DRAFT TRAFFIC IMPACT ANALYSIS GUIDELINES

Bannock Transportation Planning Organization

Traffic Analysis Guidelines

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Reviewed By
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Ooctober 26, 2020

BANNOCK
Transportation Planning
ORGANIZATION

Contents

Appendices

Acknowledgments

The Institute of Transportation Engineers (ITE) completed its best practice for traffic impact studies in 2010. The transportation planning field has changed since 2010. Many additional types of traffic controls and intersection designs are now in practice. Bannock Transportation Planning Organization (BTPO) completed a review of traffic impact guidelines in thirty various sized communities. These guidelines browed heavily from several communities having the same focus as BTPO's guidelines. The BTPO staff and project development committee would like to acknowledge the City of Peoria Arizona, City of Redding California, and the Town of Queen Creek Arizona, for their efforts and providing a framework for this effort.

Introduction

The Traffic Impact Analysis (TIA) guidelines are an update of the 2006 Traffic Impact Guidelines. This update modifies when a TIA is required and the method required to conduct the analysis.

The purpose of TIA is to ensure that the transportation network is safe and reliable for all users. The TIA helps identify needed on-site and off-site improvements as the results of the development process. The process ensures that proposed developments meet local jurisdictions' infrastructure standards and identify any potential impacts to the existing transportation network.

The guidelines provide a framework for member agencies and developers to collaborate to make critical access and design decisions during the development process. The guidelines will also allow the City of Pocatello and the City of Chubbuck to have a standardized process to assist property owners and developers in the review process.

Developments on State Highways

Developments located on or have access to a state highway must coordinate with the Idaho Transportation Department. Developments required to complete the Idaho Transportation Department process may be exempt from these guidelines with the local jurisdiction's approval. Any TIA completed for the Idaho Transportation Departments shall include all access points, including those not on the state highway. Coordination with local jurisdictions is also required.

Traffic Impact Analysis Categories

A Traffic Impact Analysis is required whenever a new development, adding to existing development or changing zoning to a higher level of potential traffic. The development levels list determines the type of TIA (Table 1).

Table 1 Categories of Traffic Impact Analysis

Category	Trip Generation Threshold
Statement	Developments that are estimated to generate less than 100 peak hour trips or 1,000 daily trips.
A	Developments that are estimated to generate between 100 to 500 peak hour vehicle trips in the highest peak hour.
B	Developments that are estimated to generate over 500 peak hour trips in the highest peak hour.

Notes

1. Internal or pass-by trips shall not reduce trip generation for purposes of the TIA category.
2. The total proposed development trip rate determines the planned unit development category.
3. The development type determines the trip generation rates. Residential developments are assumed to generate 12 trips per household (source BTPO Household survey, 2012). Commercial trip rates are calculated from the ITE trip generation manual using gross floor area and the highest peak hour data.
4. The TIA for located in the development area shall include an analysis of potential development impact.

Category Assessment

The categories listed in Table 1 are guidelines designed to fit most development types. The specific category and potential modification of the study area occur after the initial category assessment. Table 2 provides the trip generation information required to determine the category of TIA. The category assessment form, provided in Appendix A, also requires a vicinity map and identification of surrounding land uses.

Table 2 Trip Generation Estimates

Type of Development (e.g., residential, commercial)	**Size** (The number of dwelling units or gross floor area)	**AM Peak Hour trip rate per unit***	**PM Peak Hour trip rate per unit***	**Daily trip rate per unit***	**AM Peak Hour Trips**	**PM Peak Hour Trips**	**Daily Trips**
Total							

* Commercial trip generation rates can be found in the Institute of Transportation Engineers Trip Generation Manual. The dwelling trip rate is one trip for each unit in the AM and PM peak hour and 12 trips for the day. (Source of the residential trip generation is BTPO Household Survey and time of day factors used in the regional travel demand model.

Additional Criteria that may require a TIA

The local jurisdictions may require a TIA for zoning actions outside the subdivision process if the local jurisdiction identifies a potential transportation impact. Those actions could include but are not limited to creating special districts, conditional use permits, and rezoning applications.

Public schools may have additional development review requirements described in Idaho Code Title 67 Chapter 65 (67-6519 (3).

Methodology

The section provides a guide for completing the Traffic Impact Statement or Traffic Impact Study.

Scoping meeting

The purpose of the scoping meeting is to determine the specific project scope and determine data collection needs, the type of intersection analysis required, time periods to include, horizon years, and the inclusion of any future adjacent developments if known.

Horizon Year and Study Area

Table 3 provides the horizon year and study area requirements for each TIA category. The study area in Table 3 is a guideline. The City or County staff will determine the specific study area at the scoping meeting. Category B and planned unit developments require an analysis of future traffic conditions.

Analysis Time Periods

The time of day to evaluate the site generated traffic is during the adjacent street's peak hour or the nearest collector or arterial streets. The analysis time period is during the weekday, but some land uses may require weekend traffic analysis. The peak hour period, which has the highest adjacent street traffic and the highest peak hour development, generated trips. The peak hours of interest are the AM peak hour (07:00 to 09:00) and the PM peak hour (16:00 to 18:00). The street segment analysis is conducted using the average weekday traffic (24-hours).

The peak hours analysis can be altered by the local jurisdiction when the development has unusual traffic patterns. These may include church, schools, conference centers, movie theaters, or any use that substantially shifts the traffic peak outside the normal AM and PM peak hours. The adjacent street conditions may also alter the peak hour analysis periods.

Table 3 Horizon Year and Study Area

Category	Horizon Year	Study Area
Statement	Current Year	<u>Site Developments</u> • Access to public streets • The first intersection in all directions from the site • Any intersections of a collector or arterial within 1/3 mile of the property line <u>Subdivisions (Adjacent to a collector or arterial)</u> • The first intersection in all directions from the site • Any intersections of a collector or arterial within 1/3 mile of the property line <u>Subdivisions</u> • From the point where the subdivision connects to a public road, The first intersection of collector or arterial street in either direction
A	Current Year	<u>Site Developments</u> • Access to public streets • The first intersection in all directions • Any intersections of a collector or arterial within 1/2 mile of the property line <u>Subdivisions</u> • Any intersections of a collector or arterial within 1/2 mile of the endpoint of any private or public street included in the development
B	Current year Five and ten years in the future.	<u>Site Developments</u> • Access to public streets • The first intersection in all directions • Any intersections of a collector or arterial within 1 mile of the property line • All intersections of concern within 1 mile of system access miles (distance is from where the development connects to a collector or arterial) <u>Subdivisions</u> • Any intersections of a collector or arterial within 1 mile of the endpoint of any private or public street included in the development • All intersections of concern within 1 mile of system access miles (distance is from where the development connects to a collector or arterial)

Data Collection

The TIA requires traffic and land use data to determine the impact of the proposed development.

Current Turning Count Data

The TIA requires existing and projected traffic data for intersections and roadways within the study area. The local jurisdiction must approve the count locations before data collection efforts.

Include an AM and PM Peak hour turn count For each intersection included in the analysis. Category B analysis requires a 12-hour turn count (6:00 AM to 6: 00 PM). The collected data must use 15-minutes intervals. The count data must be with two calendar years of the beginning analysis date.

For new public roads and access points, the background traffic volumes include all public streets the development access. The Development Trips section of this report describes the process to use for trip distribution and traffic assignment. BTPO website has turning count data for locations within the region. The applicant needs to conduct turning counts for intersections not available on the BTPO website. The developer should attach the turning count data and the method used to collect the analysis data. Examples of data collection methods are manual, electronic turning boards, and video processing.

Current Traffic Volume Data

Two types of traffic volume data may be needed to complete the analysis. For public roadways within the urban area, traffic count data is available on the BTPO website. The data must be within two calendar years of the analysis date. The developer must collect traffic data for roads with no data available or roads with data exceeding two years old. Any method listed in the Federal Highway Administration Traffic Monitoring Guide is allowed in collecting the 48-hour traffic volume data. New public roads proposed as part of the development can use daily trips from the development to determine the approximate daily traffic.

Future Traffic Volumes and Growth Rates

The BTPO is the source for Traffic projections and growth rates. The collectors and arterials the Travel Demand Model data for the nearest five-year interval is used and factored with the growth rate determined by BTPO to get the year of interest.

Surrounding Land Use

Identify the existing land use with the study area.

Proposed Development

The TIA includes a location map and a site plan. The size of the proposed development (number of dwelling units or gross floor area). Identify all access points or proposed public streets in the distance between the access points or public streets. The distance between the adjacent development access points or public streets is also needed.

Crash Data

Crash data for three years is required for all existing public intersections within the study. Crash data is available from the Local Highway Technical Assistance Council's website (https://lhtac.org/resources/maps/interactive-crash-map/).

Trip Generation and Distribution

Developers will use the latest version of the Institute of Transportation Engineers Trip Generation Manual to determine commercial trip generation rates. Include the land use code and name along with the rate used in the TIA. The dwelling rate is one trip for each unit for AM and PM peak hour and 12 daily trips

Trip Distribution and Assignment

The direction traffic will approach and exit the development depend on many factors, including but not limited to:

- The type of development;
- the location of other developments and significant residential and commercial centers;
- the traffic control on streets used to access the development; and
- the conditions of streets within the study area.

The analysis will estimate the percentage of trips entering and exiting each access point to the development or subdivision. Figure 1, 2, and 3 provides examples of site trip assignment and distribution. The local agency must approve the percentages before conducting the analysis.

Figure 1 Existing Traffic Volumes

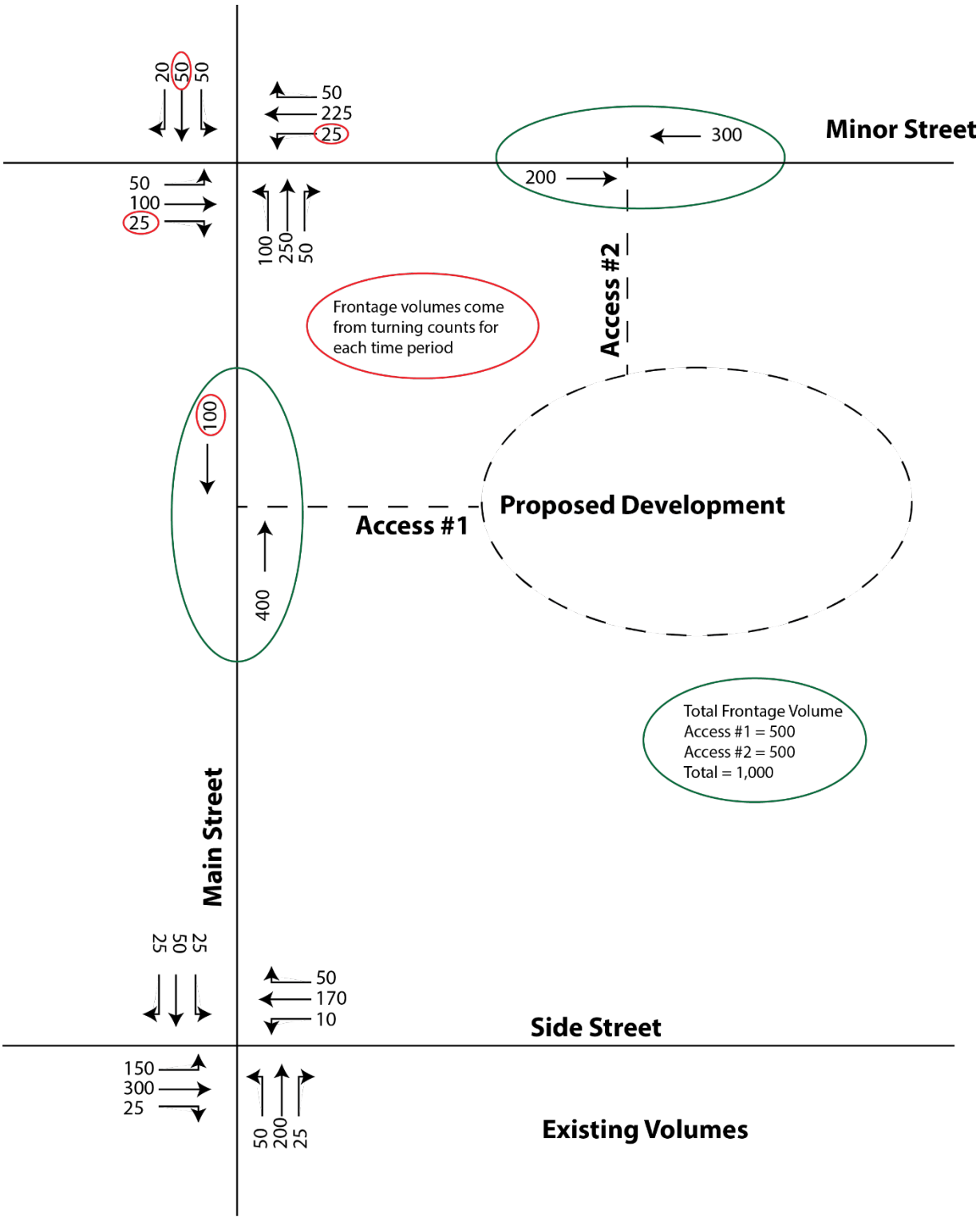


Figure 2 Trips Entering the Development

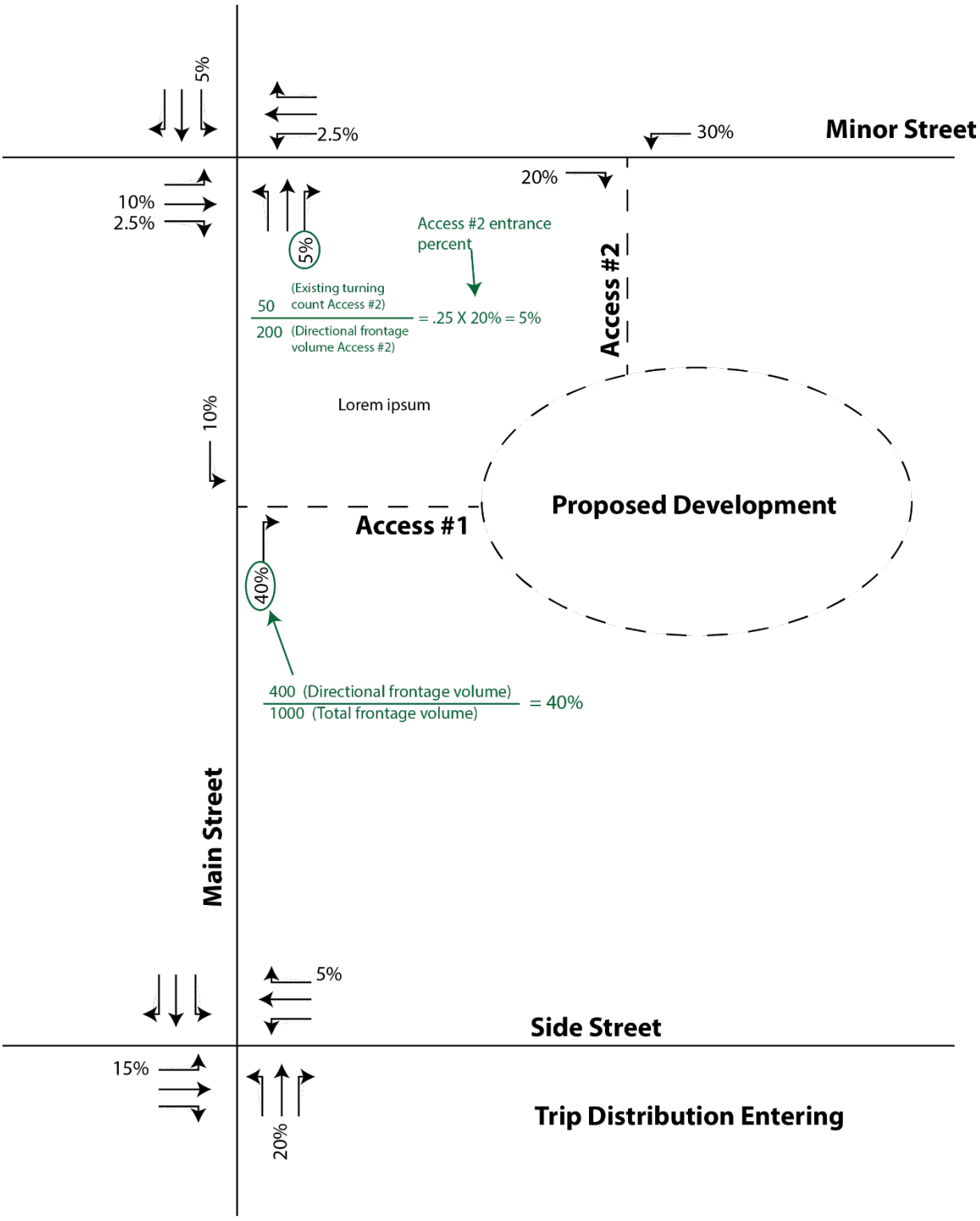
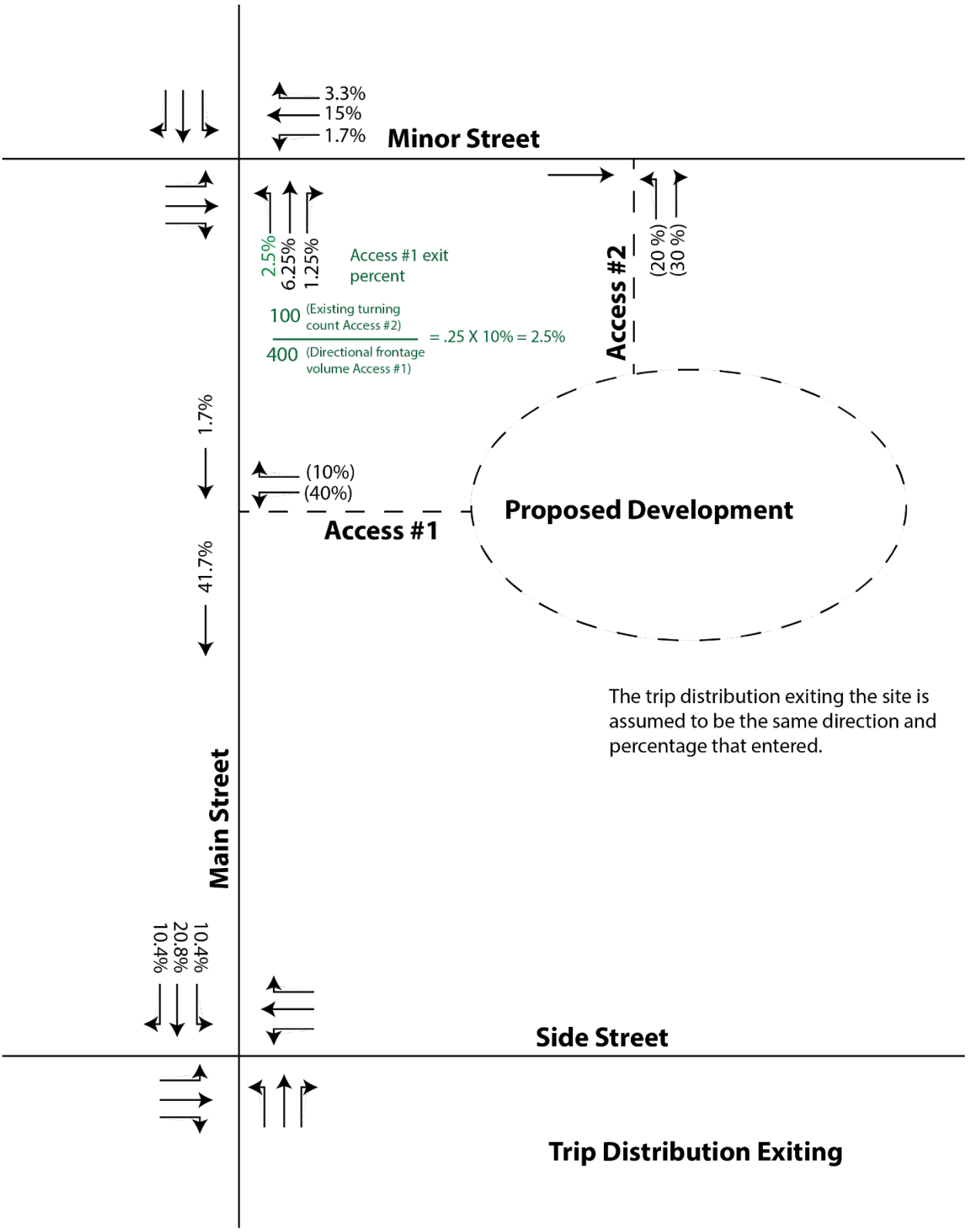


Figure 3 Trips Exiting the Development



Pass-By Trips

For commercial development, some of the trips which access the site might not be a new vehicle, but rather an existing vehicle on the adjacent roadway. The Institute of Transportation Engineers Trip General Handbook Chapter 10 discusses a process for estimating Pass-By Trips. The handbook also cautions the use of pass-by trips due to the lack of data for specific sites and variability in site characteristics. Pass-by trip reductions are not allowed in the analysis unless approved by the individual jurisdiction before the analysis.

Who can Perform the Analysis?

The developer or a professional engineer may complete the analysis for a traffic impact statement. Category A and B need to be completed and stamped by an Idaho Professional Licensed Engineer

Intersection Level of Service Standards

Highway Capacity Manual Software and Synchro are the two methods to calculate the Level of Service (LOS) for intersections. BTPO's Synchro model covers most major arterial streets within the urban core. BTPO can provide a Synchro model for the area of interest to the engineer performing the analysis. For isolated intersection and those not included in the Synchro model, the analysis may use the latest version of McTrans HCS, include a printout of the results page with the analysis.

Signalized Intersection

The acceptable LOS for signalized intersections is LOS D for collectors with no approach lower than LOS E. The standard for arterials intersection is LOS E for the intersection. No approach below LOS F. Table 4 provides the range in delay per vehicle in seconds for each LOS category.

Table 4: Level of Service for Signalized Intersections

Level of Service	Control delay per vehicle (sec)	Description
A	≤ 10	Good progression, few stops
B	> 10 -20	Good progression or short cycle length, more vehicles stopped.
C	> 20 -35	Longer cycle lengths, some cycle failures
D	>35 -55	High volume to capacity ration, longer delays, and noticeable cycle failures
E	> 55 – 80	Poor progression, long -cycles, high volumes, long queues.
F	> 80	Unstable and unpredictable flows

Source: HCM Version 6.0 Exhibit 19.8

Un-signalized Intersection

The acceptable LOS for an un-signalized intersection is LOS D and above for all approaches to the intersection. The report will include a signal warrant analysis for any intersection of collectors or arterials where an approach is below LOS E. Table 5 shows the delay in seconds for each Level of Service category.

Table 5 Level of Service for Unsignalized Intersections

Level of Service	Control delay per vehicle (sec)	Description
A	≤ 10	Little or no delay
B	> 10 -15	Short traffic delays
C	> 15 -25	Average Traffic Delays
D	>25 -35	Long Traffic Delays
E	> 35 – 50	Very Long Traffic Delays
F	> 50	Unacceptable traffic Delays

Source: HCM Version 6.0 Exhibit 20.2 (Two-Way Stop) and Exhibit 21.8 (All-Way Stop)

The individual performing the analysis should conduct a signal warrant analysis on any un-signalized intersection when the major street's peak hour volume exceeds 420 vehicles per hour per lane, and the minor street's peak hour volume exceeds 105 vehicles per hour per lane.

Roundabouts

The Highway Capacity Manual (HCM) discusses roundabouts in Chapter 22, and several applications can provide an analysis of roundabout operations. The accepted methods are the latest version of the HCM and the Highway Capacity Manual Method. The jurisdiction must approve other methods before starting the analysis. Table 6 provides the LOS criteria for roundabouts. The acceptable LOS for roundabouts is LOS D and above. In addition to LOS, the volume to capacity (V/C) ratio must be calculated for each roundabout. Any roundabout with a V/C greater or equal to 1 has a LOS of "F."

Level of Service	Control Delay (seconds per vehicle
A	0 -10
B	> 10 -15
C	> 15 – 25
D	> 25 – 35
E	>35 – 50
F	>50

Source: HCM Version 6.0 Exhibit 22.8 LOS Criteria: Motorized vehicle Mode

Street Segments

Table 6 provides the planning level capacity analysis. Local jurisdictions use the results of Table 6 are to determine the correct street design standard.

Table 6 Maximum Peak Hour Volumes and Daily Capacities.

Classification	LOS A	LOS B	LOS C	LOS D	LOS E
Arterial (Limited Access)	570	600	760	850	850
Arterial (No left turn lane)	410	470	540	610	680
Arterial (Left turn lane)	500	560	650	730	810
Collector	270	340	410	470	540
Local	N/A	N/A	N/A	N/A	N/A
The values are vehicles per hour per lane.					
Source NCHRP Report 599 Default values for Highway Capacity and Level of Service Analysis. Table 40					
Local street standard 2,000 vehicles per day or 180 peak hour					
Collector street standard 4,000 vehicles per day or 360 peak hour					

Intersection Design Elements

All developments must follow the BTPO Access Management Guidelines. The local jurisdiction determines the design of intersections and determines the spacing of public streets.

Appendix A. Traffic Impact Analysis Category Form

This initial assessment form will help determine the category of TIA required for the development.

Development Name: _____

Development Location: _____

(Attach a map of the proposed development location)

Type of Development (e.g., residential, commercial)	**Size** (The number of dwelling units or gross floor area)	**AM Peak Hour trip rate per unit***	**PM Peak Hour trip rate per unit***	**Daily trip rate per unit***	**AM Peak Hour Trips**	**PM Peak Hour Trips**	**Daily Trips**
Total							

* *Commercial trip generation rates can be found in the Institute of Transportation Engineers Trip Generation Manual. The dwelling trip rate is one trip for each unit in the AM and PM peak hour and 12 trips for the day. (Source of the residential trip generation is BTPO Household Survey and time of day factors used in the regional travel demand model.*

Appendix B. Traffic Statement Report Format

Developers shall submit a traffic statement report as a part of the development review process for all developments which generate fewer than 100 peak hour trips, and there are no additional traffic and safety concerns in the area,

Description of Proposed Development

☐ Project Name

☐ Location

☐ Site plan, which includes the spacing of driveway and public intersections within the project area. (***note the spacing must be consistent with Access Management Guidelines)***

Trip Generation

☐ Attach the complete Traffic Impact Analysis Category Form (Appendix A)

Description of the Existing Conditions

☐ For each intersection with a collector or arterial public street intersections within the study area, provide the following:

- Figure depicting the intersection layout including the number of lanes
- Traffic control at the intersection
- Table showing the existing turning volumes and Level of Service for each analysis period

☐ Provide the surrounding land use within the study area.

Description of the Proposed Development

☐ Figure depicting the trip distribution to the nearest collector or arterial street in each direction.

☐ A table showing the anticipated turning volumes and Level of Service at each intersection and for both analysis periods

☐ Provide a table identifying the streets within the development which access the existing street network. The table should include the name of the street, classification, existing ADT, development ADT, and Leve of Service (Table 6). The table should also include the data for any collector or arterial the development access directly or can be accessed within ½ mile of the development.

Appendix C. Traffic Impact Analysis Report Format

The following outline is a guide in preparing the Traffic Impact Analysis. The outline below provides the documentation for most studies. However, if additional studies or analysis has been required at the scoping meeting, additional sections will be required. The report format is not applicable if the project accesses a state highway unless it accesses a non-state highway. A professional engineer licensed in Idaho must complete the analysis.

☐ Cover Page

☐ Table of Contents, List of Figures, and Table

☐ Executive Summary

☐ Study Overview

- Project Name
- TIA Category
- Study Area, Study Intersections and access points
- Analysis time periods and any horizon years, if applicable

☐ Study Area Map and Site Location

☐ Project Description

- Traffic Impact Analysis Category Form
- Phasing
- Access points and spacing
- Bicycle and pedestrian facilities

☐ Existing Conditions

- Description of street function classification
- Description of study intersections and traffic control
- Table Summarizing the LOS for each study intersection and access point
- Table Summarizing the LOS for a public street segment
- Figure depicting the daily traffic volumes and intersection or access point turning counts
- Figure depicting the existing street cross-sections, intersection lane configurations, and traffic control.

☐ Site Plan showing access points and internal circulation

- Provide access spacing

☐ Traffic Information

- Trip distribution (including any horizon years)
- Existing traffic including turning counts and street ADT

- Level-of-Service Analysis for each intersection or access point
- Level-of-Service Analysis for each road segment

☐ Safety Analysis

- Summarize the crash data for public intersections within the study area

☐ Project Improvements

- Provide the proposed projects for areas the LOS is not meet.

☐ Conclusions