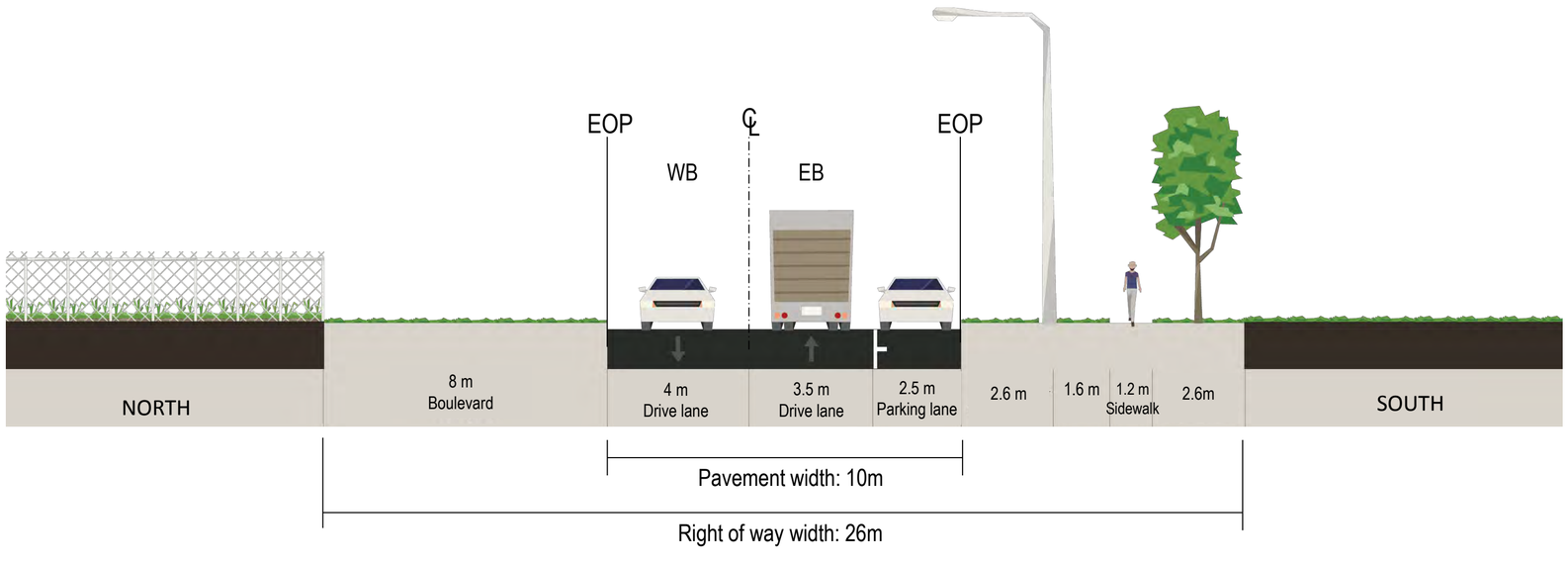
Alternative Cross Section: Colborne St

Section A – A: West of St. Joseph

Ref Map

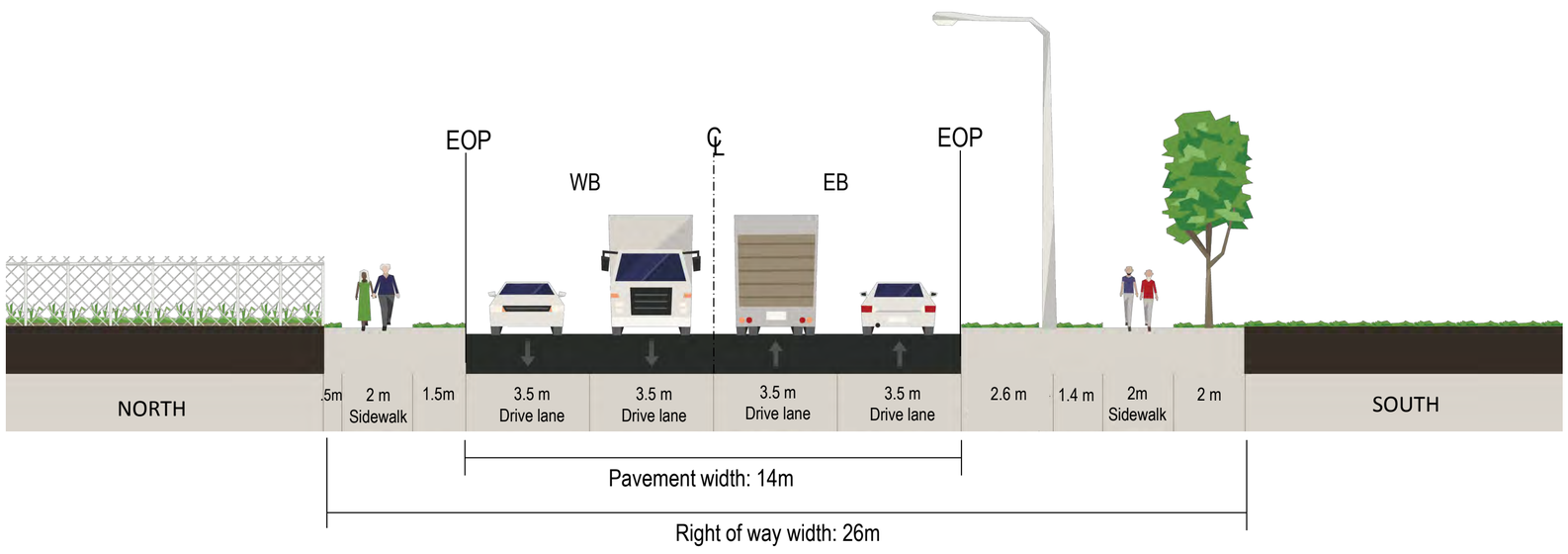


Do Nothing



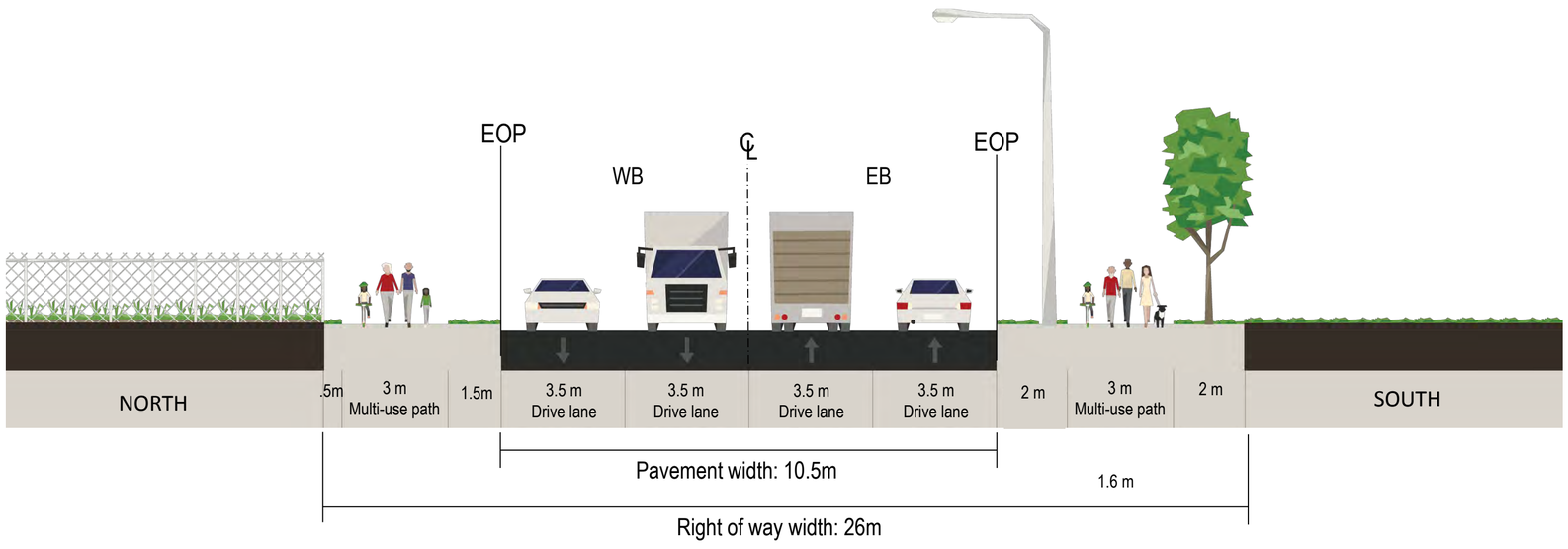
- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative 1



- Widen to 4-lanes
- New sidewalk on north side
- 2m wide sidewalk on both sides

Alternative 2



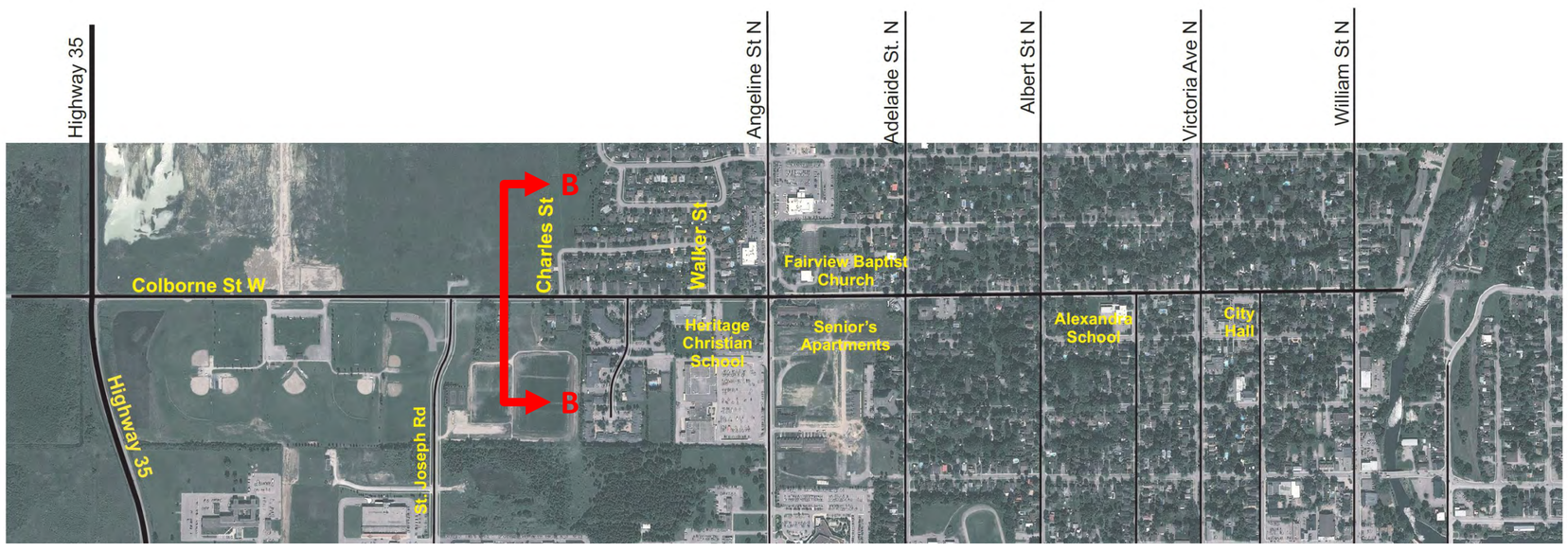
- Widen to 4-lanes
- Multi-use path on both sides

Notes:
EOP: Edge of Pavement

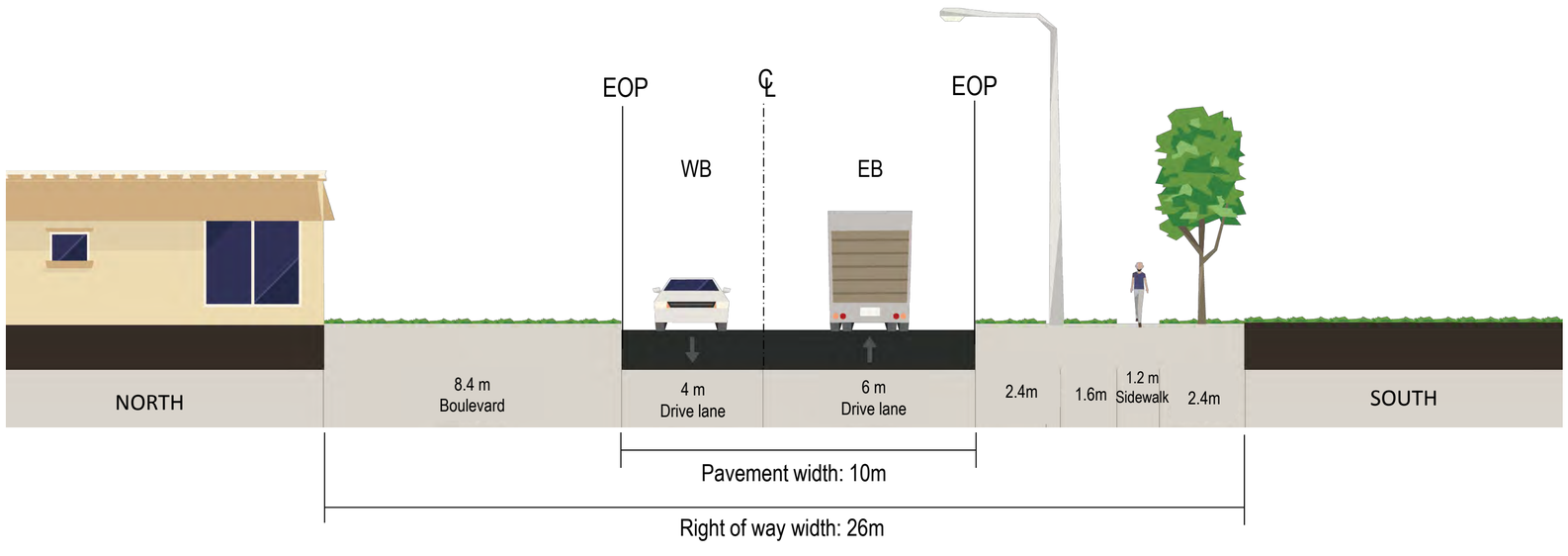
Alternative Cross Section: Colborne St

Section B – B: East of St. Joseph

Ref Map

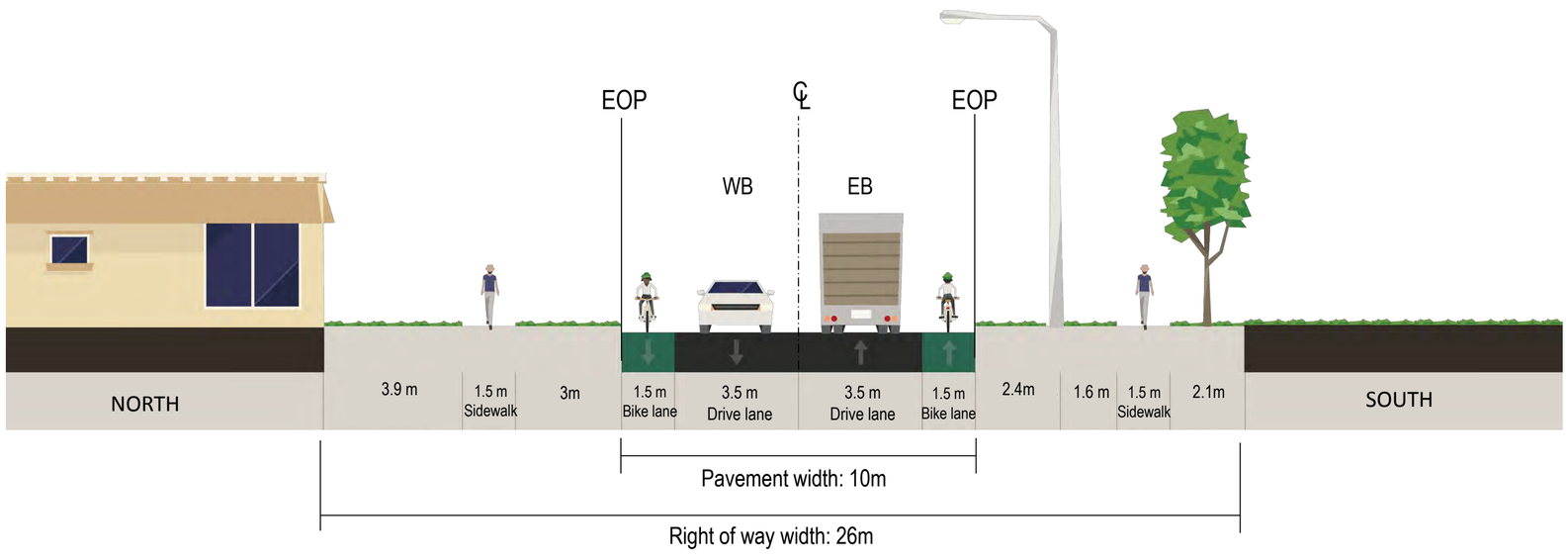


Do Nothing



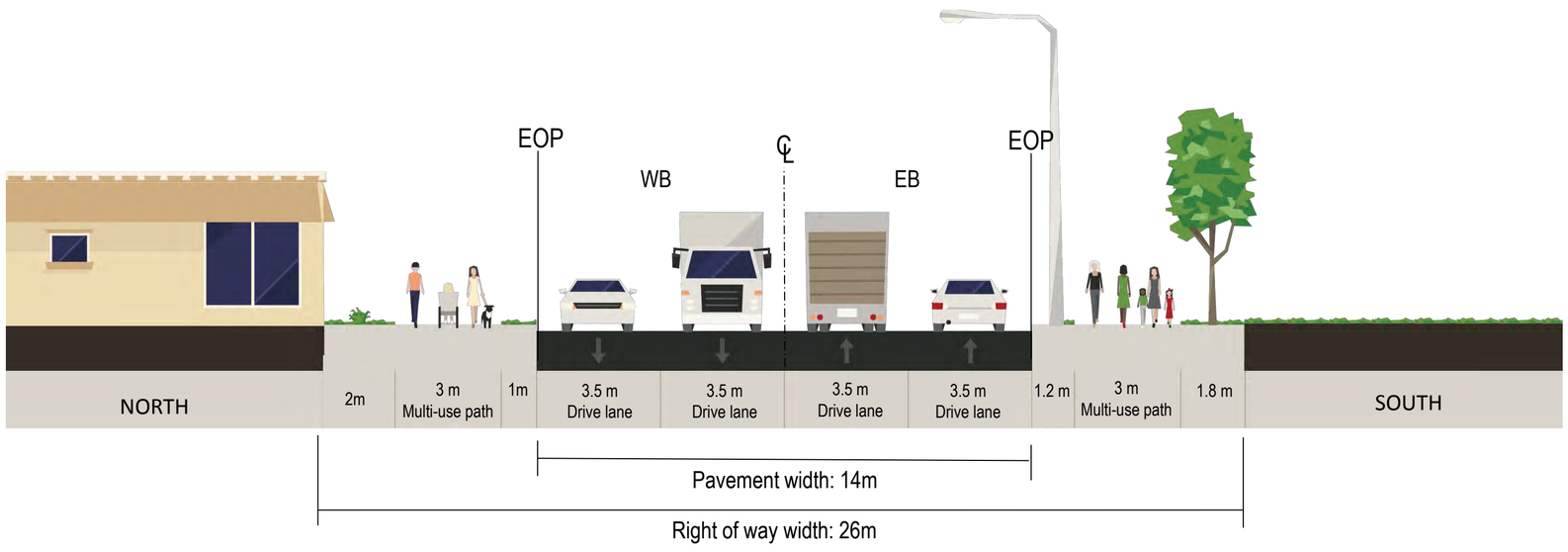
- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative 1



- Increase sidewalk width on south side
- New sidewalk on north side
- Bike lane in both directions

Alternative 2



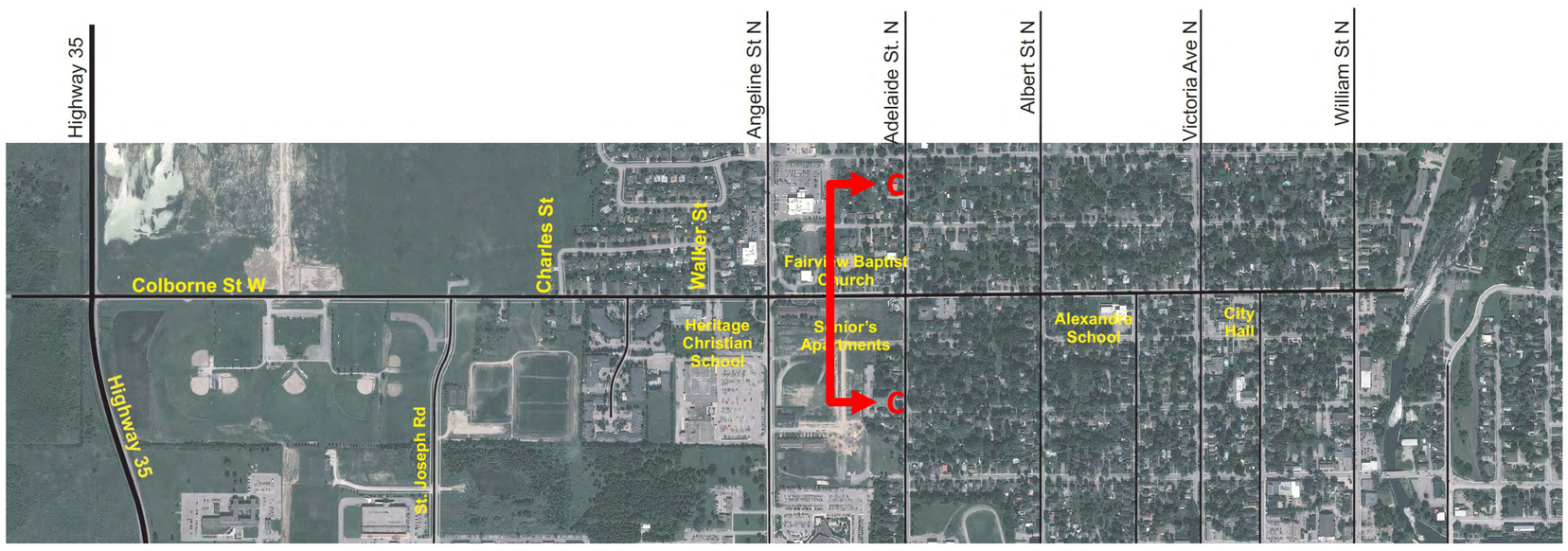
- Widen to 4 travelled lanes; 2 per direction
- Multi-use paths on both sides of the street

Notes:
EOP: Edge of Pavement

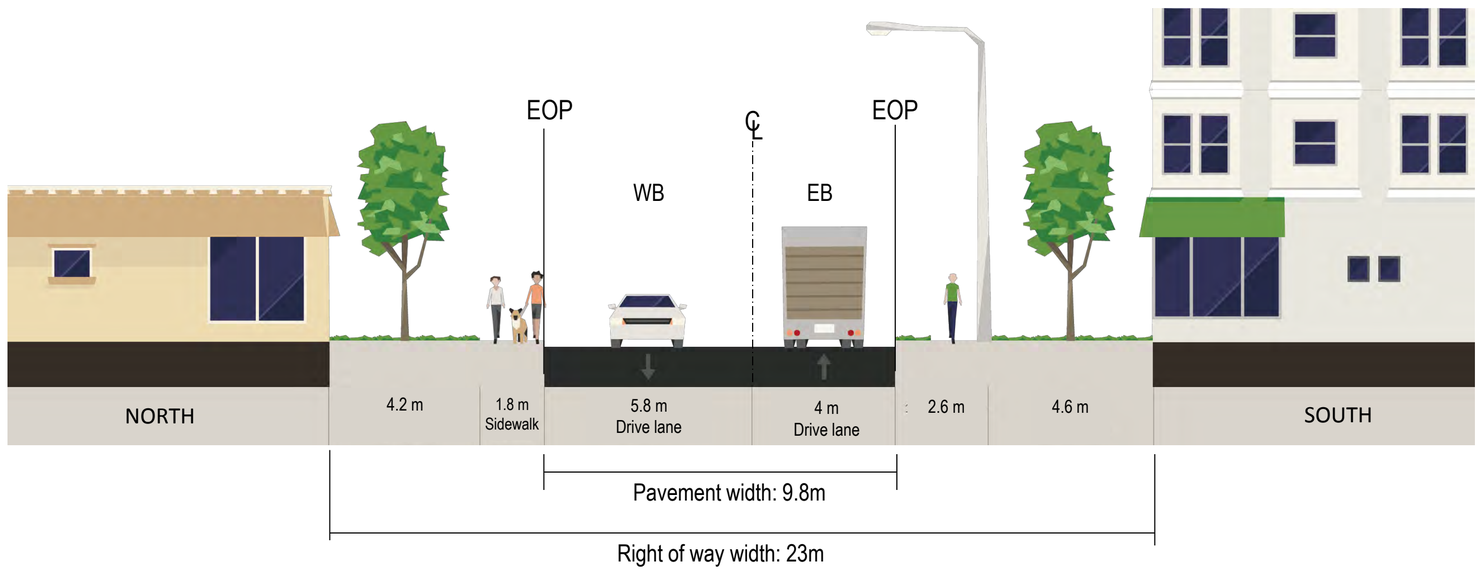
Alternative Cross Section: Colborne St

Section C – C: East of Angeline

Ref Map

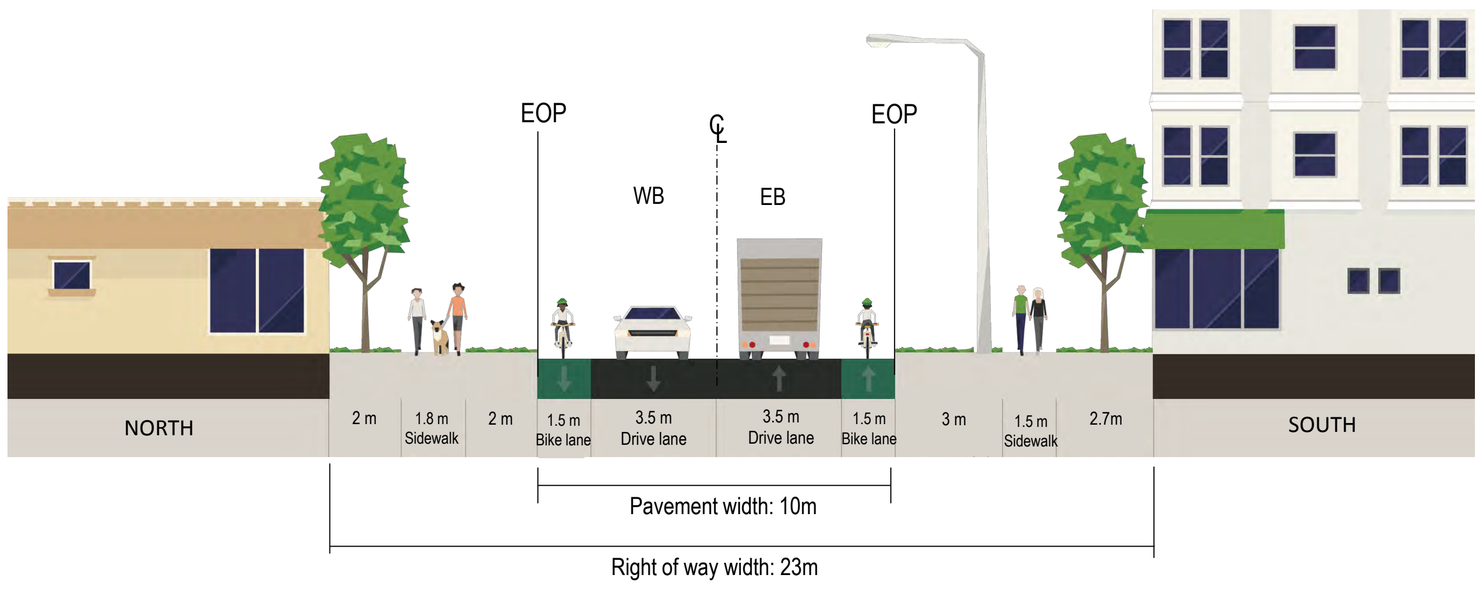


Do Nothing



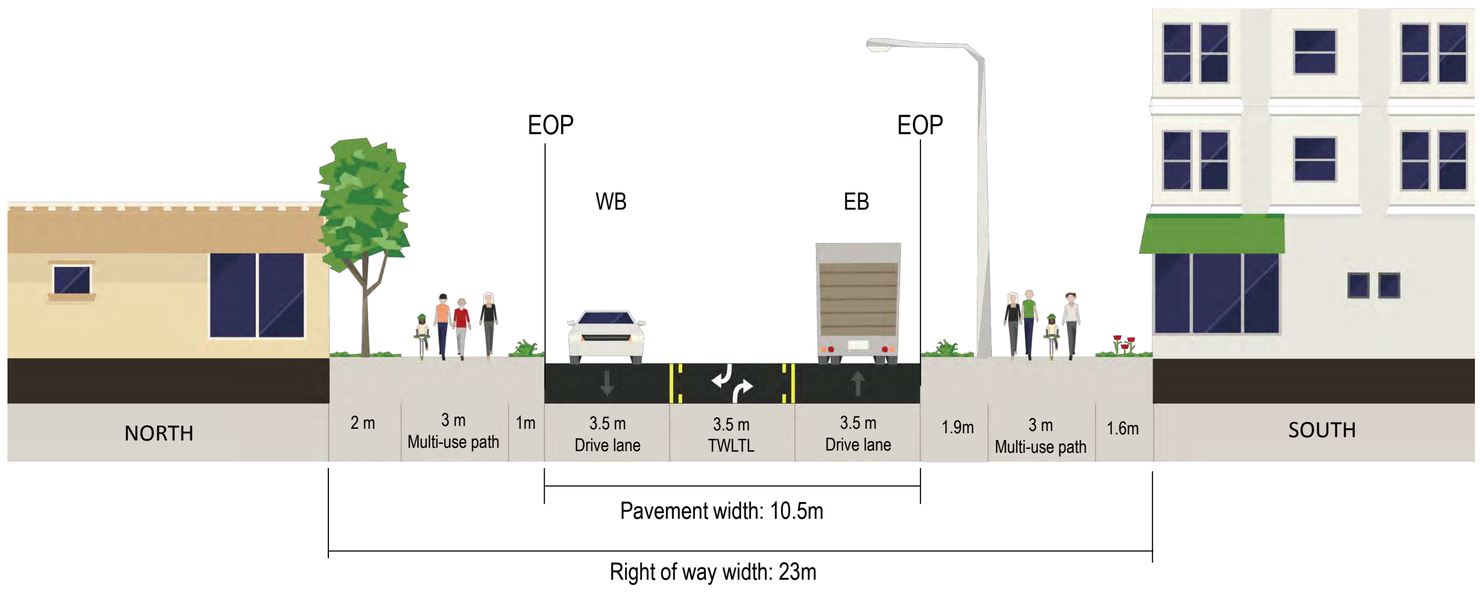
- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative 1



- Increase sidewalk width on south side
- Bike route in both directions
- Increase boulevard widths both sides

Alternative 2



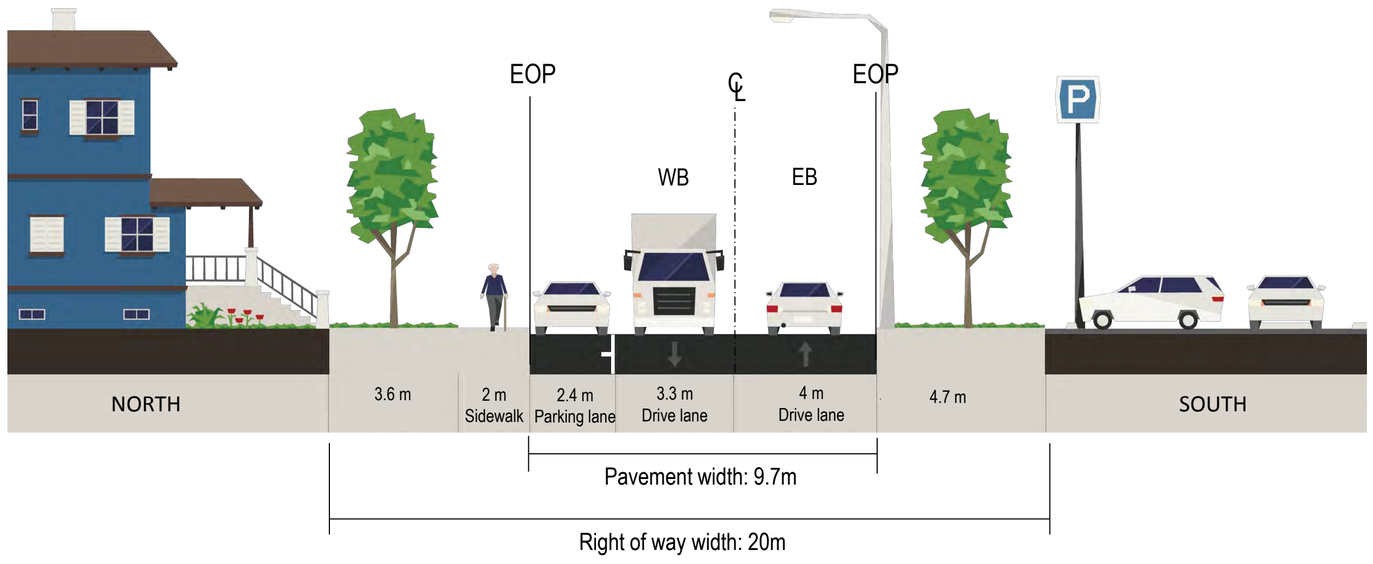
- 3-lane cross section with a Centre Two-way Left-turn Lane
- Multi-use paths on both sides of the street

Notes:
EOP: Edge of Pavement
TWLTL: Two-way Left Turn

Alternative Cross Section: Colborne St

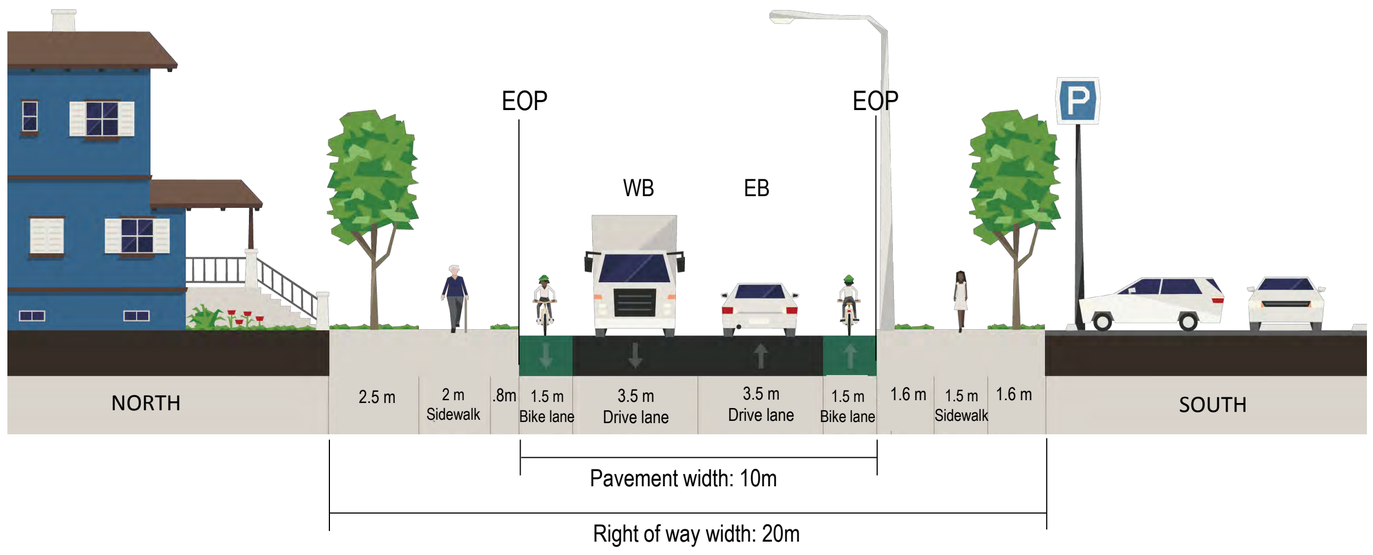
Section D – D: East of Victoria

Do Nothing



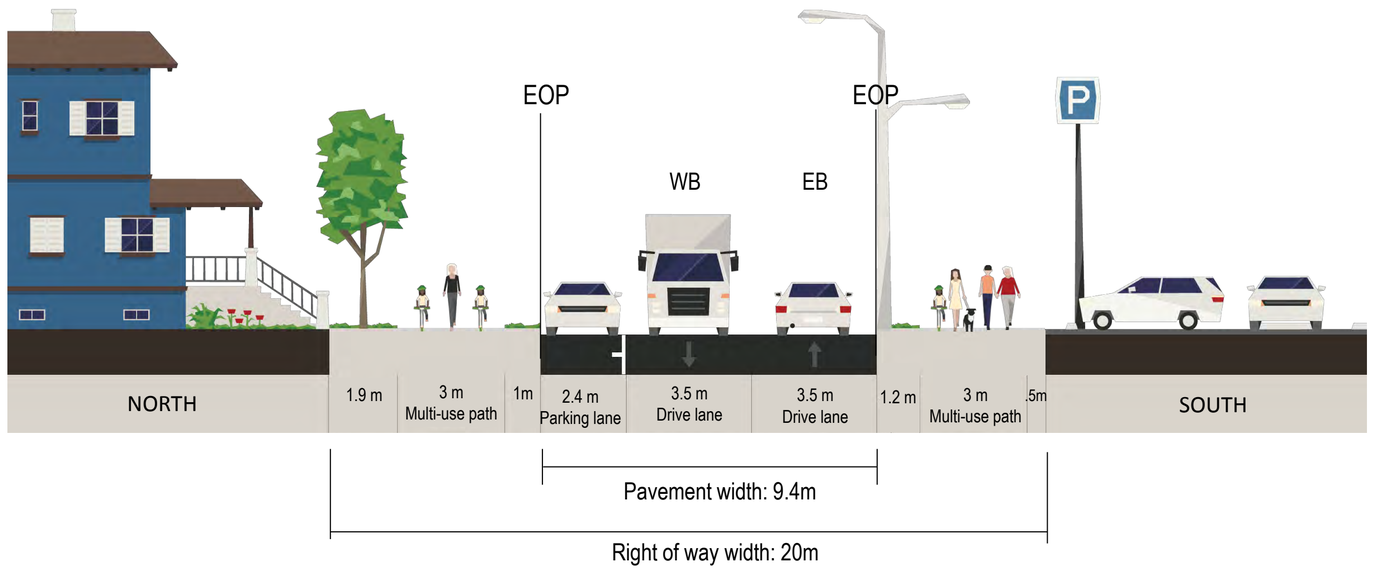
- Typical Existing cross section

Alternative 1



- Sidewalk on both sides of the street
- Bike route in both directions
- Boulevard on both sides of the street

Alternative 2



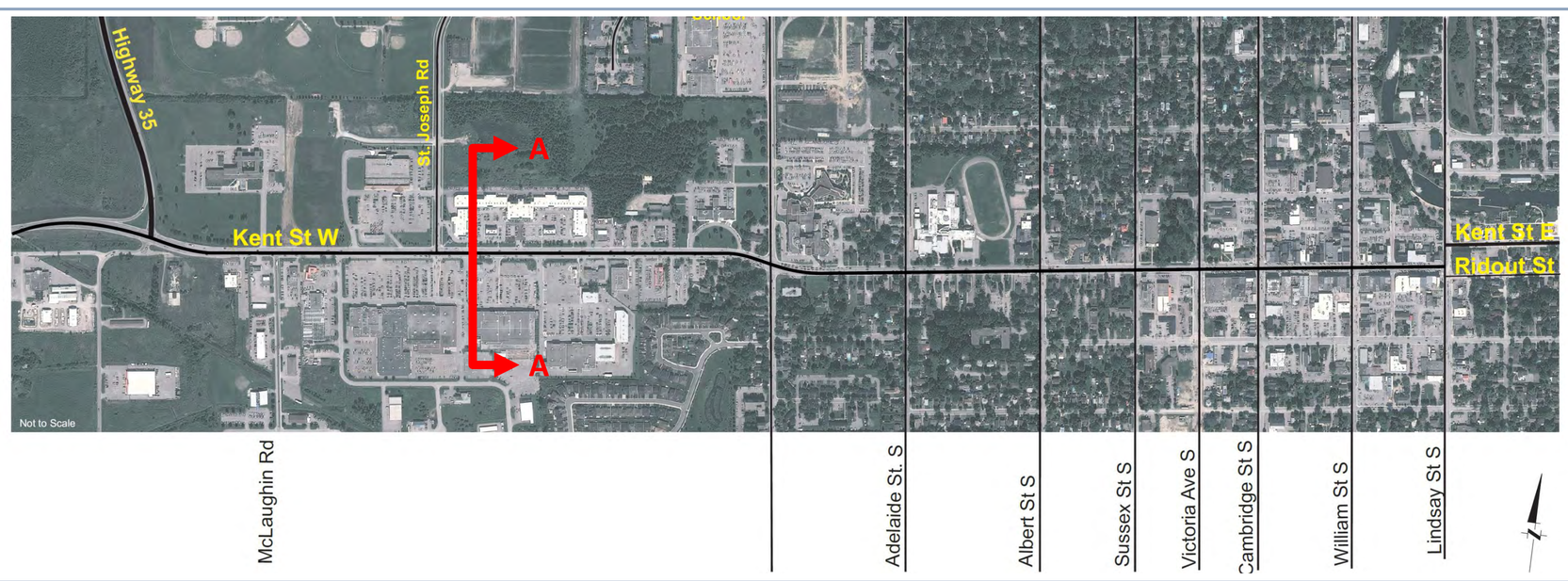
- Maintain parking lane in westbound direction
- Multi-use paths on both sides of the street

Notes:
EOP: Edge of Pavement

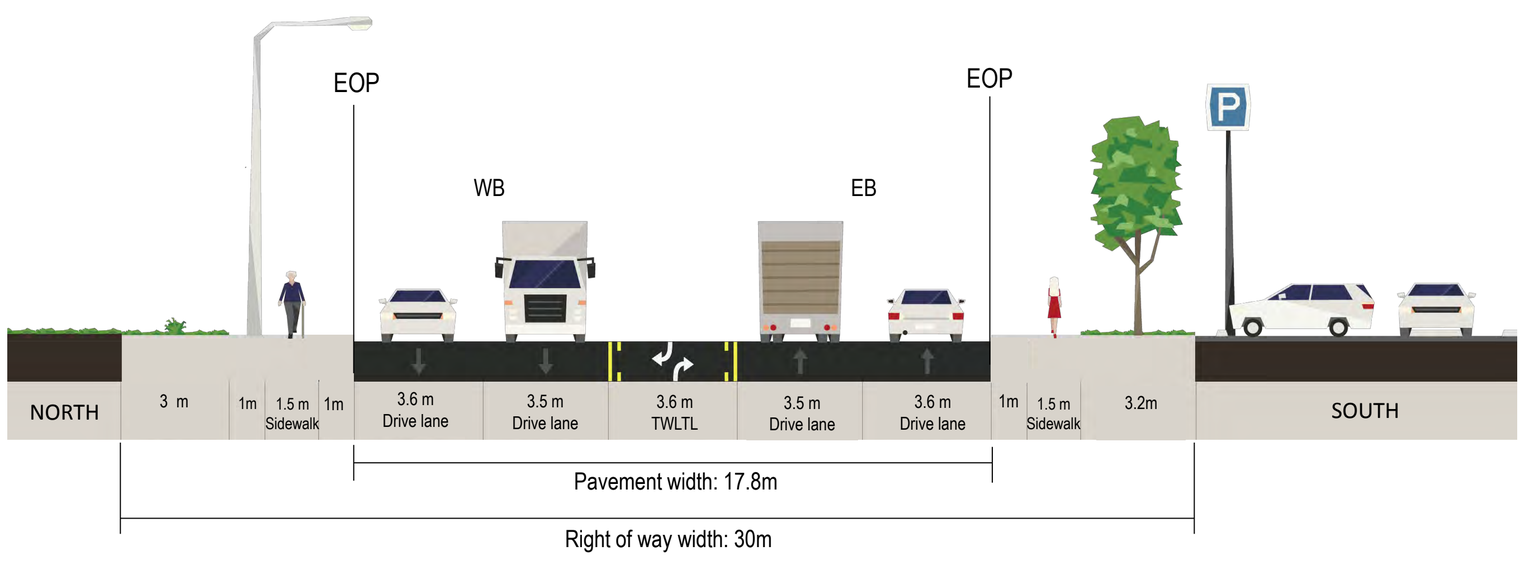
Alternative Cross Section: Kent St

Section A – A: East of St. Joseph (West Commercial)

Ref Map

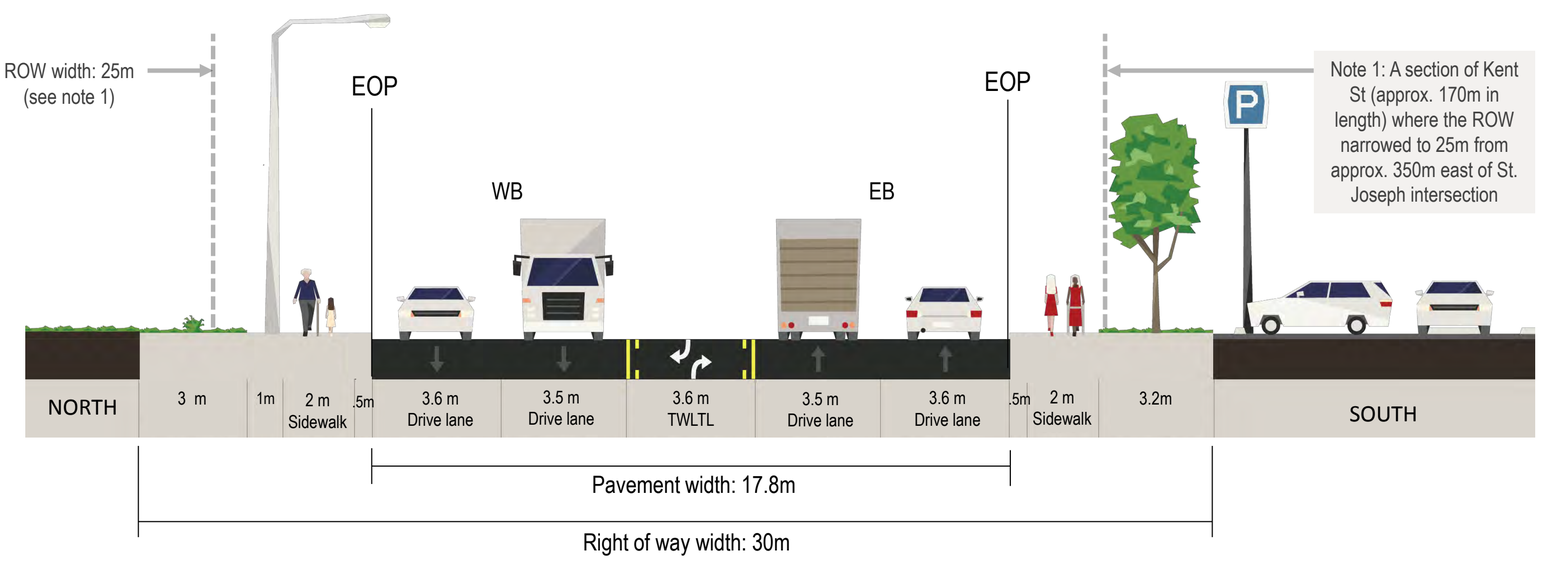


Do Nothing



- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative



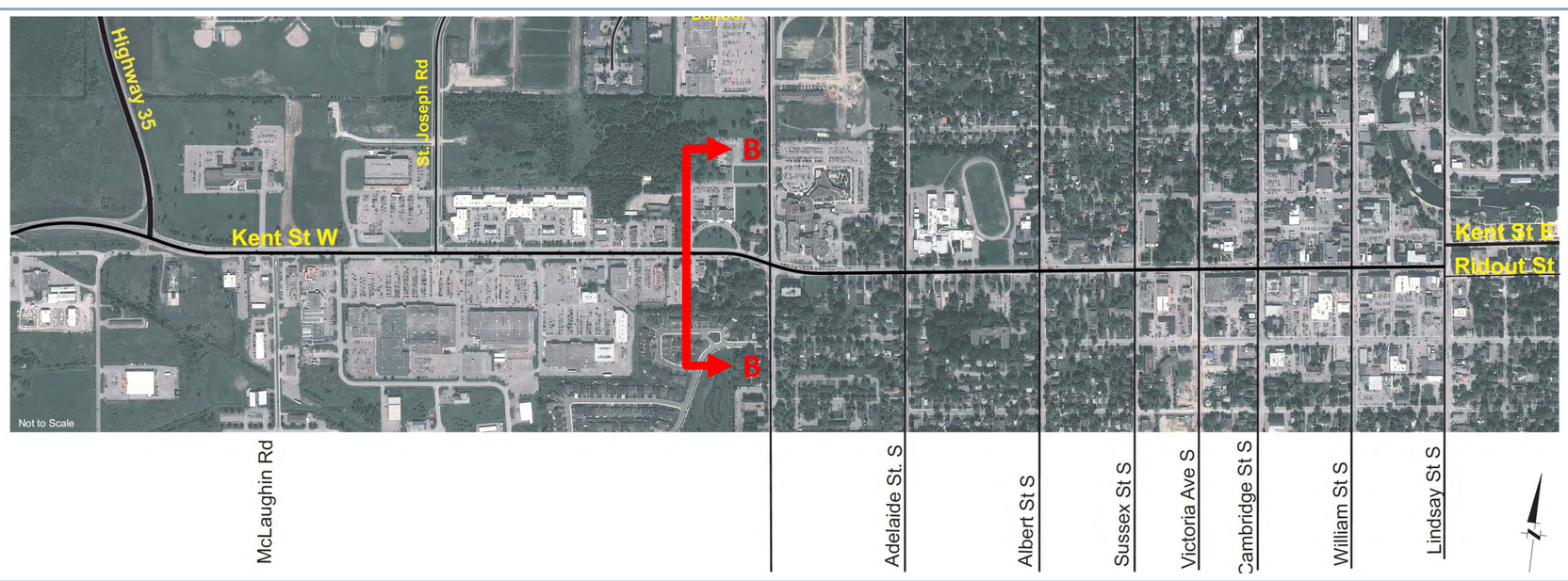
- Increase sidewalk width to 2m on both sides of the street
- Narrowed boulevard width to widen sidewalks on both sides due to ROW constraints

Notes:
EOP: Edge of Pavement
TWLTL: Two-Way Left Turn Lane
ROW: Right of Way

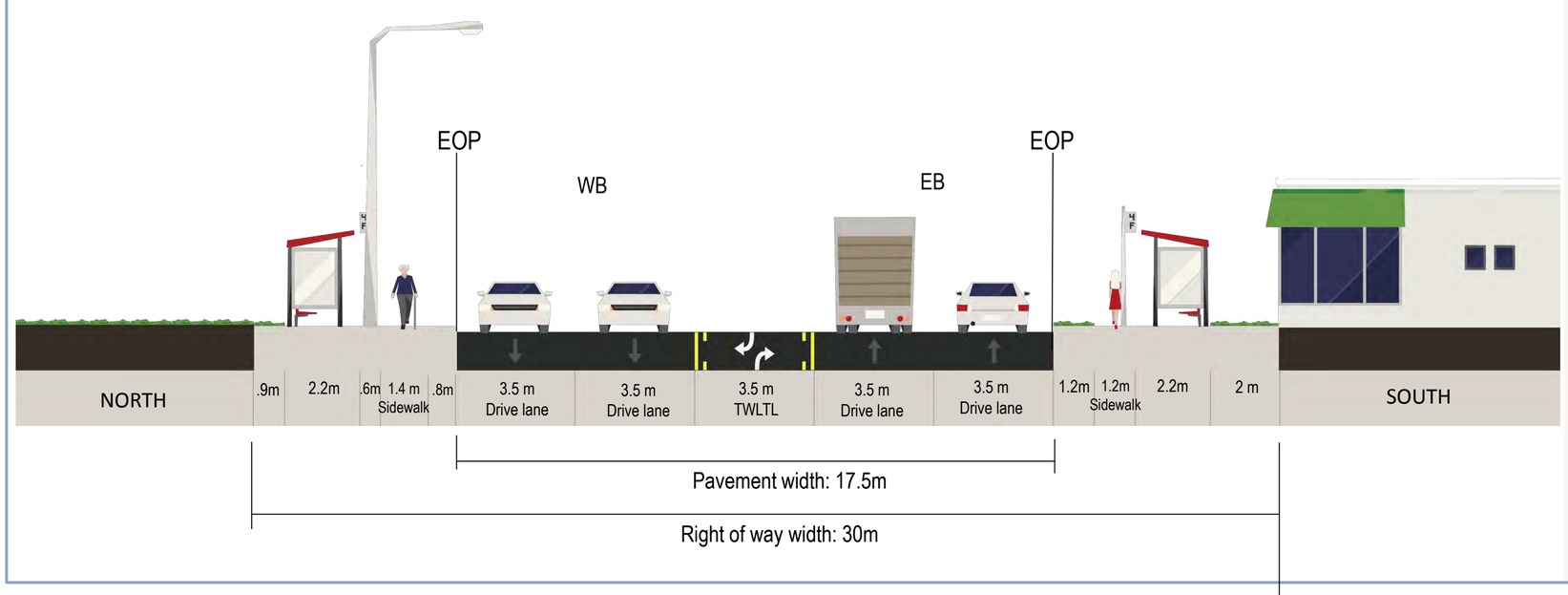
Alternative Cross Section: Kent St

Section B – B: West of Angeline

Ref Map

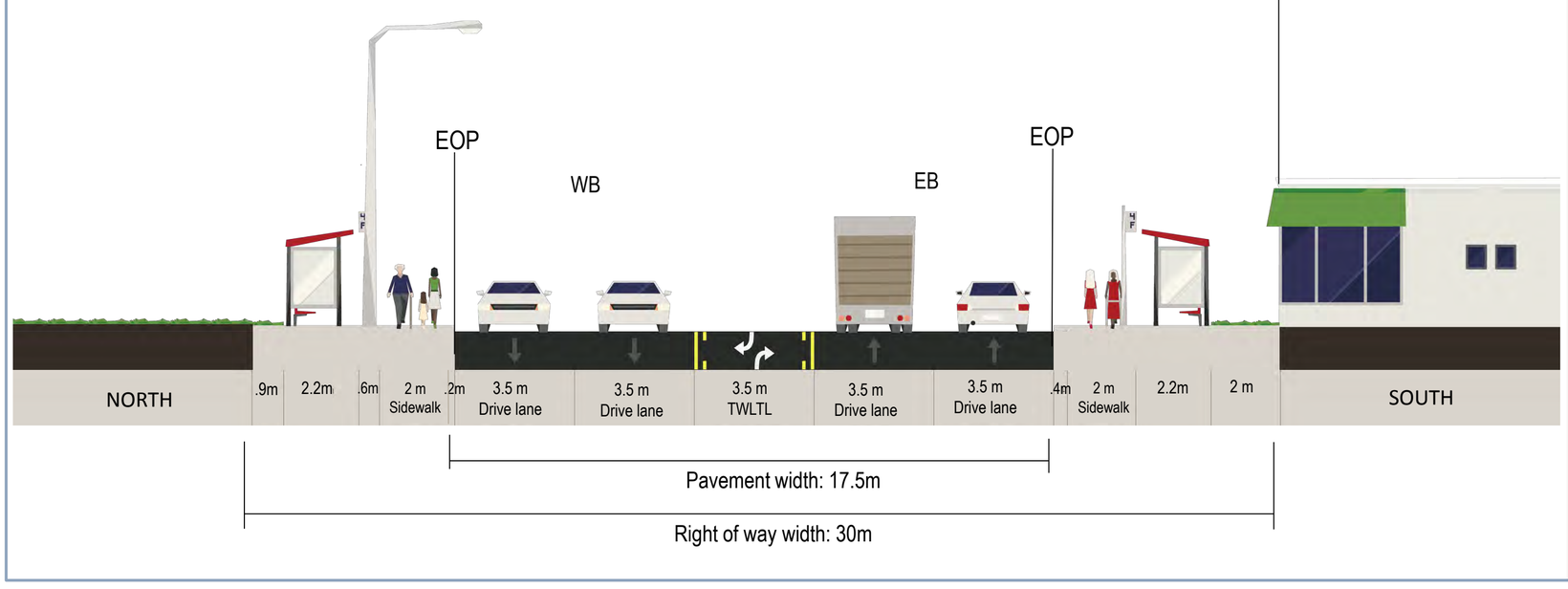


Do Nothing



- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative



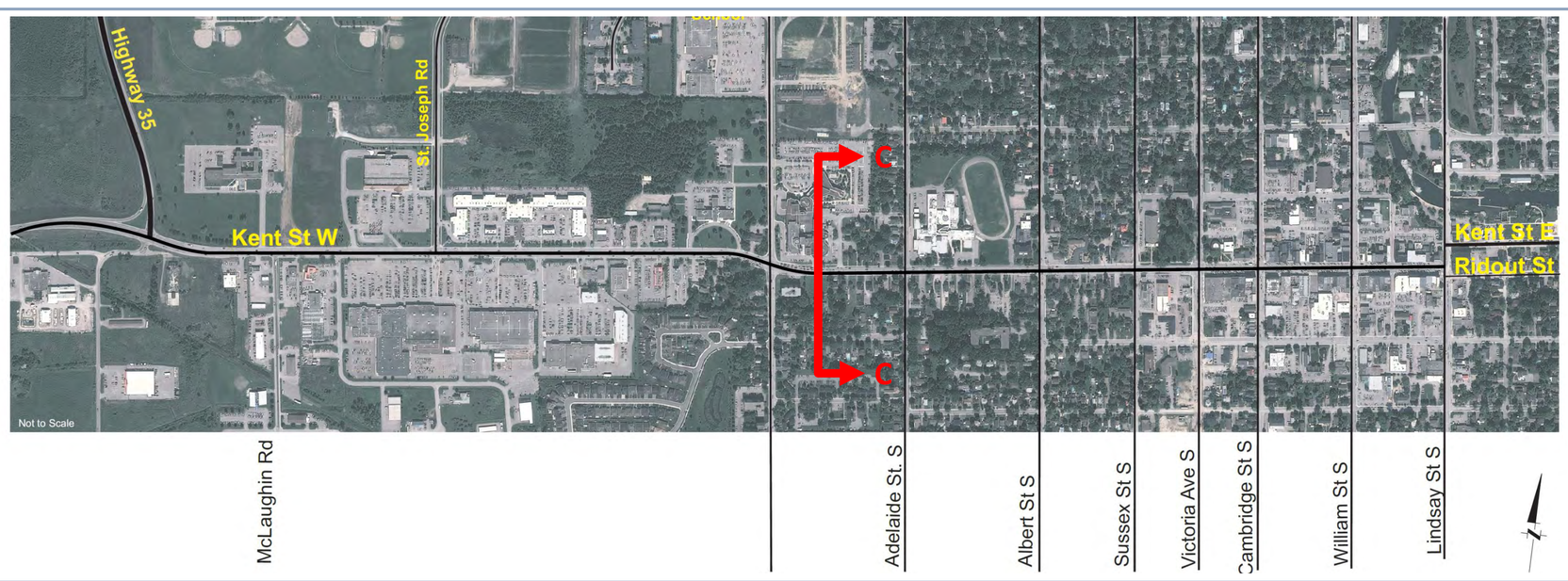
- Increase sidewalk width to 2m on both sides of the street
- Narrowed boulevard width to widen sidewalks on both sides due to infrastructures (utility poles and bus shelters)

Notes:
EOP: Edge of Pavement
TWLTL: Two-Way Left Turn Lane

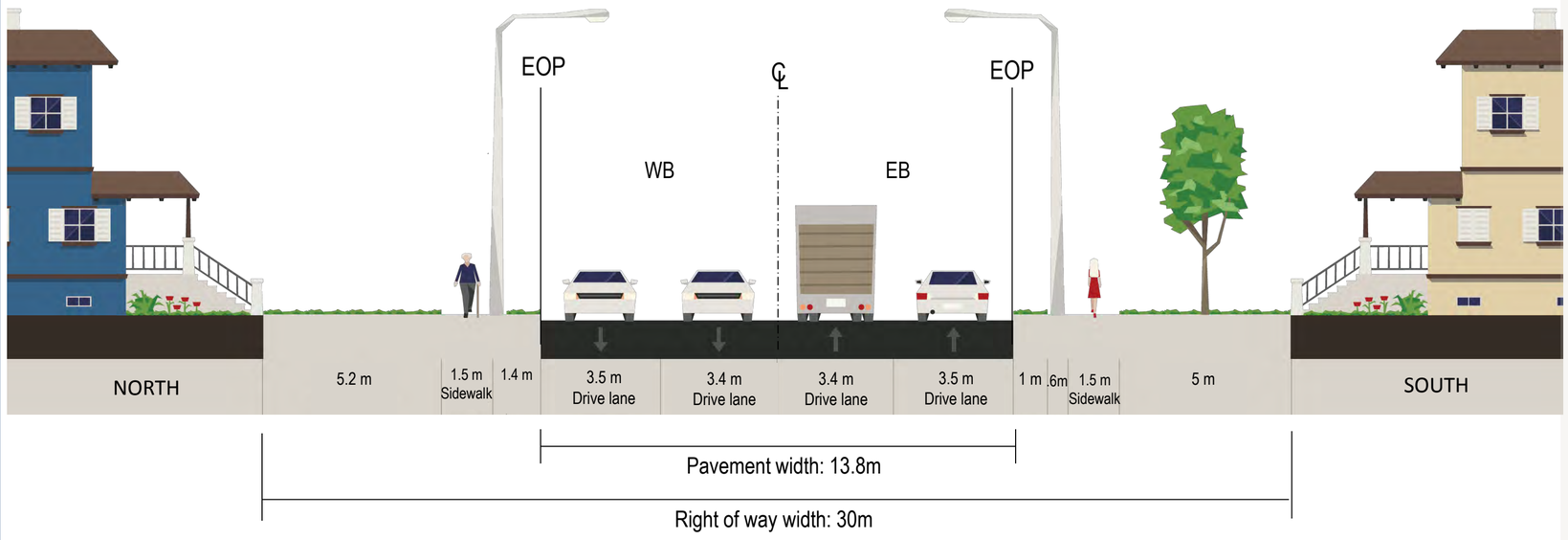
Alternative Cross Section: Kent St

Section C – C: East of Angeline

Ref Map

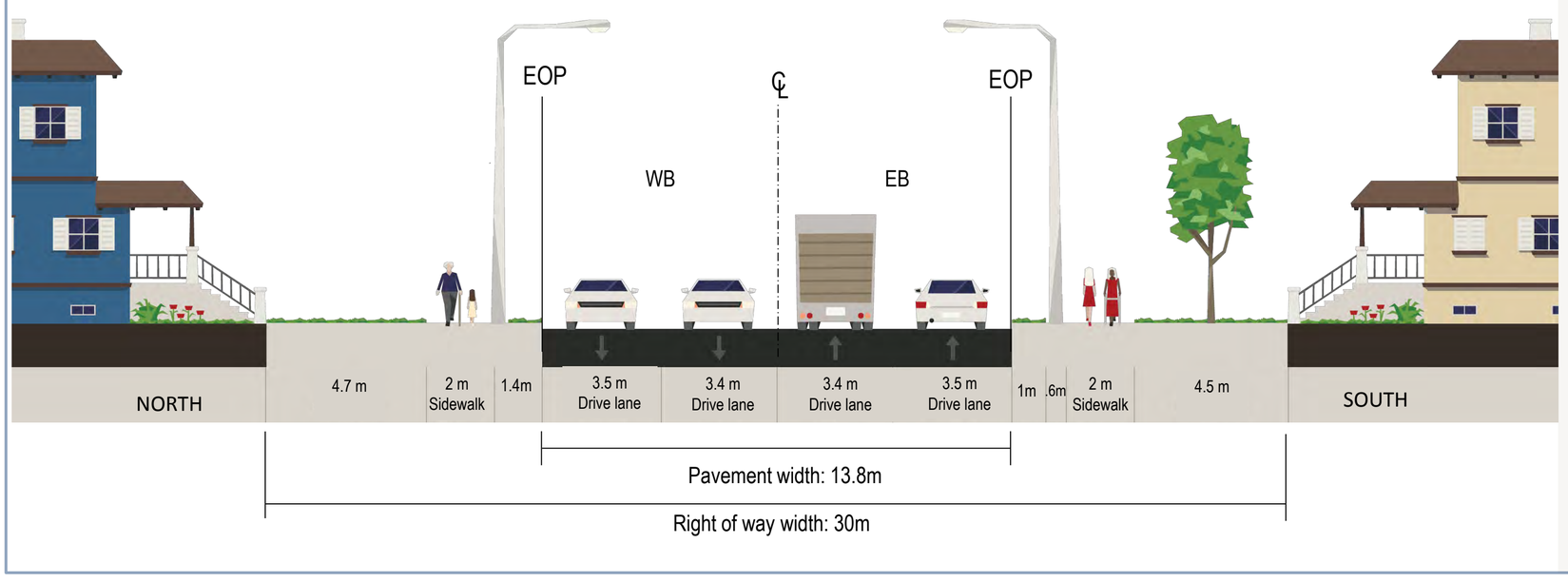


Do Nothing



- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative



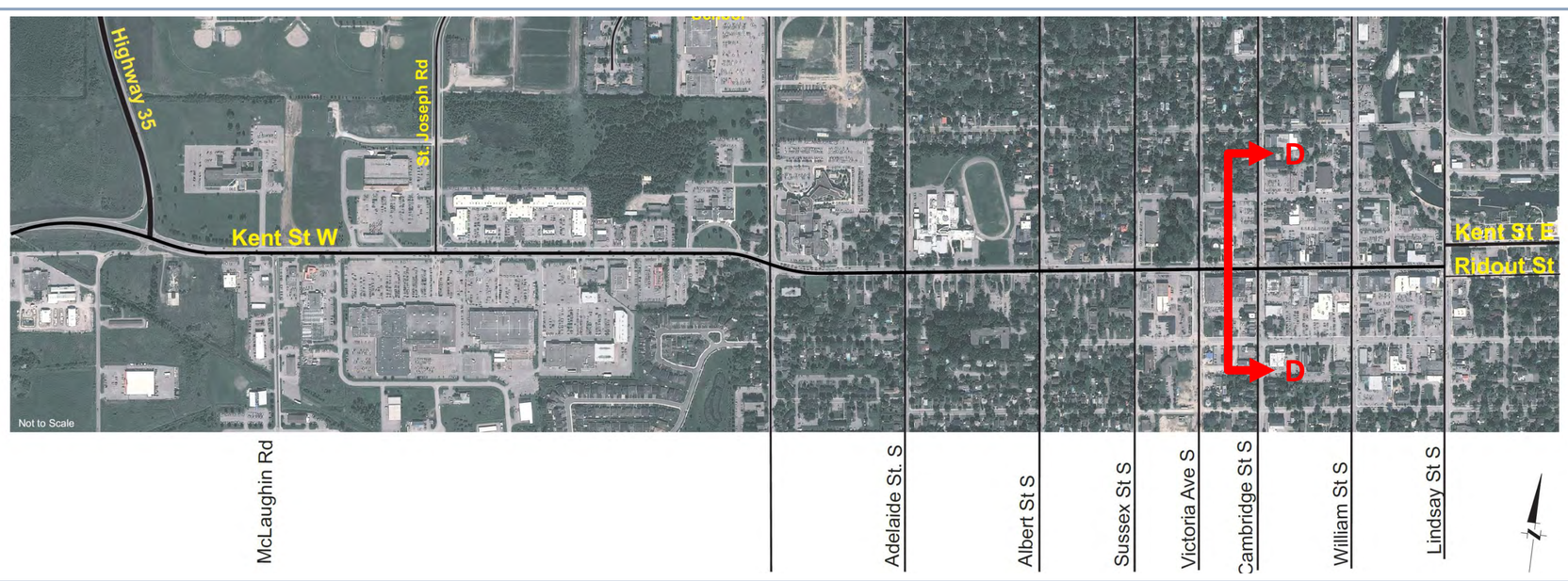
- Increase sidewalk width to 2m on both sides of the street

Notes:
EOP: Edge of Pavement

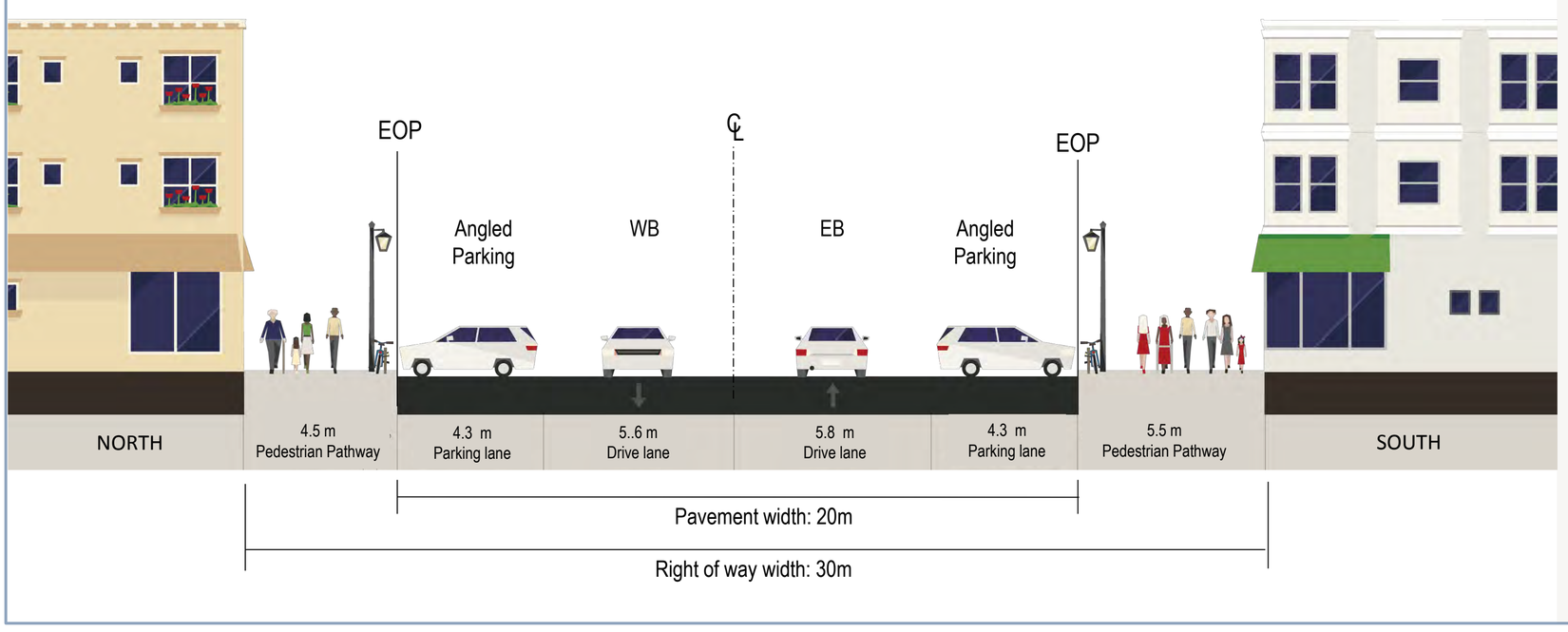
Alternative Cross Section: Kent St

Section D – D: East of Victoria (Downtown)

Ref Map

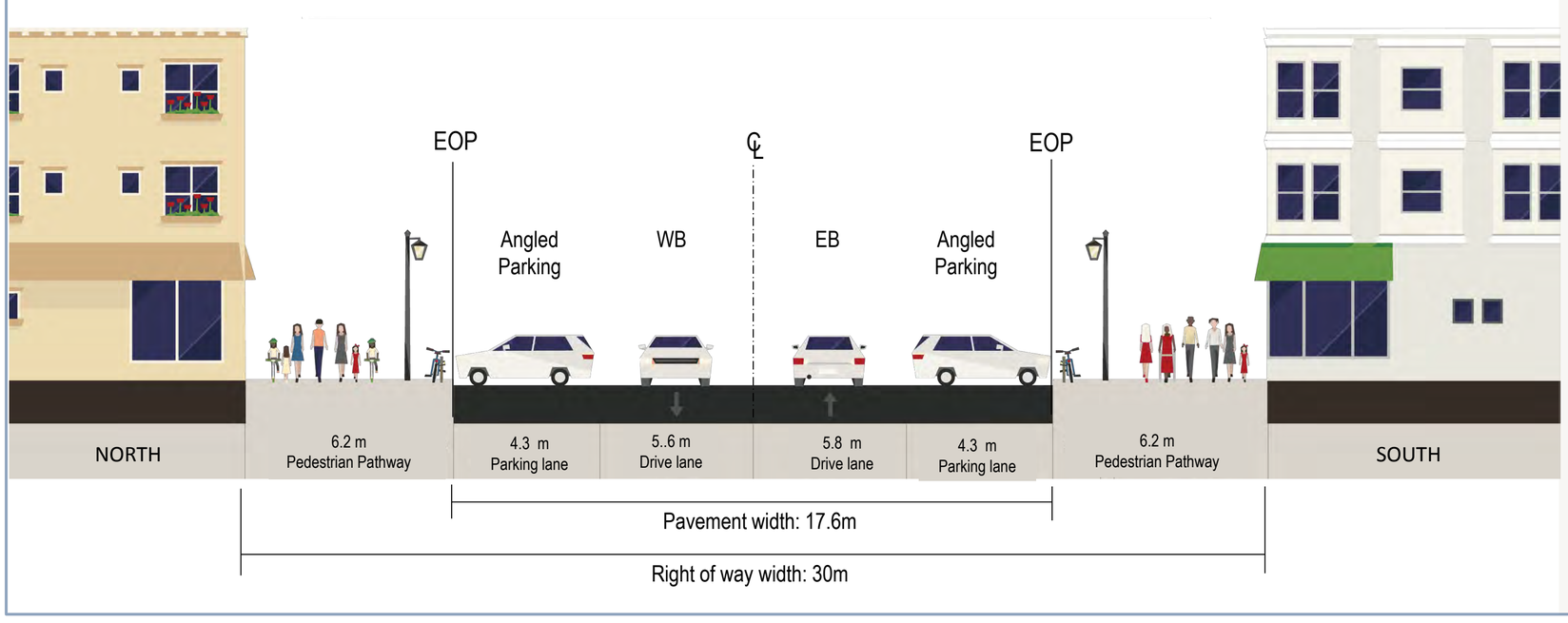


Do Nothing



- Typical Existing cross section
- No impacts to properties, natural environment or built/cultural heritage features

Alternative



- Increased sidewalk / boulevard width on the north
- Implement reverse parking policy
- Narrowed travelled ways to accommodate wider sidewalk

Notes:
EOP: Edge of Pavement

REVERSE ANGLE PARKING ON KENT

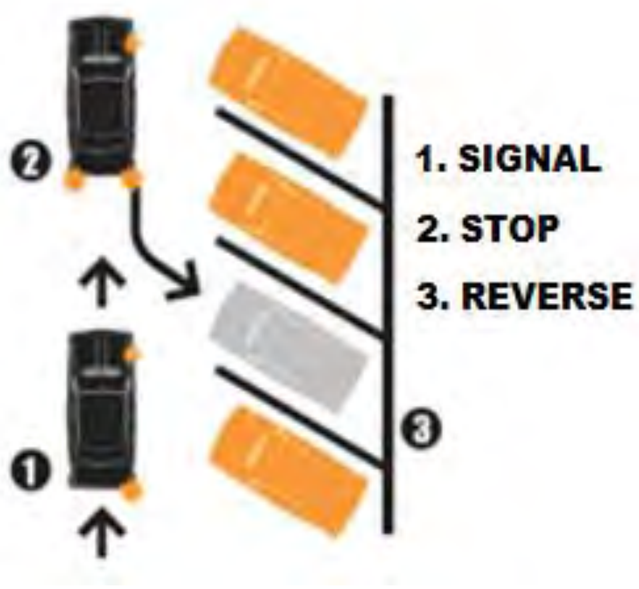
- Reverse angle parking is considered a safer type of angle parking; instead of pulling into the parking spot, cars back into their spots, allowing them to make eye contact with oncoming traffic when exiting the parking space

Benefits

- Improved visibility and increased field of vision
- Decreased number of collisions
- Improved safety for children and cyclists
- Improved loading and unloading
- Improved handicapped parking
- Increased space
- Traffic Calming

Downsides

- Vehicles overhanging sidewalk
- Vehicles backing into street furniture
- Vehicle exhaust over sidewalks
- Potential congestion and delay if driver takes longer to back in



Source: Burlington, Vermont, USA

REVERSE ANGLE PARKING - EXAMPLES

BEFORE

AFTER

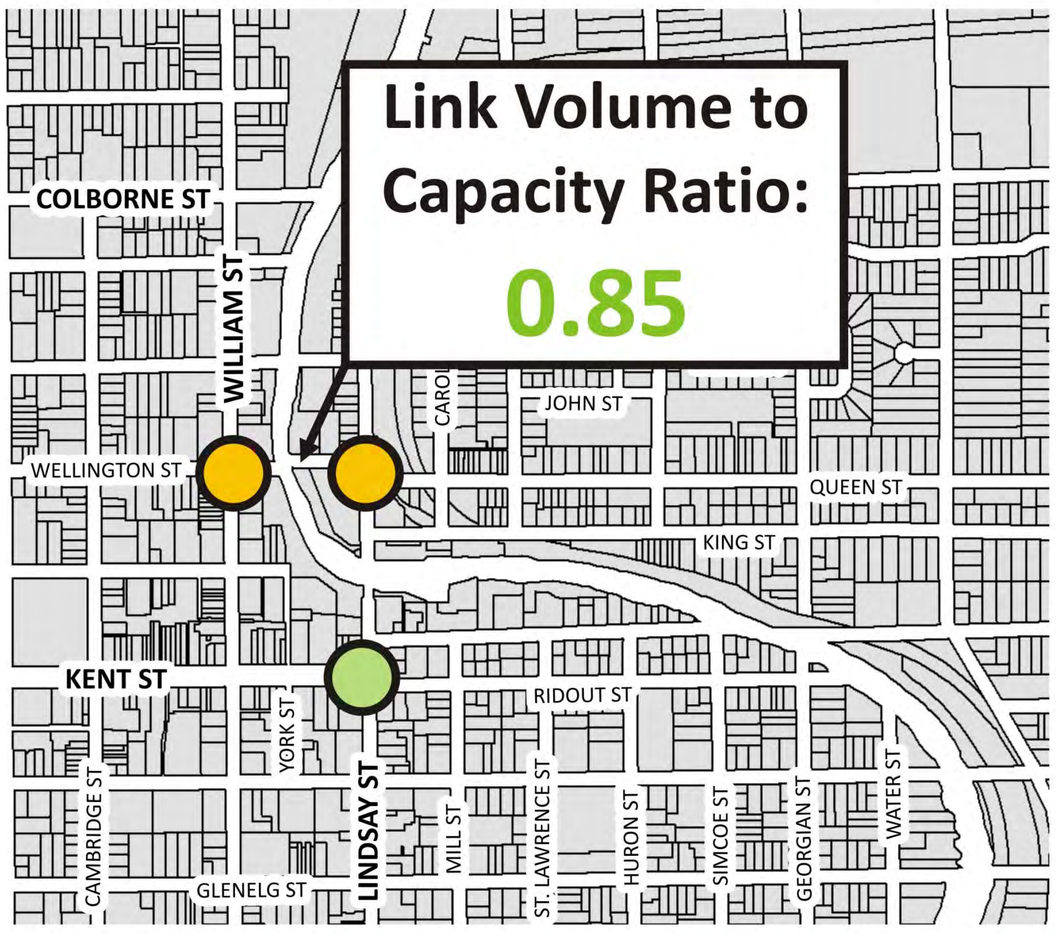
Signage:

PLEASE LET US KNOW YOUR COMMENTS ON REVERSE ANGLE PARKING

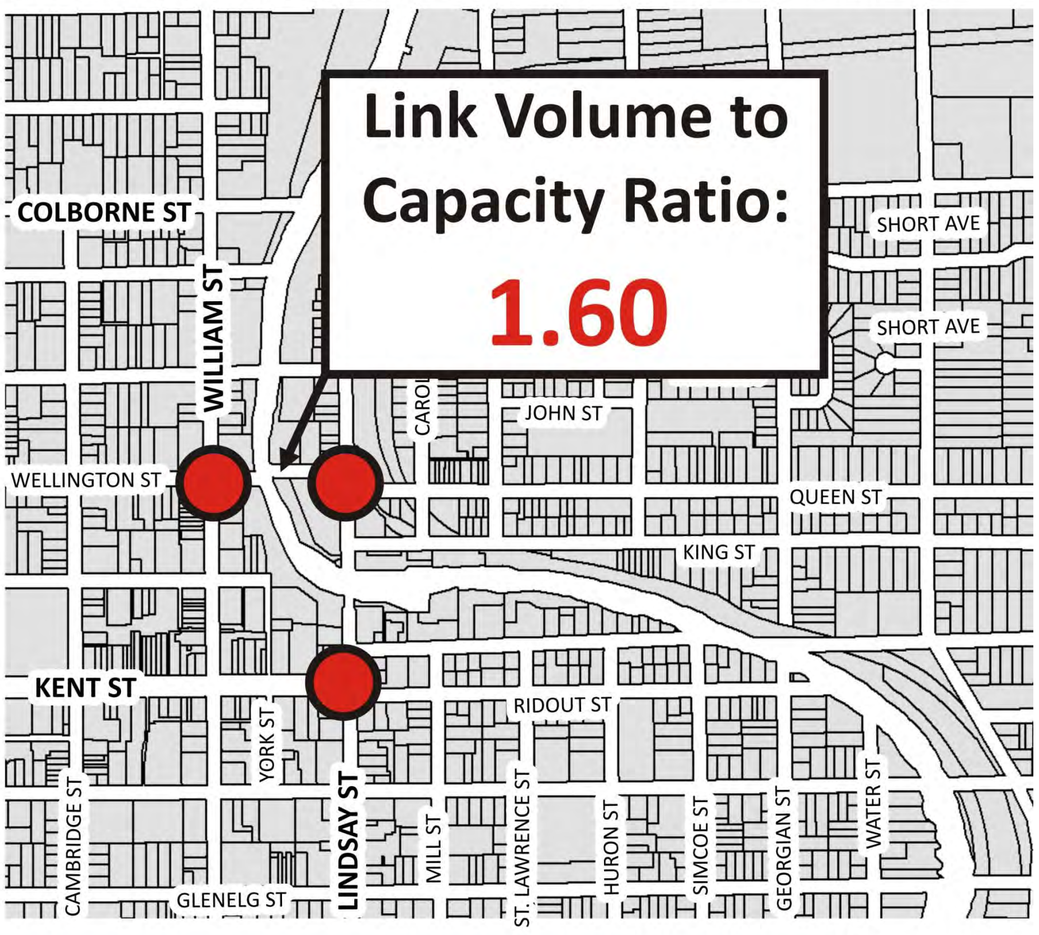
RIVER CROSSINGS / BRIDGES

- The Transportation Master Plan identified the need for an additional crossing of the Scugog River
- An existing traffic pattern has been established by drivers in this area along Colborne Street, William Street, and Wellington Street.
- If a new bridge crossing is not built, drivers on the existing road network will experience congestion and longer delays and queues
- An alternative location for the crossing would be at Thunderbridge Road; however, will it serve traffic that wants to cross into Downtown?
- Wellington Street between William Street and Lindsay Street is operating at 85% of its capacity, (assuming lane capacity of 600 vehicles per lane for a collector roadway). Projected traffic volumes will result in Wellington operating at **160% of its capacity** (even assuming that the Thunderbridge Road crossing is implemented)
- An additional river crossing will likely be necessary before the 2031 horizon year

2013 Signalized Intersection LOS - PM Peak Hour



2031 Signalized Intersection LOS - PM Peak Hour



Legend

LOS A to B LOS C to D LOS E to F NORTH

Level of Service (LOS) is taken directly from the Synchro HCM Reports.

Contact us!

Future Transportation Networks Analyses
November 2013

Public Open House No.2
December 2013

Preliminary Recommendations
December 2013

Draft and Final Report
January / February 2014

Project Manager

Michael Farquhar, Project Manager
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department
P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Phone: (705) 324-9411 ext 1156
Email: mfarquhar@city.kawarthalakes.on.ca

Consultant Project Manager

Carl Wong, P.Eng.
Consultant Project Manager
HDR Corporation
100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Phone: 905-882-4100 ext. 5234
Email: carl.wong@hdrinc.com

Thank you!

Your input is very valuable to us.
Comments and suggestions are greatly appreciated.

Public Open House #2
Comment Sheets

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

Question & Comment Form **Public Open House #2 –** Thursday December 5th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street ☐ Colborne Street ☐

Please place a check mark beside the factor(s) involved in your concern:

	Kent Street	Colborne Street
Vehicle Operations	☐	☐
Vehicle Safety	☐	☐
Pedestrian Operations	☐	☐
Pedestrian Safety	☐	☐
Cyclist Operations	☐	☐
Cyclist Safety	☐	☐

Other: _____ Other: _____

_____ _____

_____ _____

Please place a check mark beside the countermeasures you feel may be appropriate:

	Kent Street	Colborne Street
Roundabouts	☐	☐
More Pedestrian Crossings	☐	☐
Bicycle Lanes	☐	☐
More On-Street Parking	☐	☐
Transit Route Changes / Expansion	☐	☐
Increased Police Presence	☐	☐
Traffic Calming Measures	☐	☐

Other: _____ Other: _____

_____ _____

_____ _____

HDR

Question #2

Do you have any comments on the alternatives and options that were presented at this Public Information Centre (eg: roundabout, multi-use path, sidewalk widening, bicycle /transit routes, and pedestrian crossings)?

THEIR SHOULD BE AN ALTERNATIVE ROUTE OUT OF SUBDIVISION ON BROAD ST. - BEHIND CANADIAN TIRE.

General Comments:

Please leave this form with staff when you are finished, or send it to the following contacts by mail or e-mail:

Michael Farquhar
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department

P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Email: mfarquhar@city.kawarthalakes.on.ca
Phone: (705) 324-9411 ext. 1156

Carl Wong, P.Eng.
HDR Corporation
Consultant Project Manager

100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Email: carl.wong@hdrinc.com
Phone: (289) 695-4634

Name: [redacted]
Address:
E-Mail Addr

This information is collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

HDR

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

City of KAWARTHA LAKES
Catch the Kawartha spirit

Question & Comment Form **Public Open House #2 –** Thursday December 5th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street		Colborne Street	X

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations		Vehicle Operations	X
Vehicle Safety		Vehicle Safety	
Pedestrian Operations		Pedestrian Operations	
Pedestrian Safety		Pedestrian Safety	
Cyclist Operations		Cyclist Operations	
Cyclist Safety		Cyclist Safety	

Other: _____ Other: _____

_____ _____

_____ _____

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts		Roundabouts	
More Pedestrian Crossings		More Pedestrian Crossings	
Bicycle Lanes		Bicycle Lanes	
More On-Street Parking		More On-Street Parking	
Transit Route Changes / Expansion		Transit Route Changes / Expansion	
Increased Police Presence		Increased Police Presence	
Traffic Calming Measures		Traffic Calming Measures	

Other: _____ Other: _____

_____ _____

_____ _____

HDR

Question #2

Do you have any comments on the alternatives and options that were presented at this Public Information Centre (eg: roundabout, multi-use path, sidewalk widening, bicycle /transit routes, and pedestrian crossings)?

Concern over increased traffic on Colborne St. impacting Families across Church + Colborne Lodge. The only option I see is Option 2 - Turn Lanes. This would cause us to lose ~7m on N/S of Colborne. We do have a concern on the expansion of Angeline St. If we lose 3.5 m on the E/S Angeline for the church it would impact our parking.

General Comments:

If the dead end of Regent St. on the N/S of our Church becomes surplus would the town entertain a Land Trade for the land on Angeline for Regent St. I can see that the Regent St. property would "likely" be no value to anyone else.

Please leave this form with staff when you are finished, or send it to the following contacts by mail or e-mail:

Michael Farquhar
City of Kawartha Lakes
Development Services
Engineering Division
Public Works Department

P.O. Box 9000, 12 Peel Street West
Lindsay, ON K9V 5R8
Email: mfarquhar@city.kawarthalakes.on.ca
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Carl Wong, P.Eng.
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Consultant Project Manager

100 York Boulevard, Suite 300
Richmond Hill, ON L4B 1J8
Email: carl.wong@hdrinc.com
Phone: (289) 695-4634

Name: [redacted]

Address: [redacted]

E-Mail Address: [redacted]

This information is collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

HDR

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

City of KAWARTHA LAKES
Catch the Kawartha spirit

Question & Comment Form **Public Open House #2 –** Thursday December 5th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street ☐ Colborne Street ☒

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations	☐	Vehicle Operations	☒
Vehicle Safety	☐	Vehicle Safety	☐
Pedestrian Operations	☐	Pedestrian Operations	☐
Pedestrian Safety	☐	Pedestrian Safety	☐
Cyclist Operations	☐	Cyclist Operations	☐
Cyclist Safety	☐	Cyclist Safety	☐

Other: _____ Other: _____

_____ _____

_____ _____

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts	☐	Roundabouts	☐
More Pedestrian Crossings	☐	More Pedestrian Crossings	☐
Bicycle Lanes	☐	Bicycle Lanes	☐
More On-Street Parking	☐	More On-Street Parking	☐
Transit Route Changes / Expansion	☐	Transit Route Changes / Expansion	☒
Increased Police Presence	☐	Increased Police Presence	☐
Traffic Calming Measures	☐	Traffic Calming Measures	☐

Other: _____ Other: _____

_____ _____

_____ _____

HDR

Question #2

Do you have any comments on the alternatives and options that were presented at this Public Information Centre (eg: roundabout, multi-use path, sidewalk widening, bicycle /transit routes, and pedestrian crossings)?

Concerned about the traffic lanes east of Angeline. I question if three (3) are enough? I wonder if we are building for future capacity? Four lanes may be better.

General Comments:

I'm concerned about the driveway coming out of Fairview Baptist on to Colborne. It is very close to Angeline

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HDR

City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

City of KAWARTHA LAKES
Catch the Kawartha spirit

14

Question & Comment Form **Public Open House #2 –** Thursday December 5th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street ☐ Colborne Street ☑

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations	☐	Vehicle Operations	☑
Vehicle Safety	☐	Vehicle Safety	☑
Pedestrian Operations	☐	Pedestrian Operations	☑
Pedestrian Safety	☐	Pedestrian Safety	☑
Cyclist Operations	☐	Cyclist Operations	☐
Cyclist Safety	☐	Cyclist Safety	☐

Other: _____ Other: _____

_____ _____

_____ _____

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts	☐	Roundabouts	☐
More Pedestrian Crossings	☐	More Pedestrian Crossings	☐
Bicycle Lanes	☐	Bicycle Lanes	☐
More On-Street Parking	☐	More On-Street Parking	☐
Transit Route Changes / Expansion	☐	Transit Route Changes / Expansion	☐
Increased Police Presence	☐	Increased Police Presence	☑
Traffic Calming Measures	☐	Traffic Calming Measures	☑

Other: _____ Other: _____

_____ _____

_____ _____

HDR

Question #2

Do you have any comments on the alternatives and options that were presented at this Public Information Centre (eg: roundabout, multi-use path, sidewalk widening, bicycle /transit routes, and pedestrian crossings)?

General Comments:

SPEED ON COLBOURNE ST HAS BECOME VERY FAST. BOTH EMERGENCY & PUBLIC VEHICLES

* DO NOT WIDEN THE STREET

Please leave this form with staff when you are finished, or send it to the following contacts by mail or e-mail:

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Public Works Department

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City of Kawartha Lakes

Kent Street and Colborne Street Corridor Study

Environmental Assessment

City of KAWARTHA LAKES
Catch the Kawartha spirit

Question & Comment Form **Public Open House #2 –** Thursday December 5th, 2013

Question #1

Please place a check mark beside the corridor(s) you have concerns with:

Kent Street	☐	Colborne Street	☑

Please place a check mark beside the factor(s) involved in your concern:

Vehicle Operations	☑	Vehicle Operations	☑
Vehicle Safety	☐	Vehicle Safety	☐
Pedestrian Operations	☐	Pedestrian Operations	☐
Pedestrian Safety	☑	Pedestrian Safety	☑
Cyclist Operations	☐	Cyclist Operations	☐
Cyclist Safety	☐	Cyclist Safety	☐

Other: _____

Other: Residential environment e.g., trucks (large), traffic volume (in both senses).

Please place a check mark beside the countermeasures you feel may be appropriate:

Roundabouts	☐	Roundabouts	☐
More Pedestrian Crossings	☐	More Pedestrian Crossings	☑
Bicycle Lanes	☐	Bicycle Lanes	☐
More On-Street Parking	☐	More On-Street Parking	☐
Transit Route Changes / Expansion	☐	Transit Route Changes / Expansion	☐
Increased Police Presence	☐	Increased Police Presence	☐
Traffic Calming Measures	☐	Traffic Calming Measures	☑

Other: _____

Other: _____

HDR

Question #2

Do you have any comments on the alternatives and options that were presented at this Public Information Centre (eg: roundabout, multi-use path, sidewalk widening, bicycle /transit routes, and pedestrian crossings)?

- I like the concept of a round-about at Kent & Victoria
- I like the idea of improving the intersection of Angeline & Colborne
- I strongly approve/support the construction of a bridge in the [practical] vicinity of Thunder Bridge Road

General Comments:

- Can there be developed an extension of Victoria Rd north to a cross link to a bridge in the area I mentioned above. If not, why not?

[or William?]

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Public Works Department

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HDR

Stakeholder Meeting #1
Display Materials

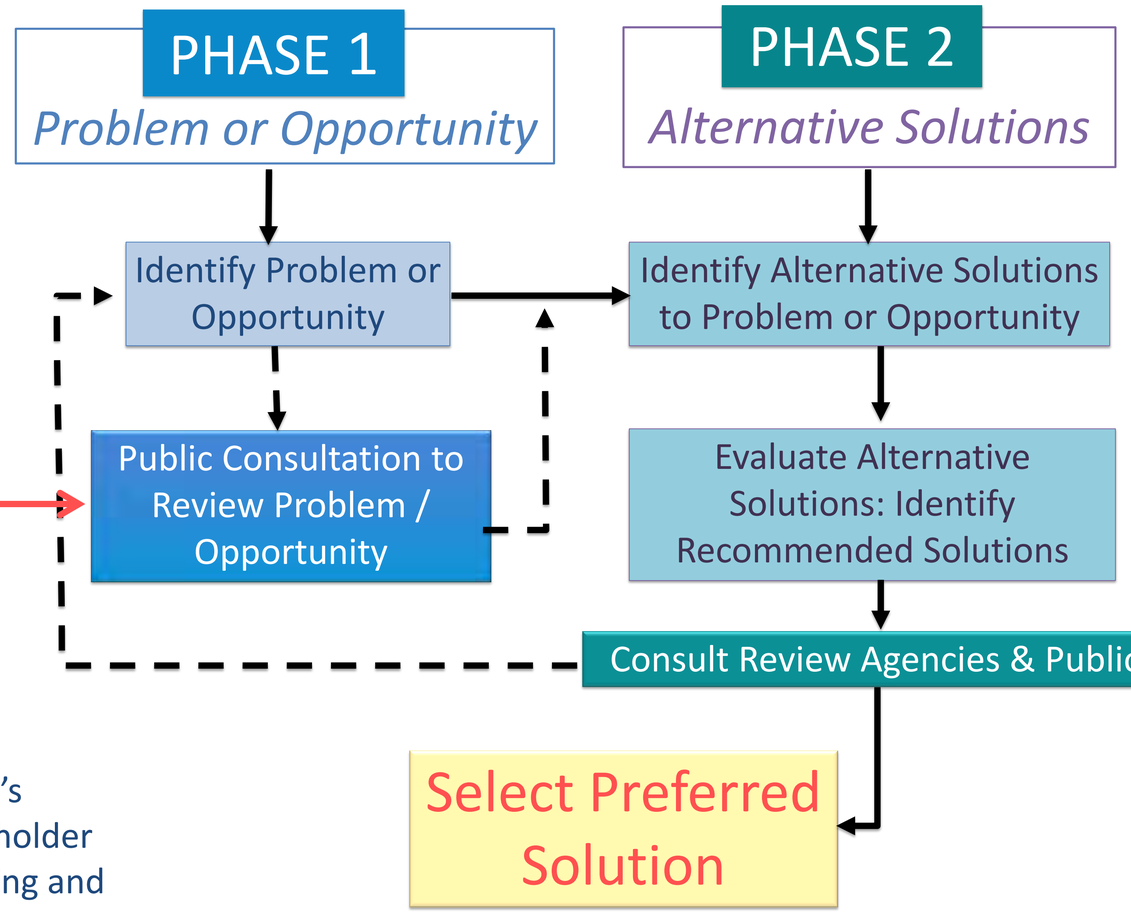
July 2020

Welcome to the First Stakeholders Meeting for the Kent Street and Colborne Street Corridor Study Environmental Assessment

September 17th, 2013

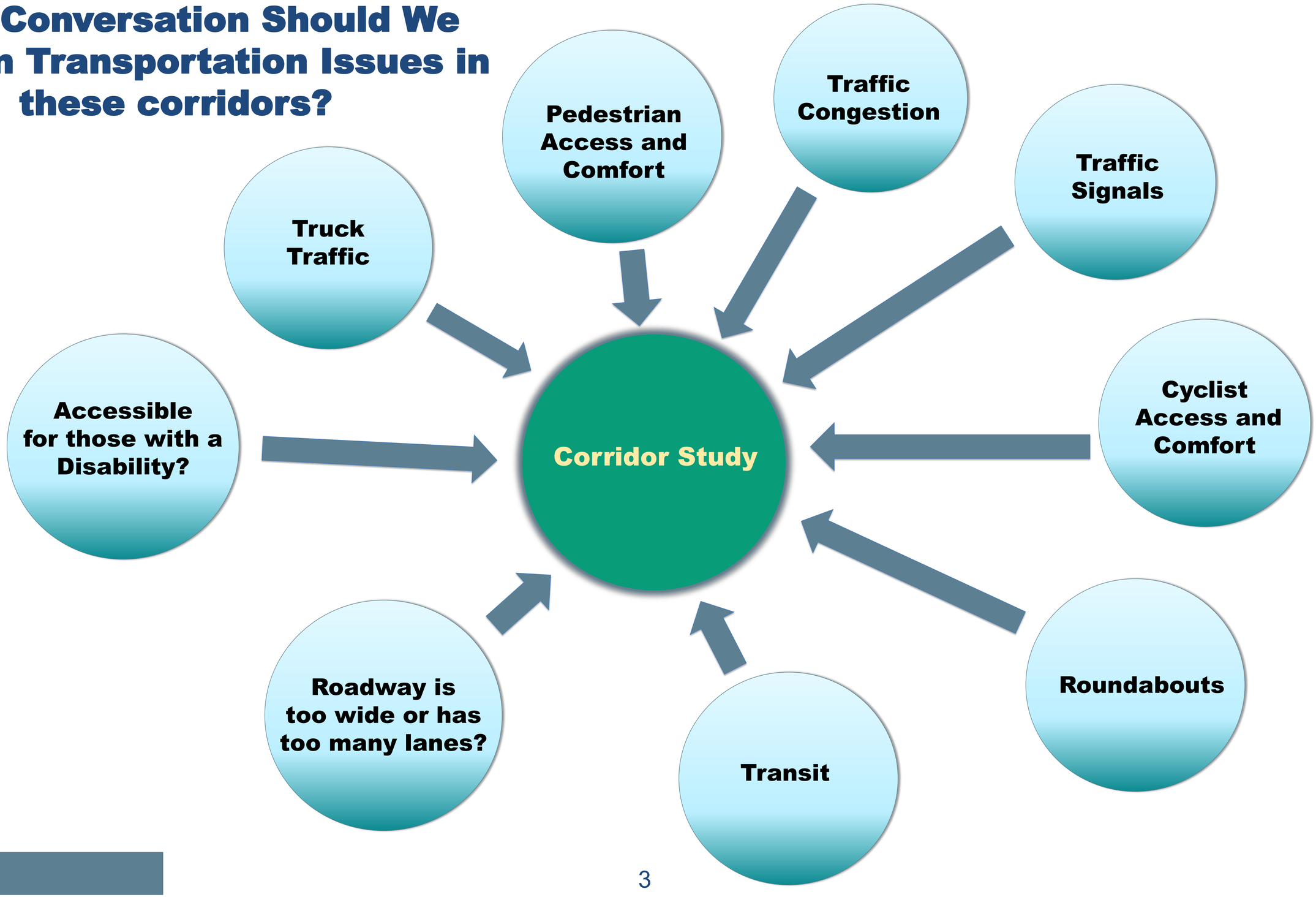
What is a Corridor Study EA?

- More detailed examination of a particular corridor than the 2012 Transportation Master Plan
- Specific short to long term recommendations;
- Planning for drivers, pedestrians, cyclists and transit users with an emphasis on a multi-modal approach;
- In conformity to the Strategic Plan and the Official Plan;
- Will allow the City to make informed decisions on transportation issues affecting the community; and
- Follows Phase 1 and 2 of the *Municipal Class Environmental Assessment Process.*



EA Process

What Conversation Should We Have on Transportation Issues in these corridors?

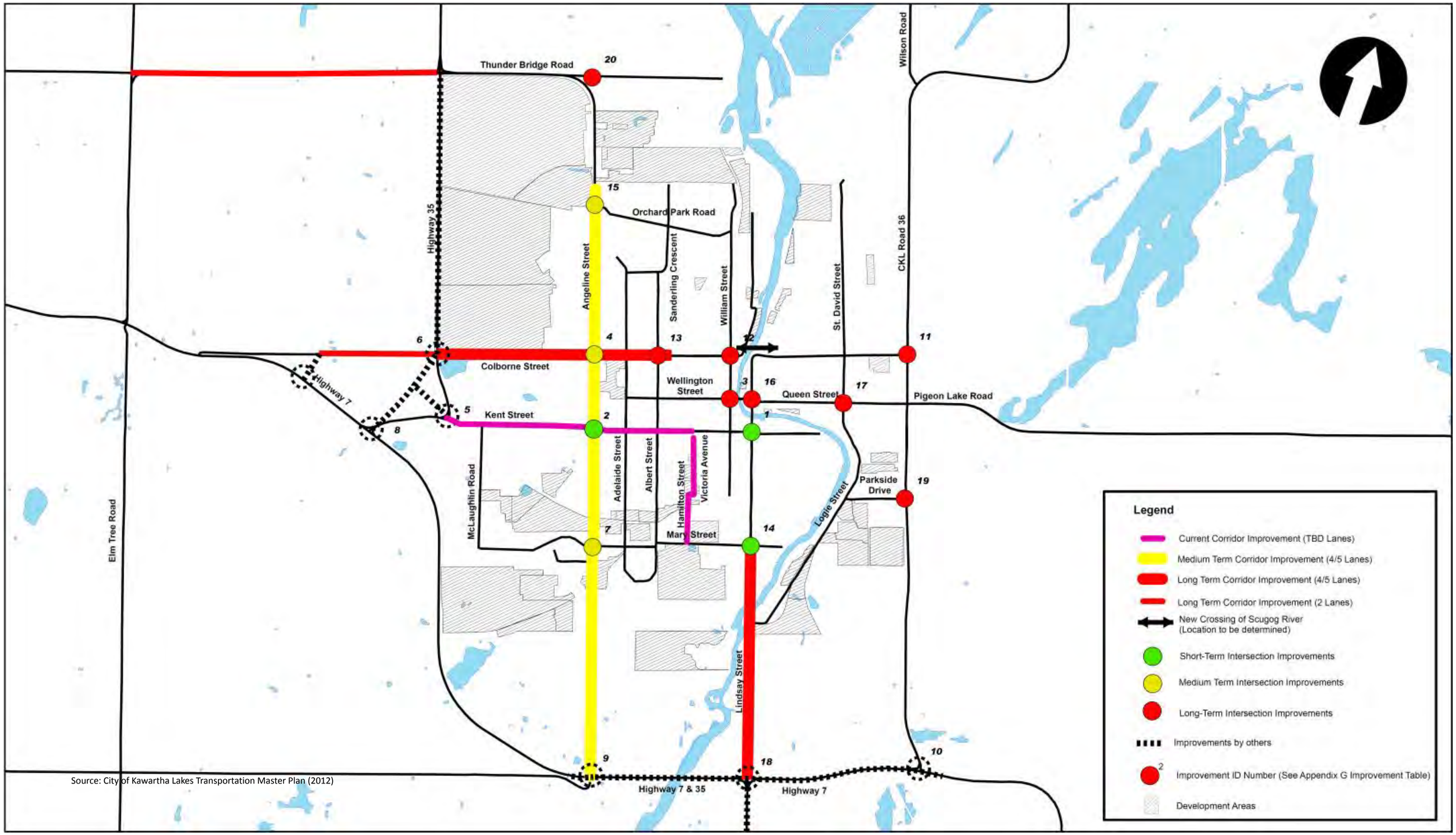


POLICY FRAMEWORK

The City's Transportation Master Plan 2012:

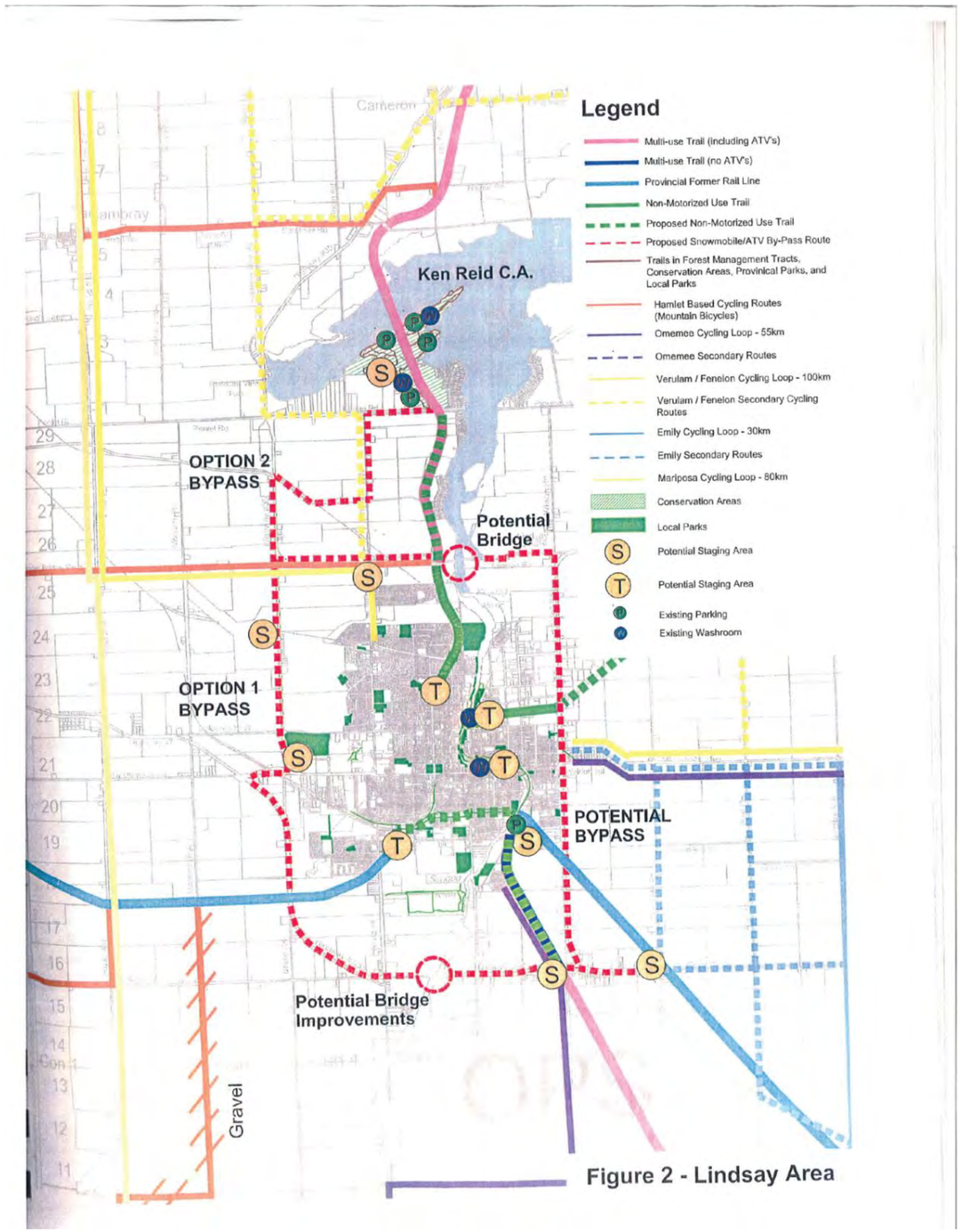
- Sets forth the long term transportation vision to 2031 for Lindsay and the subject two corridors.
- Identifies the following suggested improvements requiring further study on Kent Street and Colborne Street
    - Kent Street
        - Highway 35 to Victoria Avenue: Current corridor improvements
        - Intersection with Angeline Street: Short term intersection improvements
        - Intersection with Lindsay Street: Short term intersection improvements
    - Colborne Street
        - Highway 35 to Albert Street: Long term corridor improvements (4/5 lanes)
        - Intersection with Angeline Street: Medium term intersection improvements
        - Intersection with Albert Street: Long term intersection improvements
        - Intersection with William Street: Long term intersection improvements
- Identifies the need for a second east-west bridge crossing of the Trent River within the neighbourhood of Colborne Street
- Identifies a need to review on-street parking

Transportation Master Plan Recommendations



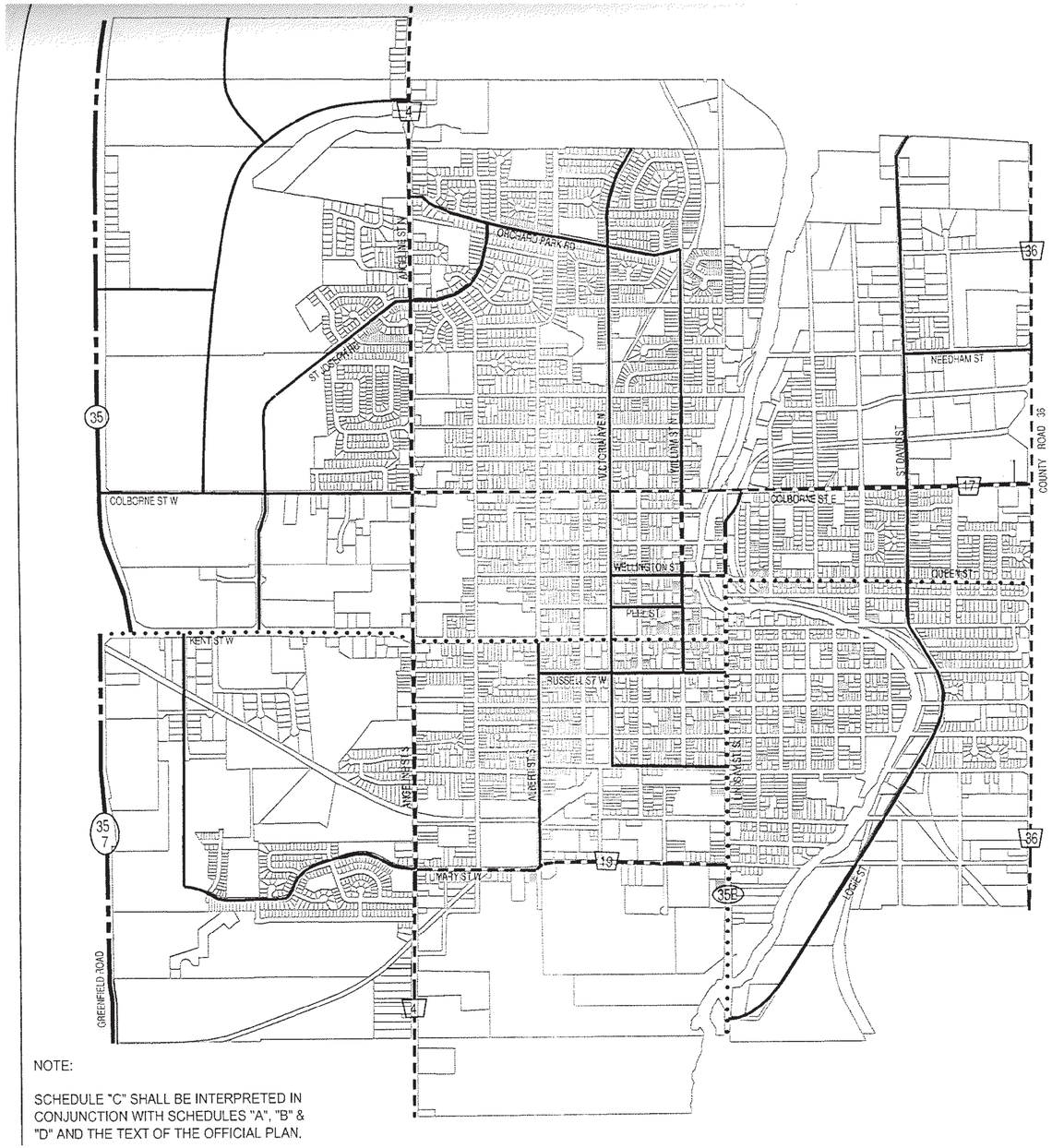
Source: City of Kawartha Lakes Transportation Master Plan (2012)

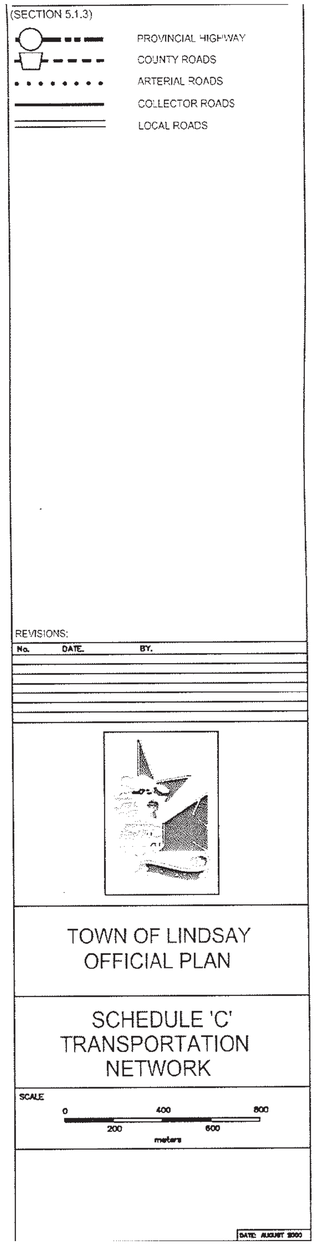
Lindsay Area Trails Master Plan



Source: Kawartha Lakes Trails Master Plan (March 2006) Figure 2

Existing Lindsay Roadway Functional Classification





NOTE:

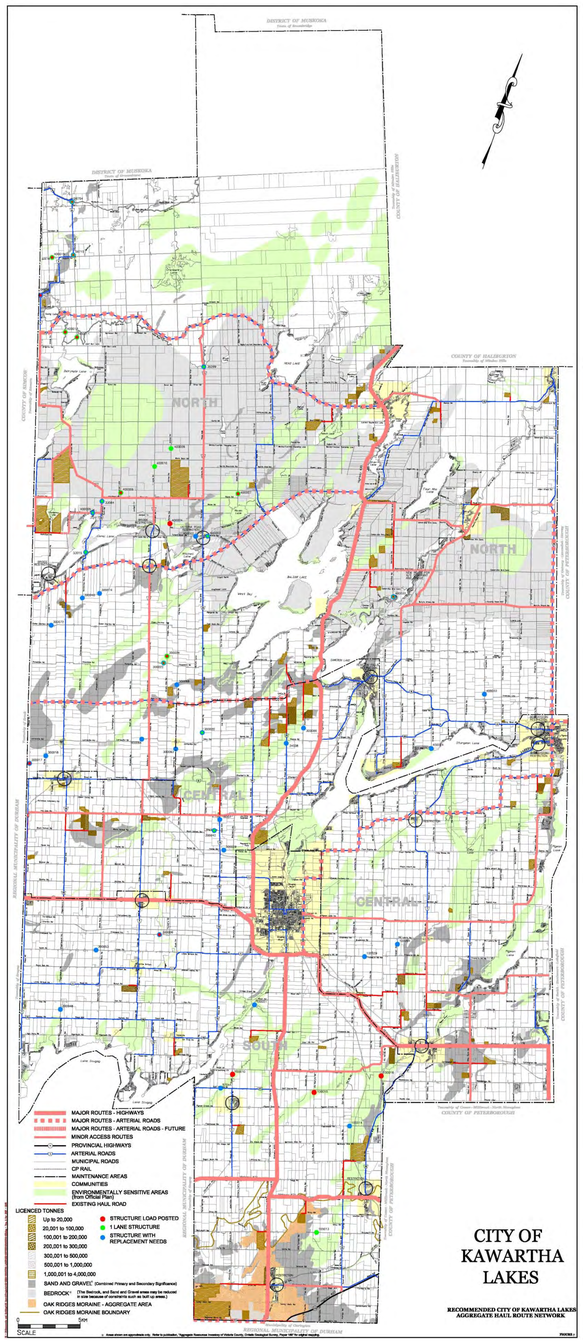
SCHEDULE "C" SHALL BE INTERPRETED IN CONJUNCTION WITH SCHEDULES "A", "B" & "D" AND THE TEXT OF THE OFFICIAL PLAN.

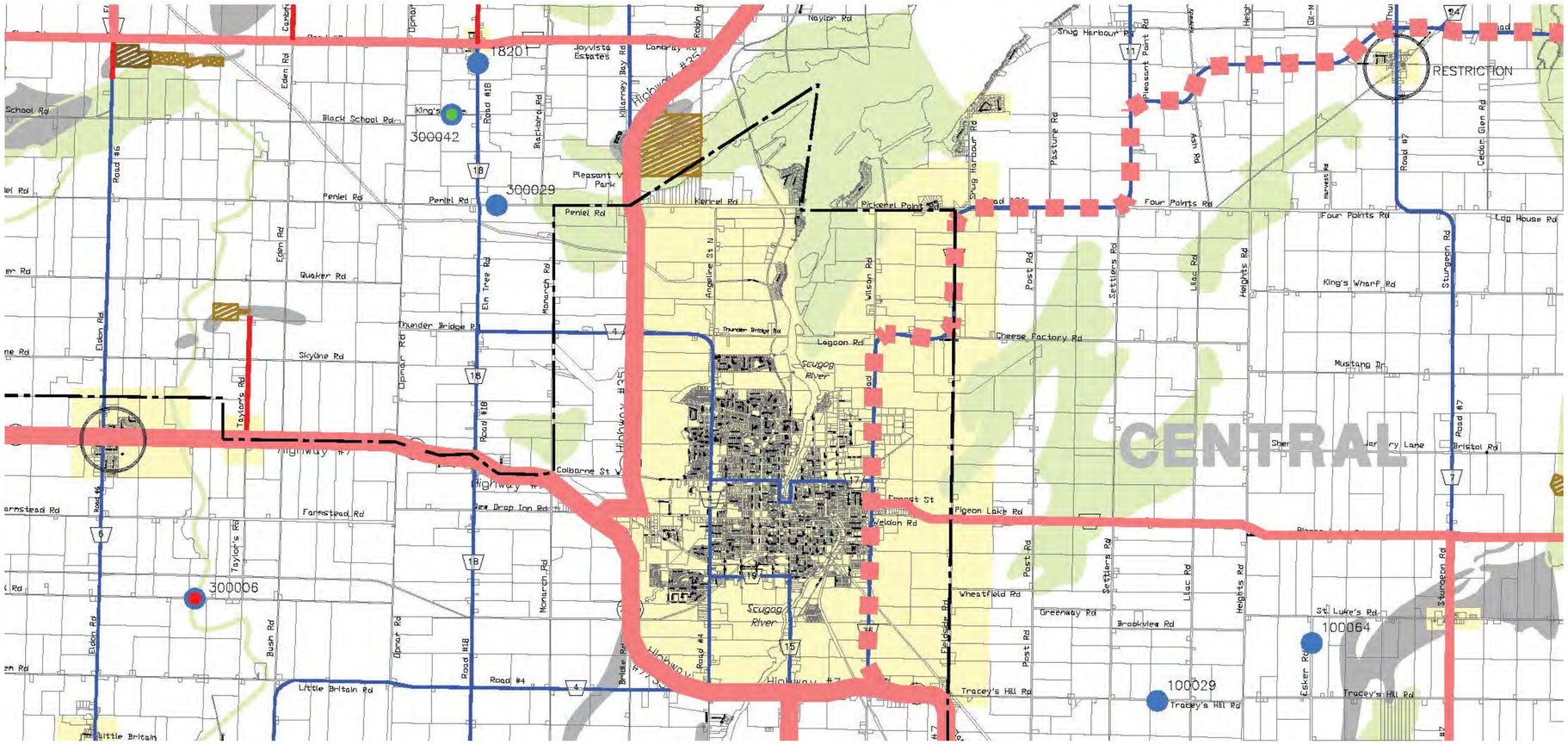
Source: Town of Lindsay Official Plan (2000)

Current Transit Network

Source: Lindsay Transit Bus Schedule

Existing Truck Routes





Source: 2006 Aggregate Truck Route Study

PROBLEM AND OPPORTUNITY STATEMENT

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031 with Lindsay experiencing the bulk of this growth.

The 2012 Transportation Master Plan (TMP) identified existing transportation capacity constraints on Kent and Colborne Streets with recommended improvements in the short, medium and long term.

The two corridors require more detailed examination and a review of the TMP's recommendations. There is an opportunity to not only improve vehicular capacity to respond to travel demand, but also improve the multi-modal mobility needs of existing and future residents, employees and businesses by improving access for pedestrians and cyclists.

Moving Forward...

Contact us!

Project Manager

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Engineering Division
Public Works Department
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Thank you!

Your input is very valuable to us.
Comments and suggestions are greatly appreciated.

Stakeholder Meeting #1
Feedback Report

July 2020

Kent Street and Colborne Street Corridor Study Environmental Assessment

Feedback Report from Stakeholder Meeting held September 17, 2013

Summary of input received through the Stakeholder Workshop held on September 17, 2013.

Feedback Report from Stakeholder Meeting held September 17, 2013

Table of Contents

Kent Street and Colborne Street Corridor Study Environmental Assessment

Feedback Report from Stakeholder Meeting held September 17, 2013

INTRODUCTION

This report summarizes the feedback received at and as an outcome of a Stakeholder Workshop held by the City of Kawartha on September 17, 2013 from 1:00 to 3:30 p.m. The purpose of the meeting was to present and receive feedback on the existing conditions, transportation needs and opportunities for consideration in the study. The Stakeholder Workshop was attended by individuals representing the business community, downtown interests, developers and organizations with an interest in the study.

The meeting began with a brief presentation on the study process and existing conditions by the consultant, HDR Corporation, and then the balance of the meeting was devoted to a roundtable discussion on existing conditions, issues of concern to stakeholders, and ideas and opportunities for enhancing transportation operations along the Kent Street and Colborne Street Corridors.

This report has been prepared by facilitator Sue Cumming, Cumming+Company and is intended to capture the key messages and themes noted through the discussion. It identifies key themes and suggestions for consideration. While this report reflects the feedback received on this study through the September 17th Workshop, it is not intended to be a verbatim account of the meeting.

Kent Street and Colborne Street EA Study

Guiding Principles

Sustainable and multi-modal transportation corridors

Transportation network planned to **minimize impact on local businesses and residents**

Corridors designed to **consider and accommodate all users**: Pedestrians, cyclists, transit buses, autos and trucks

Opportunity for **streetscape / landscape enhancements**

On-street parking in support of mixed-use, main street areas

STUDY BACKGROUND

The City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors. The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

The study limits are from Highway 35 in the west to Lindsay Street in the east, including a review of the need for a second east-west bridge over the Trent River.

The study is being carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) public process. A key component of the study is consultation with the public and stakeholders and public open houses (two) and stakeholder meetings (two) will be held this fall.

KEY MESSAGES HEARD:

The following is a synthesis of the key themes noted through the discussion with stakeholders:

a. Better pedestrian accommodation is needed along Kent Street both in and outside of the downtown area. This includes the need to address pedestrian safety for crossing the street and between establishments.

b. Better left turn movements are needed along Kent Street in the west and middle areas of the Study Area to facilitate safer access to commercial uses in these areas.

c. Demographics need to be taken into account with more seniors in the community. The Study should address the needs of older adults in planning for pedestrian movements.

d. The study area roads should be re-grid for a better flow of traffic.

e. Intersection function needs to be reviewed along with posted speeds as you approach busy commercial areas and downtown.

f. Transportation improvements in the downtown include maintaining parking, reviewing better logistics for deliveries, addressing user conflicts with cyclists on

sidewalks, improving pedestrian safety and coordinating efforts with revitalization and capital projects.

g. Transit access and flow to and from the downtown is important. The transit hub near Wally's is seen as the best location for existing transit users. New routes and services should be provided to service new commercial and residential developments and along Colborne Street when these developments are realized. Stakeholders support transit improvements to ensure good flow to the downtown and along Kent Street and Colborne Street.

h. It was noted that Colborne Street functions to funnel traffic to the downtown and plays an important role in the overall transportation hierarchy. There is interest in improving the pedestrian environment and transit connections along Colborne. Transportation improvements would be coordinated with planned developments.

QUESTIONS NOTED

The following questions were noted through the discussion:

1. What is the overall study objective? The following response was noted:
   - *To improve operations for all users (pedestrians, cycle, vehicle, transit) without hindering vehicle operations. To balance commercial areas. To provide for pedestrians and cyclists.*
   - *Staff provided an overview of Council's Strategic Priorities including – active transportation (endorsing consideration of cycling and pedestrian improvements), economic development, and maintaining infrastructure.*

2. Have you factored in future traffic from expected growth? The following response was noted:
   - *Growth from all existing, planned and approved growth will be included. Where information on development growth is available, expected needs for Wal-Mart, Mason Homes developments and future redevelopment on the Provincial site will be included in the traffic numbers.*

3. When were traffic counts undertaken? The following response was noted:
   - *Counts were taken on a Tuesday and Wednesday in mid-August. Several of the stakeholders noted that this is a slower time in commercial shopping and the numbers would be expected to be lower in that time period. There was a discussion of how the traffic numbers are*

generated taking into account traffic volumes, traffic patterns and turning movements. HDR provided an overview of the existing conditions and functioning of Kent Street and Colborne Street.

4. Will there be general notice for the public meeting so that citizens who may have an interest or concern about a second crossing would learn about this study. The following response was noted:
   - *The first Public Meeting is being held on September 24 and citizens would be notified through local media, posting of notices and through the City of Kawartha Lakes. Stakeholders were encouraged to share the notice with individuals and organizations that may have an interest in the study.*

5. Are roundabouts being considered in the study? A discussion followed on the merits of and considerations for roundabouts vs. traffic circles and implication for potential at Victoria Street and Kent Street.
   - *A number of roundabout locations were noted including Highway 33 in Picton, at Picov Downs in Ajax, and the consideration of one as part of the Durham and Victoria EA (near the Fenelon Arena and Fairgrounds). HDR Corporation will identify other examples and can provide further information on the feasibility, elements and planning parameters for considering roundabouts at the second stakeholder meeting.*

COMMENTS AND CONSIDERATIONS FOR KENT STREET

Kent Street is a key focus of the corridor study. Aerial plans were used to highlight existing conditions, to identify issues and to discuss improvement opportunities along Kent Street. Comments and input are organized in two sections – along Kent Street and Kent Street in downtown Lindsay.

Along Kent Street: West commercial area and middle commercial areas

The following is a synthesis of key issues and opportunities identified along Kent Street in the west and middle commercial areas:

a. Better pedestrian accommodation is needed to address poor pedestrian conditions

There are many concerns about unsafe pedestrian conditions for people walking across Kent Street and between commercial establishments. Comments include the following:

- There is an absence of mid-block crossings and people cross where they think they can.
- Narrow sidewalks impede comfortable pedestrian movements.

- Many pedestrians get caught in the turning lane waiting for an opening to continue crossing Kent Street.
- Consideration needs to be given for safe crossing for High School students who frequent commercial uses during lunch hour.
- Instead of using the Kent Street frontage, many people unsafely walk between parked cars and through various parking lots to access other commercial activities. The example of people crossing the Tim Horton's parking lot on route to Canadian Tire was noted.
- Sidewalk installation should be a priority. Staff noted that sidewalks from McLaren to LCBO are identified in the 2014 Capital Budget
- Kent Street lacks a mid-block crossing for pedestrians. The introduction of a mid-block crossing potentially at St. Joseph and Angeline should be considered.
- An amber flashing light should be considered for Albert Street.

b. Problems with left turns and congestion on Kent

A number of stakeholders identified issues with left turn movements and resulting congestion on Kent Street. This creates back up in the parking lots adjacent to Kent Street. Left turns were noted to be an issue at St. Joseph and Angeline.

c. Need for better entrance management policies

A number of issues with entrances were noted with the following specific suggestions:

- It was suggested that the establishment of a grid pattern around the commercial uses would enable cars and trucks to go to the right. At present there is congestion with the layout through the back of the properties which forces vehicles to go through the area and turn left.
- There was discussion of a road layout for the Mason Homes property and interest in the timing and configuration for this. It was noted that vehicular connection to commercial uses would be part of the Phase 3 conditions.
- It was further noted that vehicles continue through the back parking lot up to the Staples location then through the parking lot to the Food Basics location. This is very busy most times of the day and left turns were noted to be problematic (impossible).
- There is an interest in exploring shared entrances, all way stops and better turning movements around the commercial properties.

d. Need for a mid-block collector

There was discussion of the need for and suitable location for a mid-block collector. There is interest in improving vehicle movements to Food Basics. It was noted that this is a busy location with no light and many customers have difficulty turning left onto Kent Street. The study should consider opportunities for a mid-block collector which would also facilitate pedestrian crossings.

e. Better accommodation of built environment and transportation improvements for older adults and the aging population

Many of the customers are older adults and it was noted that the study should consider better accommodation of the needs of these older adults and the aging population. It was noted that there is an issue with curb heights and people falling and tripping in the some of the parking lots. It was also noted that pedestrian routes are not well delineated and need better surface treatment for ease of movement of older adults. Safety issues were noted in particular for the Whitby Town Centre.

f. Need for better functioning intersections along Kent Street.

A number of issues were noted with intersection function including the following:

- Poor left turn movements from commercial properties onto Kent Street are creating congestion along Kent Street which back up into commercial plazas.
- The left hand turn for the driving school where the posted speed is 80 kph is problematic and creates a higher risk for the left hand turn.
- Would like to see the posted speed transitioning along Kent Street from St. Joseph to Highway No. 35to be lowered to 50 kph.
- Would like to see additional review of analysis of functionality of intersections along Kent Street in vicinity of existing and future commercial uses with particular focus on Friday nights and November and December when higher volumes are experienced.

Kent Street in the Downtown Area

The following is a synthesis of key issues and opportunities identified along Kent Street in the Downtown:

a. Adequate, conveniently located and accessible parking is fundamental to the viability of the downtown with the need to maintain existing parking.

Where and how parking fits onto Kent Street is important to the viability of downtown. The extra width of the street accommodates angle parking which is well used with turnover sometimes 3 to 4 times an hour. It was noted that the front in and back out situation with the angle parking can create short delays and issues with driver site lines. There was a discussion about the potential to reconfigure these angle spaces to have cars back in and pull forward as is being piloting in a few other communities (i.e. Collingwood). More review of the merits and impacts is needed before determining the feasibility of such a change. Parallel parking is not supported as it would reduce the number of spaces. The perception is that there is a limited parking supply now with much emphasis on the need to maintain existing parking and where possible increase the supply. The potential to create a multi-level parking structure off site in close proximity to the downtown should be explored.

b. Improve pedestrian environment in the downtown

Concerns were noted about potential tripping hazards along the sidewalks and curbs, conflicts with cyclists on sidewalks, delivery vehicles and accessibility issues for pedestrians. Winter maintenance of pay and display meters, street furniture and snow storage in the downtown can impede pedestrian movements.

c. Coordinate study outcomes with downtown revitalization initiatives

There is an opportunity to combine recommendations from this study with the revitalization to the downtown and five year capital projects. A key goal is to improve flow to the downtown. Revitalization and capital improvements should be coordinated to address better lighting, access to some of the properties, uneven sidewalks, location of patios and street furniture. Legal survey work and topographical has been completed to assist with detailed design and to understand encroachments.

d. Consideration of logistics with goods movement and deliveries in the downtown

It was noted that a full range of small vehicles to large eighteen wheel trucks access the downtown from the main street, side streets at all times of day from early morning to late evenings. Some of the business can accommodate deliveries from the back with many only accessible from the front. It was noted that it is not unusual to have large trucks stopped in a lane in the downtown to unload with drivers having to navigate around the stopped vehicle. Goods movement should be considered as part of the study.

e. Improve the environment for cycling and address conflicts between users

Cyclists on sidewalks conflict with pedestrians and create hazards for those using patios and benches. Cycling lanes along Kent Street are not seen as feasible. There was a discussion of cycling infrastructure along Victoria, Durham and Russell with the need to review opportunities for implementing cycling infrastructure. More cycling facilities are needed including bicycle parking (Value-Mart property noted along with other locations).

f. Review the transition along Kent Street and gateway location

It was noted that the Ministry of Transportation has realigned Highway 35 and Kent Street with a T-intersection. This should be looked at to see what additional improvements may be needed to support traffic flow to and through the downtown.

COMMENTS AND CONSIDERATIONS FOR COLBORNE STREET

There was a discussion of the need for another thoroughfare. It was noted that this is necessary for the flow of traffic and can be accommodated in the 100 foot right of way. It was further noted that proper turning lanes would be provided for the Mason Homes development and Wal-Mart. The City has hired HDR to undertake a traffic study for the Wal-Mart and HDR has recently undertaken a peer review of the Mason Homes transportation work. The Mason Homes development is being planned with more focus on trails and walking. Site plans for the new development will incorporate active transportation with cycling and pedestrian connections.

It was noted that Colborne Street functions to funnel traffic to the downtown and plays an important role in the transportation hierarchy. There is interest in improving the pedestrian environment and transit connections. There was also a discussion of the potential to increase

Colborne to four lanes. Instead of widening, other alternatives are being reviewed. On street parking on Colborne east of Angeline was noted to be needed.

COMMENTS AND CONSIDERATIONS FOR TRANSIT

Transit is important to the Downtown. All routes go through downtown. The exiting transit hub is located outside Wally's and TD Bank. Transit users particularly older adult are comfortable with this location. There are some concerns about fumes from idling transit vehicles but these are seen as more acceptable than relocating the hub.

More transit connections will be made in the future as development occurs and ridership increases. New routes will be developed to access new sites and the future commercial on Colborne Street.

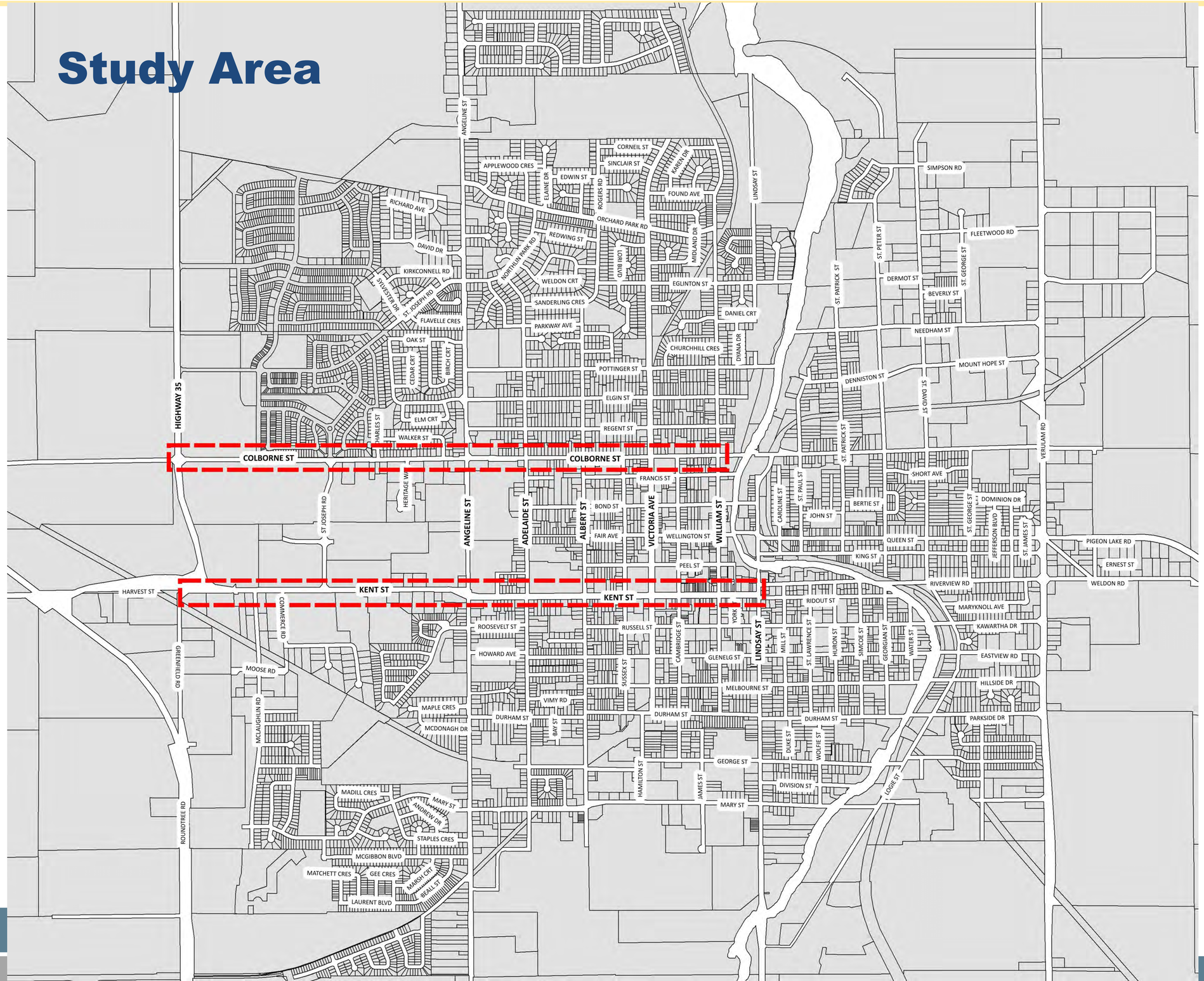
There is support amongst stakeholder for increased transit access to the downtown and along Kent Street and Colborne to connect to other establishments, the high school and planned developments.

Stakeholder Meeting #2
Display Materials

Welcome to the 2nd Stakeholders Meeting for the Kent Street and Colborne Street Corridor Study Environmental Assessment

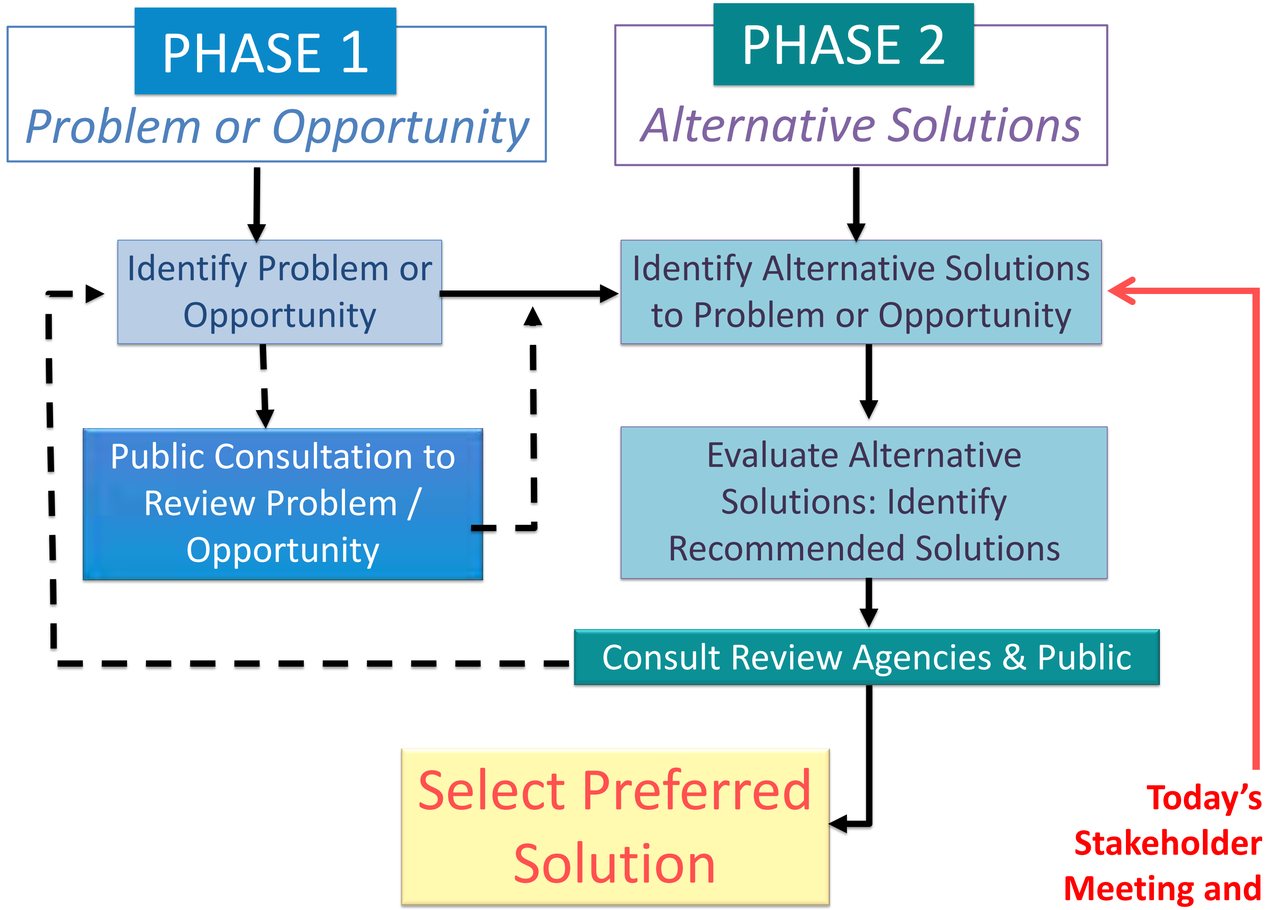
September 28th, 2013

Study Area


HIGHWAY 35
ANGELINE ST
ST JOSEPH RD
ADELAIDE ST
ALBERT ST
VICTORIA AVE
WILLIAM ST
LINDSAY ST
COLBORNE ST
KENT ST
HARVEST ST
GREENFIELD RD
ROUNDTREE RD
COMMERCE RD
MCLAUGHLIN RD
HAMILTON ST
JAMES ST
ST PATRICK ST
ST PETER ST
ST GEORGE ST
ST DAVID ST
VERULAM RD
LOCKE ST
WATER ST
GEORGIAN ST
SIMCOE ST
HURON ST
CAMBRIDGE ST
YORK
MILL ST
ST LAWRENCE ST
SUSSEX ST
DUKE ST
WOLFE ST
BAY ST
JEFFERSON BLVD
CAROLINE ST
ST PAUL ST
LOB BLVD
MIDLAND DR
ROGERS RD
ELAINE DR
KAREN DR
NORTHUM PARK RD
SYLVESTER DR
CHARLES ST
HERITAGE WAY
APPLEWOOD CRES
CORNEIL ST
SINCLAIR ST
EDWIN ST
FOUND AVE
ORCHARD PARK RD
REDWING ST
RICHARD AVE
DAVID DR
KIRKCONNELL RD
WELDON CRT
SANDERLING CRES
FLAVELLE CRES
PARKWAY AVE
OAK ST
CEDAR CRT
BIRCH CRT
ELM CRT
WALKER ST
EGLINTON ST
DANIEL CRT
CHURCHHILL CRES
DYANA DR
POTTINGER ST
ELGIN ST
REGENT ST
FRANCIS ST
BOND ST
FAIR AVE
WELLINGTON ST
PEEL ST
QUEEN ST
KING ST
JOHN ST
BERTIE ST
SHORT AVE
DENNISTON ST
NEEDHAM ST
MOUNT HOPE ST
BEVERLY ST
DERMOT ST
FLEETWOOD RD
SIMPSON RD
DOMINION DR
ST JAMES ST
PIGEON LAKE RD
ERNEST ST
WELDON RD
RIVERVIEW RD
MARYKNOLL AVE
KAWARTHA DR
EASTVIEW RD
HILLSIDE DR
PARKSIDE DR
RIDOUT ST
RUSSELL ST
GLENELG ST
MELBOURNE ST
DURHAM ST
GEORGE ST
DIVISION ST
MARY ST
ROOSEVELT ST
HOWARD AVE
MOOSE RD
VIMY RD
MAPLE CRES
MCDONAGH DR
MADILL CRES
MARY ST
ANDREW DR
STAPLES CRES
MCGIBBON BLVD
MATCHETT CRES
GEE CRES
MARSH CRT
BEALL ST
LAURENT BLVD

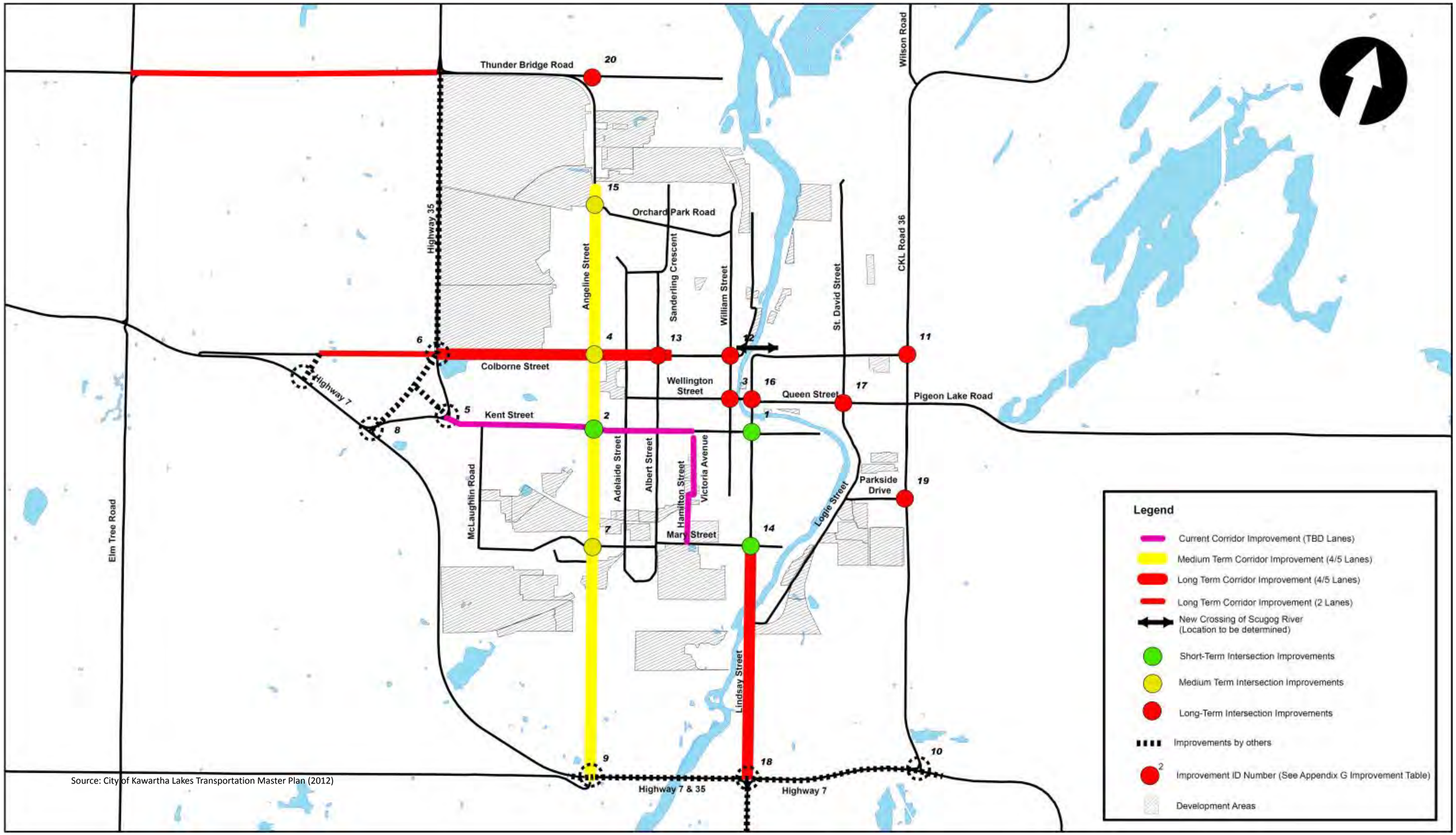
What is a Corridor Study EA?

- More detailed examination of a particular corridor than the 2012 Transportation Master Plan
- Specific short to long term recommendations;
- Planning for drivers, pedestrians, cyclists and transit users with an emphasis on a multi-modal approach;
- In conformity to the Strategic Plan and the Official Plan;
- Will allow the City to make informed decisions on transportation issues affecting the community; and
- Follows Phase 1 and 2 of the *Municipal Class Environmental Assessment Process.*



EA Process

Transportation Master Plan Recommendations



Source: City of Kawartha Lakes Transportation Master Plan (2012)

What Have We Heard From The Public?

- **Angeline Street at Kent Street**
  - Cut-through traffic using Peel Lane (eastbound to southbound)
  - Implementation of pedestrian signal heads could help improve existing safety concerns
  - Student and senior pedestrian volumes are particularly high at this intersection

- **Kent Street at McLaughlin Road**
  - A new traffic signal is needed

- **Queen Street Bridge**
  - Existing capacity deficiencies; some indicate the need for another crossing to the north
  - Capacity deficiencies are short lived throughout the day, and affect only the peak periods

- **Colborne Street Corridor**
  - Pedestrian safety (students and seniors). J-walking is prevalent
  - Reduce conflict points
  - Traffic signal at Adelaide Street is “not working”
  - Town Hall has parking issues, specifically for staff and events

- **Kent Street Corridor**
  - Pedestrian safety (students and seniors). J-walking is prevalent
  - Reduce conflict points
  - Bicycle access to the commercial area near St. Joseph Street should be improved
  - Pedestrian crossing volume near Canadian Tire / Food Basics is high
  - Downtown angled parking concerns
  - Belleville Downtown along Front Street could be a template for Lindsay's historic downtown

What Have We Heard From The Public? Continued...

What were your concerns?

Mode	Concern	Kent Street Corridor	Colborne Street Corridor
Vehicular	Operations	✓	✓
	Safety		✓
Pedestrian	Operations	✓	✓
	Safety	✓	✓
Cyclist	Operations	✓	✓
	Safety	✓	✓

What measures do you feel may help?

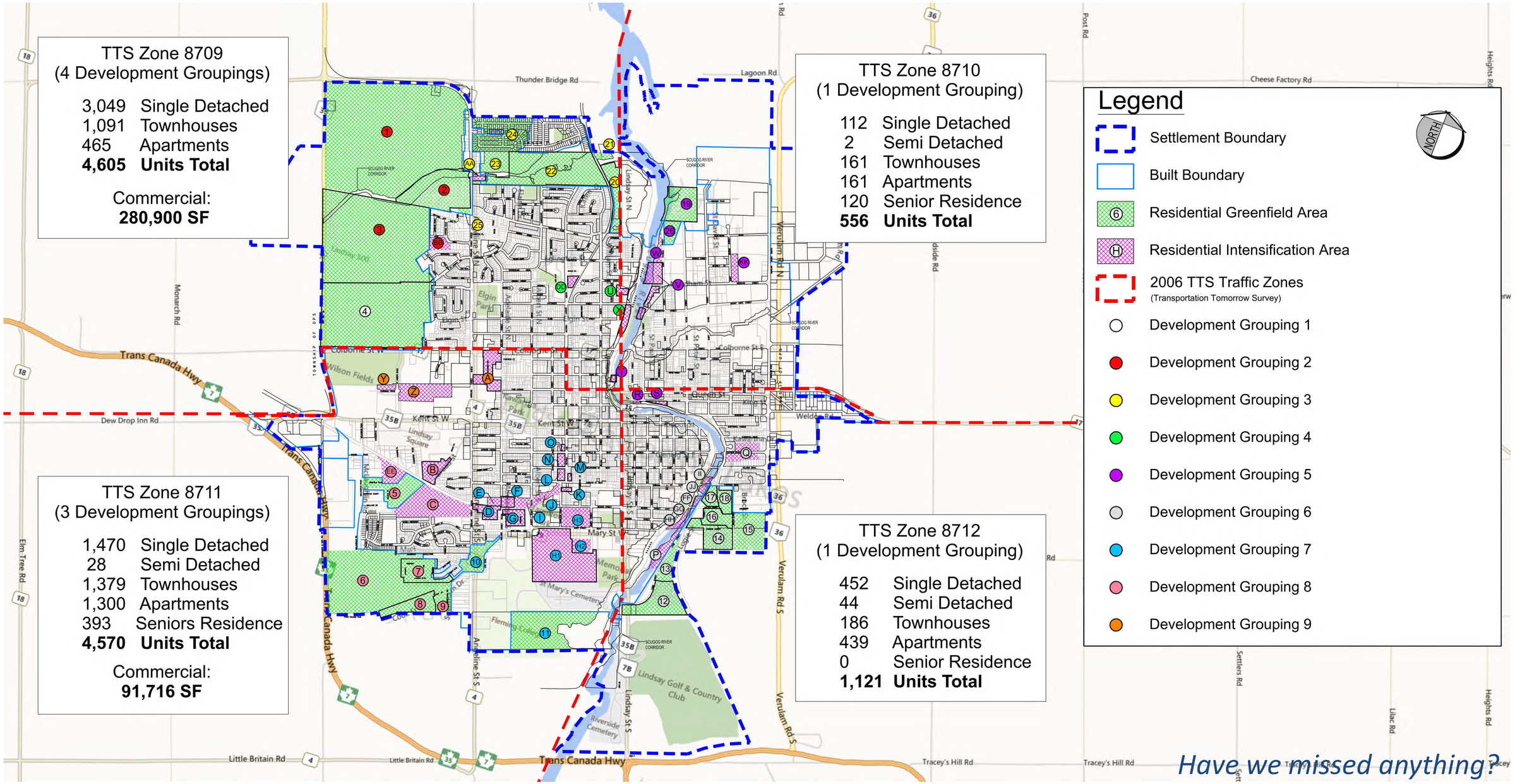
Countermeasure	Kent Street Corridor	Colborne Street Corridor
Roundabouts		
More Pedestrian Crossings	✓	✓
Bicycle Lanes		
More On-Street Parking		
Transit Route Changes / Expansion		
Increased Police Presence	✓	✓
Traffic Calming Measures		✓

Note: Results based on comment form responses from Public Information Centre #1. Four (4) response forms were received.

Have we missed anything?

Please let us know your questions or comments.

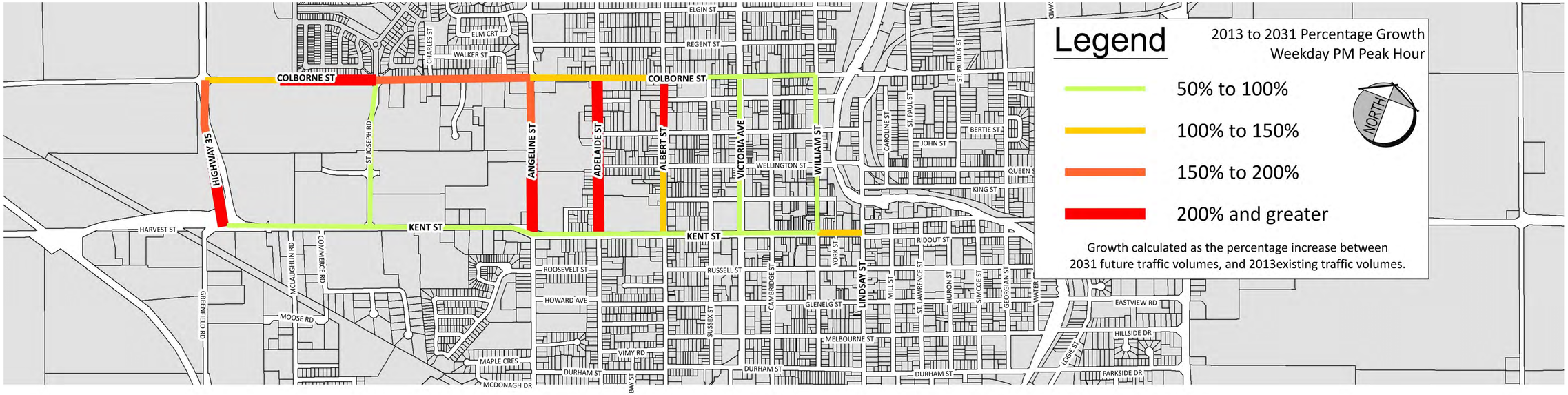
Development Growth Projections

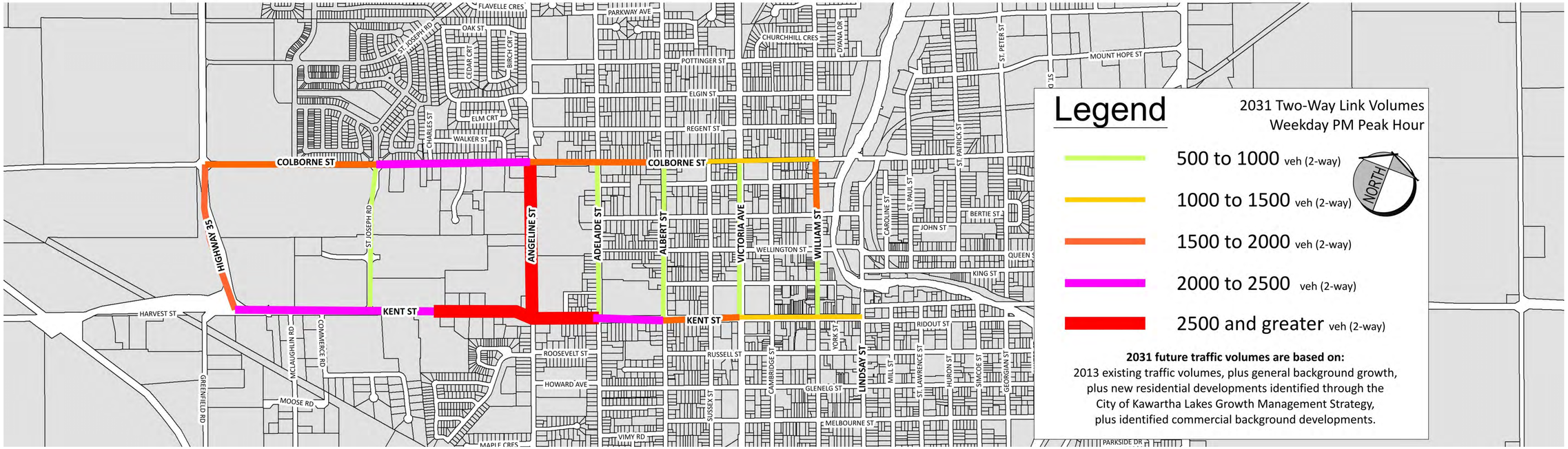


Have we missed anything?

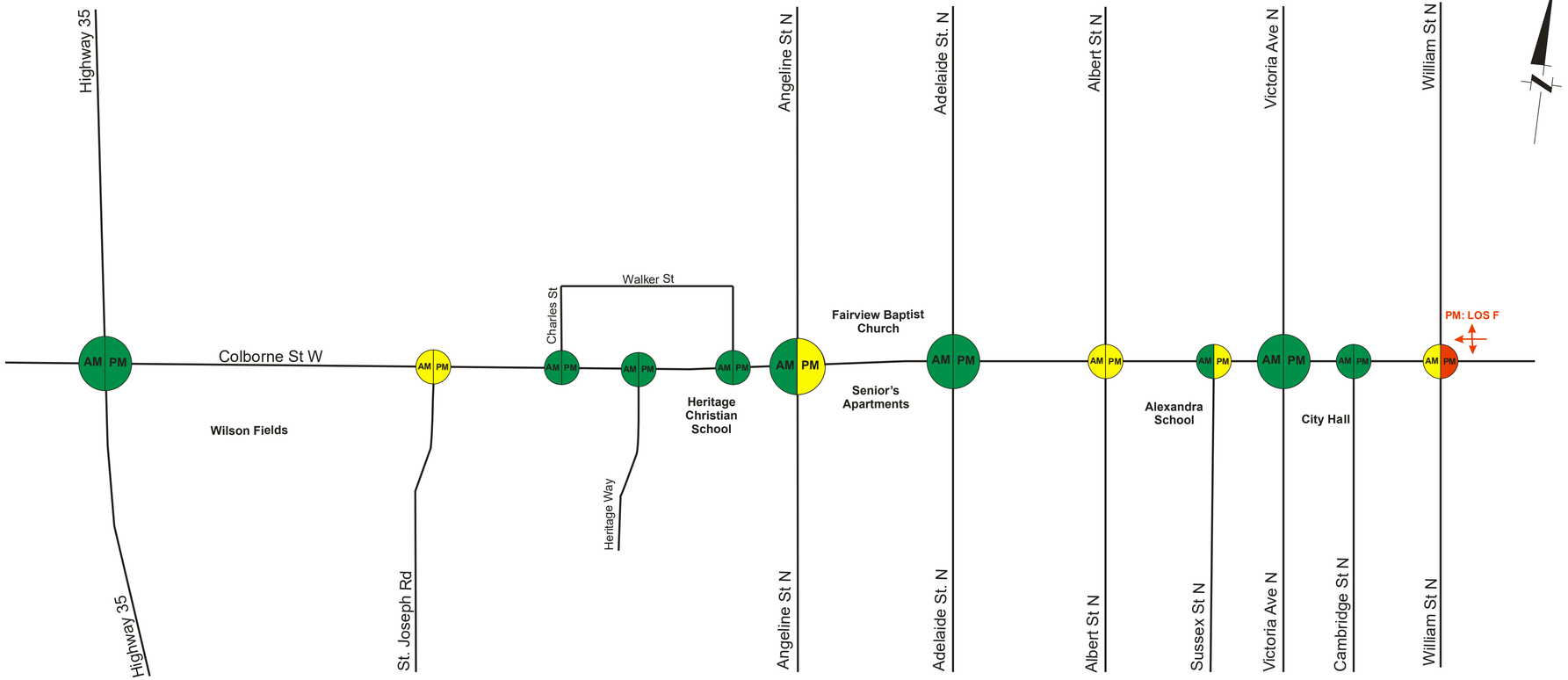
Please let us know your questions or comments.

2031 Traffic Forecast





Existing Deficiencies (Colborne)



Not to Scale

Legend

- AM | PM — Signalized Intersection Overall Intersection Level of Service (LOS) (AM Peak Hour | PM Peak Hour)
- AM | PM — Unsignalized Intersection Worst Movement Level of Service (LOS) (AM Peak Hour | PM Peak Hour)

Level of Service (LOS) Colour Scale

- LOS A to LOS B: Very Little Delay
- LOS C to LOS D: Some Delay
- LOS E to LOS F : Higher Delay

Note:

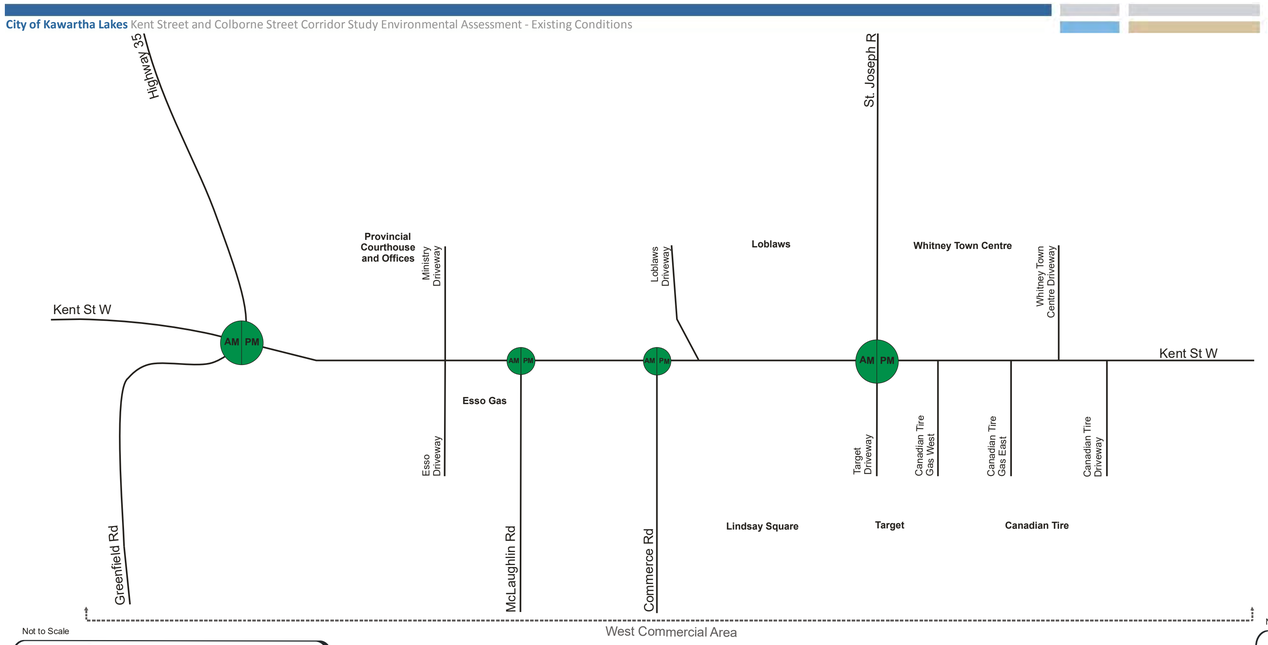
Operations shown for signalized and unsignalized intersections only. Driveway operations are not shown.

Existing Traffic Operations

Colborne Street

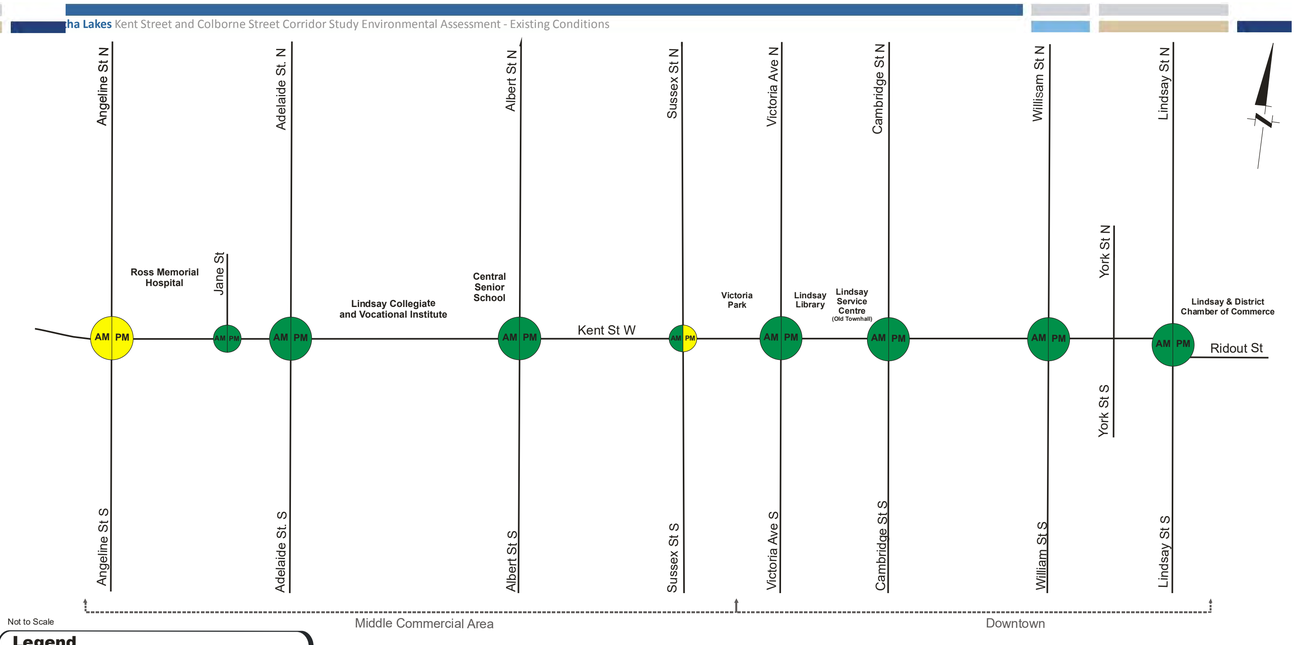
September 2013

Existing Deficiencies (Kent)



Existing Traffic Operations
Kent Street (West Commercial Area)

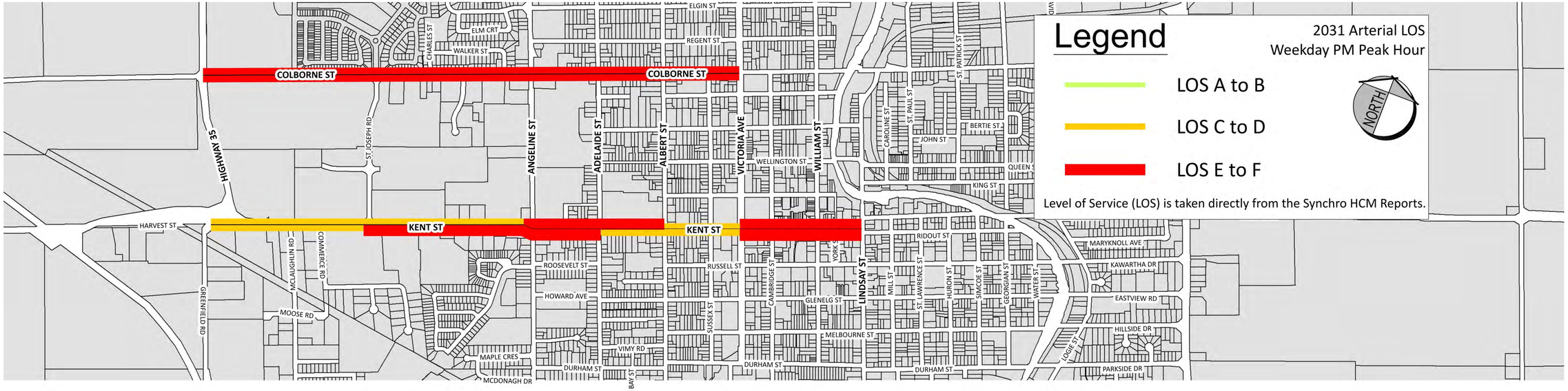
September 2013



Existing Traffic Operations
Kent Street (Middle Commercial Area & Downtown)

September 2013

Future Deficiencies



Problem and Opportunity Statement

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. This is a population increase of approximately 33% from 2011.

The bulk of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 300% compared to 2013 traffic volumes. As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes.

- **Colborne Street** will operate with Level of Service E and F during the weekday PM peak hour. 3 out of 4 signalized intersections will operate with overall Level of Service E or F.
- **Kent Street** will operate with Level of Service C to F during the weekday PM peak hour. 3 out of 9 signalized intersections will operate with Level of Service E or F.

While the goal is to improve and accommodate vehicular flow, pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must be addressed through improvement options that will provide a balanced approach.

Have we missed anything?

Please let us know your questions or comments.

Alternatives

- Do Nothing
- TDM Measures only
- Improve Transit
- Improve Active Transportation Network Connections
- Improve Intersection Operations
- Improve Road Network (including widening and new roads)

Have we missed anything?

Please let us know your questions or comments.

Travel Demand Management Measures

- Strategies that help to reduce traffic by reducing auto-dependency: carpooling, bike-to-work programs, flexible work hours, working from home, transit pass incentives, mixed use developments etc..

Improve Transit Network

- Opportunities to develop a Local Transit System to improve mobility / access as well as connectivity to neighbouring towns and municipalities
- Future opportunities such as GO bus service, or extension of existing services:
  - GO Transit Feasibility Study (Delcan, April 2013)
  - The Study assessed route options to connect with Whitby and Oshawa GO stations, as well as to Peterborough. The preferred option was a connection to Oshawa GO via Highway 35, Highway 115, and Highway 401

Lindsay Transit
Ride Smart.

Improve Active Transportation Network and Connections

- Invest in Active Transportation infrastructure (sidewalks, trails, bike lanes, multi-use paths) to provide mobility and safety for non-motorists
- Connectivity within the sidewalk network; improve environment for pedestrians
- On-road bicycle lanes to improve safety and accommodate multiple modes

Intersection Improvements

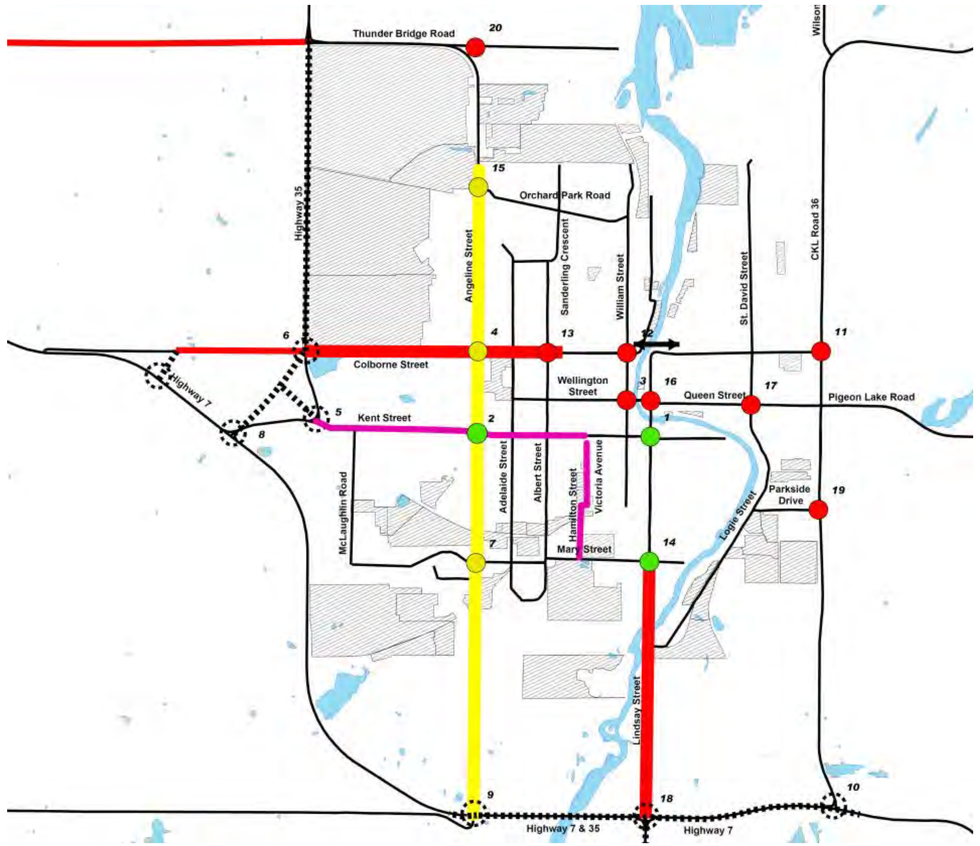
- Explore opportunities to improve traffic flow at critical intersections
- Improve efficiency (e.g. signal timing optimization, additional turn lanes)
- Assess the feasibility of installing roundabouts or traffic calming measures
- Provide for controlled pedestrian crossings

Road Network Improvements

- Road widening (added lanes) to accommodate traffic growth along links
- Results in improved traffic flow throughout the road network
- New roads to improve traffic flow and provide access to future developments

Colborne St – West of St. Joseph (Existing)

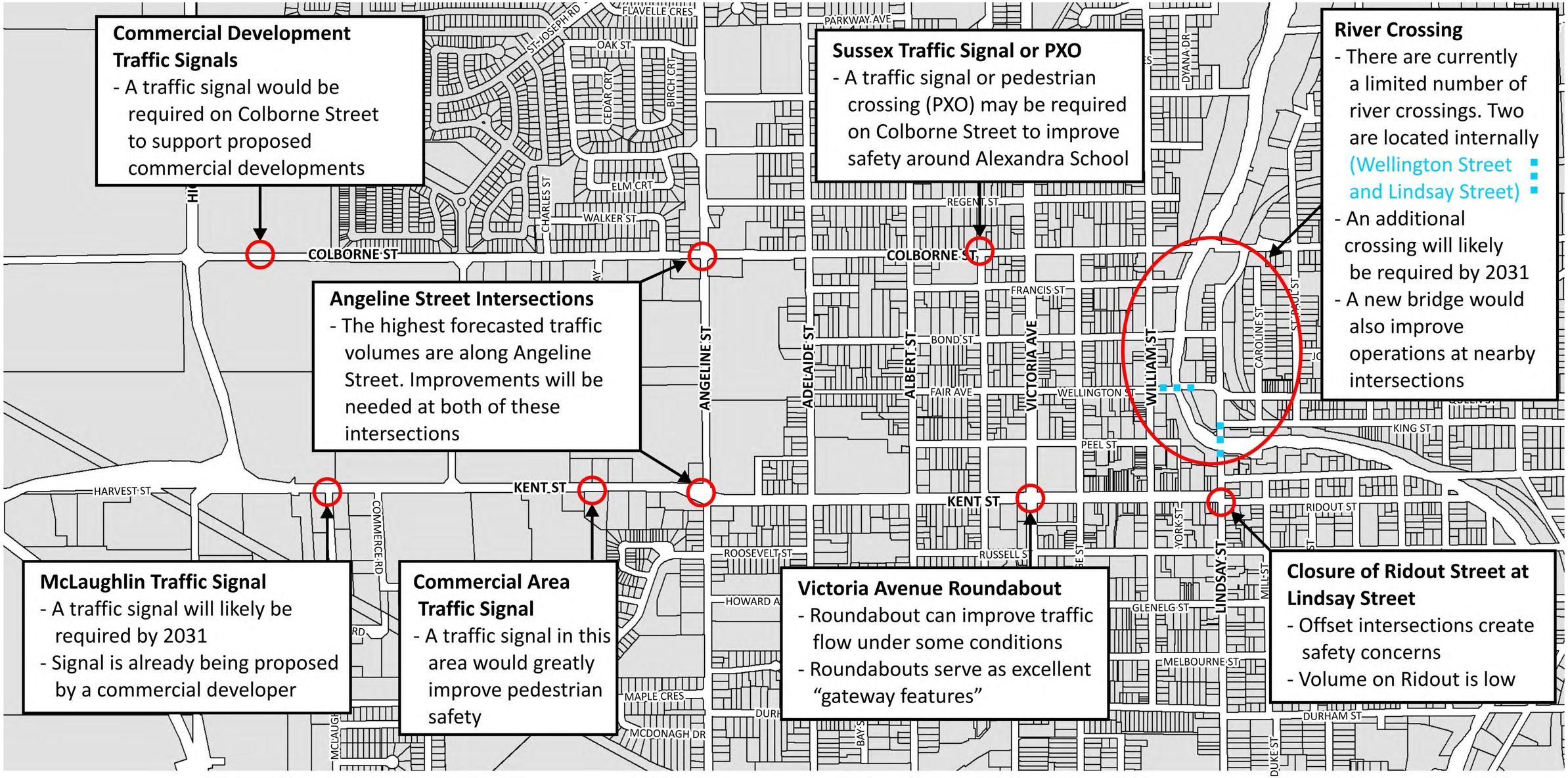
Colborne St – West of St. Joseph (Alternative)



Evaluation Criteria

Transportation Service: . Level of Service . Traffic Congestion & Delays . Public Transit Service . Accommodation of Pedestrians and Cyclists . Traffic Safety	**Socio-Economic Environnent:** . Business Impacts . Residents Impacts . Institutional and Recreational Facilities Impacts and Access . Traffic Noise . Archaeological / Cultural Heritage Resources . Visual Aesthetics . Accommodation of Planned Development
Natural Environnent: . Vegetation . Aquatic Habitat . Surface Water . Ground Water . Air Quality	**Engineering:** . Capital Costs . Operating Costs . Property Acquisition . Utility Relocation

Issues



Commercial Development Traffic Signals
- A traffic signal would be required on Colborne Street to support proposed commercial developments

Angeline Street Intersections
- The highest forecasted traffic volumes are along Angeline Street. Improvements will be needed at both of these intersections

Sussex Traffic Signal or PXO
- A traffic signal or pedestrian crossing (PXO) may be required on Colborne Street to improve safety around Alexandra School

River Crossing
- There are currently a limited number of river crossings. Two are located internally (Wellington Street and Lindsay Street)
- An additional crossing will likely be required by 2031
- A new bridge would also improve operations at nearby intersections

McLaughlin Traffic Signal
- A traffic signal will likely be required by 2031
- Signal is already being proposed by a commercial developer

Commercial Area Traffic Signal
- A traffic signal in this area would greatly improve pedestrian safety

Victoria Avenue Roundabout
- Roundabout can improve traffic flow under some conditions
- Roundabouts serve as excellent "gateway features"

Closure of Ridout Street at Lindsay Street
- Offset intersections create safety concerns
- Volume on Ridout is low

Have we missed anything?

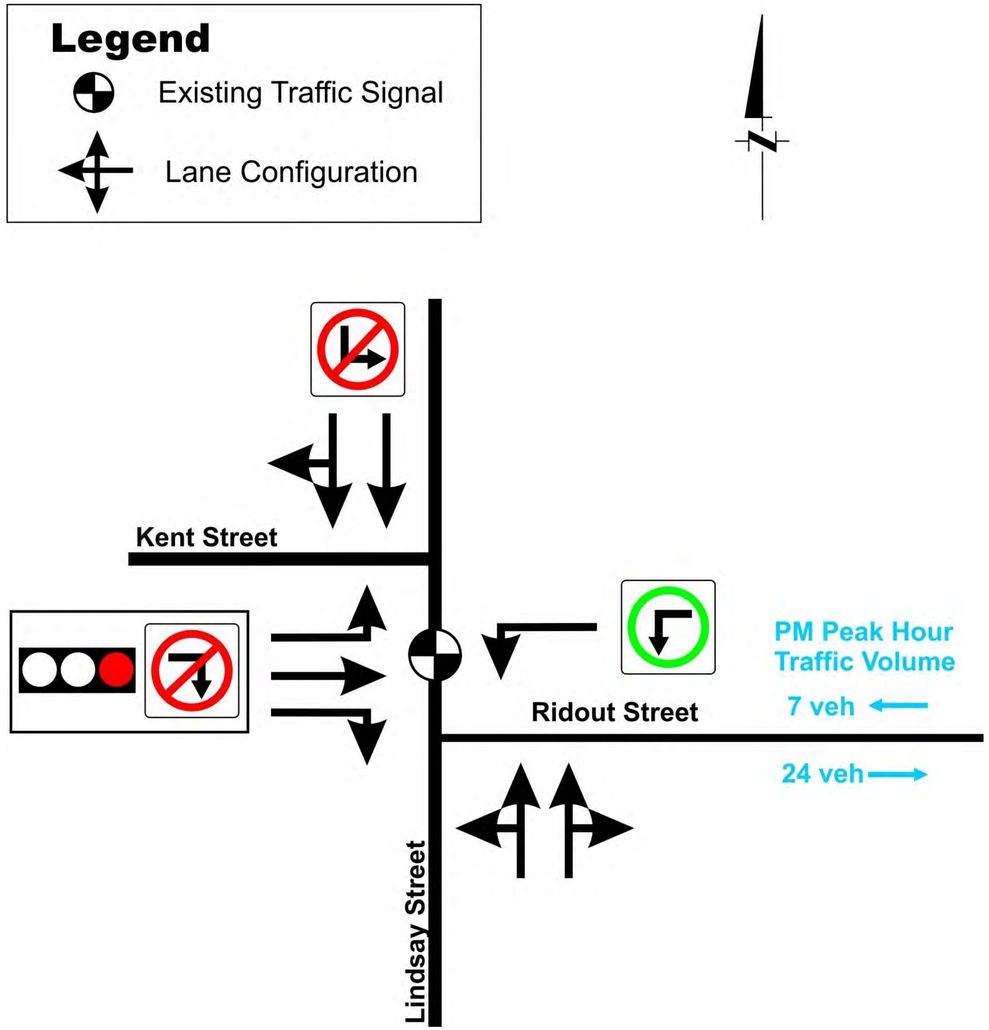
Please let us know your questions or comments.

Closure of Ridout Street

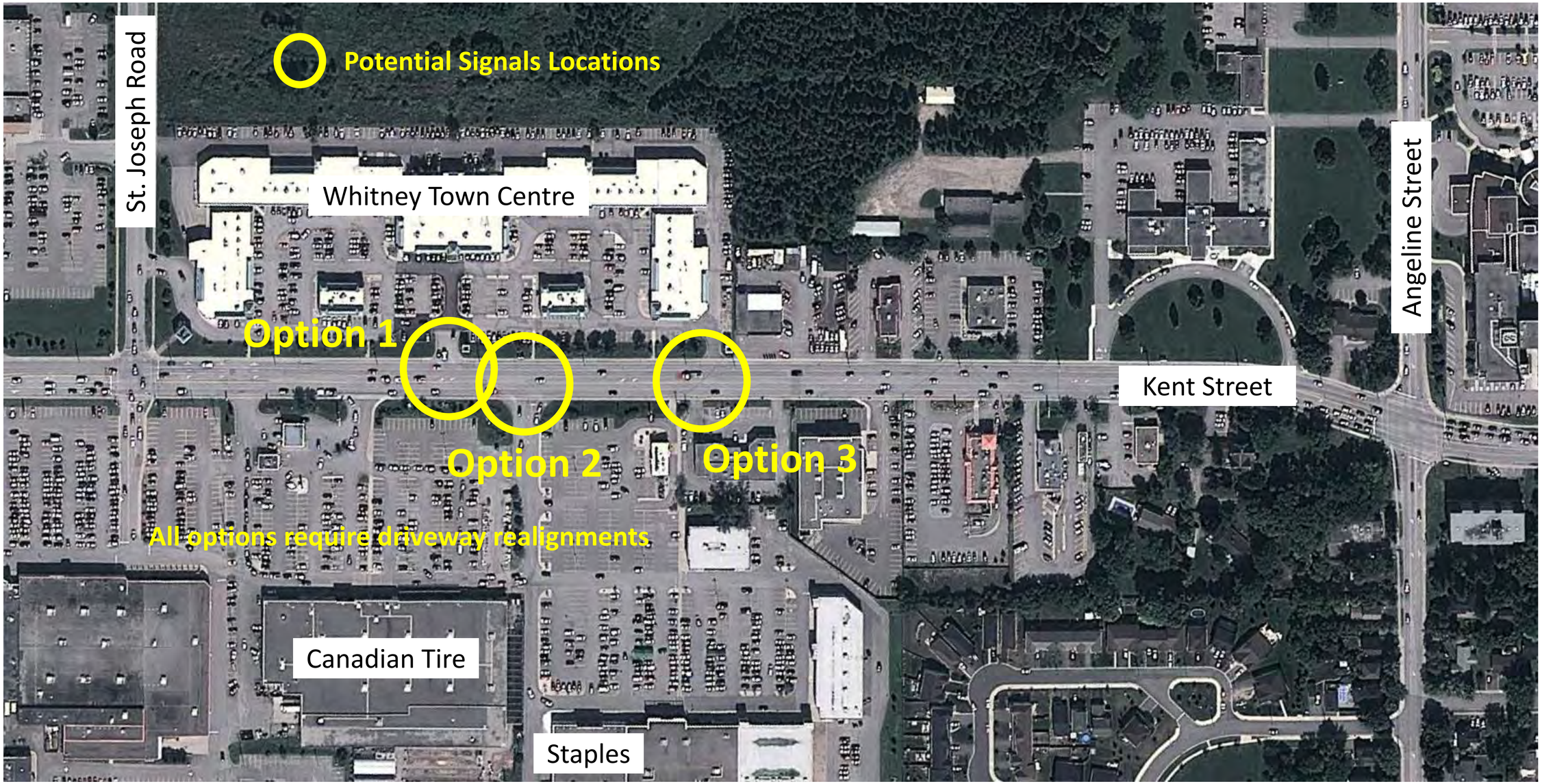
- The current configuration of the Kent Street / Lindsay Street / Ridout Street intersection is jogged such that the east leg is offset south by 20 metres

- This offset has resulted in the following turn restrictions due to safety concerns:
  - Southbound left-turns are not permitted
  - Eastbound right-turns are not permitted on red
  - Westbound right-turns are not permitted (westbound left-turns only on green)

- Removal of these restrictions can be achieved by eliminating the jog. This can be done through closure of Ridout Street at Lindsay Street
- Closure would affect only 31 vehicles that could easily use adjacent side streets



New Signal East of St. Joseph Road



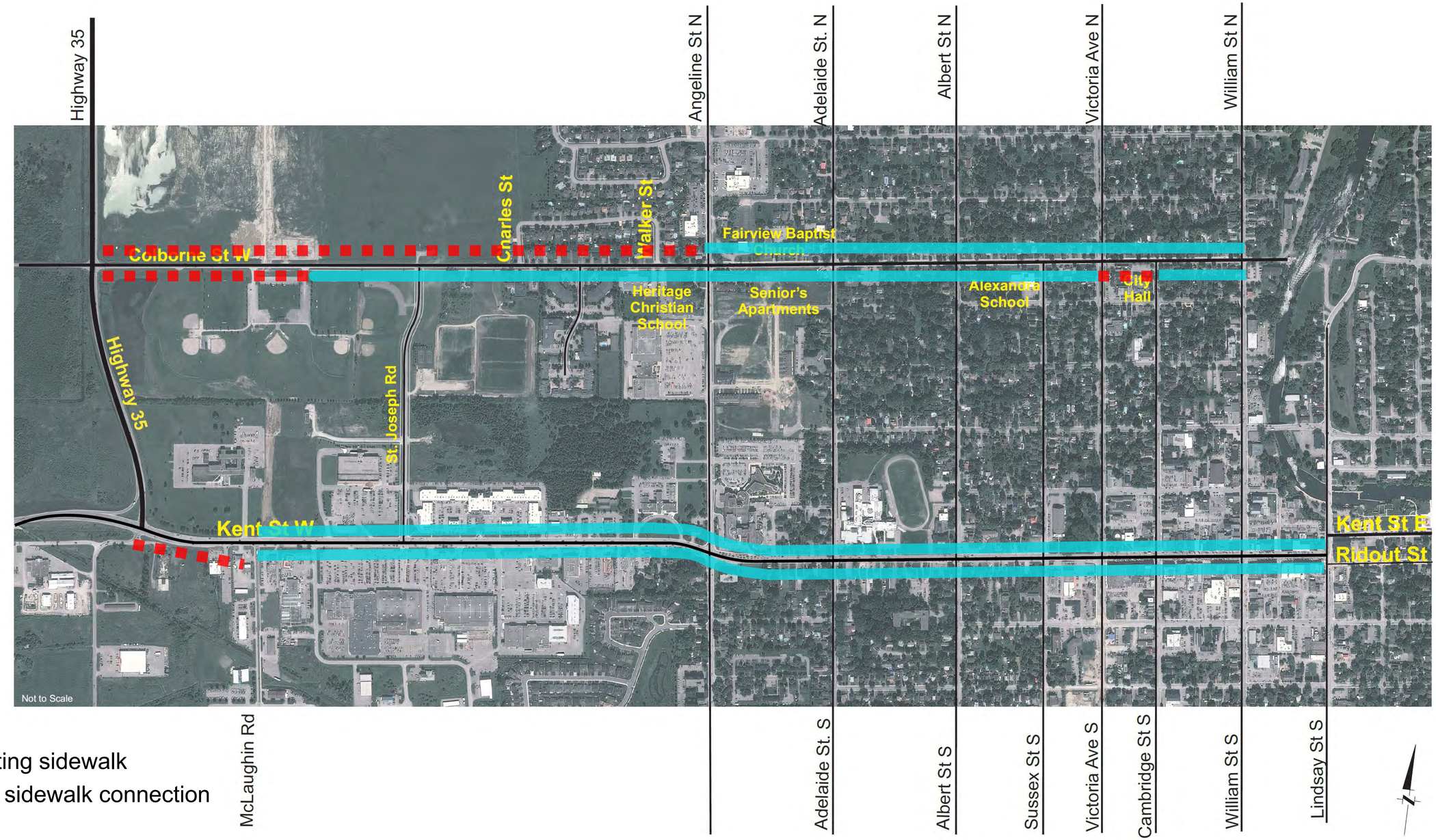
New Signal East of St. Joseph Road

Option 1
- Approximately 170m east of St. Joseph Road.
- Westbound queue at St. Joseph Road will not extend to Option 1 location.
- Eastbound queue at Option 1 location will not extend to St. Joseph Road.
- Signal serves both Whitney Town Centre and Staples and Canadian Tire Plaza.
- Pedestrian crossing will be available at the signal.
- Major parking lot layout modification for Staples and Canadian Tire Plaza for driveway realignment.
- Driveway will be operating with a Level of Service of C during the PM Peak Hour.
- No significant impact to the road network.

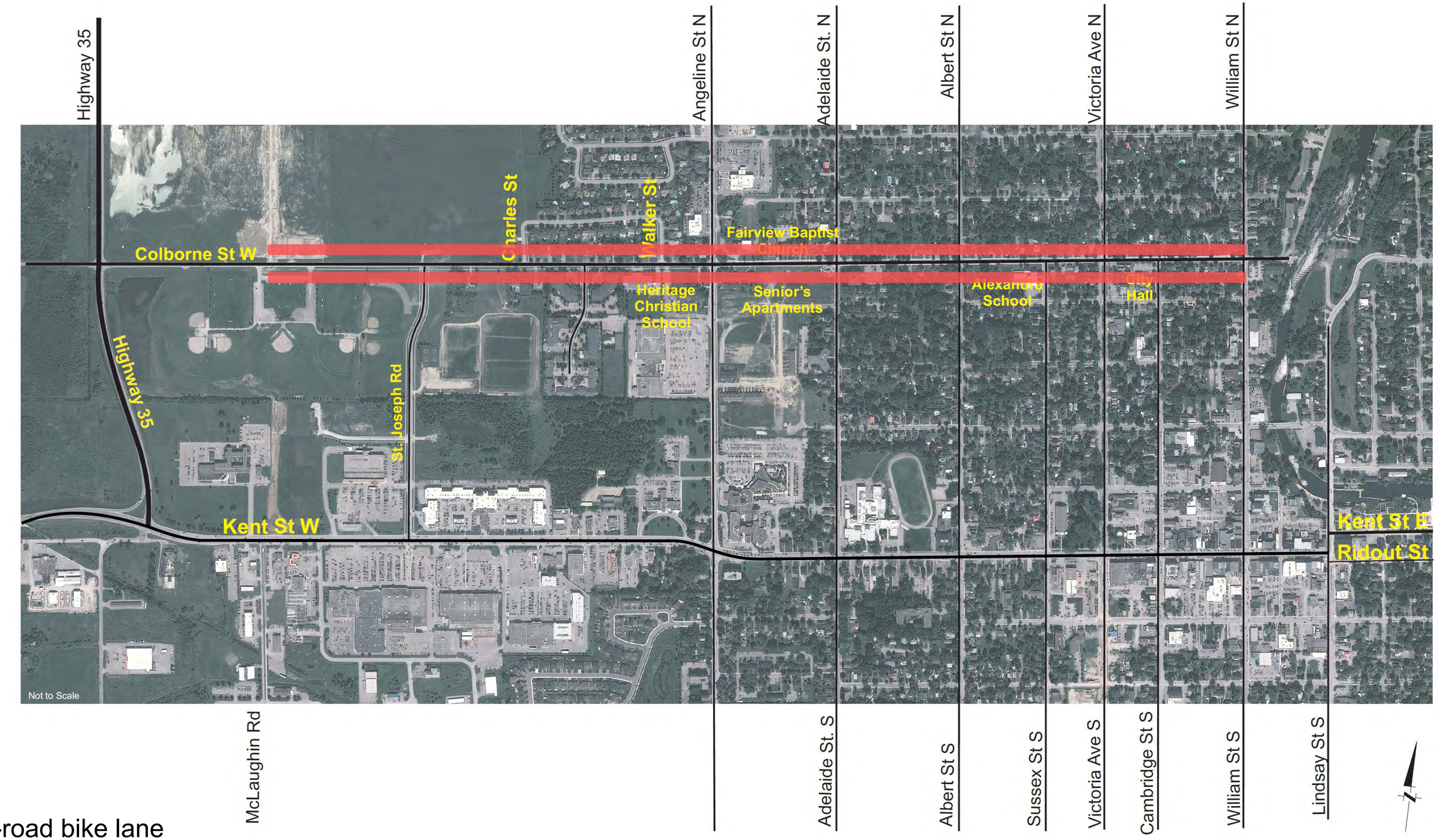
Option 2
- Approximately 210m east of St. Joseph Road.
- Eastbound queue at Option 1 location will not extend to St. Joseph Road.
- Signal serves both Whitney Town Centre and Staples and Canadian Tire Plaza.
- Pedestrian crossing will be available at the signal.
- Minor parking lot layout modification for Whitney Town Centre for driveway realignment.
- Driveway will be operating with a Level of Service of C during the PM Peak Hour.
- No significant impact to the road network.

Option 3
- Approximately 310m east of St. Joseph Road.
- Minor parking lot layout modification required on either side.
- Pedestrian crossing will be available at the signal.
- Serve less traffic since the signal will be unable to serve Staples and Canadian Tire Plaza.
- A portion of the enter/exit volumes from the Whitney Town Centre main driveway will be shifted to the Option 3 location.

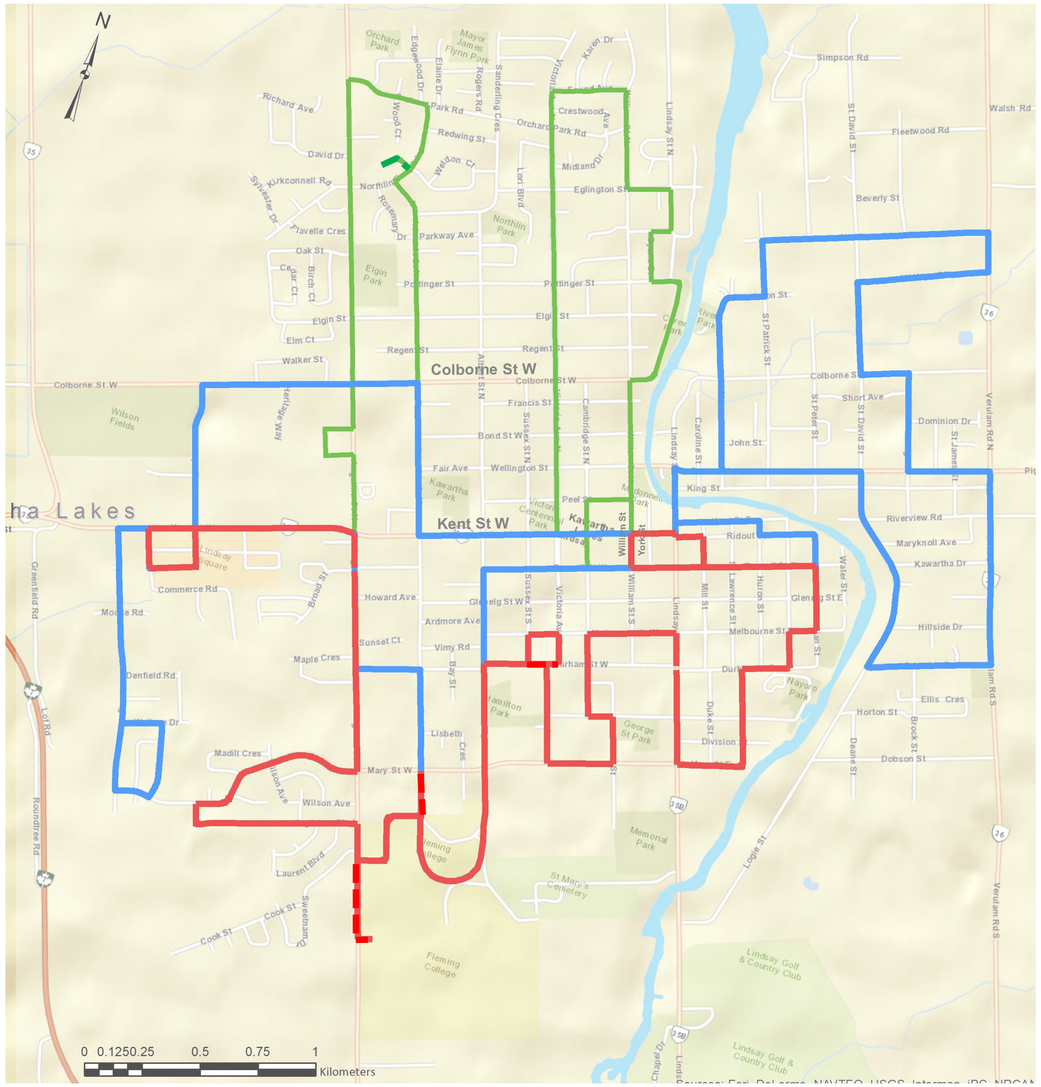
Improved Sidewalk Network



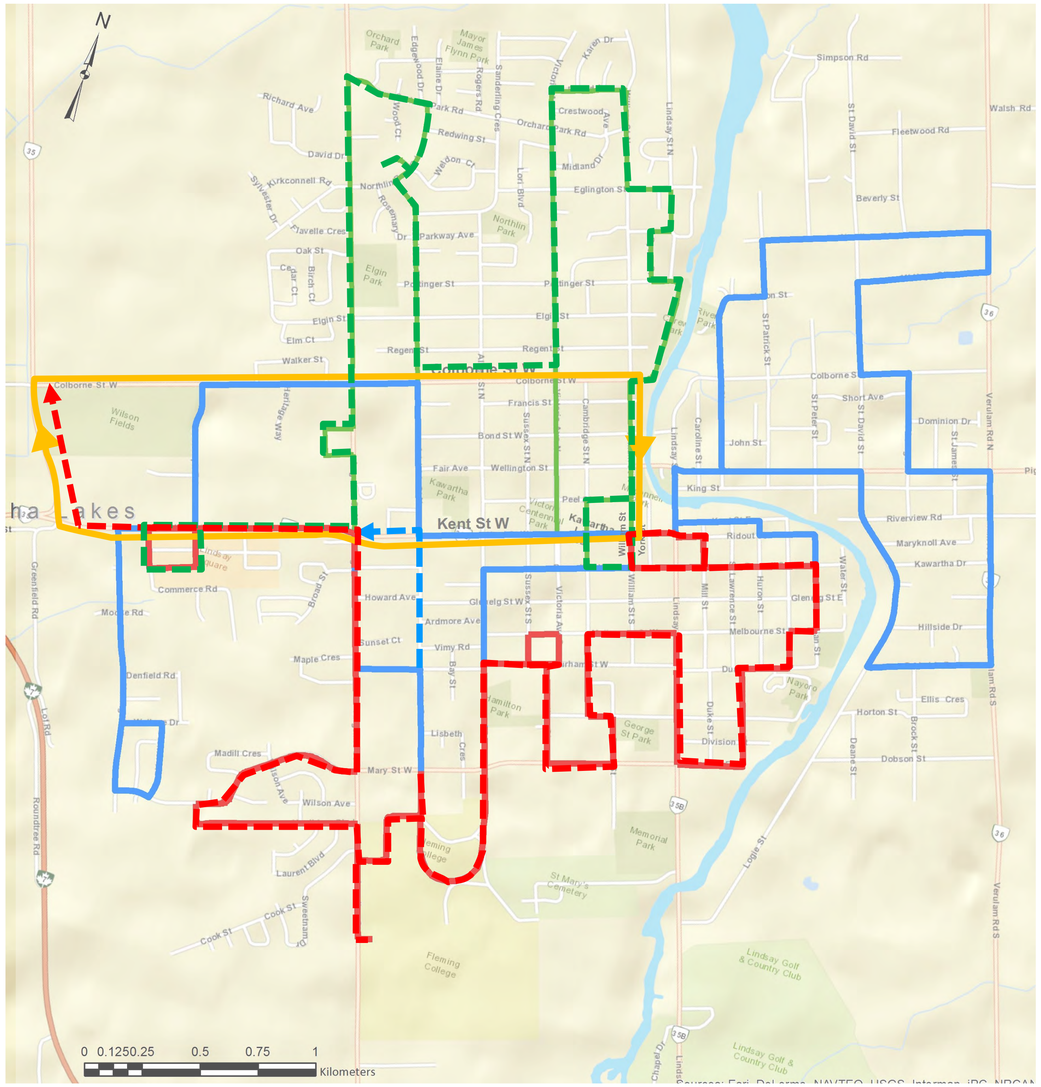
Improved Bike Connection



Existing Transit Service Routes



Improved Transit Service Routes



Re-routed bus routes

Potential New loop service

Alternatives for Re-Routing

1. Re-route Blue Route to turn left on Kent from Adelaide and continue west to its current routing (instead of west on Durham from Adelaide)
2. Blue and green route currently overlap on Kent between Victoria and Adelaide: green route could be re-routed to run on Colborne St for this section
3. Re-route Red route to eliminate loops at Zellers and Sussex St / Durham St to continue on Colborne and Hwy 35

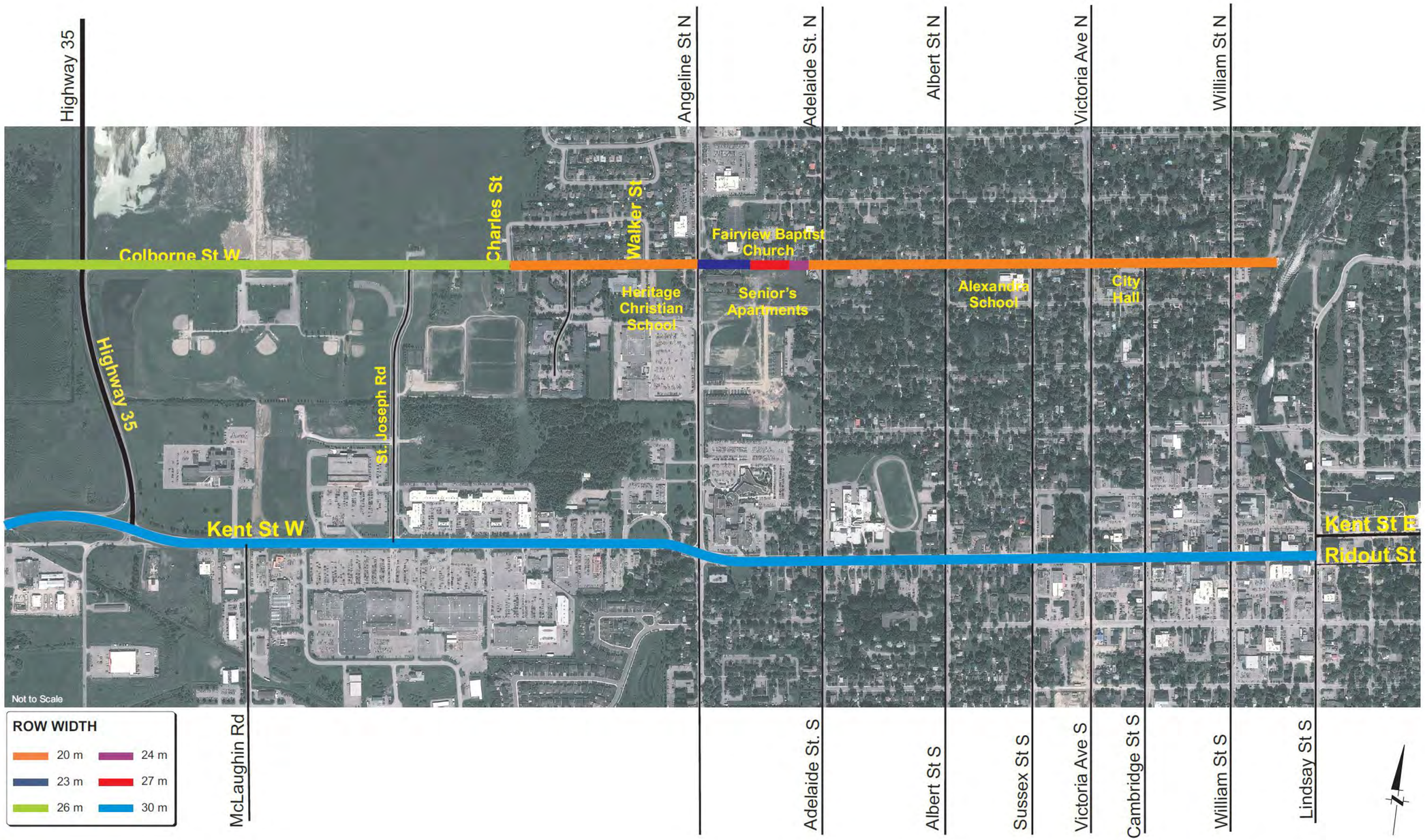
New Loop Service

- Runs on Kent and Colborne via William St and Hwy 35

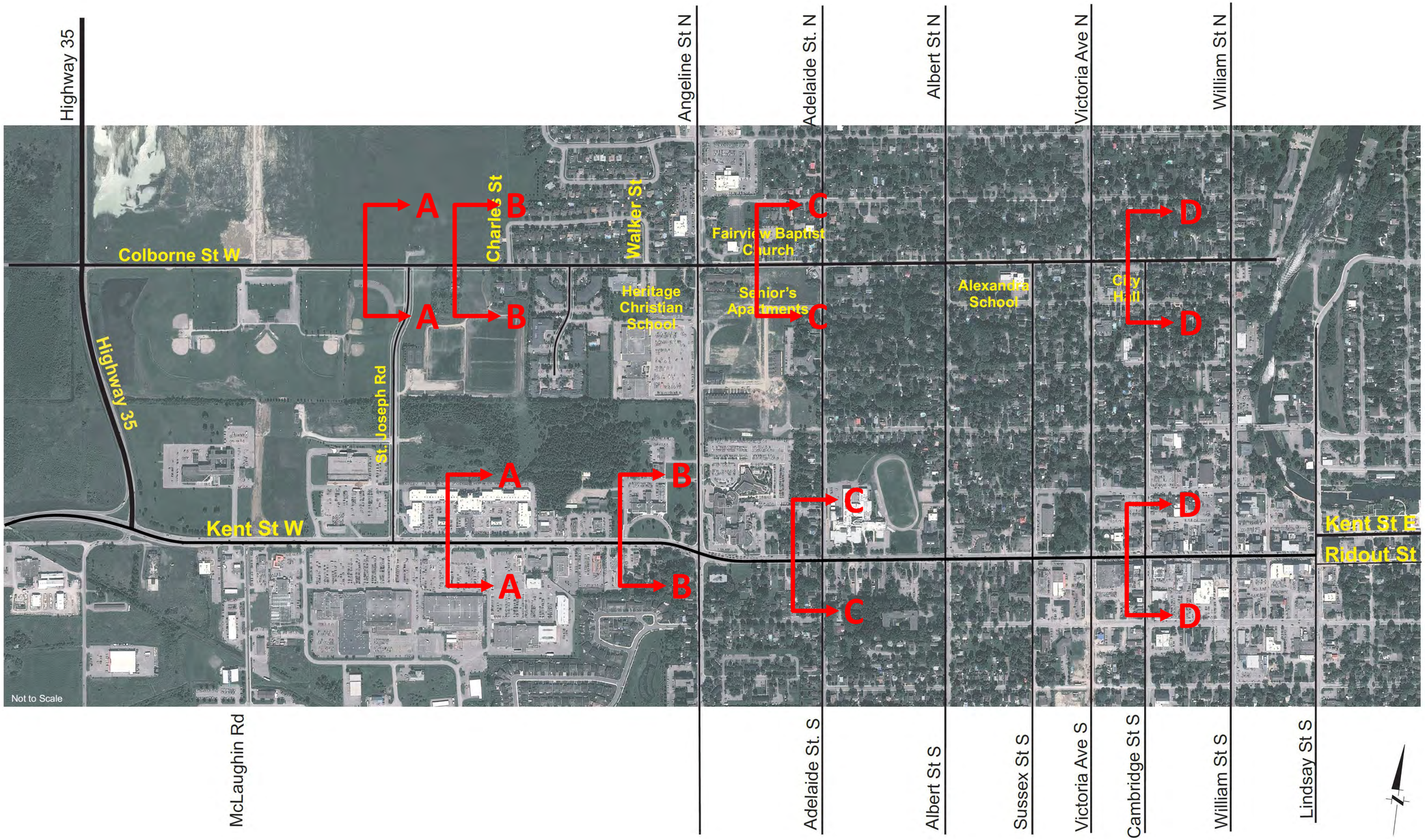
Route Extension

- Extension of local bus route to improve connectivity to other transit services such as Peterborough GO bus Service

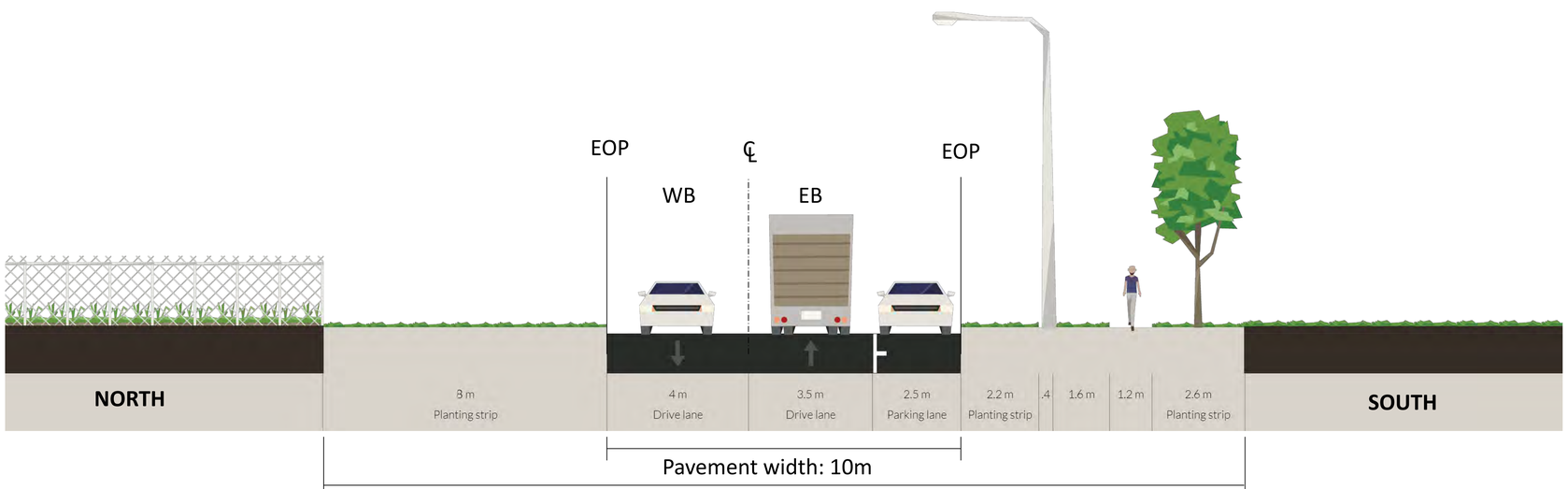
Alternative Cross Sections



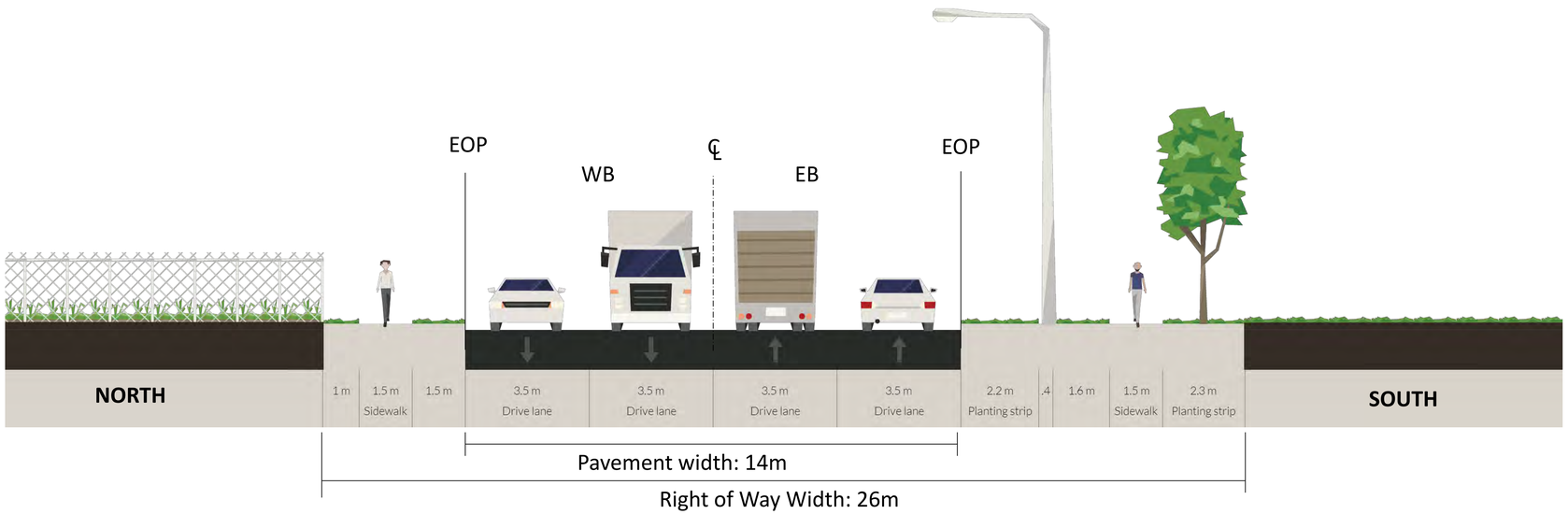
Alternative Cross Sections



Alternative Cross Section: Colborne St



Section A – A: Colborne St – West of St. Joseph (Existing)

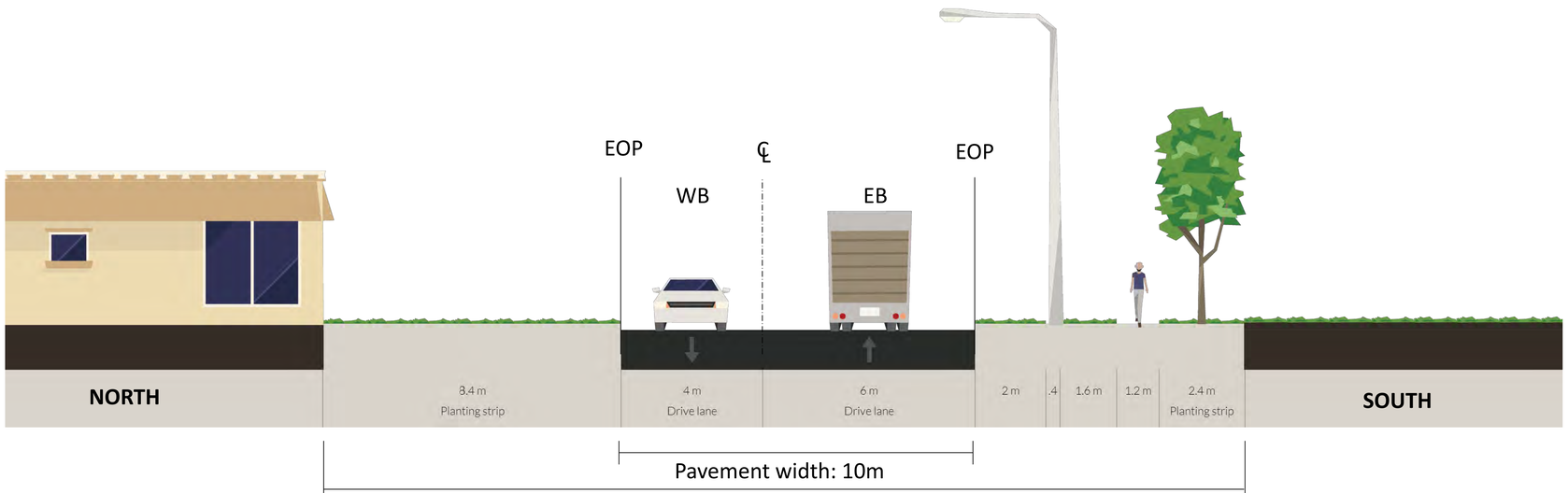


Section A – A: Colborne St – West of St. Joseph (Alternative)

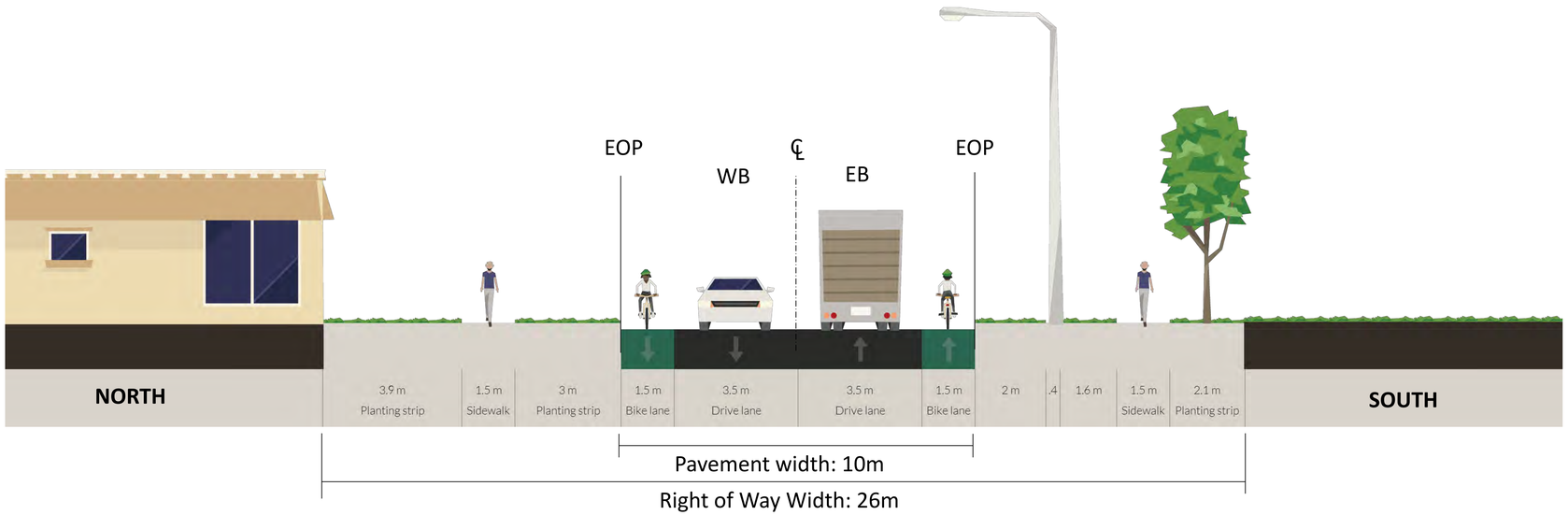
Opportunities:

- Widen to 4-lanes
- Increase sidewalk in the south
- New sidewalk in the north

Alternative Cross Section: Colborne St



Section B – B: Colborne St – East of St. Joseph (Existing)

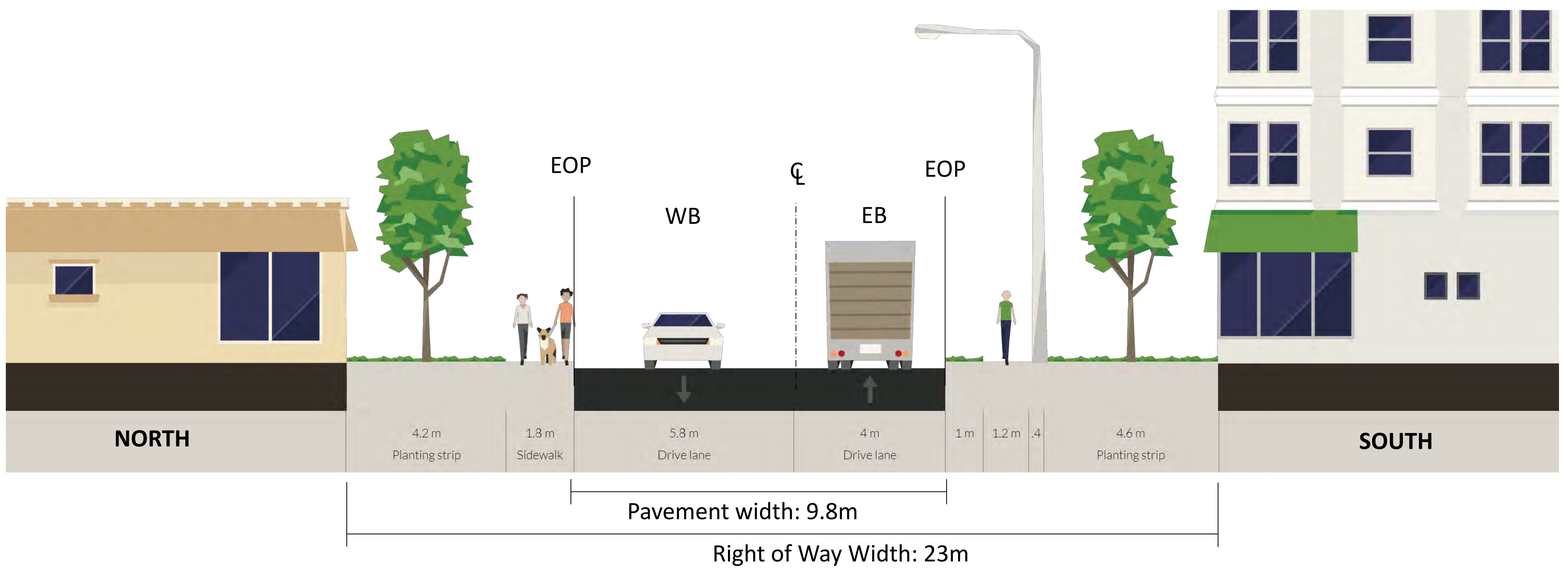


Section B – B: Colborne St – East of St. Joseph (Alternative)

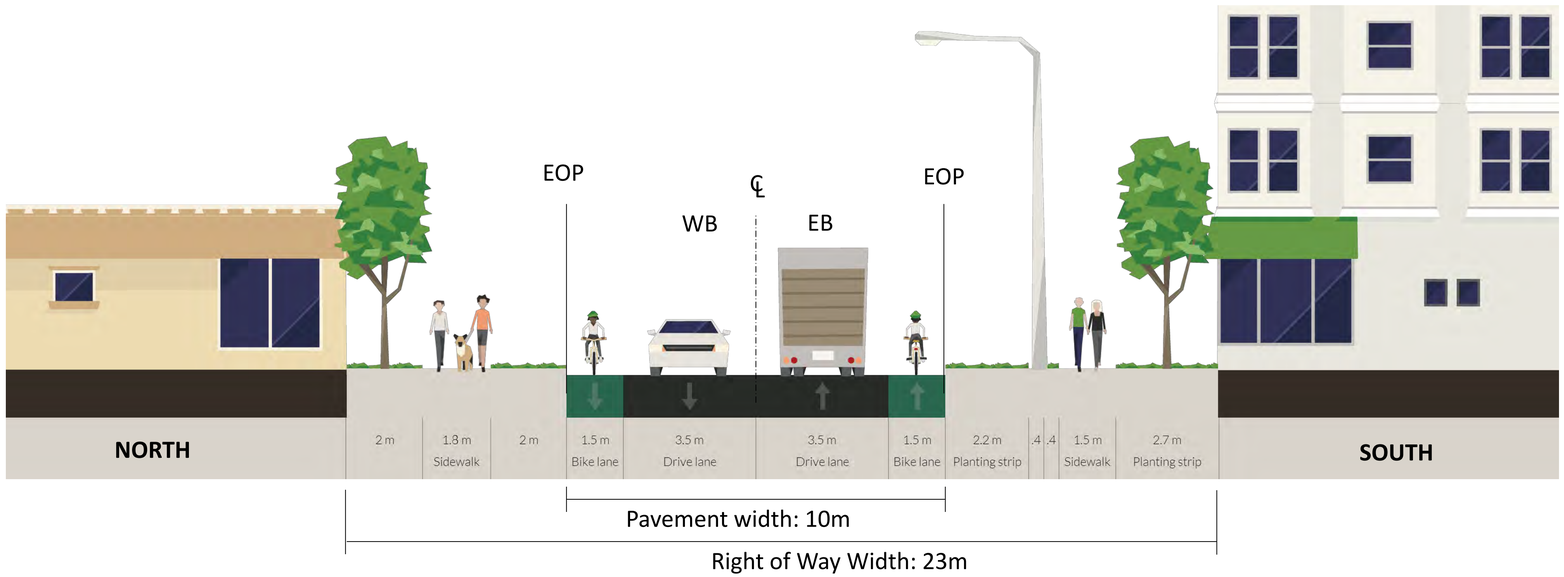
Opportunities:

- Increase sidewalk width on south side
- New sidewalk on north side
- Bike route in both directions

Alternative Cross Section: Colborne St



Section C – C: Colborne St – East of Angeline (Existing)

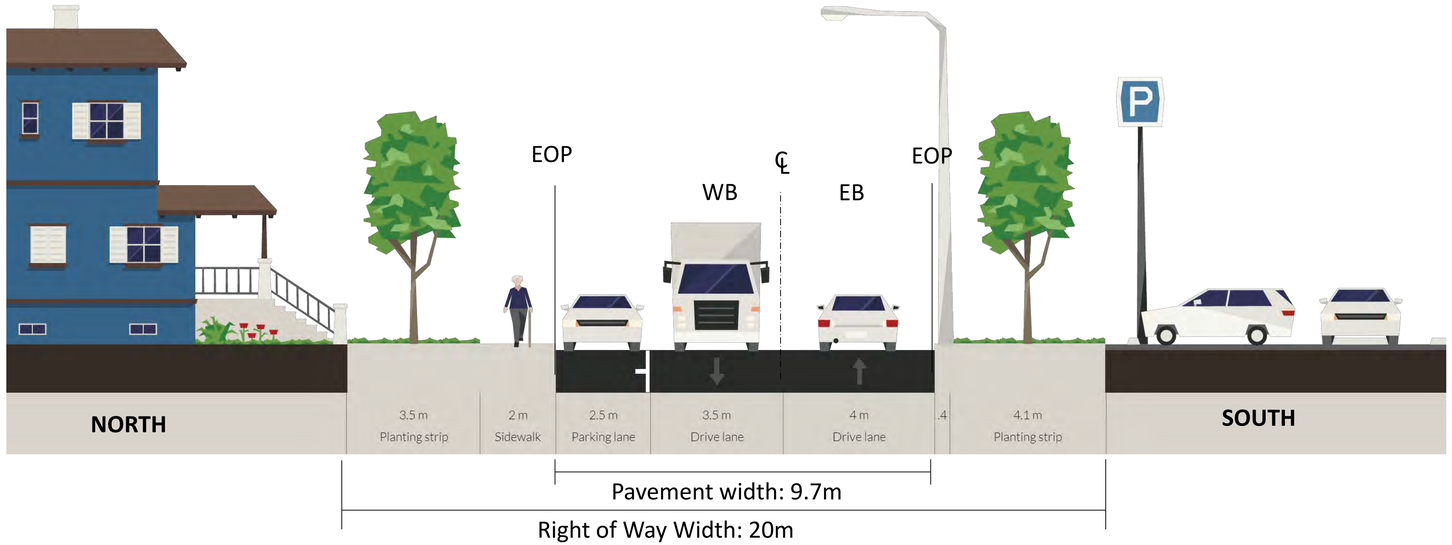


Section C - C: Colborne St – East of Angeline (Alternative)

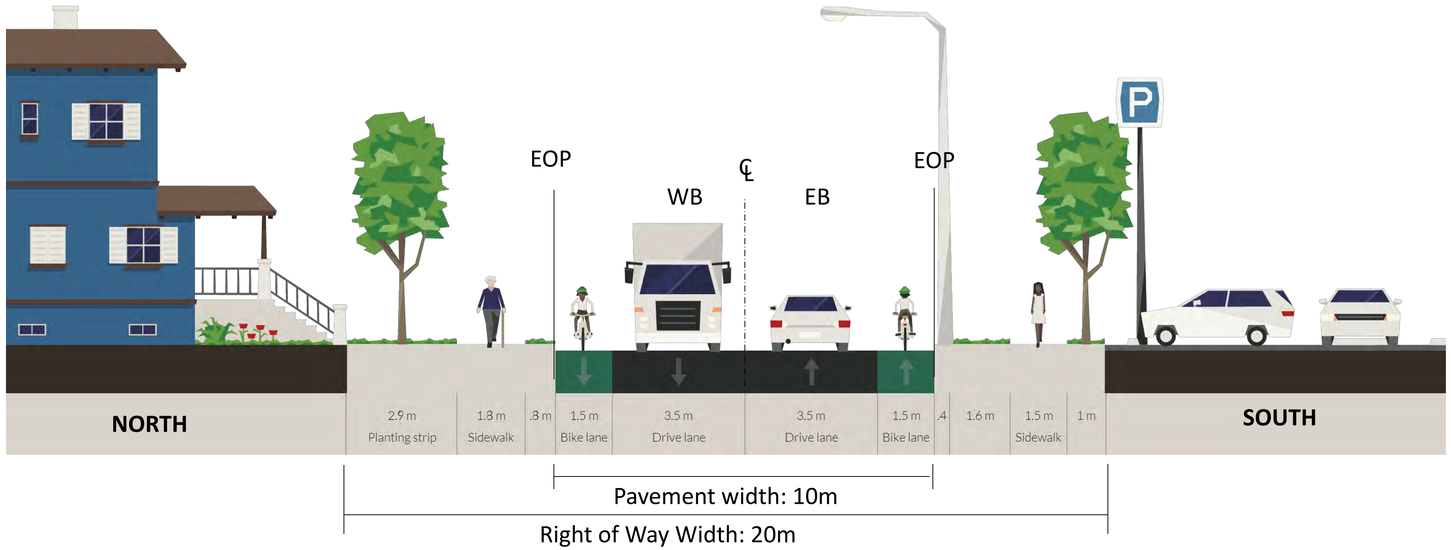
Opportunities:

- Increase sidewalk width on south side
- Bike route in both directions
- Increase boulevard width in both directions

Alternative Cross Section: Colborne St



Section D – D: Colborne St – East of Victoria (Existing)

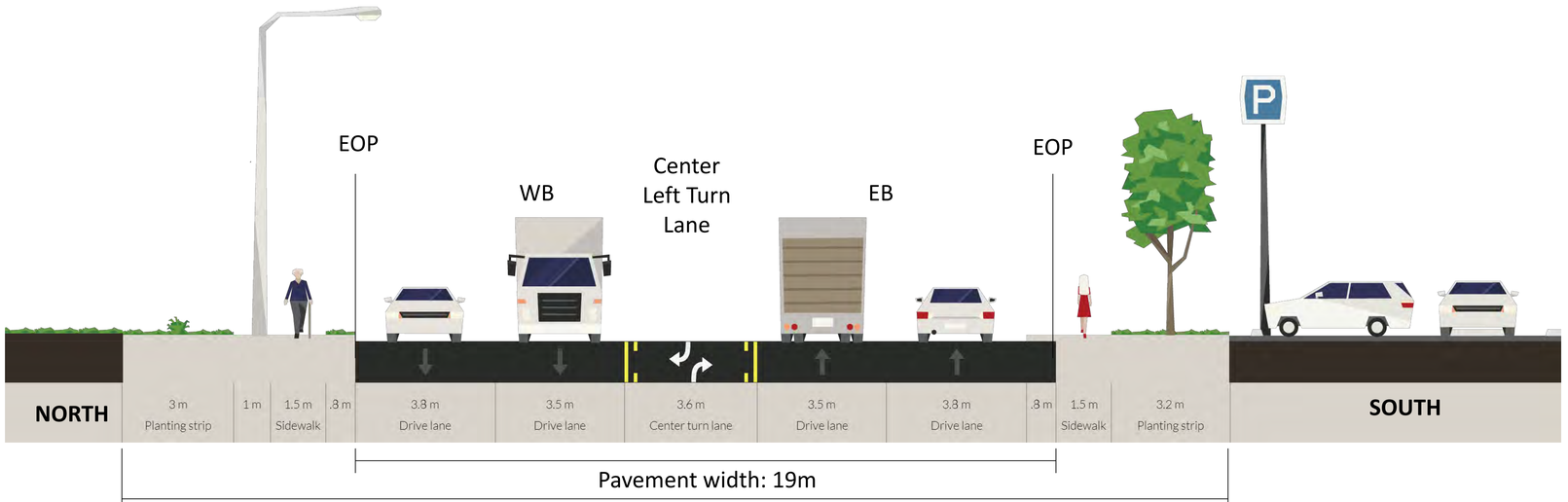


Section D - D: Colborne St – East of Victoria (Alternative)

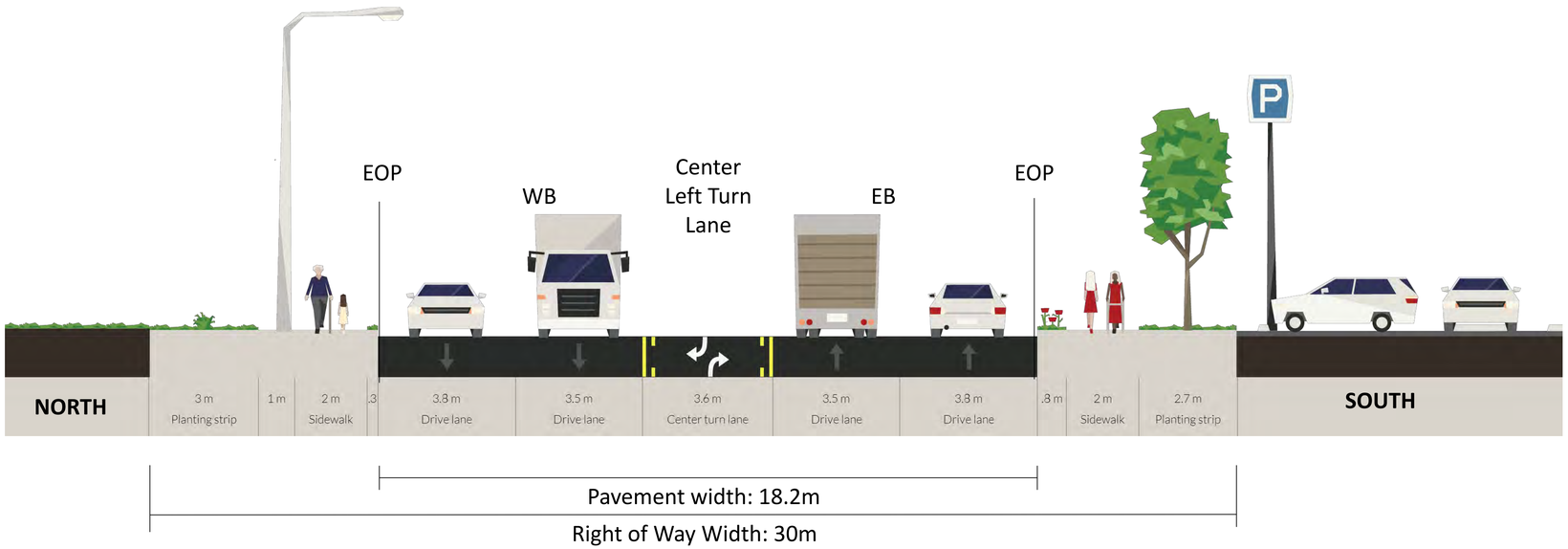
Opportunities:

- Sidewalk on both sides of the street
- Bike route in both directions
- Boulevard on both sides of the street

Alternative Cross Section: Kent St



Section A – A: Kent St – East of St. Joseph (Existing)

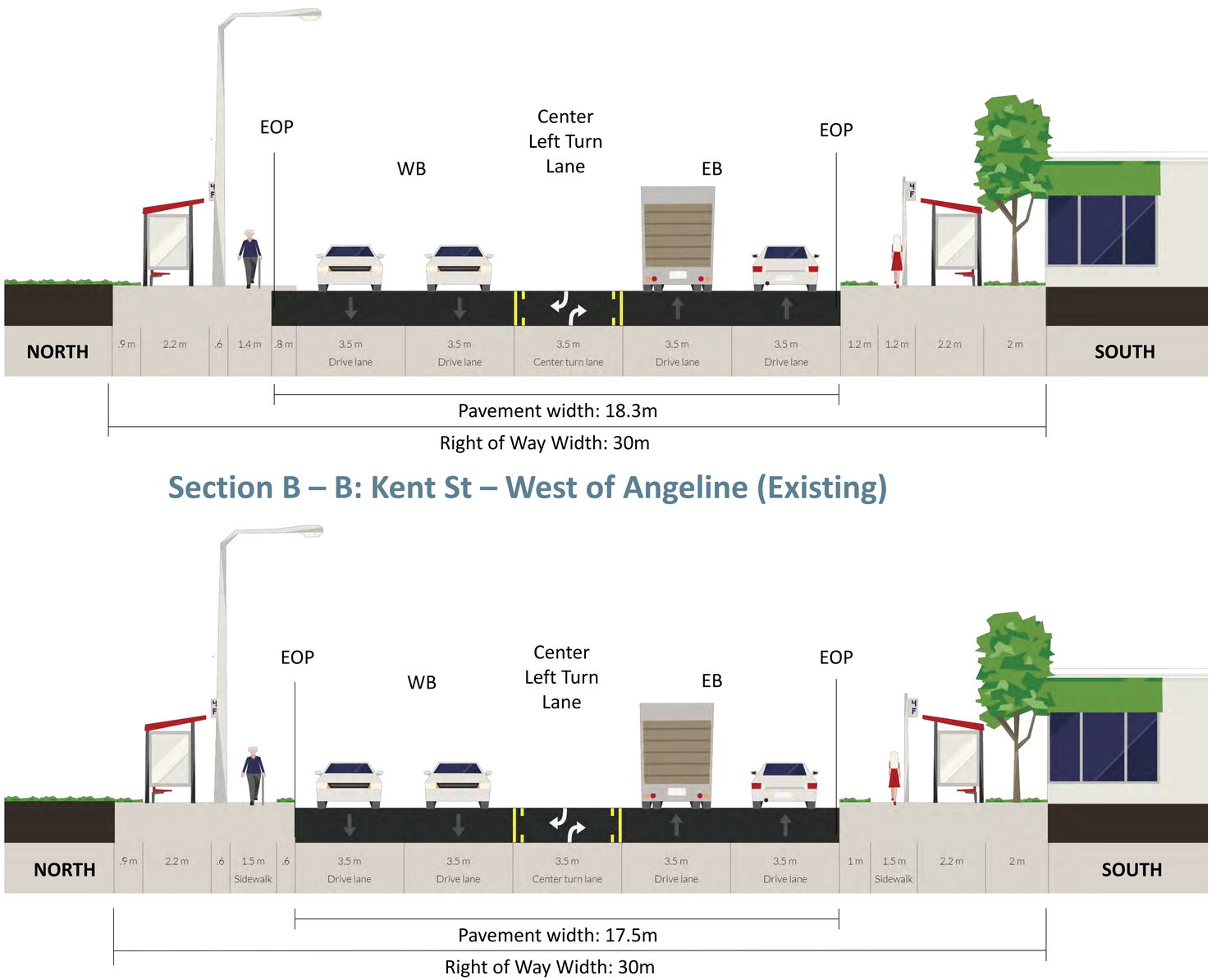


Section A – A: Kent St – East of St. Joseph (Alternative)

Opportunities:

- Increase sidewalk width on south side
- New landscape area on north side

Alternative Cross Section: Kent St



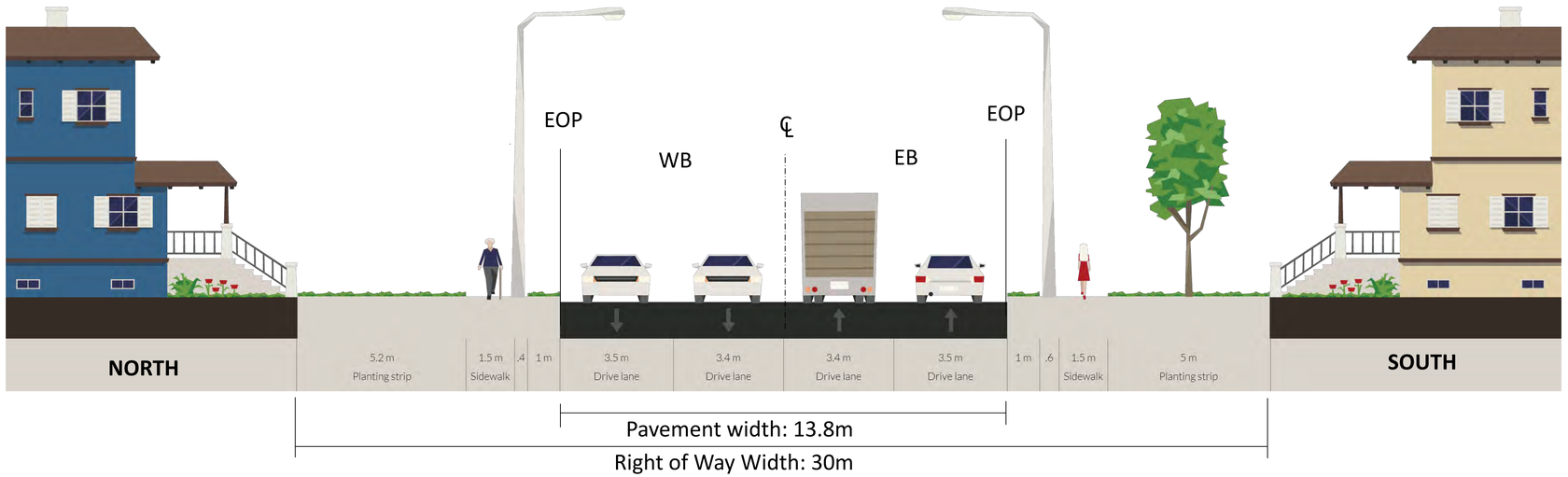
Section B – B: Kent St – West of Angeline (Existing)

Section B – B: Kent St – West of Angeline (Alternative)

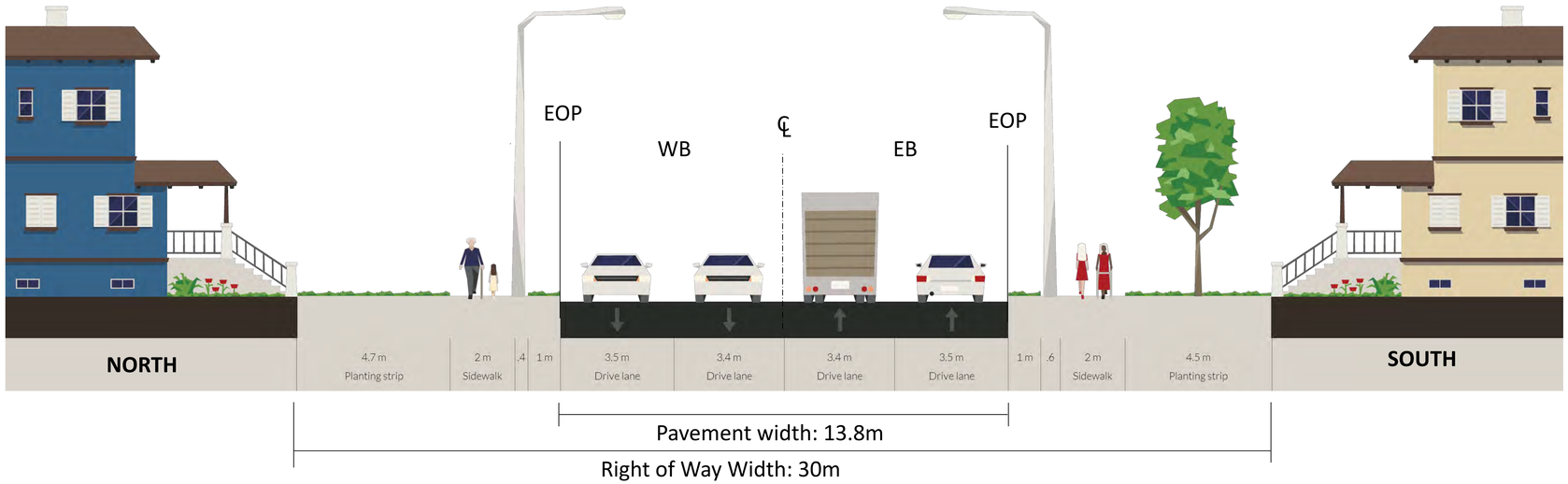
Opportunities:

- Increase sidewalk width on both sides
- New landscape area on north side

Alternative Cross Section: Kent St



Section C – C: Kent St – West of Angeline (Existing)

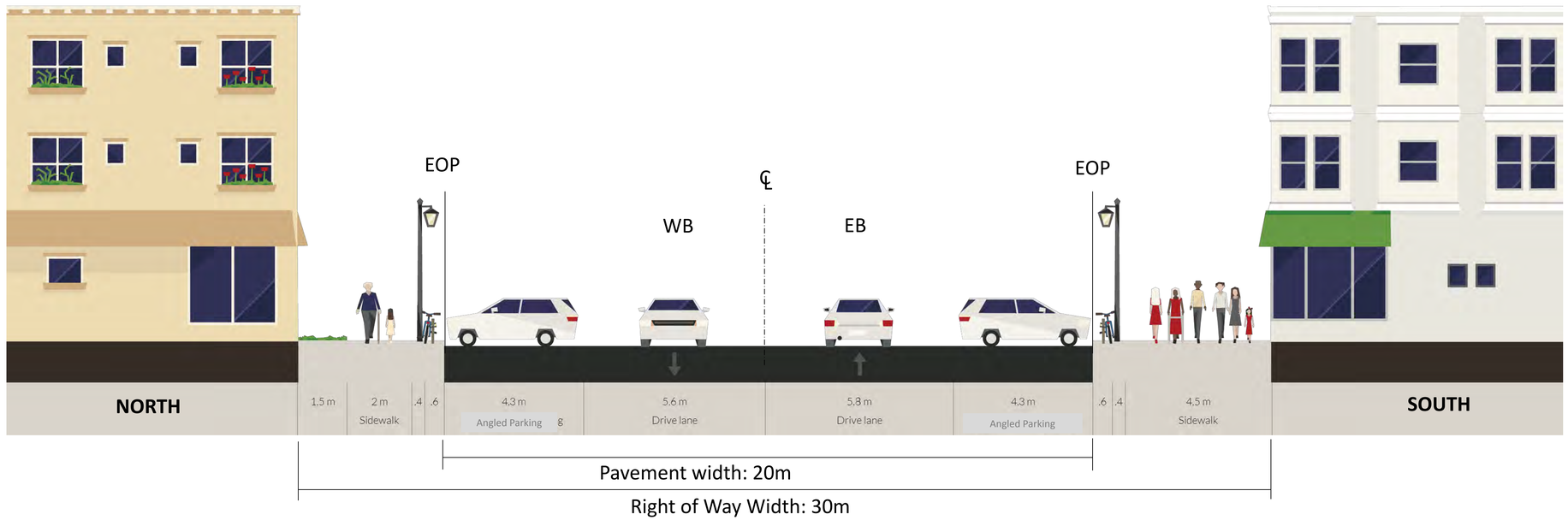


Section C – C: Kent St – West of Angeline (Alternative)

Opportunities:

- Increase sidewalk width on both sides

Alternative Cross Section: Kent St



Section D – D: Kent St – East of Victoria (Existing)

Constraints and Opportunities:

- Not ideal to add bike lane with angle parking
- Some large trucks stop in centre of road for delivery
- Potential to implement back-in angle parking policy

Reverse Angle Parking

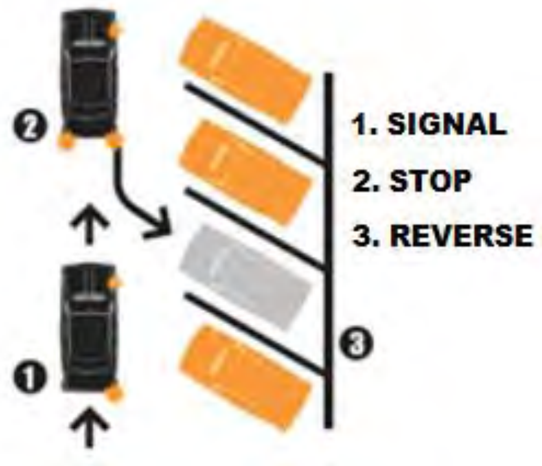
- Reverse angle parking is considered a safer type of angle parking; instead of pulling into the parking spot, cars back into their spots, allowing them to make eye contact with oncoming traffic when exiting the parking space

Benefits

- Improved visibility and increased field of vision
- Decreased number of collisions
- Improved safety for children and cyclists
- Improved loading and unloading
- Improved handicapped parking
- Increased space
- Traffic Calming

Downsides

- Vehicles overhanging sidewalk
- Vehicles backing into street furniture
- Vehicle exhaust over sidewalks
- Potential congestion and delay if driver takes longer to back in



Source: Burlington, Vermont, USA

Reverse Angle Parking - Examples

BEFORE

AFTER

Signage:

Reverse Angle Parking – Town of Collingwood, Ontario

History

- The Town of Collingwood implemented reverse angle parking near one of their parks in 2007 but reverted back to regular angle parking in 2011.

Background

- The scheme was brought in because it was thought to be safer.
- The scheme was implemented without any monitoring, reporting or enforcement processes.
- As a result, many residents were not following the rules, which caused driver confusion.
- Although many parents were in favor of reverse angle parking due to increased safety for children, the Town decided to revert back to the original front-in scheme due to resident complaints regarding residents not following the rules and regarding difficulty with backing into parking spots, particularly from seniors.

River Crossings / Bridges

- The Transportation Master Plan identified the need for an additional crossing of the Scugog River

- An existing traffic pattern has been established in this area along Colborne Street, William Street, and Wellington Street. This route results in forecasted turning movements which will not be accommodated by the existing road network

- The existing arterial volume to capacity ratio along Wellington Street between William Street and Lindsay Street is approximately 0.85 (PM peak hour), assuming a theoretical lane capacity of 600 vehicles per lane for a collector roadway
  - Projected traffic volumes result in a volume to capacity ratio of **1.75**

- An additional river crossing will likely be necessary before the 2031 horizon year

Have we missed anything?

Please let us know your questions or comments.

Moving Forward...

Contact us!

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Thank you!

Your input is very valuable to us.
Comments and suggestions are greatly appreciated.

Stakeholder Meeting #2
Feedback Report

July 2020

Kent Street and Colborne Street Corridor Study Environmental Assessment

Feedback Report from Stakeholder Meeting held November 28, 2013

Summary of input received through the Stakeholder Workshop held on November 28, 2013.

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Kent Street and Colborne Street Corridor Study Environmental Assessment

Feedback Report from Stakeholder Meeting held November 28, 2013

STUDY BACKGROUND

The City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors. The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

The study limits are from Highway 35 in the west to Lindsay Street in the east, including a review of the need for a second east-west bridge over the Trent River.

The study is being carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) public process. A key component of the study is consultation with the public and stakeholders and public open houses (two) and two stakeholder meetings, held on September 17 and November 28, 2013.

INTRODUCTION

This report summarizes the feedback received at and as an outcome of a Stakeholder Workshop No. 2 held by the City of Kawartha on November 28, 2013 from 1:00 to 3:30 p.m. The purpose of the meeting was to present and receive feedback on the existing conditions, issues and potential solutions. The Stakeholder Workshop was attended by seven individuals representing the Ministry of Transportation, business community, downtown interests, developers and organizations with an interest in the study. Councillors Pat Dunn and Pat O Reilly attended the meeting.

The meeting began with a presentation by the consultant HDR Corporation which included the following:

- Purpose of corridor study environmental assessment
- Transportation Master Plan recommendations
- What was heard from the public and stakeholders at meetings held in the early fall.
- Development Growth Projections
- 2031 Traffic Forecast and Future Deficiencies
- Alternatives (Figure 1)
- Updated Problem and Opportunity Statement (Figure 2) which was refined through input from the public at PIC 1 and through stakeholder meeting held in the Fall 2013
- Issues along the Kent Street and Colborne Street corridors and alternative cross-sections
- Next Steps in the study process.

Figure 1 - Transportation Solutions Alternatives Being Considered

1. *Do Nothing*
2. *Transportation Demand Measures (TDM) only*
3. *Improve Transit*
4. *Improve Active Transportation Network Connections*
5. *Improve Intersection Operations*
6. *Improve Road Network (including widening and new roads)*

The presentation is on the City of Kawartha Lakes web site at www.city.kawarthalakes.ca

Figure 2 - Problem and Opportunity Statement

The City of Kawartha Lakes is projected to be home to an estimated 100,000 residents by 2031. This is a population increase of approximately 33% from 2011.
The bulk of this growth is expected to occur within Lindsay, and as a result, traffic volumes are expected to increase anywhere between 50% to over 300% compared to 2013 traffic volumes. As a result of this growth, the existing road network will not be able to accommodate future 2031 traffic volumes.
• **Colborne Street** will operate with Level of Service E and F during the weekday PM peak hour. 3 out of 4 signalized intersections will operate with overall Level of Service E or F.
• **Kent Street** will operate with Level of Service C to F during the weekday PM peak hour. 3 out of 9 signalized intersections will operate with Level of Service E or F.
While the goal is to improve and accommodate vehicular flow, pedestrian and cyclist safety will also be impacted by the City's growth. These modes of travel must be addressed through improvement options that will provide a balanced approach.

The majority of the meeting was devoted to a roundtable discussion on existing conditions, issues of concern to stakeholders, and feedback on potential solutions for enhancing transportation operations along the Kent Street and Colborne Street Corridors.

This report has been prepared by facilitator Sue Cumming, Cumming+Company and is intended to capture the comments noted through the discussion. While this report reflects the feedback received on this study through the November 28, 2013 Workshop, it is not intended to be a verbatim account of the meeting.

COMMENTS NOTED

The following is a synthesis of the feedback noted through the discussion with stakeholders. A number of key themes – improve transit and active transportation, intersection improvement were addressed together with comments on specific proposed solutions.

a. Improve Transit Network

HDR Corporation identified opportunities to further develop the local transit system to improve mobility/access as well as connectivity to neighbouring towns and municipalities. It was noted that there are constraints relative to how transit outside of the Town of Lindsay would be financed which should be reflected in the final recommendations. The following key points about transit were noted:

- City of Kawartha Lakes transit planning is running different scenarios for routing and is being responsive to neighbourhood and area demand.
- It was noted that routing to accommodate new demand should not be at the expense of service for areas that already have transit.
- Transit service to new commercial and employment uses along Kent and Colborne Street corridors should be implemented as the demand for these occurs.
- Rural service is limited with opportunities for dial a bus and rural services to be considered as part of the overall Transportation Master Planning process.
- How transit is funded and the historical relationship between the former Town of Lindsay and City of Kawartha Lakes may be an impediment to increasing transit connections to Kent and Colborne Street corridors from areas outside the Town of Lindsay. It was noted that Town specific transit is paid for by the Town of Lindsay. It was suggested that HDR Corporation review future transit planning with City staff to

ensure that recommendations from this study fit with the overall planning and context for transit.

b. Improve Active Transportation Network and Connections

A key message from the public is the need to improve the pedestrian environment along these corridors and at key intersections. A number of solutions are being considered including new traffic signals at McLaughlin and Kent Street, a mid-block commercial area traffic signal on Kent Street east of St. Joseph, a potential roundabout at Victoria Avenue and Kent Street and a traffic signal or pedestrian crossing on Colborne to improve safety around Alexandria School. Comments on these proposed solutions are contained elsewhere in this report. All of those attending the November 28th Stakeholder meeting concur with the need to improve pedestrian safety and accessibility in the study area.

With respect to improved bike connections, it was suggested that cyclists should be distinguished from bike riders. Bike riders (mostly families and children) cycle mostly on the sidewalks. Several individuals expressed the view that there is no need to build on-road bike lanes citing other opportunities to improve bike connections through expansion of existing trials – for example on Colborne Street to the Wilson Park trail without the need to implement cycling lanes. Several commented that there is a small interest from a small group of cyclists who would use on-road cycling lanes.

Another noted that if cycling is to be increased in the community then bike racks need to be encouraged at destinations. Bike racks could be identified on site plans and considered as part of secondary planning processes. A more comprehensive and consistent approach through planning policy and approvals could secure facilities that could increase opportunities for cycling.

c. Consider Traffic Calming Measures

Concerns were noted about cars and school buses on King Street, Needham and Willow and the desire to identify traffic calming measures. HDR did not anticipate traffic calming measures on Kent and Colborne Streets in the study area but will review if traffic calming measures need to be considered. HDR overviewed tools for traffic calming and examples of approaches being utilized in other municipalities. These include:

- ***Temporary speed bumps*** – which could be utilized in warmer months and removed during the winter months. The Town of Ajax is piloting these in a few strategic locations. Some of the participants noted the upside with the opportunity for trying these out to see if they were effective for slowing traffic before a more permanent

solution was put in place. It was noted, however, that this may be offset with the potential added costs to take these up and down.

- ***Bump outs*** – which stick out into the roadway. It was noted that these may require extra width and storage along the corridors where they are located and could interfere with snow removal. It was further noted that bump outs would be difficult to implement in the downtown with the angle parking.

d. Discussion of Reverse Angle Parking in the Downtown and potential to narrow the road.

Angle parking in Lindsay's downtown is regarded as an asset which is important to be maintained. Some communities that have angle parking are looking to create reverse angle parking which would have drivers back into the space and then drive out instead of what occurs now. HDR provided information about how reverse angle parking is being implemented in the Town of Collingwood. A discussion followed which confirmed the low incidence of accidents occurring with the current angle parking with a few minor situations. Truck deliveries are coordinated to occur in the early morning when the parking spaces are not utilized. If parking were changed, this could result in impact to loading.

Many negatives were expressed about removing angle parking or changing or reversing the directional flow. This included the potential for cars and trucks to overhang the sidewalk by backing in too far and could create conflicts with pedestrians using the parking metres. Accessible vehicles were noted to have some rear and some side doors which wouldn't result in much change should the parking spaces be reversed. The reverse angle would require retraining for all those that use the downtown. It was noted that the wide street can safely accommodate the angle as it is now and most drivers going through the downtown keep to the centre line of the road. There is support for maintaining how the parking is aligned.

The downtown is unique with its wide pavement and ample sidewalks. It is noted to be the widest mainstreet in Ontario. HDR identified that one consideration could be to narrow the pavement width and add .5 to a full metre on both sides of the street to the sidewalk. This could provide a multi-purpose space for additional street furniture, for midnight madness and sidewalk sales and other similar types of activities. Although a wider sidewalk has some appeal, it is already wide enough to accommodate sidewalk sales and street furniture and the gain of a .5 metre or more is not significant enough to offset the negatives identified.

e. Potential closure of Ridout Street at Lindsay Street

HDR identified that the current configuration of the Kent Street /Lindsay Street / Ridout Street intersection is jogged such that the east leg is offset south by 20 metres. This offset has resulted in the following turn restrictions due to safety concerns:

- Southbound left-turns are not permitted
- Eastbound right-turns are not permitted on red
- Westbound right-turns are not permitted (westbound left-turns only on green)

Stakeholders agree that the offset creates safety concerns. Removal of these restrictions can be achieved by eliminating the jog. This can be done through closure of Ridout Street at Lindsay Street. Through the discussion it was confirmed that 31 vehicles would be affected and that these could use adjacent side streets. Pedestrian connections would still be maintained. Stakeholders support the change and ask that the confusing signage be removed.

f. Consideration of coordinating signal timing with MTO

A question was posed as to whether there is any winning strategy for improving the functionality of the road network through coordination of signal timing with MTO. It was agreed that there could be some benefit and if this is identified early on then opportunities could be explored.

g. Consideration of a roundabout at Victoria Avenue and Kent Street

HDR described the potential for a roundabout at Victoria Avenue at Kent Street. This could improve accessibility and create a gateway feature. Key comments and questions include:

- Most agree that improving pedestrian accessibility and safety is important and would like to see how this would improve walkability and accessibility.
- Concerns were expressed about property implications – what are the land needs and what are the costs relative to benefit?
- How would it function at peak times when traffic volumes are higher?
- It the intersection is wide enough then it is thought it could work when traffic is lighter.
- How would this work at peak times.

There are mixed views about a roundabout at Victoria and Kent noting that pedestrian crossings may be impacted, long term maintenance may be a negative and given the mix of ages with both young and older residents it may not be the best solution here. Russell and Victoria may be a better location.

A general discussion of the pros and cons of roundabouts followed. The representative from MTO identified the planning considerations that resulted in the successful roundabout in the Picton area. She noted that roundabouts work well if they are designed properly and can be a great solution in the right location. She cautioned that roundabouts are not a blanket solution and need to be considered carefully. Education on how to drive roundabouts was noted to be important for establishing a level of comfort for their use.

h. New Signal on Kent Street east of St. Joseph Road

Better left turn movements are needed along Kent Street in the west and middle areas of the Study Area to facilitate safer access to commercial uses in these areas. HDR overviewed the conditions along Kent Street in the vicinity of the Whitney Town Centre and Canadian Tire and Staples and other commercial outlets Three potential options were reviewed for creating a new signal east of St. Joseph Road. All options would require driveway re-alignments. It was noted that it is in everyone's interest to sort out left turning movements. There is agreement that the existing situation is problematic and needs to be resolved. There are, however, concerns about the impact to commercial operations.

One stakeholder advised that Option 2 was proposed eight years ago when it would have been feasible to accommodate with the Whitney Town Centre and was turned down by the Town. The entrance was then established where it is located today. To go forward with Option 2 now would seriously impact the Centre. Issues relate to entrance management, gateway signage, alignment with front door and façade of Centre, site organization and internal circulation. It was recommended that HDR and City staff further review and discuss options with commercial property owners.

i. Review of intersection of Colborne Street and St. Joseph

It was noted that HDR will be undertaking the traffic impact study for Mason Homes on behalf of the City after the completion of the EA. It was commented that when St. Joseph connects with Angeline to the north of Colborne, it could carry a major portion of the north-south traffic resulting in some diversion from Angeline Street. The extension of St. Joseph along its proposed alignment may be impacting about 25 existing homes. Some would like to see the traffic numbers for this intersection.

j. Proposed McLaughlin Traffic Signal

It was noted that this needs to be coordinated with MTO. The realignment of Highway No. 35 should occur within the next 15 years before 2031. Discussion ensued on how best to show the realignment on the study plans. It was agreed that the realignment could be shown as proposed future alignment. This will be added to the drawings for the upcoming PIC.

k. Proposed Sussex traffic signal or pedestrian crossing on Colborne Street to improve safety around Alexandra School.

The option of either a traffic signal or pedestrian crossing was discussed and it was noted that either could work. There is no strong preference for which option would be the most desirable. However, during school peaks where there are a lot of younger children crossing Colborne, there is currently a crossing guard at this location.

Further questions resulted on what is happening with the flashing amber at Albert Street and Colborne Street. Concerns were noted about the higher volumes on Albert Street and Adelaide Street and the need to address pedestrian safety in these locations. The pedestrian crossings at these locations are comprised of youth from the nearby high school.

l. Proposed improvements to Angeline intersections at both Colborne Street and Kent Street.

There is agreement that these intersections need to be improved. Sidewalk improvement is recommended along Colborne Street with opportunities shown on the various cross-sections. It was noted that there may be opportunities to improve bike connections along Colborne Street with the potential to have either an on-road bike lane or multi-purpose trail in the grass area. Others noted that bike lanes are not needed along Colborne Street, preferring to ensure that the sidewalks are wide enough to accommodate bike riders and pedestrians. All agree that it is important to have kids riding where they are safest. If asked to choose between parking and on-lane cycling lane along Colborne in some sections this would be a toss-up.

It was further noted that while a bike lane could be accommodated in some sections along Colborne where the right of way widths are permissive, other sections could result in the need for property takings given the location of the dwellings close to the road. Recommendations should include reference to implications for property encroachment should any property be impacted. Recommendation should also include a policy to review potential for property takings as development occurs should bike lanes be recommended.

m. Other suggested ideas for Kent Street

Other suggestions noted that could improve Kent Street include:

- Sidewalks improved along Kent Street. It was noted that there may be possibilities to do this on the north side. The south side may be more of a challenge with the narrow sidewalks and property line.
- Entrance management strategies.
- Improvements to the entrance and sidewalks near McDonalds. The sidewalk in this area is depressed and there are issues with the grades for the right in and right out and protection of the overland flow route.
- Need for review of implication of Loblaw's expansion to 120,000 square feet. It was noted by some that a widening was not required during the site plan process. HDR was asked to address how this property would impact traffic flow along Kent Street.

n. Other additional comments and considerations noted through the discussion

The following additional comments and considerations were noted:

- HDR should address the impact of not considering a river crossing. There is a Council position for the crossing of Thunderidge Road. What is the implication of not providing a crossing in this area? The report should address this. There is no political will to build a bridge and this should be documented in the report.
- Important to recognize that although population projections show a growth, this growth appears to be skewed with a growth in seniors.
- The area is experiencing an influx of Amish families who are settling on farms and coming by buggy to Lindsay. This population is increasing and buggy parking needs to be better accommodated. At present, parking is haphazard.
- Mapping for use at the December 5, 2013 PIC should reflect existing Official Plan approved and designated roads. Colborne Street and St. Joseph road should also be shown as a node.
- Highway 35 future alignment should be shown on the plans as Proposed Future Alignment.
- Final report should reference approved planning documents – Secondary Plans and Official Plan.

- Could explore the feasibility of a three lane configuration with a middle transition lane along Colborne similar to Jarvis Street in Toronto.
- Another idea involves creating a one way directional street flow for Kent Street and Colborne Street.

Public and Stakeholder Correspondence

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~~Ministry of the Environment and Climate Change~~	~~–~~	~~–~~	~~Environmental Approvals Branch~~					~~MEA.Notices.EAAB@ontario.ca~~
Ministry of the Environment, Conservation and Parks	–	–	Environmental Assessment and Permissions Branch					eanotification.eregion@ontario.ca
Ministry of the Environment, Conservation and Parks	Vicki	Mitchell	Environmental Resource Planner and EA Coordinator	1259 Gardiners Rd.		Kingston, ON	K7P 3J6	vicki.mitchell@ontario.ca
Loblaws	Dean	Valentznuzzi						dean.valentznuzzi@loblaw.ca
LaSalle Investment Management	Greg	Spafford						greg.spafford@lasalle.com
J. Stollar Construction Limited	Marty	Stollar						martstol@rogers.com
The Hi-Rise Group	Stephen	Podolsky						aandlinvestments@thehi-risegroup.com
Osler, Hoskin & Harcourt	M	Bowman						mbowman@osler.com
Canadian Tire	John	Fox		377 Kent St.		Lindsay, ON		johnfox@on.aibn.com
Boston Pizza	John	Fox		435 Kent St.		Lindsay, ON		johnfox@on.aibn.com
Counterpoint	Karl	Repka						krepka@counterpointeng.com

LEGEND: = contact removed/replaced

City of Kawartha Lakes March 12, 2012

Director of Public Works,

Attn. Michelle Hendry

I am writing to you in regards to a traffic flow concern that I have noticed at the corner of Kent Street West and Angeline Street. We have lived [redacted]st six (6) years and have really noticed a significant increase in the traffic flow at this intersection. We have also witnessed several collisions here as well. We have noted what we believe to be approx 70 percent of all east- bound traffic on Kent Street to turn south on Angeline Street. This includes a lot of heavy commercial vehicles as well as tractor trailers. The east-bound traffic lanes do not have an identified right-turn-lane only at this intersection. We have observed on many occasions that vehicle's traveling eastbound, in the curb side lane, are stopped at a red light and not making a right turn. When this situation occurs, it often results in a huge back-up of traffic on Kent Street, sometimes as far back as Shoppers Drug mart or further.

This often creates another troublesome and dangerous situation for those of us [redacted]. With traffic backed-up on Kent Street west, a lot of motorists decide to turn off Kent Street, into the dentist office parking lot, and then continue through onto Peels lane, often at a high rate of speed, and then exit onto Angeline Street. And of course this is done to avoid waiting at the red light. Peels lane is a private right-of-way lane. There are three private residences on Peels lane, all homes of senior citizens'.

There have been several dangerous incidents that have occurred when this situation arises. During snow removal in the winter and grass cutting in the summer, we have all had close calls with fast moving vehicles through this lane. The exit from Peels Lane onto Angeline Street is very dangerous as well. There is a large apartment building and a thick hedge right out to the sidewalk, which significantly hinders the sight lines for these vehicles as well as the pedestrians' walking on the sidewalks. Although Peels Lane has posted "PRIVATE ROADWAY" and "NO EXIT" signs in place at both ends of it, there does not seem to be any acknowledgment from the motorists who are in a hurry. There was recently an incident involving a taxi doing this exact "Bypass" that resulted in the police having to attend.

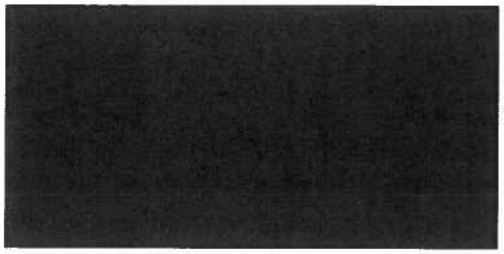
It seems that most of this bypass traffic occurs from Friday afternoon through till Sunday. During the week, Peels Lane is used as a commercial driveway by the dentist office and their customers and delivery vehicles.

It is my summation that if the right side curb lane on Kent Street east-bound was identified as a "Right-turn-lane-only", then a lot of this traffic issue would be resolved. It would also likely resolve the illegal bypass of traffic through the dentist office parking lot and [redacted] This would of course make it safer for those of us living in the homes[redacted] I would also like to mention that the recent change to the pedestrian walk signals at the corner of Kent Street and St. Josephs road has made it a much safer intersection for pedestrians'. The number of vehicle and pedestrian accidents at this intersection has been greatly reduced. This same style and set up of these walk-signal- lights would be most beneficial at the intersection of Kent Street and Angeline Street as well. There is a large number of

seniors living in this area as well a large flow of students accessing the intersection cross walks at Kent Street and Angeline Street.

I hope that my observations, thoughts, concerns, and suggestions contained in this letter will generate a sincere look into this issue. Please feel free to contact should you require any other information. I look forward to your response and consideration on this matter.

Sincerely,



Mike F.?

AGL ISSUEtraQ

Tuesday, August 13 2013

Home | Add Issue | Issues | Work Orders | Reports | Documents | Quick Search 3:29:00 PM

VIEW ISSUE

ISSUE NUMBER:34050

Issue Details | Issue History | Notes | Call Backs | Attachments

Caller Information

[redacted]

Issue Identification

When Observed: Monday August 12, 2013 12:19

Category: Engineering

Issue: Traffic Related Issue

Issue Class: Request - Information

Property/Personal Damage: No **Damage Details:**

Issue Details: Resident seen in the local paper that we are currently doing a traffic survey on Kent St. He would like to speak to whomever is responsible for this survey in regards to bike accessability on Kent Street West to the mails. Please contact [redacted] to discuss bike lane possibility. Thanks

Issue Location

Address: [redacted]

Area: [redacted]

Site:

Details:

View Map

Issue Assignment

Activity: Respond

Priority: High

Status: Active

Target Date: Tuesday August 13, 2013

Scheduled Date:

Entered By: [redacted]

Assigned To: [redacted]

Department: PW: Engineering

Work Order: Add WO

Close Date:

Close Issue

Modify Issue | E-Mail | Print

Previous Page

main menu | tools | my settings | logout

Any service requests should be sent to the IT help desk at:
It.servicedesk@city.kawarthalakes.on.ca

From: Mike Farquhar [mailto:mfarquhar@city.kawarthalakes.on.ca]
Sent: Tuesday, September 10, 2013 2:34 PM
To: 'martstol@rogers.com'; 'mbowman@osler.com'; 'admin@masonhomes.ca'; 'greg.spafford@lasalle.com'; mark.neal2@infrastructureontario.ca; 'Cheryl Tolles (cheryl.tolles@ontario.ca)'; 'Mike Bell (mikebell@masonhomes.ca)'; 'Danielle Greene'; Stephen Podolsky (aandlinvestments@thehi-risegroup.com); 'gayle@lindsaychamber.com'; 'dean.valentznuzzi@loblaw.ca'; 'lindsaysquare@cogeco.net'
Cc: Ron Taylor; Juan Rojas; Richard Holy; Michael Benner; Doug Carroll; Joseph Kelly; Angelakis, David; Patrick O'Reilly; Pat Dunn; Andy Luff; Gord James; Ric McGee
Subject: Kent St and Colborne St traffic corridor study external stakeholders group

Dear respected members

The City of Kawartha Lakes invites you to be a part of the Kent St west and Colborne St west Lindsay, traffic corridor stakeholders group.

The City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors and we are looking for your input.

The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

The study limits are from Highway 35 in the west to Lindsay Street in the east,

This study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA). A key component of the study will be consultation with the public and stakeholders and public open houses (two) and stakeholder meetings (two) will be held this fall.

We invite you to participate in the first stakeholder meeting which will be held on: September 17, 2013 at 1:00 pm to 3:30 at 12 Peel St Lindsay in the William St. Conference room. A written notice of invitation will be sent in the mail however for expediency this email is being sent out.

If you intend to attend the stakeholders group meeting please respond back to this email. If you can't attend PDF's of the presentation and minutes can be sent to you.

Michael Farquhar
Supervisor, Technical Services
Engineering Division- Development Services
City of Kawartha Lakes
12 Peel Street,P.O.Box 9000
Lindsay,ON K9V 5R8
1-888-822-2225 ext. 1156
Fax.705-324-2982
E-mail :mfarquhar@city.kawarthalakes.on.ca

From: Mike Farquhar [mailto:mfarquhar@city.kawarthalakes.on.ca]
Sent: Tuesday, September 10, 2013 3:09 PM
To: Terry Cox (TCox@klps.ca); Terry Jones; Michael Benner; Juan Rojas; Ron Taylor; Barb Condie; Oliver Vigelius; Enzo Ingribelli; 'lkaldeway@hkpr.on.ca'; Lance Sherk; Norm Price; Angelakis, David; Joseph Kelly
Subject: Internal Stakeholders group for the Kent St and Colborne St traffic corridor study.

Dear respected members

The Engineering Division invites you to be a part of the Kent St west and Colborne St west Lindsay, traffic corridor stakeholders group.

The City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors and we are looking for your input.

The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

The study limits are from Highway 35 in the west to Lindsay Street in the east,

This study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA). A key component of the study will be consultation with the public and stakeholders and public open houses (two) and stakeholder meetings (two) will be held this fall.

We invite you to participate in the first stakeholder meeting which will be held on: September 17, 2013 at 10:00pm to 12:30 at the Lindsay Library , in the basement .

If you intend to attend the stakeholders group meeting please respond back to this email. If you can't attend PDF's of the presentation and minutes can be sent to you

Michael Farquhar
Supervisor, Technical Services
Engineering Division- Development Services
City of Kawartha Lakes
12 Peel Street,P.O.Box 9000
Lindsay,ON K9V 5R8
1-888-822-2225 ext. 1156
Fax.705-324-2982
E-mail :mfarquhar@city.kawarthalakes.on.ca

September 5, 2013 **City Logo Here**

Mr. John Smith
Title
Company
Street Address
City, Province (ON) Postal Code

Dear Mr. Smith:

Re: Stakeholders Meeting
Kent Street and Colborne Street Corridors EA Study

The City of Kawartha Lakes has initiated an Environmental Assessment (EA) Study for the Kent Street and Colborne Street corridors and we are looking for your input.

The EA will examine the efficient and safe accommodation of all forms of transportation including cars, trucks, transit, cyclists and pedestrians. It will determine any deficiencies and opportunities for enhancing transportation operations along these corridors in a sustainable way, in compliance with the City's Transportation Master Plan. The study reflects the City's desire to develop a transportation system with a strong focus on active transportation and enhancement of these vibrant commercial and residential corridors.

The study limits are from Highway 35 in the west to Lindsay Street in the east, including a review of the need for a second east-west bridge over the Trent River.

This study will be carried out through an open public process in accordance with the requirements of Phases 1 and 2 of the Municipal Class Environmental Assessment (EA). A key component of the study will be consultation with the public and stakeholders and public open houses (two) and stakeholder meetings (two) will be held this fall.

We invite you to participate in the first stakeholder meeting which will be held on:

Tuesday, September 17th, 2013
From 1:00 to 3:30pm
Victoria Room at City Hall
26 Francis Street, Lindsay

There will be a brief presentation on the study process and existing conditions by the consultant, HDR Corporation, and then the balance of the meeting will be devoted to a roundtable discussion on existing conditions, issues of concern to stakeholders, and ideas

and opportunities for enhancing transportation operations along the Kent Street and Colborne Street Corridors. We are inviting representatives from the business community, developers, and organizations with a potential interest in this study.

A public open house is being held on the evening of September 24th, 2013, where members of the public will be able to learn about the study and provide their input. The second round of meetings is tentatively scheduled for November 2013.

Kindly advise if you or another representative of your organization plan on attending by emailing me at mfarquhar@city.kawarthalakes.on.ca by September 16th, if possible.

Should you have any questions please call me at (705) 324-9411, extension 1156.

Yours truly,

City of Kawartha Lakes

Mike Farquhar
Supervisor, Technical Services
Development Services
Engineering Division

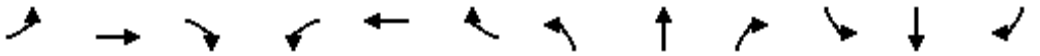
cc:

APPENDIX C

Traffic Analysis

APPENDIX C.1

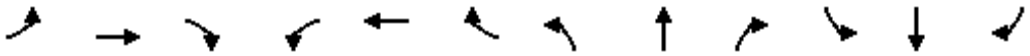
Traffic Analysis – Synchro Output (2031 Future Do Nothing)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	195	18	170	386	449	14	609	153	328	466	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.8			6.8		6.5	6.5		6.5	6.5	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.99			0.94		1.00	0.97		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788			1684		1372	3315		1755	3300	
Flt Permitted		0.45			0.85		0.39	1.00		0.24	1.00	
Satd. Flow (perm)		823			1436		559	3315		448	3300	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	212	20	185	420	488	15	662	166	357	507	51
RTOR Reduction (vph)	0	2	0	0	24	0	0	19	0	0	6	0
Lane Group Flow (vph)	0	339	0	0	1069	0	15	809	0	357	552	0
Heavy Vehicles (%)	0%	6%	20%	13%	6%	4%	33%	5%	14%	4%	10%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)		54.2			54.2		52.5	52.5		52.5	52.5	
Effective Green, g (s)		54.2			54.2		52.5	52.5		52.5	52.5	
Actuated g/C Ratio		0.45			0.45		0.44	0.44		0.44	0.44	
Clearance Time (s)		6.8			6.8		6.5	6.5		6.5	6.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		371			648		244	1450		196	1443	
v/s Ratio Prot								0.24			0.17	
v/s Ratio Perm		0.41			c0.74		0.03			c0.80		
v/c Ratio		0.91			1.65		0.06	0.56		1.82	0.38	
Uniform Delay, d1		30.7			32.9		19.5	25.1		33.8	22.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		26.4			299.2		0.1	0.5		389.0	0.2	
Delay (s)		57.1			332.1		19.6	25.6		422.7	23.0	
Level of Service		E			F		B	C		F	C	
Approach Delay (s)		57.1			332.1			25.5			178.9	
Approach LOS		E			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	177.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.3
Intersection Capacity Utilization	120.8%	ICU Level of Service	H
Analysis Period (min)	15		

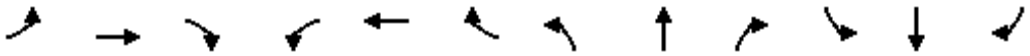
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	294	607	272	194	551	226	199	717	218	146	585	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		4.5	5.5		5.5	5.5		4.5	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.96		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1789		1807	1757		1807	1797		1772	1788	
Flt Permitted	0.15	1.00		0.13	1.00		0.13	1.00		0.11	1.00	
Satd. Flow (perm)	284	1789		245	1757		242	1797		207	1788	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	309	639	286	204	580	238	209	755	229	154	616	232
RTOR Reduction (vph)	0	18	0	0	16	0	0	12	0	0	15	0
Lane Group Flow (vph)	309	907	0	204	802	0	209	972	0	154	833	0
Confl. Peds. (#/hr)	2		5	5		2	3		3	3		3
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	2%	2%	0%	1%	5%	1%	1%	3%	1%	3%	2%	3%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.5	26.5		37.0	37.0		31.5	31.5		42.0	42.0	
Effective Green, g (s)	26.5	26.5		37.0	37.0		31.5	31.5		42.0	42.0	
Actuated g/C Ratio	0.29	0.29		0.41	0.41		0.35	0.35		0.47	0.47	
Clearance Time (s)	5.5	5.5		4.5	5.5		5.5	5.5		4.5	5.5	
Vehicle Extension (s)	1.0	1.0		3.0	1.0		1.0	1.0		3.0	1.0	
Lane Grp Cap (vph)	83	526		204	722		84	628		200	834	
v/s Ratio Prot		0.51		0.07	c0.46			0.54		0.05	c0.47	
v/s Ratio Perm	c1.09			0.34			c0.87			0.31		
v/c Ratio	3.72	1.73		1.00	1.11		2.49	1.55		0.77	1.00	
Uniform Delay, d1	31.8	31.8		24.1	26.5		29.2	29.2		20.2	24.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1254.3	334.2		63.0	67.9		703.7	254.1		16.6	30.6	
Delay (s)	1286.0	366.0		87.1	94.4		733.0	283.3		36.8	54.6	
Level of Service	F	F		F	F		F	F		D	D	
Approach Delay (s)		596.3			92.9			362.1			51.9	
Approach LOS		F			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	295.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	146.3%	ICU Level of Service	H
Analysis Period (min)	15		

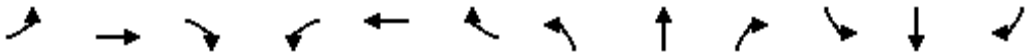
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	817	77	20	816	77	76	135	27	62	85	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1842			1848			1754			1721	
Flt Permitted		0.86			0.97			0.73			0.75	
Satd. Flow (perm)		1592			1788			1295			1306	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	82	878	83	22	877	83	82	145	29	67	91	70
RTOR Reduction (vph)	0	3	0	0	4	0	0	6	0	0	18	0
Lane Group Flow (vph)	0	1040	0	0	978	0	0	250	0	0	210	0
Confl. Peds. (#/hr)			6	6			8					8
Confl. Bikes (#/hr)			2									2
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	11%	4%	0%	0%	8%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		59.0			59.0			19.0			19.0	
Effective Green, g (s)		59.0			59.0			19.0			19.0	
Actuated g/C Ratio		0.66			0.66			0.21			0.21	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			3.0			3.0	
Lane Grp Cap (vph)		1055			1185			276			278	
v/s Ratio Prot												
v/s Ratio Perm		c0.65			0.55			c0.19			0.16	
v/c Ratio		0.99			0.83			0.91			0.76	
Uniform Delay, d1		14.6			11.2			34.1			32.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		24.0			5.1			30.9			11.1	
Delay (s)		38.6			16.2			65.0			43.9	
Level of Service		D			B			E			D	
Approach Delay (s)		38.6			16.2			65.0			43.9	
Approach LOS		D			B			E			D	

Intersection Summary			
HCM 2000 Control Delay	33.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



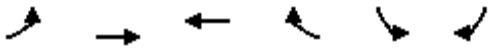
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	509	118	8	578	124	141	293	12	51	176	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.98		1.00	0.99		1.00	0.95	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1801			1626		1786	1872		1819	1720	
Flt Permitted		0.75			0.99		0.42	1.00		0.32	1.00	
Satd. Flow (perm)		1355			1612		798	1872		617	1720	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	137	566	131	9	642	138	157	326	13	57	196	84
RTOR Reduction (vph)	0	7	0	0	8	0	0	2	0	0	18	0
Lane Group Flow (vph)	0	827	0	0	781	0	157	337	0	57	262	0
Confl. Peds. (#/hr)	4		2	2		4	2		4	4		2
Confl. Bikes (#/hr)			1			2			3			3
Heavy Vehicles (%)	0%	3%	7%	0%	4%	0%	2%	2%	0%	0%	7%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		53.1			53.1		21.6	21.6		21.6	21.6	
Effective Green, g (s)		53.1			53.1		21.6	21.6		21.6	21.6	
Actuated g/C Ratio		0.61			0.61		0.25	0.25		0.25	0.25	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		829			987		198	466		153	428	
v/s Ratio Prot								0.18			0.15	
v/s Ratio Perm		c0.61			0.48		c0.20			0.09		
v/c Ratio		1.00			0.79		0.79	0.72		0.37	0.61	
Uniform Delay, d1		16.7			12.6		30.5	29.8		26.9	28.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		30.5			4.6		20.2	5.9		2.1	3.0	
Delay (s)		47.2			17.3		50.7	35.7		29.0	31.8	
Level of Service		D			B		D	D		C	C	
Approach Delay (s)		47.2			17.3			40.4			31.3	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	126.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	550	177	335	446	211	405
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	561	181	342	455	215	413
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			742		1790	652
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			742		1790	652
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			60		0	12
cM capacity (veh/h)			865		53	470

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	742	797	215	413
Volume Left	0	342	215	0
Volume Right	181	0	0	413
cSH	1700	865	53	470
Volume to Capacity	0.44	0.40	4.07	0.88
Queue Length 95th (m)	0.0	14.5	Err	71.4
Control Delay (s)	0.0	8.7	Err	46.9
Lane LOS		A	F	E
Approach Delay (s)	0.0	8.7	3455.8	
Approach LOS			F	

Intersection Summary			
Average Delay	1005.5		
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	1156	975	1	1	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	1217	1026	1	1	6
Pedestrians			4			
Lane Width (m)			3.7			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1027				2275	1027
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1027				2275	1027
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	98
cM capacity (veh/h)	684				44	287

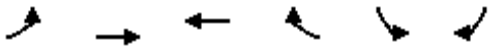
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1231	1027	7
Volume Left	14	0	1
Volume Right	0	1	6
cSH	684	1700	160
Volume to Capacity	0.02	0.60	0.05
Queue Length 95th (m)	0.5	0.0	1.1
Control Delay (s)	0.8	0.0	28.6
Lane LOS	A		D
Approach Delay (s)	0.8	0.0	28.6
Approach LOS			D

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		81.2%	ICU Level of Service D
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	1148	11	10	961	14	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1234	12	11	1033	15	18
Pedestrians	1				2	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				290		
pX, platoon unblocked					0.65	
vC, conflicting volume			1248		2298	1242
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1248		2737	1242
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.3
p0 queue free %			98		0	91
cM capacity (veh/h)			564		13	215

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1246	1044	33
Volume Left	0	11	15
Volume Right	12	0	18
cSH	1700	564	28
Volume to Capacity	0.73	0.02	1.21
Queue Length 95th (m)	0.0	0.4	29.7
Control Delay (s)	0.0	0.7	452.0
Lane LOS		A	F
Approach Delay (s)	0.0	0.7	452.0
Approach LOS			F

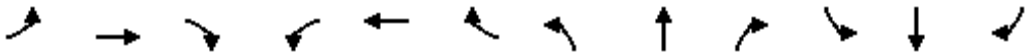
Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	1169	962	7	1	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	4	1257	1034	8	1	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			111			
pX, platoon unblocked	0.54				0.54	0.54
vC, conflicting volume	1042				2304	1038
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	659				2975	652
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				87	98
cM capacity (veh/h)	511				9	257

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1261	1042	6
Volume Left	4	0	1
Volume Right	0	8	5
cSH	511	1700	44
Volume to Capacity	0.01	0.61	0.15
Queue Length 95th (m)	0.2	0.0	3.6
Control Delay (s)	0.4	0.0	100.1
Lane LOS	A		F
Approach Delay (s)	0.4	0.0	100.1
Approach LOS			F

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	62	776	52	6	784	73	81	136	5	13	44	46
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	64	800	54	6	808	75	84	140	5	13	45	47
Pedestrians		6									1	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		278			322							
pX, platoon unblocked	0.85			0.55			0.62	0.62	0.55	0.62	0.62	0.85
vC, conflicting volume	885			854			1889	1852	827	1889	1841	853
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	773			321			1572	1512	273	1572	1495	736
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.1	3.3
p0 queue free %	91			99			0	0	99	0	33	87
cM capacity (veh/h)	720			685			21	68	423	0	68	356

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	918	890	229	106
Volume Left	64	6	84	13
Volume Right	54	75	5	47
cSH	720	685	38	0
Volume to Capacity	0.09	0.01	6.06	Err
Queue Length 95th (m)	2.2	0.2	Err	Err
Control Delay (s)	2.5	0.3	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	2.5	0.3	9999.0	Err
Approach LOS			F	F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	112.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	762	46	4	785	75	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	886	53	5	913	87	8
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				129		
pX, platoon unblocked					0.63	
vC, conflicting volume			941		1836	915
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			941		2034	915
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		0	98
cM capacity (veh/h)			736		40	333

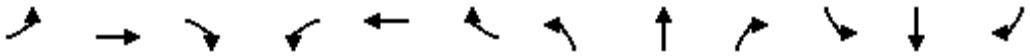
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	940	917	95
Volume Left	0	5	87
Volume Right	53	0	8
cSH	1700	736	43
Volume to Capacity	0.55	0.01	2.23
Queue Length 95th (m)	0.0	0.1	76.8
Control Delay (s)	0.0	0.2	765.0
Lane LOS		A	F
Approach Delay (s)	0.0	0.2	765.0
Approach LOS			F

Intersection Summary			
Average Delay	37.4		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	510	57	14	547	164	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	573	64	16	615	184	11
Pedestrians	4			1	3	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	128					
pX, platoon unblocked			0.72		0.72	0.72
vC, conflicting volume			640		1258	609
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			309		1165	266
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		0	98
cM capacity (veh/h)			910		151	560

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	637	630	196
Volume Left	0	16	184
Volume Right	64	0	11
cSH	1700	910	158
Volume to Capacity	0.37	0.02	1.24
Queue Length 95th (m)	0.0	0.4	85.3
Control Delay (s)	0.0	0.5	205.9
Lane LOS		A	F
Approach Delay (s)	0.0	0.5	205.9
Approach LOS			F

Intersection Summary			
Average Delay	27.7		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		



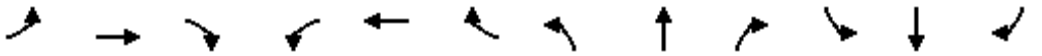
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	33	22	458	7	13	2	592	408	14	5	272	37
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	40	27	559	9	16	2	722	498	17	6	332	45
Pedestrians		13			2			6			5	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			0			1			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								373				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	2345	2340	373	2896	2354	513	390			517		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2347	2342	373	2900	2356	510	390			514		
tC, single (s)	7.2	6.5	6.2	7.4	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.8	4.0	3.3	2.5			2.2		
p0 queue free %	0	0	15	0	0	100	30			99		
cM capacity (veh/h)	0	11	660	0	11	562	1029			1057		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	626	27	1237	383
Volume Left	40	9	722	6
Volume Right	559	2	17	45
cSH	0	0	1029	1057
Volume to Capacity	Err	Err	0.70	0.01
Queue Length 95th (m)	Err	Err	46.3	0.1
Control Delay (s)	Err	Err	16.3	0.2
Lane LOS	F	F	C	A
Approach Delay (s)	Err	Err	16.3	0.2
Approach LOS	F	F		

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	115.0%	ICU Level of Service	H
Analysis Period (min)	15		

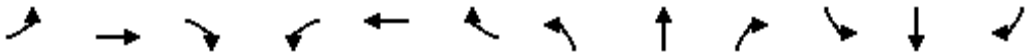
APPENDIX C.2

Traffic Analysis – Synchro Output (2031 Future with Improvements)



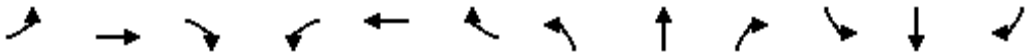
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	195	18	170	386	449	14	609	153	328	466	47
Future Volume (vph)	100	195	18	170	386	449	14	609	153	328	466	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.8		6.8	6.8		6.5	6.5		4.0	6.5	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.92		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1792		1807	3198		1508	3398		1755	3444	
Flt Permitted	0.14	1.00		0.61	1.00		0.44	1.00		0.15	1.00	
Satd. Flow (perm)	272	1792		1168	3198		703	3398		280	3444	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	212	20	185	420	488	15	662	166	357	507	51
RTOR Reduction (vph)	0	4	0	0	237	0	0	25	0	0	8	0
Lane Group Flow (vph)	109	228	0	185	671	0	15	803	0	357	550	0
Heavy Vehicles (%)	0%	6%	4%	1%	6%	4%	21%	5%	1%	4%	5%	0%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	1	6			2			8		7	4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	31.3	31.3		24.2	24.2		22.4	22.4		42.5	42.5	
Effective Green, g (s)	31.3	31.3		24.2	24.2		22.4	22.4		42.5	42.5	
Actuated g/C Ratio	0.36	0.36		0.28	0.28		0.26	0.26		0.49	0.49	
Clearance Time (s)	4.0	6.8		6.8	6.8		6.5	6.5		4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	643		324	888		180	873		409	1680	
v/s Ratio Prot	c0.03	0.13			0.21			0.24		c0.16	0.16	
v/s Ratio Perm	c0.23			0.16			0.02			c0.26		
v/c Ratio	0.71	0.35		0.57	0.76		0.08	0.92		0.87	0.33	
Uniform Delay, d1	23.4	20.5		27.0	28.7		24.6	31.5		21.1	13.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.5	0.3		2.4	3.7		0.2	14.7		18.2	0.1	
Delay (s)	37.9	20.8		29.4	32.5		24.8	46.2		39.2	13.7	
Level of Service	D	C		C	C		C	D		D	B	
Approach Delay (s)		26.3			31.9			45.8			23.7	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	87.1	Sum of lost time (s)	21.3
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



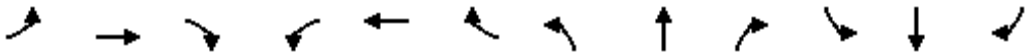
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	550	177	335	446	204	211	249	405	214	148	260
Future Volume (vph)	229	550	177	335	446	204	211	249	405	214	148	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		6.5	6.5	6.5	4.0	6.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96		1.00	0.95		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1789	3397		1789	3358		1738	1883	1617	1789	1703	
Flt Permitted	0.29	1.00		0.16	1.00		0.46	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	544	3397		309	3358		845	1883	1617	844	1703	
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.92	0.98	0.92	0.98	0.92	0.92	0.92
Adj. Flow (vph)	249	561	181	342	455	222	215	271	413	233	161	283
RTOR Reduction (vph)	0	35	0	0	66	0	0	0	264	0	70	0
Lane Group Flow (vph)	249	707	0	342	611	0	215	271	149	233	374	0
Heavy Vehicles (%)	2%	4%	2%	2%	4%	2%	5%	2%	1%	2%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.0	20.4		39.1	24.5		29.5	29.5	29.5	37.5	37.5	
Effective Green, g (s)	31.0	20.4		39.1	24.5		29.5	29.5	29.5	37.5	37.5	
Actuated g/C Ratio	0.35	0.23		0.44	0.27		0.33	0.33	0.33	0.42	0.42	
Clearance Time (s)	4.0	6.5		4.0	6.5		6.5	6.5	6.5	4.0	6.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	335	773		377	918		278	619	532	395	712	
v/s Ratio Prot	0.09	0.21		c0.15	0.18			0.14		0.03	c0.22	
v/s Ratio Perm	0.17			c0.25			c0.25		0.09	0.22		
v/c Ratio	0.74	0.91		0.91	0.67		0.77	0.44	0.28	0.59	0.52	
Uniform Delay, d1	22.5	33.8		21.6	28.9		27.0	23.6	22.2	21.2	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.6	15.3		24.6	1.8		18.7	2.2	1.3	2.3	2.8	
Delay (s)	31.1	49.1		46.3	30.7		45.7	25.8	23.5	23.5	22.2	
Level of Service	C	D		D	C		D	C	C	C	C	
Approach Delay (s)		44.6			36.0			29.5			22.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	89.6	Sum of lost time (s)	21.0
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



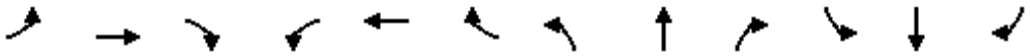
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	607	272	194	551	226	199	717	218	146	585	220
Future Volume (vph)	294	607	272	194	551	226	199	717	218	146	585	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.5	5.5	5.5	4.0	5.5		4.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	1883	1601	1807	1830	1593	1807	3414		1772	3397	
Flt Permitted	0.10	1.00	1.00	0.10	1.00	1.00	0.11	1.00		0.12	1.00	
Satd. Flow (perm)	179	1883	1601	200	1830	1593	218	3414		224	3397	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	309	639	286	204	580	238	209	755	229	154	616	232
RTOR Reduction (vph)	0	0	102	0	0	95	0	24	0	0	33	0
Lane Group Flow (vph)	309	639	184	204	580	143	209	960	0	154	815	0
Confl. Peds. (#/hr)	2		5	5		2	3		3	3		3
Confl. Bikes (#/hr)			2									
Heavy Vehicles (%)	2%	2%	0%	1%	5%	1%	1%	3%	1%	3%	2%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	58.2	43.6	43.6	48.2	38.1	38.1	44.9	34.9		41.2	33.3	
Effective Green, g (s)	58.2	43.6	43.6	48.2	38.1	38.1	44.9	34.9		41.2	33.3	
Actuated g/C Ratio	0.50	0.37	0.37	0.41	0.33	0.33	0.39	0.30		0.35	0.29	
Clearance Time (s)	4.0	5.5	5.5	4.5	5.5	5.5	4.0	5.5		4.5	5.5	
Vehicle Extension (s)	3.0	1.0	1.0	3.0	1.0	1.0	3.0	1.0		3.0	1.0	
Lane Grp Cap (vph)	311	704	599	222	598	520	220	1022		184	970	
v/s Ratio Prot	c0.14	0.34		0.08	0.32		c0.08	0.28		0.06	0.24	
v/s Ratio Perm	c0.36		0.11	0.30		0.09	c0.28			0.24		
v/c Ratio	0.99	0.91	0.31	0.92	0.97	0.28	0.95	0.94		0.84	0.84	
Uniform Delay, d1	35.6	34.5	25.8	27.9	38.6	29.0	28.3	39.8		30.0	39.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	49.0	15.1	0.1	38.4	28.8	0.1	46.1	15.3		26.8	6.4	
Delay (s)	84.6	49.7	25.9	66.2	67.4	29.1	74.4	55.1		56.8	45.5	
Level of Service	F	D	C	E	E	C	E	E		E	D	
Approach Delay (s)		52.9			58.3			58.5			47.2	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	54.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	116.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	817	77	20	816	77	76	135	27	62	85	65
Future Volume (vph)	76	817	77	20	816	77	76	135	27	62	85	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			5.0			5.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.98			0.96	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1842			1848			1804			1755	
Flt Permitted		0.86			0.97			0.73			0.75	
Satd. Flow (perm)		1592			1788			1331			1330	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	82	878	83	22	877	83	82	145	29	67	91	70
RTOR Reduction (vph)	0	3	0	0	4	0	0	6	0	0	18	0
Lane Group Flow (vph)	0	1040	0	0	978	0	0	250	0	0	210	0
Confl. Peds. (#/hr)			6	6			8					8
Confl. Bikes (#/hr)			2									2
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	2%	4%	0%	0%	3%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		59.0			59.0			18.9			18.9	
Effective Green, g (s)		59.0			59.0			18.9			18.9	
Actuated g/C Ratio		0.66			0.66			0.21			0.21	
Clearance Time (s)		6.0			6.0			5.0			5.0	
Vehicle Extension (s)		4.0			4.0			3.0			3.0	
Lane Grp Cap (vph)		1056			1186			282			282	
v/s Ratio Prot												
v/s Ratio Perm		c0.65			0.55			c0.19			0.16	
v/c Ratio		0.98			0.82			0.89			0.74	
Uniform Delay, d1		14.5			11.1			34.0			32.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		23.8			5.0			26.8			10.2	
Delay (s)		38.3			16.1			60.7			42.9	
Level of Service		D			B			E			D	
Approach Delay (s)		38.3			16.1			60.7			42.9	
Approach LOS		D			B			E			D	

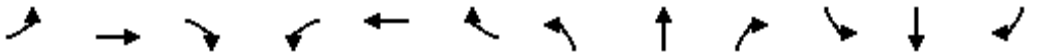
Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	11.0
Intersection Capacity Utilization	114.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	509	118	8	578	124	141	293	12	51	176	76
Future Volume (vph)	123	509	118	8	578	124	141	293	12	51	176	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.98		1.00	0.99		1.00	0.95	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1801			1626		1786	1872		1819	1720	
Flt Permitted		0.75			0.99		0.42	1.00		0.32	1.00	
Satd. Flow (perm)		1355			1612		798	1872		617	1720	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	137	566	131	9	642	138	157	326	13	57	196	84
RTOR Reduction (vph)	0	7	0	0	8	0	0	2	0	0	18	0
Lane Group Flow (vph)	0	827	0	0	781	0	157	337	0	57	262	0
Confl. Peds. (#/hr)	4		2	2		4	2		4	4		2
Confl. Bikes (#/hr)			1			2			3			3
Heavy Vehicles (%)	0%	3%	7%	0%	4%	0%	2%	2%	0%	0%	7%	3%
Parking (#/hr)				0	0	0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		53.1			53.1		21.6	21.6		21.6	21.6	
Effective Green, g (s)		53.1			53.1		21.6	21.6		21.6	21.6	
Actuated g/C Ratio		0.61			0.61		0.25	0.25		0.25	0.25	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)		829			987		198	466		153	428	
v/s Ratio Prot								0.18			0.15	
v/s Ratio Perm		c0.61			0.48		c0.20			0.09		
v/c Ratio		1.00			0.79		0.79	0.72		0.37	0.61	
Uniform Delay, d1		16.7			12.6		30.5	29.8		26.9	28.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		30.5			4.6		20.2	5.9		2.1	3.0	
Delay (s)		47.2			17.3		50.7	35.7		29.0	31.8	
Level of Service		D			B		D	D		C	C	
Approach Delay (s)		47.2			17.3			40.4			31.3	
Approach LOS		D			B			D			C	

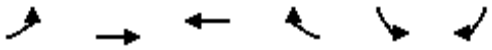
Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	126.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	22	458	7	13	2	592	408	14	5	272	37
Future Volume (vph)	33	22	458	7	13	2	592	408	14	5	272	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.96	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99	1.00	0.98	1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	0.98		1.00	1.00		1.00	0.98	
Flt Protected		0.97	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1818	1527	1393	1880		1587	1865		1820	1842	
Flt Permitted		0.82	1.00	0.71	1.00		0.27	1.00		0.47	1.00	
Satd. Flow (perm)		1534	1527	1046	1880		448	1865		907	1842	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	40	27	559	9	16	2	722	498	17	6	332	45
RTOR Reduction (vph)	0	0	489	0	2	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	67	70	9	16	0	722	514	0	6	372	0
Confl. Peds. (#/hr)	5		6	6		5	13		2	2		13
Confl. Bikes (#/hr)						3			4			3
Heavy Vehicles (%)	3%	0%	3%	29%	0%	0%	15%	2%	14%	0%	1%	7%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		11.2	11.2	11.2	11.2		70.8	70.8		28.5	28.5	
Effective Green, g (s)		11.2	11.2	11.2	11.2		70.8	70.8		28.5	28.5	
Actuated g/C Ratio		0.12	0.12	0.12	0.12		0.79	0.79		0.32	0.32	
Clearance Time (s)		4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		190	190	130	233		837	1467		287	583	
v/s Ratio Prot					0.01		c0.37	0.28			0.20	
v/s Ratio Perm		0.04	c0.05	0.01			c0.31			0.01		
v/c Ratio		0.35	0.37	0.07	0.07		0.86	0.35		0.02	0.64	
Uniform Delay, d1		36.1	36.1	34.8	34.8		13.3	2.8		21.2	26.3	
Progression Factor		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1	1.2	0.2	0.1		9.1	0.7		0.1	5.3	
Delay (s)		37.2	37.3	35.0	34.9		22.5	3.5		21.3	31.6	
Level of Service		D	D	D	C		C	A		C	C	
Approach Delay (s)		37.3			35.0			14.6			31.5	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	1156	975	1	1	6
Future Volume (Veh/h)	13	1156	975	1	1	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	1217	1026	1	1	6
Pedestrians			4			
Lane Width (m)			3.7			
Walking Speed (m/s)			1.2			
Percent Blockage			0			
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)		227				
pX, platoon unblocked					0.70	
vC, conflicting volume	1027				2276	1026
vC1, stage 1 conf vol					1026	
vC2, stage 2 conf vol					1249	
vCu, unblocked vol	1027				2615	1026
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	98
cM capacity (veh/h)	684				172	287

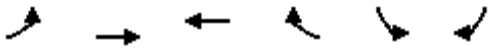
Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	14	1217	1027	7
Volume Left	14	0	0	1
Volume Right	0	0	1	6
cSH	684	1700	1700	262
Volume to Capacity	0.02	0.72	0.60	0.03
Queue Length 95th (m)	0.5	0.0	0.0	0.6
Control Delay (s)	10.4	0.0	0.0	19.1
Lane LOS	B			C
Approach Delay (s)	0.1		0.0	19.1
Approach LOS				C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1148	11	10	961	14	17
Future Volume (Veh/h)	1148	11	10	961	14	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	1234	12	11	1033	15	18
Pedestrians	1				2	
Lane Width (m)	3.7				3.7	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)	358			290		
pX, platoon unblocked			0.72		0.76	0.72
vC, conflicting volume			1248		2298	1242
vC1, stage 1 conf vol					1242	
vC2, stage 2 conf vol					1056	
vCu, unblocked vol			1152		1734	1144
tC, single (s)			4.1		6.5	6.2
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.3
p0 queue free %			98		91	90
cM capacity (veh/h)			444		175	178

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1246	11	1033	33
Volume Left	0	11	0	15
Volume Right	12	0	0	18
cSH	1700	444	1700	177
Volume to Capacity	0.73	0.02	0.61	0.19
Queue Length 95th (m)	0.0	0.6	0.0	5.1
Control Delay (s)	0.0	13.3	0.0	30.0
Lane LOS		B		D
Approach Delay (s)	0.0	0.1		30.0
Approach LOS				D

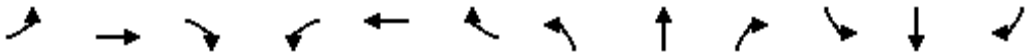
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	1169	962	7	1	5
Future Volume (Veh/h)	4	1169	962	7	1	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	4	1257	1034	8	1	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			111			
pX, platoon unblocked	0.60				0.60	0.60
vC, conflicting volume	1042				2303	1038
vC1, stage 1 conf vol					1038	
vC2, stage 2 conf vol					1265	
vCu, unblocked vol	734				2843	727
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				99	98
cM capacity (veh/h)	526				184	255

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	4	1257	1042	6
Volume Left	4	0	0	1
Volume Right	0	0	8	5
cSH	526	1700	1700	240
Volume to Capacity	0.01	0.74	0.61	0.03
Queue Length 95th (m)	0.2	0.0	0.0	0.6
Control Delay (s)	11.9	0.0	0.0	20.4
Lane LOS	B			C
Approach Delay (s)	0.0		0.0	20.4
Approach LOS				C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	776	52	6	784	73	81	136	5	13	44	46
Future Volume (Veh/h)	62	776	52	6	784	73	81	136	5	13	44	46
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	64	800	54	6	808	75	84	140	5	13	45	47
Pedestrians		6									1	
Lane Width (m)		3.7									3.7	
Walking Speed (m/s)		1.2									1.2	
Percent Blockage		1									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		278			322							
pX, platoon unblocked	0.80			0.55			0.65	0.65	0.55	0.65	0.65	0.80
vC, conflicting volume	884			854			1888	1851	827	1888	1840	852
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	732			327			1412	1355	278	1412	1339	693
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.1	3.3
p0 queue free %	91			99			0	0	99	0	49	87
cM capacity (veh/h)	707			685			36	88	422	0	87	356

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	918	889	229	105
Volume Left	64	6	84	13
Volume Right	54	75	5	47
cSH	707	685	59	0
Volume to Capacity	0.09	0.01	3.91	Err
Queue Length 95th (m)	2.3	0.2	Err	Err
Control Delay (s)	2.5	0.3	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	2.5	0.3	Err	Err
Approach LOS			F	F

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	112.4%	ICU Level of Service	H	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	762	46	4	785	75	7
Future Volume (Veh/h)	762	46	4	785	75	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	886	53	5	913	87	8
Pedestrians				1	1	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				129		
pX, platoon unblocked					0.61	
vC, conflicting volume			940		1836	914
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			940		2049	914
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		0	98
cM capacity (veh/h)			737		38	333

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	939	918	95
Volume Left	0	5	87
Volume Right	53	0	8
cSH	1700	737	41
Volume to Capacity	0.55	0.01	2.33
Queue Length 95th (m)	0.0	0.2	77.9
Control Delay (s)	0.0	0.2	817.5
Lane LOS		A	F
Approach Delay (s)	0.0	0.2	817.5
Approach LOS			F

Intersection Summary			
Average Delay	39.9		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	510	57	14	547	164	10
Future Volume (Veh/h)	510	57	14	547	164	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	573	64	16	615	184	11
Pedestrians	4			1	3	
Lane Width (m)	3.7			3.7	3.7	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)	128			187		
pX, platoon unblocked			0.71		0.78	0.71
vC, conflicting volume			640		1259	609
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			292		821	249
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		29	98
cM capacity (veh/h)			910		261	564

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	637	631	195
Volume Left	0	16	184
Volume Right	64	0	11
cSH	1700	910	269
Volume to Capacity	0.37	0.02	0.73
Queue Length 95th (m)	0.0	0.4	38.8
Control Delay (s)	0.0	0.5	47.0
Lane LOS		A	E
Approach Delay (s)	0.0	0.5	47.0
Approach LOS			E

Intersection Summary			
Average Delay	6.5		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Arterial Level of Service: EB Colborne St W

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (km)	Arterial Speed	Arterial LOS
Highway 35	III	50	49.1	21.7	70.8	0.62	31.6	C
Wilson Fields	III	50	30.7	15.5	46.2	0.39	30.3	C
St Joseph Rd	III	50	26.2	49.9	76.1	0.33	15.7	F
Angeline St N	III	50	51.2	53.6	104.8	0.65	22.3	E
Adelaide St N	III	50	23.3	40.8	64.1	0.28	15.7	F
Victoria Ave N	III	44	47.4	50.4	97.8	0.60	22.1	E
William St N	III	50	24.8	39.4	64.2	0.31	17.7	E
Total	III		252.7	271.3	524.0	3.19	21.9	E

Arterial Level of Service: WB Colborne St W

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (km)	Arterial Speed	Arterial LOS
William St N	III	50	35.7	30.1	65.8	0.45	24.7	D
Victoria Ave N	III	50	24.8	21.0	45.8	0.31	24.7	D
Adelaide St N	III	44	47.4	19.0	66.4	0.60	32.6	C
Angeline St N	III	50	23.3	69.7	93.0	0.28	10.8	F
St Joseph Rd	III	50	51.2	29.4	80.6	0.65	29.0	C
Street A	III	50	26.2	21.3	47.5	0.33	25.2	D
Highway 35	III	50	30.7	24.4	55.1	0.39	25.4	D
Total	III		239.3	214.9	454.2	3.02	23.9	D