

Bremner Area Project

Transportation Impact
Assessment Guidelines



Prepared for:
Strathcona County


Prepared by:
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Sign-off Sheet

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June 14, 2019

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Draft Transportation Impact Assessment Guidelines





1 INTRODUCTION


The purpose of this document is to provide direction for developers, consultants, and land owners with the requirements for transportation impact assessments (TIA) for projects located within the Bremner Area and Local Employment Area (LEA) within Strathcona County (the County).



Bremner is an urban development area located north of Highway 16 and east of Highway 21. The Bremner area is shown in Map 1a. The LEA is located south of Highway 16, east of Highway 21 and north of the CN Rail tracks and shown in Map 1b.

This document will provide general direction for TIAs to support plans and development applications. Strathcona County may require additional analysis or specific information on a case-by-case development to promote development that accommodates users of all ages and modes within Bremner and the LEA. The directions in this document for TIAs are specific to only Bremner and the LEA. For any other TIA submission in Strathcona County developers will refer to existing TIA guidelines within the Strathcona County Design and Construction Standards. Requirements for TIAs within Bremner and the LEA may be different from the rest of Strathcona County; this is to support the specific policy goals and objectives identified through the Bremner Area Concept Plan, the Bremner Transportation Master Plan and Bremner Design and Construction Standards which may be referenced for additional guidance.

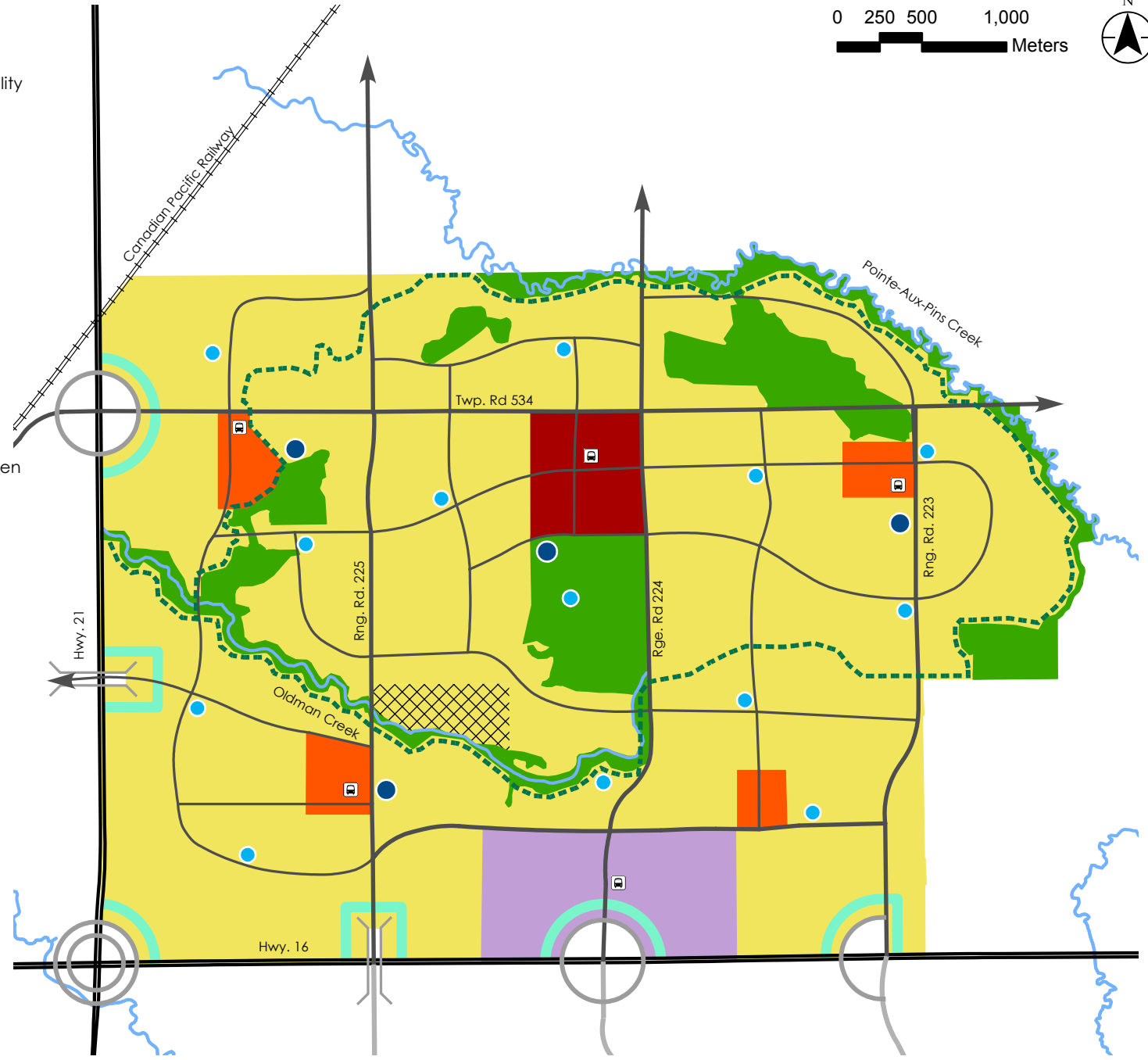
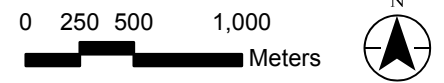
Legend

-  Transit Terminal/Transit Transfer Facility
-  Systems Interchange
-  Full Interchange
-  Partial Interchange

-  Flyover
-  Gateways

- #### Community Node Policy Area
-  Primary Community Node
 -  Secondary Community Node

-  Business Park Policy Area
-  Priority Wetlands, Uplands, and Open Space Policy Area
-  Major Open Space Corridor
-  Neighbourhood Policy Area
-  Existing Country Residential
-  Village Centre Policy Area
-  Town Centre Policy Area




STRATHCONA COUNTY


Note: This map is conceptual in nature. The exact location and alignment of land uses, facilities, roadways and services will be determined by the future development ASPs subject to Strathcona County's approval.

MAP 1B

LOCAL EMPLOYMENT AREA DEVELOPMENT CONCEPT

Legend


 Community Service

 Priority Wetlands, Uplands and Openspace


 Major Public Service


 Commercial

 Industrial

 Systems Interchange

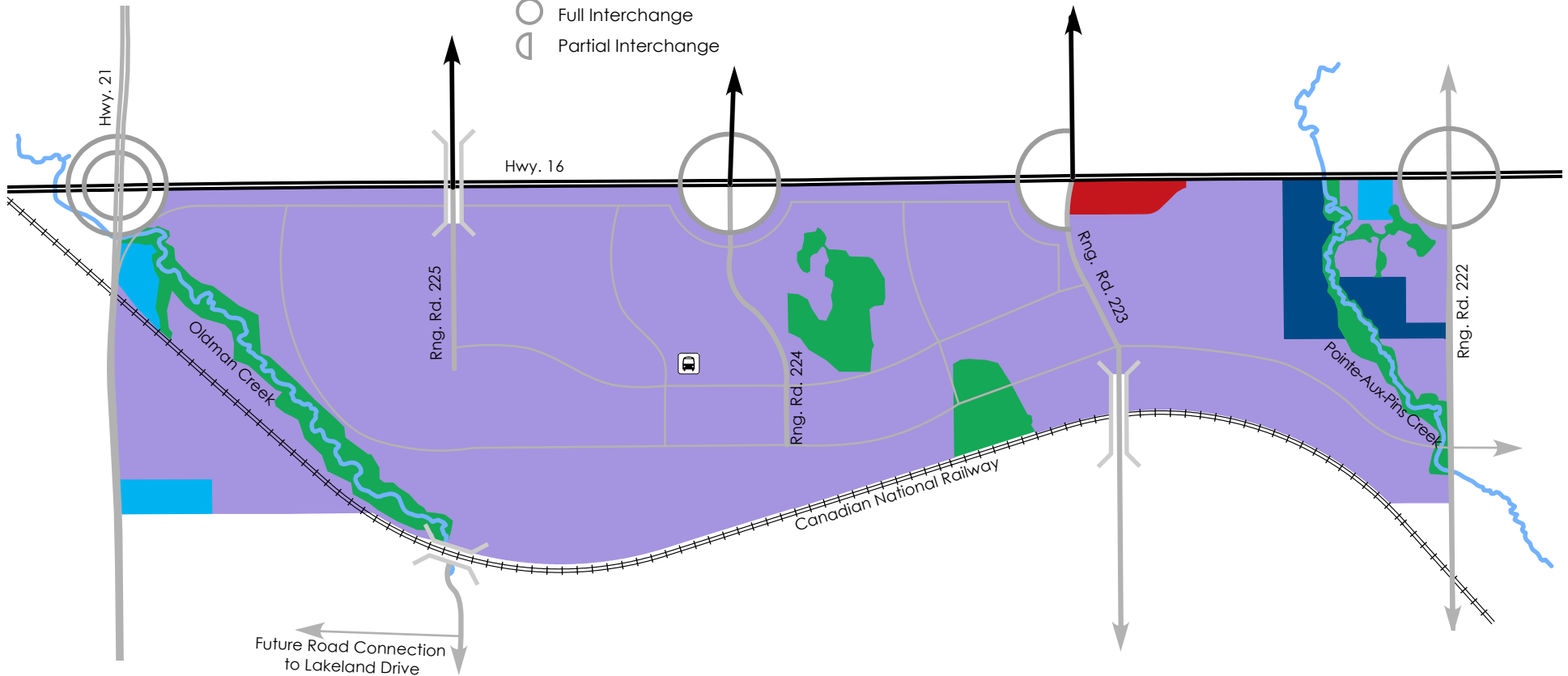
 Full Interchange

 Partial Interchange

 Transit Terminal/Transit Transfer Facility

 Flyover

0 250 500 1,000 Meters



Note: This map is conceptual in nature. The exact location and alignment of land uses, facilities, roadways and services will be determined by the future development ASPs subject to Strathcona County's approval.

1.1 Bremner and LEA Objectives

Bremner is planned to be a green, connected, and diverse community where people have safe and equitable options in how they move around. While the expectation is to continue to provide safe access for people driving with sufficient capacity, TIAs are expected to reflect the multimodal Vision, Goals and Policies of the Bremner Area Concept Plan and the Bremner Transportation Plan. Streets and intersections designs should align with the street types identified in the Bremner Design and Construction Standards. Exceptions will be considered, but must follow the Design Exception procedures identified in the BD&CS. All TIAs must show how users of all ages and modes can access an area or site on foot, bike or by transit.

TIAs must show how development plans in Bremner will be designed to accommodate an *accessible, connected, and integrated multimodal transportation system that provides mobility, access for goods and services, safety for all users and links to local and regional destinations.*

Policies from the Area Concept Plan and Transportation Plan which can be implemented through the TIA include:

- Require the development of a highly-connected street network for all users to ensure shorter travel distances for people walking, cycling, and taking transit
- Require an active transportation infrastructure network that includes an internal network of multi-use trails, cycle tracks, and sidewalks within each neighbourhood with connections across neighbourhoods to ensure access across Bremner for people walking and cycling.
- Require transit stops to be located within 250 m of seniors housing and community housing, and to be designed to accommodate users with mobility aids and visual impairments to ensure access to transit.
- Encourage intersection designs that include a separate signal phase (protected phase) for people walking to promote the goals of Vision Zero.
- Require development within 400 m of the Town Centre and Village Centres to include street, intersection designs that prioritize people walking, cycling, and taking transit as higher or equal priority to vehicular travel to ensure the use of active transportation and
- Require transit terminals have a pedestrian-oriented design where vehicular parking is underground or stacked and has a main entrance that is on and faces a public street to ensure active frontages to the public realm and improved access to transit terminals by active transportation.

1.2 When is a TIA Required?

Transportation impact assessments support development changes throughout Bremner. Types of applications which may require TIAs include, but are not limited to:

- Area Concept Plan Amendment
- Area Structure Plan Submission
- Changes to Area Structure Plans
- Redevelopment/Development in established areas which increase density or change development type (may include any development application that is not part of the three applications listed above).

A TIA is required to help the County identify new roads, transit, pedestrian and cyclist upgrades within Bremner and the LEA anytime a new development is proposed that may change traffic and mobility conditions enough that they may necessitate upgrades, additions, or changes to the existing street, transit, or multimodal network at the discretion of Strathcona County.

All TIAs must be stamped and signed by a professional engineer (P.Eng.) licensed to practice in Alberta by the Association of Professional Engineers and Geoscientists (APEGA).

1.3 Submission Procedure

Upon initiation of development changes as identified in Section 1.2, the consultant, land owner or developer must complete a terms of reference document for the County. This document must include the draft scope of work which aligns with the contents identified in this document for transportation impact assessments. The scope must summarize the proposed project, study area/intersections and access assumptions, background traffic assumptions, anticipated buildout year, analysis horizon, and trip generation, distribution, and assignment. No intersection analysis is required in the terms of reference. The County will review and approve these assumptions and inform the applicant of any required changes.

1.4 Level of Detail

Not all TIAs require the same level of effort. To support ease of application, the County has identified three levels of study. Please identify which level was selected and include a checklist to confirm inclusion of the required elements.

1.4.1 Transportation Impact Memo

For development or minor redevelopment applications which identify a minimal change to zoning within a site that is not anticipated to significantly change identified trip generation, the County will require a memo which identifies the proposed changes to current or previously estimated volumes. This memo may trigger a more detailed analysis. Requirements for a memo include at a minimum:

- Background
- Study Scope, Goals, Methodology
- Site Location
- Existing Land Uses
- Existing Transportation Network
- Existing Traffic Volumes
- Study Horizon (a memo will typically only require an evaluation of the current horizon/existing conditions)
- Proposed Land Uses
- Site Plan
- Trip Generation Rates and Total Trips
- Updates to Network for People Walking, Cycling and Taking Transit (as needed)
- Parking Supply Review (as needed)
- Conclusions and Recommendations

As noted previously, the above list is the *minimum* requirements for a transportation impact memo. Additional areas of transportation analysis may be requested by the County as part of the TIA scoping process based on specific site characteristics and/or context of the surrounding areas.

1.4.2 **Transportation Impact Update**

Transportation impact updates are acceptable for study areas for which a previously approved TIA is in place (typically within the last 7 years, though in some cases even a more recent TIA may require an update depending on context). Situations which will typically allow for update reports include: minor amendments to Area Structure Plans and Sub-Area Structure Plans, Development Permit Applications, and more significant rezoning's within existing approved plan areas or development applications which increase density in established areas. Requirements for Transportation Impact Updates include at a minimum **(Bolded Items represent requirements that are in addition to those required in the Memo):**

- Background
- Study Scope, Goals, Methodology
- Site Location
- Existing Land Uses
- Existing Transportation Network
- Existing Traffic Volumes
- Study Horizon (**Short Term Horizon, 10 years past existing conditions**)
- **Future Adjacent Land Uses and Site Plans (if different from existing)**
- Proposed Land Uses
- Site Plan
- **Access Locations**
- Trip Generation Rates and Total Trips
- **Trip Distribution, Assignment and Traffic Volumes (Peak hours which may include weekends and AADT)**
- **Proposed Roadway Cross Sections and Conceptual Designs of Intersections**
- **Review of Intersection Spacing, if applicable**
- **Review of Sight Distances**
- Proposed Network for People Walking, Cycling and Taking Transit
- **Multimodal Evaluation including Intersection Analysis**
- **Parking Supply Review**
- **Staging Analysis** (may be required in cases where a change in staging plan has triggered need for TIA Update)
- Conclusions and Recommendations

As noted previously, the above list is the *minimum* requirements for a transportation impact update. Additional areas of transportation analysis may be requested by the County as part of the TIA scoping process based on specific site characteristics and/or context of the surrounding areas.

1.4.3 Full Transportation Impact Assessment

Detailed transportation impact assessments include major amendments to Area Structure Plans and Sub-Area Structure Plans as well as new plans. Requirements for a full transportation impact assessment include at a minimum (**Bolded Items represent requirements that are in addition to those required in the Memo and Transportation Impact Assessment Update**):

- Background
- Study Scope, Goals, Methodology
- Site Location
- Existing Land Uses
- Existing Transportation Network
- Existing Traffic Volumes
- Study Horizon (Short and Long Term. Long term will typically reflect either full build out of development or 20 years past full build out, but should not exceed approximately 25 years past existing conditions)
- **Future Adjacent Land Uses, Road Network, and Site Plans**
- Proposed Land Uses
- Site Plan
- Access Locations
- Trip Generation Rates and Total Trips
- Trip Distribution, Assignment and Traffic Volumes (Peak hours which may include weekends and AADT)
- Proposed Roadway Cross Sections and Conceptual Designs of Intersections
- Review of Intersection Spacing, if applicable
- Review of Sight Distances
- Proposed Network for People Walking, Cycling, and Taking Transit
- Multimodal Evaluation including Intersection Analysis
- Parking Supply Review
- **Staging Analysis**
- Conclusions and Recommendations

As noted previously, the above list is the *minimum* requirements for a full transportation impact assessment. Additional areas of transportation analysis may be requested by the County as part of the TIA scoping process based on specific site characteristics and/or context of the surrounding areas.

1.4.4 Summary of Level of Detail

Table 1 indicates a summary of the requirements for each level of analysis.

Table 1 Summary of TIA Level of Detail

Element	TIA Memo	TIA Update	Full TIA
Background	•	•	•
Study Scope, Goals and Methodology	•	•	•
Site Location	•	•	•
Existing Land Uses	•	•	•
Existing Transportation Network	•	•	•
Existing Traffic Volumes	•	•	•
Study Horizon	•		
- Short Term		•	•
- Long Term			•
Future Adjacent Land Uses and Site Plans			•
Future Adjacent Road Network			•
Proposed Land Uses	•	•	•
Site Plan	•	•	•
Access Locations		•	•
Trip Generation Rates and Total Trips	•	•	•
Trip Distribution, Assignment and Traffic Volumes		•	•
Proposed Roadway Cross Sections and Conceptual Design of Intersections		•	•
Review of Intersection Spacing, if applicable		•	•
Review of Sight Distances		•	•
Proposed Network for People Walking, Cycling and Taking Transit	•	•	•
Multimodal Evaluation including Intersection Analysis		•	•
Parking Supply Review		•	•
Staging Analysis			•
Conclusions and Recommendations	•	•	•

2 FORMAT

TIAs submitted must include the following information:

- Application number
- Professional and Permit to Practice Stamps. TIAs must be stamped by a professional engineer licensed to practice in Alberta, and the company's permit to practice number must be included. Draft reports will not be reviewed.

2.1 Scope

Notwithstanding the minimum requirements for each tier of study level, the average TIA will align with the following general format:

1. Introduction and Background
2. Site Context
3. Study Context and Proposed Development
4. Site Trips
5. Multimodal Transportation Analysis
6. Staging and Short-Term Evaluation
7. Conclusions and Recommendations
8. Appendices

2.2 Detailed Contents

Key items that must be covered in each section are highlighted below.

2.2.1 Introduction and Background

- Background information on-site
- Previous applications or approvals
- Applicant name and land owner
- Type of application associated with TIA
- Study goals and objectives
- Study scope
- Methodology

2.2.2 Site Context

- Site location within Bremner or specifically within a sub-area (including figure)
- Existing and adjacent land uses
- Existing road network including classifications, lanes, intersections, speed limit, and existing and historic traffic volumes on links and at intersections
- Existing walking facilities, crossings, and pedestrian volumes
- Identification of gaps in the pedestrian and cycling network within the study area
- Existing transit service and stop locations
- Existing cycling facilities
- Existing parking accommodation

2.2.3 Study Context and Proposed Development

- Analysis horizons and reasoning. Typical study horizons will include existing conditions, a short-term horizon and a long-term horizon. Short-term typically refers to 10 years from existing conditions. Long-term may reflect either full build out of development or 20 years past full build out, but should not exceed approximately 25 years past existing conditions.
- Approved traffic volumes from previous studies, if relevant, including trip generation rates (include figure)
- Changes to any adjacent land uses and street/cycling/walking/transit network within study horizon
- Assumed future background traffic volumes for study horizon years (include figure)
- Proposed land use description including site plan, proposed land uses, population, areas, densities, and sizes of any trip generating land uses.
- Proposed site street network (include figure)
- Proposed access locations (include a centreline to centreline spacing diagram to confirm intersection spacing)

2.2.4 Site Trips

Site trip information will be presented in tabular format and with figures.

- Trip generation rates based on identified land uses
- Total gross person trips
- Mode split information
- Pass-by and internal trip capture
- Net trips by mode
- Trip distribution and assignment
- Site generated traffic volumes for driving, walking, cycling, and transit
- Total traffic volumes (driving) for intersection analysis (AM, PM, Daily and potential weekend peak depending on land use).

2.2.5 Multimodal Transportation Analysis

- Evaluation for people driving, walking, cycling and taking transit, including connectivity of infrastructure and coverage maps to illustrate percentage of proposed development area within walking distance
- Intersection analysis using Synchro, Version 9 or newer
- Roundabout evaluation (if applicable) using SIDRA 7 or newer
- Intersection and roundabout analysis results for anticipated level of service (LOS), volume-to-capacity (v/c) ratios and 95th Percentile Queues by movement for each peak period evaluated.
- Existing, background (no build), and future (with build) scenario comparison
- Recommendations for traffic control measures including figures.
- Access review and queuing review to evaluate adequacy of throat depths at site accesses and intersection turn bays to accommodate 95th Percentile Queues, including potential blockage by adjacent lanes of traffic
- Parking Evaluation relative to bylaw requirements

2.2.6 Cross Sections and Conceptual Figures

- Figures identifying recommended cross sections (can be taken directly from Bremner Complete Street Design and Construction Standards)
- Conceptual intersection design figures confirming geometric recommendations
- Heavy vehicle routes

2.2.7 Staging and Short-Term Evaluation

- Evaluation to support interim horizon development and identify short term upgrades to support any staging
- Thresholds for infrastructure upgrades

2.2.8 Conclusions and Recommendations

- Summary of work completed
- Summary of improvements recommended
- Recommendations for any future study

2.2.9 Appendices

- Correspondences with County regarding scope of work, changes to scope, agreed upon assumptions
- Traffic counts
- Trip generation and parking generation assumptions and sources
- Synchro/SimTraffic, SIDRA outputs (pdfs of results)
- Signal and pedestrian warrants
- Detailed analysis not included in body of report

2.3 Submission and Response to Comments

All submitted TIAs should be provided to the County as a single printed hard copy. Analysis files such as Synchro and SIDRA must also be included. The County reserves the right to request pdf copies of the TIA as well.

2.4 Final Approval Procedure

Strathcona County will not review draft documents. Comments will be provided to proponent and updates may be necessary prior to final approval.

3 EXISTING AND BACKGROUND SOURCES

The source of all background assumptions including traffic volumes, street network, transit network, and walking and cycling facilities must be documented clearly within the TIA or its appendices. The following section of the TIA Guidelines summarizes potential sources for existing and future horizon background assumptions.

3.1 Study Area

The identified study area must be approved by Strathcona County prior to submission of the final TIA. Study area will vary depending on the size of the site but will include, at a minimum, all adjacent arterial/arterial, arterial/collector, and collector/collector intersections as well as all internal intersections greater than local/local. Smaller intersections may also require evaluation depending on the nature of the site. The study area may extend beyond the boundaries of the plan/site area if there is an anticipated impact of nearby major intersections, transit facilities or walking and cycling infrastructure.

3.2 Adjacent Land Uses

Adjacent land uses can be identified through site visits and existing approved plans. Any future changes to adjacent or nearby land uses must be identified through confirmed plans in the study area. If no nearby Area Structure Plans have been approved, the Area Concept Plan Development Concept may be used for assumptions.

3.3 Existing and Proposed Transportation Networks

Any known or anticipated changes to the street, transit, cycling or walking networks in the study area can also be identified through existing approved plans up to and including the Area Concept Plan. Strathcona County can support identification of future approved networks through sharing existing development plans or TIAs where appropriate. Existing infrastructure located on or near the site must be documented through approved site plans or site visits including photos. Other sources of information may include Cycling Plans, Walkability Studies and Transit Master Plans or proposed routing information as available.

3.4 Existing and Future Background Traffic Volumes

Identifying existing and future background traffic volumes for the study horizons is necessary to appropriately evaluate the impact of the site growth on the existing and proposed network. There are a number of sources which may help identify traffic volumes, including:

- On site traffic counts (no more than 2 years old),
- Strathcona County Traffic Model Data,
- Alberta Transportation's Regional Transportation Model
- Approved Existing TIAs (where available), and
- Appropriate growth assumptions.

All traffic volume data must be sourced and justified as to its relevance to the study. Any changes made to external data including model data or other approved plans and TIA must be justified. Traffic data older than 2 years may need to be re-collected. Data collection may be coordinated through Strathcona County if site is part of regular traffic county collection program. In other cases, developer will be responsible for funding traffic count data.

3.4.1 Future Background Traffic Growth

Future background traffic volumes can be based on general growth rates or through estimating impact of other regional developments. All assumptions regarding future background traffic volumes must be noted and approved by the County. Future background traffic should be consistent with Strathcona County's Transportation Model and Alberta Transportation's Regional Transportation Model unless reasonable justification is provided.

3.5 Peak Hours

At minimum all TIAs must cover an AM and PM Peak hour period, which may consist of the peak hour of the site (generator) or the peak hour of the adjacent roadways and identify daily volumes along all corridors. For major commercial centres, a Saturday peak hour may be requested in lieu of an AM Peak period. For school sites, the evaluation may need to include a specific pick up and drop off access review, which may occur outside of the adjacent intersection peak hour.

4 TECHNICAL COMPONENTS

This section outlines the expectations for the technical components of the TIA including trip generation, distribution, assignment, and mode splits. The multimodal evaluation criteria are also identified.

4.1 Trip Generation Rates

Strathcona County does not have its own trip generation rates. In absence of specific site trip generation studies, trip rates from the most recently published Institute of Transportation Engineers (ITE) Trip Generation Manual are recommended as a baseline for trip generation. Use of ITE Trip rates as a base are recommended for all TIAs in Bremner and the LEA and should not be modified without validation and approval from the County.

As ITE trip rates are generally based on studies from suburban contexts, mode splits are expected to weigh heavily towards people driving. However, depending on the Bremner context, it may be acceptable to reduce these rates using local mode split data to reassign traffic from people driving to people choosing other modes. Furthermore, ITE trip rates do not identify vehicle occupancy, which is important when converting from an all driving mode assumption to multimodal trip generation.

A useful resource in identifying vehicle occupancy, trip generation rates, and mode splits is the most recent Edmonton and Region Household Travel Survey, which includes City of Edmonton and Regional data (including Strathcona County). Professional judgement is required to adjust trip data from the ITE trip rates or other source to appropriate multimodal trips and all changes must be reviewed by the County and approved through the submission of the Terms of Reference.

For commercial developments, it is appropriate to assign some traffic volumes as linked / diverted / pass-by traffic. This is comprised of existing traffic on the roadway that was not intending to travel to the proposed site, and then departs the proposed development site in the same direction they were traveling prior to entering the site. Pass-by traffic may be calculated using ITE's *Trip Generation Handbook*. Linked / Diverted / Pass-By traffic estimates must be provided as part of the development's trip generation estimates.

For mixed-used developments, a percentage of the trips generated by the proposed site may be expected to remain on-site. Internal capture should be estimated using ITE's Trip Generation Handbook and provided as part of the development's trip generation or other appropriate source as agreed upon by the developer and the County. Internally captured trips must be accounted for at internal intersections within the development site and on roadways between the proposed uses.

4.2 Trip Distribution and Assignment

Trip distribution and assignment can be based on Strathcona County Model Data, existing TIAs or engineering judgement. All assumptions must be documented within the TIA. Trip distribution and assignment must be illustrated in figures within the TIA, and background data must be included in Appendices.

4.3 Multimodal Evaluation

The multimodal transportation evaluation will be a combination of traditional quantitative intersection level of service analysis and qualitative multimodal analysis that reviews the available facilities and infrastructure for people walking, biking and taking transit. Metrics against which the multimodal evaluation should be considered are summarized in **Table 2**.

Table 2 Typical Evaluation Criteria for Multimodal TIA

Mode	Evaluation Criteria
Driving	<ul style="list-style-type: none"> • Corridor AADT • Intersection level of service (delay/vehicle) • Volume-to-capacity ratio (v/c) • Queuing • Storage capacity of auxiliary lanes • Potential conflicts/safety issues, including blocking of auxiliary lanes due to queuing on main lines
Walking	<ul style="list-style-type: none"> • Quality of facilities • Connectivity to attractions • Missing links • Crossing delay at intersections • Crosswalk length • Traffic volumes and speeds • Buffer from walking facilities
Biking	<ul style="list-style-type: none"> • Quality and appropriateness of facilities • Missing links • Connectivity to attractions and higher over cycling facilities • Barriers to cycling
Transit	<ul style="list-style-type: none"> • Proximity and access to stops and stations • Transit service frequency • Transit stop quality

4.3.1 Driving Evaluation

The level of service required for site intersections is based on the Highway Capacity Manual procedure for identifying intersection capacity. Control delay standards as well as volume to capacity ratios as they are associated to levels of service are summarized in **Table 3**.

Table 3 Level of Service Criteria

Level of Service	Average Control Delay (Seconds per vehicle)		V/C
	Signalized	Unsignalized	
A	10.0 or less	10.0 or less	0 to 0.60
B	10.1 to 20.0	10.1 to 15.0	0.61 to 0.70
C	20.1 to 35.0	15.1 to 25.0	0.71 to 0.80
D	35.1 to 55.0	25.1 to 35.0	0.81 to 0.90
E	55.1 to 80.0	35.1 to 50.0	0.91 to 1.00
F	Greater than 80.0	More than 50.0	>1.00
Breakdown	Very High	Very High	Very High

As a general rule, a LOS of D or greater is expected for short term horizons (10 years or less) and LOS E is required for long term horizons for the overall intersection and individual approaches/movements. Exceptions may be granted in Town and Village Centres where capacity is prioritized to users of other modes, as well on major transit corridors where transit priority could impact driving level of service.

4.3.1.1 Synchro and Sidra Parameters

Recommended software parameter inputs are summarized in **Table 4**. All values can be changed with appropriate justification.

Table 4 Capacity Software Inputs

Settings	Recommended Value
% Trucks	3% for Bremner, 10% for LEA
Saturation Flow Rate	1850 pcu/hr/ln
Minimum lane width	Identified based on road classification in the Bremner D&C Standards
Grade	0%
Peak Hour Factor	0.92
Link Speed	As designed
Pedestrian Walk Time	Based on width of crossing and walking speed of 1.0 m/sec

4.3.1.2 *Signal warrants*

Signal warrant analysis following the Transportation Association of Canada (TAC) Signal Warrant procedure must be completed on intersections for short term (10 years or less) horizons. Long term evaluation of need for signals should be based on capacity analysis results.

4.3.1.3 *Roundabouts*

Roundabouts may be considered in locations where they may provide safety benefit for all users (including people walking, cycling and taking transit). Roundabouts may be considered when signal warrants or capacity analysis indicate that controls greater than stop are required and at the discretion of the County. Roundabouts must follow design recommendations identified in the Design and Construction Standards and provide safe accommodation for people walking and cycling. Roundabout design speed must not exceed 40 km/h and should be targeted at 30 km/h regardless of the design speed of the corridor. For locations with significant pedestrian volumes (within **400** m of schools and transit centres), only single lane roundabouts are recommended.

4.3.2 **Walking Evaluation**

The quality of a walking and wheeling (using mobility aids) experience is based primarily on the quality of facilities available for people walking. A high-quality walking environment is one that has sufficient space for two users in wheelchairs to pass easily, street-oriented buildings and a sense of place, safe and convenient crossings, feels secure for walking at all times of day, and has direct connections to destinations. Level of service criteria for people walking is summarized in **Table 5**.

In addition to the level of service evaluation, the TIA must show that walking facilities are connected and direct.

Table 5 Walking Evaluation Criteria

Level of Service	Mid-Block	Intersection
A	<ul style="list-style-type: none"> • Pedestrian through zone ≥ 3.0 m • Buffer from moving traffic ≥ 1.7 m 	<ul style="list-style-type: none"> • Pedestrian signal head with sufficient clearance time • Clearly delineated crosswalk • Universal design ramps • Curb radii >4.5 m and < 6.0 m • Crossing type appropriate to speed limit and volume of street
B	<ul style="list-style-type: none"> • Pedestrian through zone <3.0m and > 2.0m • Narrow buffer from moving traffic (<1.7m) 	<ul style="list-style-type: none"> • Pedestrian signal head with sufficient clearance time • Clearly delineated crosswalk • Curb ramp oriented to crosswalk • Curb radii >6.0 m and <10.0 m • Crossing type appropriate to speed limit and volume of street
C	<ul style="list-style-type: none"> • Pedestrian through zone <2.0 m and > 1.5m • No buffer from moving traffic 	<ul style="list-style-type: none"> • Pedestrian signal head with sufficient clearance time • Clearly delineated crosswalk • Crossing type appropriate to speed limit and volume of street • Curb ramp not oriented to crosswalk
D	<ul style="list-style-type: none"> • < 1.5 sidewalk 	<ul style="list-style-type: none"> • Pedestrian signal head with sufficient clearance time • Clearly delineated crosswalk • Crossing type may be appropriate to volume of street • Curb ramp not oriented to crosswalk
E	<ul style="list-style-type: none"> • Paved shoulder or no sidewalk 	<ul style="list-style-type: none"> • No pedestrian signal head • No delineated crosswalk • Crossing is skewed • Curb radii >10.0 m • Lack of curb ramps
F	<ul style="list-style-type: none"> • No facility 	<ul style="list-style-type: none"> • No marked crosswalk

A level of service of C or better is targeted for Bremner and the LEA.

4.3.3 Cycling Evaluation

Bremner and the LEA are designed to be acceptable by people on bikes throughout the study area. The type of facility depends largely on the anticipated street traffic volumes, and therefore level of service for people cycling is driven by street type, facility type and traffic volumes. Cycling level of service is summarized in **Table 6**.

In addition to the level of service evaluation, the TIA must show that cycling facilities are connected and direct.

Table 6 Cycling Level of Service Criteria

Level of Service	Mid-Block	Intersection
A	<ul style="list-style-type: none"> Protected bike lane or multi use trail with sufficient width for snow clearing and to meet user demand Protected facility buffered from traffic and people walking by $\geq 1.0\text{m}$ 	<ul style="list-style-type: none"> Separated facility through intersection Bicycle box Bicycle Signal head
B	<ul style="list-style-type: none"> Protected bike lane or multiuse trail Shared lanes if speeds $\leq 30\text{ km/h}$ and $\text{ADT} \leq 2,500$ 	<ul style="list-style-type: none"> Separated facility through intersection Bicycle box Bicycle Signal head
C	<ul style="list-style-type: none"> Bicycle facility buffered and speeds $>40\text{ km/h}$ and $\leq 50\text{ km/h}$ Shared lanes if speeds $\leq 30\text{ km/h}$ and $\text{ADT} > 2,500$ 	<ul style="list-style-type: none"> Separated facility through intersection Bicycle box Bicycle Signal head
D	<ul style="list-style-type: none"> Bicycle facility buffered (not protected) and speeds $\geq 50\text{ km/h}$ 	<ul style="list-style-type: none"> Bicycle treatment but no signal head
E	<ul style="list-style-type: none"> Bicycle facility not protected or separated and speeds $\geq 50\text{ km/h}$ For shared facilities, speed $>30\text{ km/h}$ 	<ul style="list-style-type: none"> Shared facilities No bicycle treatment
F	<ul style="list-style-type: none"> No bicycle facilities 	<ul style="list-style-type: none"> No bicycle facilities

A level of Service of C or better is targeted for Bremner and the LEA.

4.3.4 Transit Evaluation

While transit route locations are typically assigned by Strathcona County, transit stop locations should be identified in the TIA. Level of service for transit is identified in **Table 7**.

Table 7 Transit Level of Service Criteria

Level of Service	Transit Stops Proximity to Site	Transit Headway
A	<ul style="list-style-type: none"> 90% of site \leq 200 m 	<ul style="list-style-type: none"> \leq 5 minutes
B	<ul style="list-style-type: none"> 90% of site \leq 500 m 70% of site \leq 200 m 	<ul style="list-style-type: none"> >5 – 10 minutes
C	<ul style="list-style-type: none"> 90% of site \leq 500 m 50% of site \leq 200 m 	<ul style="list-style-type: none"> >10 – 15 minutes
D	<ul style="list-style-type: none"> 100% of site \leq 600 m 	<ul style="list-style-type: none"> >15 – 20 minutes
E	<ul style="list-style-type: none"> 100% of site \leq 800 m 	<ul style="list-style-type: none"> >20 – 30 minutes
F	<ul style="list-style-type: none"> 100% of site > 800 m 	<ul style="list-style-type: none"> >30 minutes

Proximity to stop assumes straight line walking distance to transit stops, which can include everything from a roadside stop to a transit station. Intersection level of service also impacts transit and the associated intersection capacity analysis should be reviewed as part of transit analysis. If intersection capacity is less than a level of service C, the TIA may recommend signal priority measures at intersections to improve level of service for transit. Transit stop design does not need to be reviewed as part of TIA but all transit stops should comply with requirements identified in the Bremner Design and Construction Standards.

A level of service of C is targeted for Bremner. A level of Service of E is targeted for the LEA. If the LOS for transit is worse than C but the area is not serviced by transit routes, the TIA should recommend transit routes. Approval will not be contingent on transit.

Railway crossings must be evaluated for projects within the LEA.

4.4 Parking Evaluation

Parking supply may be required as part of the TIA (to be determined by Strathcona County as part of TIA scoping). Parking supply and design should reflect the trip generation and mode split assumptions for site areas. Justification for providing less parking than required by trip generation must be justified through adjustments to mode splits, identification of shared parking facilities, and appropriate pedestrian and cycling infrastructure and connectivity to the surrounding network.

Onsite parking and circulation may require evaluation to show safety within the site and identify potential queue spill backs which could impact intersection operations. TIAs may also recommend neighbourhood parking bans as part of overall recommendations.

4.5 Access Review

Access to the site must follow TAC recommendations for roadway classification. Direct access to arterial streets in Bremner is not recommended except within Town and Village Centres. Access spacing must consider intersection queues. Access locations will be reviewed based on site context and traffic information.

5 CONTACT INFORMATION AND REFERENCE DOCUMENTS

This section to include contacts at the County (general) for questions and submissions and links to the Bremner Area Documents.

6 REFERENCES

Content for these guidelines was developed with support from the following sources:

- Edmonton and Regional Household Travel Survey Summary Report. (April 2018) Prepared by The City of Edmonton and R.A. Malatest & Associates.
- York Regional Transportation Mobility Plan Guidelines for Development Applications (November 2016). Prepared by York Region.
- City of Edmonton Transportation Impact Assessment Guidelines (2016 Edition). Prepared by the City of Edmonton