

Traffic Impact Study Guidelines



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Oxford County



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Disclaimer:

The following document outlines general guidelines and principles for the preparation of traffic impact studies within the County of Oxford. The County recognizes the uniqueness of each development, and that good engineering judgement is necessary when applying the guidelines and assumptions summarized in this document. The purpose of these guidelines is to outline the general process and structure required to produce a comprehensive and complete traffic impact study.

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1. Introduction

The County of Oxford (referred herein as “the County”) is an upper tier municipality in southwestern Ontario, comprised of eight area municipalities. The area municipalities are responsible for their own local roads, while the Ontario Ministry of Transportation (referred herein as “the MTO”) has jurisdiction over four highways within the County: Hwy 401, Hwy 403, Hwy 3 and Hwy 19. The County is responsible for the operation and maintenance of approximately 1,335 lane kilometers of County roads. A key objective of the County’s transportation system is to provide a safe and efficient roadway network that meets the needs of its residents, enabling convenient and safe movement throughout the County.

The County’s 2024 Transportation Master Plan (TMP) is a strategic long-term planning document that outlines and defines policies, programs and infrastructure improvements needed to manage both existing and future transportation demands to the year 2046. When specifics of a development become known, it is necessary for the applicant to complete a Traffic Impact Study (TIS) to assess the transportation impact of the proposed development. A TIS is required to identify necessary transportation improvements to accommodate the development and/or mitigation measures to offset the impact of proposed development on the transportation network.

The County’s TIS Guidelines have been prepared to outline the process and structure required to produce a complete TIS. These guidelines are designed to provide clear understanding of the requirements and expectations of a TIS, establishing a standard and consistent approach for consultants.

2. Purpose of TIS (Why)

The purpose of a TIS is to assess the potential impacts of traffic generated by development; identifying improvements or mitigation measures necessary to ensure that the surrounding road network continues to function with acceptable operations conditions upon build out.

A complete TIS should address the following:

- Assess mobility impacts to all road users (cars, trucks, pedestrians, cyclists, transit users);
- Evaluate impact of development based on number of generated trips and the primary travel routes used to travel to and from the site;
- Update traffic projections for future horizon years on the surrounding road network;



- Evaluate site access (number of access points, location, and design);
- Identify transportation improvements required to accommodate the development; and
- Determine developer's responsibility for specific off-site transportation related improvements.

3. Need for TIS (When)

A TIS is required as supporting documentation for all developments that will have an impact on the transportation network, including roads, transit, cycling and pedestrian facilities. In general, a TIS is required when one or more of the following criteria is present:

- More than 50 trips will be added to the surrounding road network during the peak hour as a result of the development;
- The development proposal includes a new access or connection to a County road;
- In the opinion of County, capacity and/or safety issues currently exist or are expected to occur as a result of the proposed development;
- Geometric changes are prompted by the proposed development. Examples include a roundabout, controlled pedestrian crossing (PXO), or turning lane; or
- A new traffic signal (or modifications to an existing signal) is necessary to mitigate traffic impacts of the development.

The County reserves the right to require a TIS notwithstanding the criteria listed above.

4. Requirements of TIS (How)

Prior to initiation/commencement, the consultant shall liaise with County staff to confirm the scope of the TIS and determine data requirements and their availability. The consultant shall submit their Terms of Reference (ToR) to the applicable agencies for review, comment and approval. The draft ToR should include the following:

- Summary of the development proposal;
- Study area intersections;
- Ongoing / planned developments in the area;
- Background growth rate;
- Analysis periods; and
- Horizon years.

If the proposed development falls within the MTO's Controlled Area, the consultant shall contact the MTO's Highway Corridor Management office to arrange for MTO approval of the ToR.

The TIS shall be completed by a qualified transportation engineering/planning professional with experience and expertise in the field of transportation and traffic engineering and preparation of traffic impact studies. A TIS report should be signed and sealed by a Professional Engineer licensed in Ontario.

The consultant completing the TIS should reference the following resources as applicable (and as amended from time to time):

- 2024 Transportation Master Plan – Oxford County
- Guidelines for Entrances to the County Road System – Oxford County
- General Guidelines for the Preparation of Transportation Impact Studies – MTO

- Ontario Traffic Manual (OTM) Books – MTO
- Geometric Design Guide for Canadian Roads – Transportation Association of Canada (TAC)
- Canadian Capacity Guide for Signalized Intersections – TAC
- Highway Capacity Manual (HCM) – Transportation Research Board (TRB)

5. Development Proposal

The TIS should include a section near the beginning of the report, which describes the development proposal, including the following components:

- Municipal address;
- Site location;
- Existing land use (based on Official Plan and Zoning by-law);
- Proposed land use;
- Property area (in hectares);
- Building footprint and floor space;
- Number of residential units;
- Population and employment details;
- Site plan / layout (access points, parking supply, etc.);
- Hours of operation (shift breakdown);
- Phasing details (description of each phase and timing of implementation); and
- Date of full build out and occupancy.

6. Study Area

The study area is a function of the size and nature of development; study area intersections should be confirmed as part of the pre-study consultation with the County. Study intersections are those that will be impacted by the proposed development. The following intersections should be included:

- All site accesses and/or proposed connections to the existing road network;
- Intersections where site traffic will cause one or more movements to incur critical operating conditions; and
- Intersections where peak hour traffic is expected to significantly increase because of development.

The consultant should produce a study area map, which illustrates all signalized and unsignalized intersections to be assessed as part of the TIS. This section should include a description of the existing transportation system (number of lanes, speed limit, lane configuration, type of control, on-street bike lanes, etc.). Any roadway restrictions (parking, stopping, heavy vehicle) should also be identified.

Planned roadway, transit and active transportation projects within the study area should also be identified based on the County's TMP, Capital Plan, Secondary Plan, and other planning documents.

7. Horizon Years

Horizon years to be assessed should be confirmed with the County as part of the pre-consultation process. Typical horizon years to be considered include the following:

- Existing Conditions – represents current operation conditions;
- Opening Day – represents full build out and occupancy of the development;
- 5 Year Horizon – five years after full build out; and
- 10 Year Horizon – ten years after full build out.

8. Analysis Time Periods

Time periods for analysis should be confirmed with the County as part of the pre-consultation process. Peak hour traffic is defined as the period of 60 minutes in which the combination of site related trips and background trips is at its highest. At minimum, the analysis should consider traffic operations during the AM and PM peak periods.

Specific timing of peak hour traffic will vary based on land use. Depending on the type of development, analysis of additional periods may be warranted. Analysis during evenings and/or weekends may be required for establishments such as churches, movie theatres, and fast-food outlets.

9. Existing Traffic

Existing traffic volumes can be derived from the most recent traffic counts available. If these counts are older than 3 years or not indicative of existing conditions, new counts should be undertaken at the cost of the consultant. New counts should be conducted during months when schools are in session (Fall and Spring). Weekday data collection should be conducted on a typical weekday (Tuesday through Thursday). New counts should delineate between cars, trucks, buses, cyclists, and pedestrians. A full 8 hours of data should be collected, generally covering the following time periods:

- 7:00 AM – 10:00 AM;
- 11:00 AM – 2:00 PM; and
- 3:00 PM – 6:00 PM.

Volume balancing is required when traffic counts have been conducted at different times of year or in different years. This will require adjustment and balancing of upstream and downstream volumes.

10. Background Traffic

Background traffic consists of two components: traffic growth and other area development. The consultant should detail background growth assumptions to account for growth between the existing year and horizon years.

Background Growth

The background growth rate projects future traffic without the proposed development and should be established through one of the following methods:

- Regression analysis of historical traffic volumes [e.g. Traffic Message Channels (TMCs), Annual Average Daily Traffic (AADT)];
- Based on recent transportation studies completed in the area; or
- Demand forecasting model (calibrated traffic forecast model).

A minimum growth rate of 2% should be used to grow existing volumes unless supporting analysis justifies a lower rate.

Other Area Developments

Anticipated traffic growth from other known developments under construction, or in the approval process, within the study area should be accounted for. Details can be obtained from the County and Area Municipality.

The consultant should identify any major transportation improvements that are planned or committed. Given that planned roadway improvements will impact travel patterns, these improvements should be accounted for in the analysis completed for the future background and future total scenarios.

11. Site Generated Traffic

Development related traffic should be estimated in accordance with industry standards and best practices. All trip generation, model split, trip distribution, and trip assignment assumptions should be clearly documented.

Trip Generation

The number of site trips entering and exiting the development should be based on one of the following methods:

- Latest edition of the Institute of Transportation Engineers (ITE) trip generation manual;
- Local surveys or data from similar developments; or
- First principles approach (e.g. occupancy rates, peaking factors, floor space per employee).

Where appropriate, it may be justified to reduce trip generation based on synergy/internal trips, pass-by trips, and travel mode share adjustments.

A table should be included in the body of the report which summarizes the land use, directional split, trip generation rates and the resulting number of trips.

Mode Split

The consultant should provide justification for any modal split adjustments. Given the nature of most County roads, a modal split reduction is generally not realistic.

Trip Distribution

Distribution of site trips should be completed in accordance with good engineering practice, using one of the following methods:

- Existing or anticipated travel patterns;
- Origin-destination surveys;
- Comprehensive travel surveys;
- Market studies; or
- Transportation planning models.

Trip Assignment

Assignment of trips to the road network should be based on trip generation and trip distribution assumptions. Logical routes to and from the site can be established based on travel patterns and location of site ingress/egress. Trip assignment should reflect probable travel patterns based on knowledge of the future transportation network in the study area.

12. Future Total Traffic

Future total traffic represents the summation of existing traffic, background traffic, and site generated traffic. In general, future total traffic should be estimated for the opening day, 5 year horizon, and 10 year horizon scenarios.

A summary of existing and future traffic demands at all study intersections should be illustrated in the form of traffic volume figures within the report. Summary exhibits should be produced for each analysis period and analysis horizon. Volumes should be illustrated for the following conditions:

- Existing Traffic;
- Future Background Traffic (existing conditions + background growth);
- Site Generated Traffic; and
- Future Total Traffic (background traffic + site generated traffic).

13. Traffic Operational Analysis

The objective of the traffic operational analysis is to assess the impacts of the generated site traffic on the surrounding road network. Operational issues arising from the increased traffic demand is used to identify necessary improvements or mitigation measures required to ensure acceptable operating conditions upon build out.

Operational analysis shall be completed in accordance with the methodology described in the latest edition of the Highway Capacity Manual (HCM). Analysis should be conducted using Synchro traffic software version 11 or later. Inputs required for Synchro modelling include; traffic volumes, truck percentages, pedestrian volumes, cyclist volumes, peak hour factors (PHFs) and signal timing. Where appropriate, SimTraffic should be used to supplement the analysis.

Traffic impacts should be evaluated at each study area intersection (signalized and unsignalized) for existing conditions, future background conditions, and future total conditions. Each of these scenarios should be assessed for the time periods and horizon years identified during the pre-consultation process. The analysis should assume existing lane configuration and existing signal timing.

The following metrics should be reported as part of the operational analysis:

- Volume to Capacity (v/c) ratios;
- Vehicle Delay;
- Level of Service (LoS); and
- 95th Percentile Queues.

The analysis should identify signalized intersections where the following conditions exist:

- v/c ratios for through or shared through/turning movements is greater than 0.85;

- v/c ratios for left turn movements are greater than 0.95;
- LoS for an individual movement (based on average delay per vehicle), exceeds LoS E;
- LoS for overall intersection operations (based on average delay per vehicle), exceeds LoS D; and
- The estimated 95th percentile queue exceeds the available turning lane storage.

The analysis should identify unsignalized intersections where the following conditions exist:

- LoS for an individual movement (based on average delay per vehicle), exceeds LoS E;
- The estimated 95th percentile queue exceeds the available turning lane storage.

Critical movements are defined based on the criteria listed above. Potential mitigation measures to alleviate unsatisfactory operating conditions should be identified. Changes in lane configuration (e.g. dual left turns) and signal phasing (e.g. advance left turn phase) dictated by analysis should be tested in Synchro and summarized in the findings and recommendations section. Additional field studies (e.g. gap survey, queue reach survey) could be required at the discretion of the County.

14. Safety Review

A safety review should be completed to identify any potential safety or operational issues. The following should be considered as part of the review:

- Sight triangles and sight distance;
- Conflict areas between vehicles and vulnerable road users;
- Access conflicts;
- Heavy truck movement conflicts;
- Weaving and merging;
- Neighbourhood traffic infiltration / Cut-through traffic;
- School crossings; and
- Emergency vehicle response.

Detailed collision analysis is typically undertaken as part of an In-Service Road Safety Review (IRSR) or Road Safety Audit (RSA). However, at the discretion of the County, collision analysis may be required in select circumstances. This would be communicated during the pre-consultation process.

The objective of collision analysis is to identify possible contributing factors for a higher overall collision rate. The analysis should be based on the most recent 5 years of collision data available. Collision data is reviewed to identify trends based on:

- Severity of collision;
- Impact type;
- Temporal distribution (year, month, day of week, time of day); and
- Driving conditions (road surface, weather and light condition).

15. Traffic Signals

Traffic signal warrants should be completed using the warrant process detailed in OTM Book 12. If a signal is warranted, timing and phasing details should also be derived from OTM Book

12 guidance. The need for mid-block controlled pedestrian crossing (PXOs) should be assessed using OTM Book 15.

16. Left Turn Lanes

The need for additional turning lanes should be based on the operation analysis. Left turn lane warrants should be assessed following guidance from the Ministry of Transportation's, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads*.

17. Access Management

Sight access should be designed in accordance with the County's *Guidelines for Entrances to the County Road System*. In general, it is preferable to minimize the number of private site accesses to the County roads to maintain the integrity of the arterial road network. Where practical, site access should only be provided to the local road network. The number of site entrances should be based on site traffic, not design preference, and should follow the County's guidelines.

All site entrances must be designed to conform with sight triangle (approach and departure) and sight distance (decision, departure, and stopping) requirements specified in TAC's *Geometric Design Guide for Canadian Roads, Chapter 9*. Where possible, accesses should align with any existing intersections or driveways on the opposite side of the roadway. Site access points should be evaluated in terms of capacity, corridor operation, safety, sight distance, and adequate queue storage. Available sight distances should be taken from actual field measurements.

18. Site Circulation

Site circulation should be assessed to confirm successful turning manoeuvres by delivery trucks, waste collection trucks, and emergency vehicles. Vehicle turning templates (i.e. swept path analysis) should be generated using AutoTurn software. The consultant should ensure proper integration between pedestrian walkways, cycling paths, transit routes, and vehicular access to the development.

19. Intersection Spacing

The Province of Ontario corridor management standards suggest that intersection spacing should be based on speed and road classification. The recommended intersection spacing for lower speed local or collector roads is 400m and the preferred spacing for higher speed arterial roadways is 650m – 800m.

When extended roadway sections require a number of back-to-back turning facilities, consideration should be given to a continuous two-way left turn lane.

Proposed new "T" accesses for major commercial or municipal street accesses should, where possible, be located directly opposite existing "T" intersections or accesses.

20. Findings and Recommendations

The TIS should include a summary of key findings and recommended improvements. Impacts of the development on the surrounding road network should be highlighted. Potential

improvements and mitigation measures should be targeted towards addressing deficiencies, alleviating delay and congestion, and maintaining safe operating conditions.

Recommendations could involve access management, sightlines and visibility triangles, geometric changes, signalization and signage, and active transportation facilities.

An implementation strategy with suggested timing for operational and geometric improvements should be developed. This should be done in consultation with the County's 2024 Transportation Master Plan for potential coordination with planned capital projects.

21. Documentation and Reporting

The consultant should provide a TIS report to relevant stakeholders for review and comment. Following the agency review period, the consultant will be required to make any necessary updates and changes to the report.

The structure and format of the report should be consistent with the preceding sections of this document. Key maps, figures, exhibits, and summary tables shall be included within the main body of the report. Appendices to the report should include supporting data and analysis, including; traffic counts, signal timing plans, synchro reports, traffic signal warrants, left turn lane warrants, and sight distance analysis.

Note that all final TIS reports become public record and can be shared with other applicants or consultants. The County reserves the right to require a peer review of a TIS. In such cases, the County will notify the proponent and their consultant.

In the event that the development application is inactive for a period of time that exceeds three years (i.e. 'shelf life'), the TIS shall be updated to reflect changes to the existing transportation condition. Updates can be made in the form of an addendum or updated report.