TRAFFIC IMPACT ASSESSMENT GUIDELINE

ALBERTA INFRASTRUCTURE & TRANSPORTATION

TRAFFIC IMPACT ASSESSMENT GUIDELINE

Prepared for:

Alberta Infrastructure & Transportation
Transportation & Civil Engineering Division
Technical Standards Branch

By:

Stantec Consulting Ltd.
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Glen Tjostheim, Alberta Infrastructure & Transportation
Robert Lindsay, Alberta Infrastructure & Transportation

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Alberta Infrastructure & Transportation
Traffic Impact Assessment Guideline

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1.0 Introduction

1.1 PURPOSE

Traffic Impact Assessments (TIAs) are a valuable tool for analysing traffic generated by proposed developments with new access or increased use of an existing access. A TIA generally includes a description of the scope and intensity of the proposed project, a summary of the projected impacts and any required mitigation measures, and helps ensure that the highway can safely accommodate a proposed subdivision/ development.

A well-prepared traffic impact assessment helps the developer and permitting agency accomplish the following:

- Forecast the traffic impacts created by proposed development based on accepted practices, not perceptions;
- Determine improvements needed to accommodate the proposed development;
- Allocate funds more efficiently;
- Relate land use decisions with traffic conditions;
- Evaluate the number, location, and design of access points;
- Update traffic data (projections)
- Identify needed roadway improvements; and
- Provide a basis for determining the developer's responsibility for specific off-site improvements (1).

Prior to the approval of a subdivision, development, Area Structure Plan, or other forms of pre-subdivision planning, Alberta Infrastructure and Transportation (INFTRA) may require the completion of a TIA. The following guideline is intended to assist developers and consultants in better understanding the department's requirements and expectations regarding TIAs.

This document is not intended to provide technical engineering guidelines, but rather to provide a framework for the documentation of such reports. A qualified transportation engineer should complete the TIA.

1.2 ETHICS & OBJECTIVITY

Although INFTRA and the developer/ consultant will sometimes have different objectives and perspectives, all parties involved in the process should adhere to established engineering practices, and conduct all analyses and reviews objectively and professionally (2).

1.3 GENERAL INFORMATION

The following is intended as a guide for the preparation of traffic impact assessments, however the guide cannot feasibly cover all situations. Some studies will require additional information as identified by INFTRA. Prior to the completion of a TIA, it is recommended that the developer/ consultant contact INFTRA. The traffic consultant should discuss whether the department is prepared to consider a new access(es) and/or a change of use of a particular access. Once confirmed, the traffic consultant should discuss the project scope with the department, including the study area, intersections to be studied, and identify the issues and concerns of INFTRA.

It should be noted that signalized intersections are generally not allowed in rural areas on the provincial highway system, and is considered an absolute last resort for improving an at-grade intersection. In addition, the department will not accept TIAs with proposed speed limit reductions on the highway, unless they have agreed to the condition prior to completing the TIA. The analysis should consider all other possible alternatives prior to recommending signals and/or speed limit reductions.

It should be noted that, when required by the department, a qualified transportation professional might be required to endorse and stamp the completed TIA report.

2.0 Recommended Study Format

By following the study format presented below, it is anticipated that INFTRA can achieve efficiencies in department review, with the added benefit of ensuring consistency among various studies. Compliance with these recommendations will result in reductions in staff review time required, which in turn should greatly enhance the overall efficiency of reviewing development/ subdivision applications.

2.1 BACKGROUND INFORMATION

Overall, the purpose of background information is to provide an understanding of the proposed development and it's location with respect to the provincial highway system. The first portion of the report should outline the background information such as, but not limited to:

A) Proposed Development

1) Development name and/or developer
2) Development location
3) Type of development
4) Size of development
5) Staging (by year anticipated)

B) Highway

1) Number & Control Section
2) Highway Classification

C) Study Area

1) Key Map
2) Site Plan

2.2 EXISTING INFRASTRUCTURE & CONDITIONS

Prior to projecting and analyzing traffic, it is necessary to identify the existing infrastructure and conditions within the study area. It is recommended that a site visit/ inspection be conducted as part of any TIA. In addition, INFTRA has a number of resources available to assist in the data collection phase of a TIA. Section 3 of this guideline outlines some of these resources. The following is a list of information to be considered for inclusion in a TIA.

A) Existing Highway Conditions

1) Pavement width
2) Pavement markings
3) Right-of-way width
4) Vertical grades on Highway
5) Horizontal alignment of Highway (i.e. curve radius)
6) Design and/or posted speed limit
7) Locations of speed limit changes
8) Existing/ proposed accesses in vicinity
9) Existing illumination in vicinity
10) Traffic control type (i.e. two-way or all-way stop control, etc.)
11) Traffic operation signage (i.e. no left-turns, no parking)

B) Existing Intersection Conditions (if applicable)

1) Intersection configuration (include scaled plan)
2) Vertical grades of local/ intersecting road
3) Intersection sight distance
4) Stopping sight distance
5) Signal timings (if existing)
6) Major developments currently using intersection

If vertical grades on the highway, or at the existing/ proposed intersection location are a concern (i.e. insufficient intersection sight distances), it is recommended that alternate access or relocation of the proposed access be considered, and discussed with the department, prior to further analyses.

C) Existing Traffic Conditions

1) Turning Movement Counts (Diagram &/or Table) – AADT
2) Turning Movement Count (Diagram &/or Table) – AM Peak
3) Turning Movement Count (Diagram &/or Table) – PM Peak
4) Existing AADT on Highway
5) Historical Traffic Growth Rate on Highway
6) 5-yr Traffic Growth Rate at Highway/ Intersection
7) 10-yr Traffic Growth Rate at Highway/Intersection
8) Annual Traffic Growth Rate at Highway/ Intersection
9) Vehicle composition (% vehicle type) on Highway/ Intersection

In many instances, INFTRA may have turning movement counts available for intersections located within the study area. If the existing intersection does not have current turning movement diagrams completed by INFTRA, the consultant should conduct manual traffic counts at the study area locations. Traffic counts shall be broken into 15-minute intervals over a long enough period to establish the peak hours. Counts should not be conducted during times of detours, accidents, or inclement weather that could affect traffic volumes. In addition, traffic counts should be taken at times when the traffic represents an average day, not on or near holidays or special events.

Traffic growth rates should be calculated as non-compounded. In order to support the average annual growth rate used for analysis purposes, it is important to consider growth rates over various timeframes (as listed above). Although this may not always be possible, it is recommended, when the appropriate information is available. This will ensure that a reasonable average annual growth rate is used for analysis purposes.

As information, INFTRA maintains a database of traffic growth rates on provincial highways. Currently, the ten-year (since 1994) growth in traffic on Alberta Highways is roughly 2.5 % of the 2003 volumes. It should be noted that the provincial average traffic growth rate is dynamic, therefore, consultants should check with the department for the current average.

2.3 TRAFFIC PROJECTIONS

The following is a sample of how to lay out traffic projections in a logical manner, which will assist the department in the review process. This is not intended to represent all TIAs, and depending on the complexity of the study, may require more or less traffic projections. The use of turning movement diagrams in the chronological manner suggested below is an effective way of conveying the necessary traffic data.

A) Existing/ Background Traffic

1) AM Peak
2) PM Peak

B) Build Year

1) Projected Background Traffic
    i) AM Peak
    ii) PM Peak
2) Projected Development Traffic
    i) AM Peak
        - Site Generated
        - Passby &/or Internal Trips
        - Total Trips
    ii) PM Peak
        - Site Generated
        - Passby &/or Internal Trips
        - Total Trips
3) Combined (Background + Development) Traffic
    i) AM Peak
    ii) PM Peak

C) Staging Years

1) Projected Background Traffic
    i) AM Peak
    ii) PM Peak
2) Projected Development Traffic
    i) AM Peak
        - Site Generated
        - Passby &/or Internal Trips
        - Total Trips
    ii) PM Peak
        - Site Generated
        - Passby &/or Internal Trips
        - Total Trips
3) Combined (Background + Development) Traffic
    i) AM Peak
    ii) PM Peak

D) 20-Year Horizon

1) Projected Background Traffic
    i) AM Peak
    ii) PM Peak
2) Projected Development Traffic
    i) AM Peak
        - Site Generated
        - Passby &/or Internal Trips
        - Total Trips
    ii) PM Peak
        - Site Generated
        - Passby &/or Internal Trips
        - Total Trips
3) Combined (Background + Development) Traffic
    i) AM Peak
    ii) PM Peak

2.3.1 Existing/ Background Traffic

Although not a traffic projection, it is important to establish the background traffic volumes and turning movements within the study area, before projecting background traffic into the future horizons.

2.3.2 Projected Background Traffic

Traffic projections shall be prepared for the build year or such other years as may be appropriate due to development staging. In all cases, the background traffic should be projected to the 20-year horizon, as this represents the life of most pavement structures. These traffic projections should be based upon the established annual traffic growth rate for the study area. In cases with erratic and/or unusual growth rates in recent years, consideration should be given to using the provincial average growth rate (currently 2.5 %/year) for projections beyond the 5-year horizon. All traffic projections should be based on non-compounded growth.

2.3.3 Projected Development Traffic

Development traffic projections shall be prepared for the build year or such other years as may be appropriate due to development staging. In all cases, the development traffic should be projected to the 20-year horizon. For each projection year, a turning movement diagram and/or table should be included illustrating the projected development traffic by turning movement.

In most cases, the trip generation for the proposed development should be based on the current Institute of Transportation Engineers trip generation rates, which can be found in the publication entitled “Trip Generation”. However, in some cases the data provided in the “Trip Generation” manual does not necessarily represent the situation present in rural Alberta. For land uses not listed in this source or when the consultant believes these rates are not representative, the department may accept alternative evidence of representative rates.

Documentation and rationale will also be required for trip distribution including directional traffic splits, intersectional traffic splits, pass-by trips, and internal trips. This information should be supplied in a graphical and/or tabular format, and included in the projected development traffic section.

2.3.4 Background + Development Traffic

Once the development traffic has been identified, the background traffic and development traffic should be combined for the determined peak periods and projection years. This information should be supplied in a graphical and/or tabular format.

The peak hour traffic analysis periods shall be identified for the proposed development, the highway, and the resultant peak-hour condition. It shall show the combination of site generated and background traffic, which causes the critical peak period(s). The peak hour will generally correlate to the AM and PM weekday peak periods on the highway. In some cases, depending on development characteristics, analysis of other peak periods such as Saturday afternoon or evening may be necessary.

2.4 ANALYSIS

2.4.1 Capacity Analysis

The TIA shall include a capacity analysis for the various traffic scenarios identified in the document. The "Highway Capacity Manual" (HCM), Special Report 209 is the standard for capacity analysis. Capacity worksheets must be provided as an appendix to the TIA. INFTRA accepts calculations performed using computer software based on the HCM, with the preference being McTrans software (Synchro/ Simtraffic).

In cases where the proposed development utilizes an existing intersection, it is necessary to first understand how the existing highway and/or intersection operates without the development. Where applicable, the TIA should include capacity analysis for the existing intersections in question.

Impacts should be evaluated with development for the build year, staging years, and 20-year horizon. Once the recommended improvements are identified the analysis should be conducted including improvements in the appropriate horizon year in order to ensure the improvements will improve intersection operations.

The capacity analysis should, in most cases, include the following information for each analysis scenario:

i. Delay per vehicle (seconds) by intersection, turning movement & peak period
ii. Level of service (LOS) by intersection, turning movement & peak period
iii. Left-turn/ right-turn warrants (based on the Departments "Highway Geometric Design Guide")

In some cases, it may be necessary to include:

i. LOS on a highway link (using HCM methodology/ software)
ii. Vehicle queuing information

With complex TIAs, it may be beneficial to supply the department with the digital capacity analysis files for review by one of the departments qualified transportation engineers. This should be determined through discussions between the developer, consultant, and department.

2.4.2 Signalization Analysis

Signalized intersections are generally not allowed in rural areas along the provincial highway system, and signalization is an absolute last resort for improving an at-grade rural intersections. The analysis should consider all other possible alternatives prior to recommending signals. If signals are recommended at a previously unsignalized intersection, supporting documentation will be required illustrating that all options were considered.

Alberta Infrastructure and Transportation utilizes TAC's "Manual of Uniform Traffic Control Devices" when determining the warrants for signalized intersections. In almost all cases, the Department uses an 80-point system, which does not include collisions in the warrant. While the 100-point system is occasionally used, it is generally reserved for intersections in large urban centres. Sound engineering judgement should guide this decision.

In some cases, and mainly in urban and semi-urban centres, signals may already exist at an intersection. Analysis should be conducted to ensure that the current signal timings and phases are still valid. If not, new signal timings and turning phases should be recommended. In cases where the distance between signalized intersections is less than optimal (at least 800 metres), the analysis must consider the impacts of the development on the upstream/ downstream signals.

All warrant calculations and analysis worksheets should be included in the appendix of the TIA.

2.4.3 Illumination Warrant Analysis

Illumination is becoming a more prevalent issue for INFTRA, specifically in semi-urban and urban areas. Lighting warrants for rural and semi-urban intersections shall be determined based on the department's Highway Lighting Guide. This will result in a requirement for full lighting, partial lighting, delineation lighting, or no lighting. For further details refer to the department's Highway Lighting Guide.

All warrant calculations and analysis worksheets should be included in the appendix of the TIA.

2.4.4 Pedestrian Warrant Analysis

Pedestrian movement accommodation is an important issue for INFTRA in the urban and semi-urban areas. Depending on the type of development, and its interaction with the surrounding community, pedestrian movements can become a significant issue. Consequently, improvements to pedestrian facilities may be required. On the other hand, at isolated rural developments, pedestrian movements are not likely an issue. Refer to TAC's "Pedestrian Crossing Control" Manual for further details.

All warrant calculations and analysis worksheets should be included in the appendix of the TIA.

2.4.5 Operational Analysis

The operational analysis is a critical phase of the TIA that should not be overlooked. Once the traffic analysis has been completed and the recommended intersection improvements have been determined, it is necessary to ensure that the design vehicle is capable of safely manoeuvring the intersection without interfering with other traffic movements.

Intersection plans should be provided illustrating that the design vehicle can safely manoeuvre the intersection. If the design vehicle is unable to properly make a specific turning movement with respect to the development, recommended revisions to the intersection layout are required.

2.5 CONCLUSIONS & RECOMMENDATIONS

The TIA should summarize the findings of the various analyses conducted, including potential issues, and clearly outline the recommendations regarding:

- Required intersection improvements;
- Pedestrian mitigation;
- Illumination;
- Signalization; and
- Right-of-way requirements.

A scaled plan illustrating the recommended horizontal intersection layout should be provided. For simple TIAs, it may be possible to utilize a typical intersection plan from the Department's Highway Geometric Design Guide. The more complex TIAs may require the completion of a one-off intersection plan.

3.0 Available Resources

INFTRA has numerous resources available to assist the developer/ consultant in the completion of TIAs. All inquiries regarding the availability of information should be directed to the Development and Planning Technologist of the appropriate district office. Below is a list of the types of information available at the department.

- *Intersection Turning Movement Diagrams* – This information is available at the department website for various existing intersection locations along provincial highway system. Each available intersection includes the traffic volumes by turning movement based on Average Annual Daily Traffic (AADT), 100th Highest AM Peak Hour, and 100th Highest PM Peak Hour. It should be noted that not every intersection has manual counts conducted every year, and may be interpolated information. Although INFTRA only keeps the current turning movement diagrams available online, the department does maintain a database of turning movement diagrams dating back to 1995.

- *Traffic Volumes at Points on the Highway* – Available online, the department provides the AADT's at points along the provincial highway system for the past 10 years. This information is published every year. Traffic volumes expressed as Average Annual Daily Traffic (AADT) or Average Summer Daily Traffic (ASDT) is estimated from data collected for INFTRA by its contractors.

  In 2003, traffic data was collected from 361 permanent ATR sites on highways throughout the province, as well as one day, nine or twelve hour turning movement counts at 500 intersections. Combined with historical turning movement counts at 1,696 intersections traffic volumes for over 5,920 points are determined.

  Automated Traffic Recorder (ATR) Monthly Volume Report 2003 presents in tabular form by direction the Monthly Average Daily Traffic (MADT) volumes recorded at INFTRA's 361 permanent ATR sites. The report also presents the 30th highest hourly traffic volume, 100th highest hourly traffic volume and 90th percentile hourly traffic volume.

- *Traffic Volumes on Links in the Highway Network* - The current Traffic Volume, Vehicle Classification, and Travel Statistics reports are prepared for INFTRA. These reports present statistical information on traffic volumes, vehicle classification and travel on Alberta's Highway Network. These statistics are given as weighted averages over entire highways, control sections and traffic control sections. These statistics are estimated from data collected for INFTRA by its contractors.

- *Existing Intersection Plans* – By contacting the department, some horizontal intersection layouts are available in either hard copy or digital format.

- *Typical Intersection Layouts* – CAD files for typical intersections outlined in the "Highway Geometric Design Guide" are available for download from the department's website under the "Highway Standard Plates CB-6".

- *Speed Limit Zones on the Highway* – The department maintains a database of the speed limits along the provincial highway system. If the location of interest is located inside a city, contact the local municipality.

- *Traffic Collision Statistics* - Alberta Infrastructure & Transportation collects and publishes collision, vehicle registration and licensed driver statistics, which are available through the department website. Collision statistics provide an overview of the "who", "what", "when", "where", "why" and "how" of traffic collisions that occurred in Alberta on a yearly basis. If interested in a specific intersection or portion of highway, contact the department for further details.

- *Horizontal / Vertical Alignment of Highways* – Alberta Infrastructure & Transportation maintains database consisting of both hard copy and digital copies of various highway horizontal and vertical alignments. Contact the department to determine if the highway in question has this information available.

- *Historical Growth Rates on Links in the Highway Network* – Dating back to 1962, INFTRA has collected growth rates on links in the highway network. Contact the department for historical growth rates on links in the highway network.

- *Aerial Photography* – Contact the department for viewing of INFTRA's most recent aerial photography of the provincial highway network.

  In addition, Sustainable Resource Development's, Air Photo Distribution group maintains a provincial database of all available aerial photography. Air Photo Distribution has a collection of over 1.3 million aerial photographs covering the entire province of Alberta dating back to 1949. Medium or small scale black & white and colour photography are available for viewing in the Reference Library. Copies of the photography can also be purchased either in hard copies or digital formats. For more information visit the Sustainable Resource Development website.

- *Video Logs* – Alberta Infrastructure & Transportation maintains a digital video log of all provincial highways. Contact the department to arrange a viewing of the available video logs.

Other resources that may prove useful in the completion of TIAs are:

- "Highway Capacity Manual", Special Report 209; Transportation Research Board
- "Trip Generation"; Institute of Transportation Engineers
- "Traffic Access and Impact Studies for Site Development – A Recommended Practice"; Institute of Transportation Engineers
- "Access Management Manual"; Transportation Research Board
- "Highway Geometric Design Guide"; Alberta Infrastructure & Transportation
- "Geometric Design Guide for Canadian Roads"; Transportation Association of Canada
- "Manual of Uniform Traffic Control Devices"; Transportation Association of Canada
- "Pedestrian Crossing Control Manual"; Transportation Association of Canada
- "Highway Lighting Guide"; Alberta Infrastructure & Transportation
- "Highway Pavement Marking Guide"; Alberta Infrastructure & Transportation
- "Illumination of Isolated Rural Intersections"; Transportation Association of Canada

4.0 Reference List

1. Stover, V.G. and F.J. Koepke. 2002. *Transportation and Land Development,* 2nd ed. ITE, Washington, D.C.

2. Institute of Traffic Engineers. 1991. *Traffic Access and Impact Studies for Site Development. A Recommended Practice*. Washington, D.C.

Appendix

TRAFFIC IMPACT ASSESSMENT GUIDELINE CHECKLIST

BACKGROUND INFORMATION

a) Proposed Development

- [ ] Development name and/or developer
- [ ] Development location
- [ ] Type of development
- [ ] Size of development
- [ ] Staging (by year anticipated)

b) Highway

- [ ] Number & Control Section
- [ ] Highway Classification

c) Study Area

- [ ] Key Map
- [ ] Site Plan

EXISTING INFRASTRUCTURE & CONDITION

a) Existing Highway Conditions

- [ ] Pavement width
- [ ] Pavement lane markings
- [ ] Right-of-way width
- [ ] Vertical grades on Highway
- [ ] Horizontal alignment of Highway (I.e. curve radius)
- [ ] Design &/or Posted Speed Limit
- [ ] Locations of speed limit changes
- [ ] Existing/ proposed accesses in vicinity
- [ ] Existing illumination in vicinity
- [ ] Traffic control type (Two-way or all-way stop, etc.)
- [ ] Traffic operation signage (i.e. no left-turns, no parking)

b) Existing Intersection Conditions (if applicable)

- [ ] Intersection configuration (including scaled plan)
- [ ] Vertical grades of local/ intersection roadway
- [ ] Intersection sight distance
- [ ] Stopping sight distance
- [ ] Existing signal timings
- [ ] Major developments currently using intersection

c) Existing Traffic Conditions

- [ ] Turning Movement Counts (Diagram &/or Table) – AADT
- [ ] Turning Movement Count (Diagram &/or Table) – AM Peak
- [ ] Turning Movement Count (Diagram &/or Table) – PM Peak
- [ ] Existing AADT on Highway
- [ ] Historical Traffic Growth Rate on Highway
- [ ] 5-year Traffic Growth Rate at Highway/ Intersection
- [ ] 10-year Traffic Growth Rate at Highway/ Intersection
- [ ] Annual Traffic Growth Rate at Highway/ Intersection
- [ ] Vehicle composition (% vehicle type) on Highway/ Intersection

TRAFFIC PROJECTIONS

a) Existing/ Background Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

b) Build Year

i) Projected Background Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

ii) Projected Development Traffic

- [ ] AM Peak
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips
- [ ] PM Peak
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips
- [ ] Other (noon, Saturday, etc.)
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips

iii) Combined (Background + Development) Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

c) Staging Years (if applicable)

i) Projected Background Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

ii) Projected Development Traffic

- [ ] AM Peak
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips
- [ ] PM Peak
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips
- [ ] Other (noon, Saturday, etc.)
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips

iii) Combined (Background + Development) Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

TRAFFIC PROJECTIONS CONT'D

d) 20-Year Horizon

i) Projected Background Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

ii) Projected Development Traffic

- [ ] AM Peak
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips
- [ ] PM Peak
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips
- [ ] Other (noon, Saturday, etc.)
  - [ ] Site Generated
  - [ ] Passby &/or Internal Trips
  - [ ] Total Trips

iii) Combined (Background + Development) Traffic

- [ ] AM Peak
- [ ] PM Peak
- [ ] Other (noon, Saturday, etc.)

ANALYSIS

a) Capacity Analysis

i) Required (by intersection, turning movement & peak period)

- [ ] Delay per vehicle (seconds)
- [ ] Level of service (LOS)
- [ ] Left-turn warrant analysis
- [ ] Right-turn warrant analysis

ii) If Applicable

- [ ] LOS on a highway link (using HCM methodology)
- [ ] Vehicle queuing information

b) Signalization Analysis (If Applicable)

i) Isolated Rural Intersections

- [ ] Signalization Warrant Analysis
- [ ] Signal Timing Optimization
- [ ] Recommended Mitigation

ii) Semi-urban/ Urban Intersections

- [ ] Signalization Warrant Analysis
- [ ] Signal Timing Optimization
- [ ] Signal Coordination Analysis
- [ ] Recommended Mitigation

c) Illumination (If Applicable)

- [ ] Illumination Warrant Analysis
- [ ] Recommended Mitigation

d) Pedestrians Movements (If Applicable)

- [ ] Pedestrian Warrant Analysis
- [ ] Recommended Mitigation

e) Operational Analysis

- [ ] Design vehicle turning movement templates
- [ ] Recommended Mitigation

CONCLUSIONS & RECOMMENDATIONS

- [ ] Required intersection improvements
- [ ] Pedestrian Mitigation
- [ ] Illumination Requirements
- [ ] Signalization Conclusions
- [ ] Right-of-way requirements
- [ ] Recommended intersection plan

Notes:

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