

Division: Public Works  
Department: Infrastructure Planning and Geo-Resources  
Program: 30TP

## TRAFFIC IMPACT ANALYSIS GUIDELINES

### 1.0 Background

A Traffic Impact Analysis (TIA) assesses the impact a proposed development has on the transportation network and provides means to mitigate the effects of added site traffic. The solutions proposed address motorized and non-motorized transportation modes. While there are common TIA characteristics, the studies vary in complexity depending on the type, size, and location of the development.

Bernalillo County Public Works Division (BCPWD) maintains a development review process that evaluates development impacts on public and private transportation system performance requiring mitigation by the developer as necessary. Bernalillo County Code states that a TIA may be required for residential, commercial and industrial developments within the County.<sup>1</sup> Under the Bernalillo County Code, a TIA may be required for subdivisions with 25 or more parcels, and apartments or mobile home parks with 25 or more dwelling units. The County Code states that non-residential design will be based on traffic generation.<sup>2</sup> Public Works classifies public facilities such as schools, parks, government offices, police/fire stations, and community centers as non-residential facilities. A TIA is considered for all commercial and industrial developments independent of size of the proposed operation if the development abuts or accesses a county or state maintained road and existing or future trail within Bernalillo County. Whether the proposed development is residential or non-residential, a TIA may be required to provide safe and efficient driveway access, and to ensure pedestrian, bicycle and vehicle safety.<sup>3</sup> The County Code establishes the thresholds for conducting a study, the concern for safety, and multimodal traffic analyses.

The threshold for considering whether or not a proposed development requires a TIA is site generated traffic equal to or exceeding 250 vehicles per day on a weekday or a PM peak hour volume exceeding 25 vehicles per hour.<sup>4</sup> These thresholds support but do not determine whether or not a TIA is required.

The Bridge Boulevard Corridor from Hartline Road to Coors Boulevard is a designated development incentive area. To encourage development in this area, new projects may be considered for a waiver if Public Works determines that a TIA is not warranted. A TIA may be required for the Bridge Boulevard Corridor within these termini when the total site generated traffic exceeds 1000 vehicles per day and/or 100 vehicles per hour in the PM peak.

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<sup>1</sup> Bernalillo County Code Chapter 74, Section 74-103 Transportation

<sup>2</sup> Bernalillo County Code Chapter 66, Section 66-222 Curb Cut Requirements

<sup>3</sup> Bernalillo County Code Chapter 66, Section 66-213 Intent and Purpose

<sup>4</sup> Consistent with the County Code notation of a TIA based on trips generated by number of residential units, the residential land use with the highest average trip generation rate (Single Family Dwelling Unit, land use 210) was the basis for the review threshold.

Proposed developments may also require other evaluations such as, but not limited to, pavement structural analysis, noise assessment, or roadside safety evaluation. While not typically included in a study which mainly focuses on demand versus capacity evaluations, these may be included in the TIA as an appendix or under a separate cover. In review of TIA requirements, consistent with the intent of the County Code, the primary concern is public safety.

## **2.0 Scoping Report**

The first step in the TIA process is the preparation of a scoping report. The scoping report will include a site plan, quantitative description of the proposed development and land use along with a vicinity map. The scoping report will be used to determine if a TIA is needed and if there are any safety issues associated with the development. Scoping report topics should include, but are not limited to, the following:

### 2.1 TIA Not Required

*If no TIA is anticipated, the information may be submitted in the form of a letter and include:*

- Proposed action and ACCELA<sup>5</sup> number (building permit, zoning change, special use permit, conditional use permit, subdivision, etc.)
- Proposed land use, vicinity map, site plan showing driveway(s) location, building size in square feet (existing, new, additions, remodel), acreage, on-site parking, and build out year
- Site generated traffic – average weekday (vehicles per day) and AM/PM peak hour traffic (vehicles per hour), and heavy vehicle traffic (trucks, buses, delivery vehicles, etc.).
- Access roadway posted speed, lane configuration (number of lanes, turn bays, type of median, and on-street parking if any), traffic signal locations within at least ½ mile along access roadway, and street lighting
- Location of adjacent driveways or intersections within 500 feet of site driveway(s)
- Proposed on-site vehicular and pedestrian/bicycle circulation, staff from Parks and Recreation may provide input
- Hours and days of operation, number of employees, customers, deliveries, and other factors affecting site generated traffic
- Jurisdiction of roadways serving the site
- Consistency with area and regional plans for all modes of transportation: sidewalks, bike racks, bike lanes, and nearby bus stops accessing the building or buildings

### 2.2 TIA Required

*If a TIA is anticipated – the information listed above plus:*

- Proposed development phasing (partial and full build-out years)
- TIA study area
- Baseline traffic data collection method – must include bike and ped counts

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<sup>5</sup> ACCELA is the County's on-line permit tracking system.

- Growth rate determination methods
- Age of previously collected data
- Relevant recent approved TIAs and recommendations
- Trip assignment/trip distribution methodology
- Financially guaranteed improvements from other developments
- Programed transportation improvements affecting TIA study area
- Proposed analysis tools and reference documents for the TIA<sup>6</sup>

### 2.3 Scoping Report Meeting

BCPWD staff may request a meeting to discuss the scoping report. Unique elements of the development and agency requirements can be discussed during the meeting. Staff from Parks and Recreation may be invited for input on non-motorized traffic facilities. When multiple governmental agencies are impacted by a proposed development, Bernalillo County recommends the developer convene a meeting in which all agencies are invited to participate.

### 2.4 Scoping Report Submittal

Upon completion submit and electronic pdf version of the scoping report for review, comments, and final approval. Approval will be provided in writing. Include a copy of the approved scoping report in the final TIA.

## **3.0 Draft Traffic Impact Analysis**

Based on the approved scoping report, unless directed otherwise by BCPWD, a licensed professional engineer in the state of New Mexico qualified to do such work will prepare the TIA for review and comment by BCPWD consistent with Bernalillo County Code and the guidelines contained herein. Three copies are needed for all TIA submittals.

### 3.1 General Approach

For Bernalillo County, the Mid-Region Council of Governments (MRCOG) maintains regional socioeconomic data and travel demand forecasts for the Albuquerque Metropolitan Planning Area (AMPA). The authorized travel demand package is the current package identified by MRCOG. Approved MRCOG datasets from the current Metropolitan Transportation Plan (MTP) should be the basis for all baseline network and socioeconomic assumptions and inputs. These MTP Scenario input datasets and model databanks are made available to the public and every member agency of the MRCOG. If the scope of the TIA is of a scale such that it requires significant traffic analysis zone and/or network modification of

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<sup>6</sup> BCPWD recommends the most current versions of the *Highway Capacity Manual (HCM)*, Transportation Research Board, with computer software conforming to the HCM; *Trip Generation Manual*, Institute of Transportation Engineers; *Guide for the Development of Bicycle Facilities*, American Association of State Highway And Transportation Officials (AASHTO); *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, AASHTO; and *A Policy on Geometric Design of Highways and Streets*, AASHTO. Exceptions to these resources must be proposed in the *Scoping Report* and approved by BCPWD prior to use in the analysis.

the approved MTP datasets, BCPWD must finally approve the model assumptions before use in the analysis.

The *Transportation Improvement Program* (TIP) is a short-term plan for federally funded improvements to the region's transportation system over the next six years. The TIP is updated bi-annually and includes roadway, bicycle, pedestrian, and transit improvements. The *Metropolitan Transportation Plan* (MTP) is the Albuquerque area's long range transportation plan which includes projections and forecasts for a 20 year timeframe. All significant improvements planned for the transportation system are included in these documents. Policy approved investment may also include privately funded transportation improvements. The TIA baseline conditions shall include only these improvements to model the transportation infrastructure in place for the baseline year with concurrence from BCPWD.

Trip Generation – The Institute of Transportation Engineers (ITE) *Trip Generation Manual* is the standard reference used to obtain trip generation rates. When appropriate, as defined in the latest edition of the *Trip Generation Handbook*, pass-by and diverted link trips may be considered to determine the amount of new traffic added to the street system by the generator. An alternative methodology to ITE's trip generation rates may be proposed for small building footprints or land uses not listed in the *Trip Generation Manual*. Guidance on conducting a local trip generation study may be found in the *Trip Generation Handbook*. This document also provides information on when to use regression equation rates, weighted average rates, and when it is necessary to collect local data.

Traffic performance measures associated with the no-build condition are reported to represent the baseline traffic conditions. This is followed by traffic performance measures for full build-out which are compared with the no-build condition. These comparisons are used to determine the need for mitigation measures. Large developments with multiple phases require traffic performance measure comparisons and mitigation measures for all planned phases. Subsequent analyses with findings and mitigation measures may be required to address future changes in milestones and horizon timeframes.

The impact of the development on the transportation system is assessed through site trip assignment to the roadway system within the area of influence. The locations and directions from which traffic will travel to and from the site will depend on many factors including the size of the development, land use in the surrounding areas, and the street system. Accepted methods for modeling site traffic directional distribution are listed in *Transportation and Land Development, 2<sup>nd</sup> Edition* by Stover and Koepke. The most appropriate method considering the characteristics of the development should be used. Large scale developments in this area have used the City of Albuquerque's gravity model with acceptable results. Site traffic assignment must adhere to established major routes avoiding local roads that serve residential areas.

The TIA will include side-by-side level of service (LOS) comparisons by movement for the baseline and build scenario(s). Additional analyses can also include, but not be limited to, queuing, speed-change lane warrants, gap studies, traffic signal warrants, traffic progression, sight triangle, access spacing, and safety analysis for all modes of travel. The findings will

include recommendations that mitigate identified transportation deficiencies from a comparison of baseline and build scenario traffic analyses. Locations where improvements may require additional/dedicated right-of-way should be identified.

Pedestrian and bicycle traffic – Traffic signal installations in urban areas and most, if not all, signals in rural or fringe areas will include pedestrian signal heads and pedestrian activated push buttons. Signal installations on roadways that contain bicycle lanes shall include appropriate detection and activation hardware appropriate for this mode of traffic. All traffic signal evaluations in urban areas must provide green time splits that include adequate pedestrian crossing times, especially considering low volume side streets that can accommodate vehicular volumes with minimum green. All signal evaluations at intersections that do not have pedestrian indicators, shall provide adequate green time for pedestrian movements.

Site access points and internal traffic circulation – The site plan must clearly indicate public and delivery access locations; delivery truck internal routing and drop-off points; parking locations; and pedestrian/bicycle facilities. Site driveways must be located adequate distances from other driveways and intersections. Site design must accommodate inbound traffic flows preventing vehicles entering the site from backing up onto the adjacent street. Adequate sight distance must be provided at all drives.

Speed Change Lanes – Access point characteristics, site generated traffic, mainline traffic, proximity to major/minor intersections, and the posted speed limit are used to determine the need for speed change lanes. Bernalillo County references the guidelines contained in the current *New Mexico Department of Transportation, State Access Management Manual* to determine when speed change lanes are required.

### 3.2 Peak Hour

The peak hour of the site and the peak hour of adjacent side street traffic can occur at the same time of day in many cases, but may differ depending on the type of development. Site generated peak hour traffic for schools and movie theaters can occur during side street off peak hours. Weekend peak period traffic may be evaluated for churches, recreation establishments, or other similar facilities. The appropriate periods to be evaluated in the study will depend on the peaking characteristics of both the site and the adjacent street or streets.

### 3.3 Study Area

At a minimum the study area will include all site driveways and major intersections, both signalized and un-signalized, adjacent to the site. The County review team will determine additional analyses for the study based upon, but not limited to, the size of the proposed development and other local or site specific traffic issues. The study area will vary based upon the proposed land use, intensity, local congestion, and location of surrounding intersections. Other locations may be included to assess unwanted changes in traffic patterns such as shortcuts, added traffic through neighborhoods, and truck traffic.

### 3.4 Traffic Data

Traffic counts of motorized, non-motorized vehicles, and pedestrians will be required by BCPWD. Traffic volume, turning movements, vehicle classification, and speed data may be counted for one or more road segments or intersections. Other data may be required such as queue lengths, controlling queue, saturation flow rate, or gap studies. Data collection techniques will adhere to transportation industry standards as outlined in the Institute of Transportation Engineers *Manual of Transportation Engineering Studies, 2nd Edition* and ASTM standard practice.<sup>7</sup>

MRCOG is a primary source of traffic monitoring data in the region and shall be the source of data for near term and long term future year traffic growth projections. MRCOG reports standard and non-standard traffic summary statistics in their *Annual Traffic Flow Maps*. The non-standard data should be used with caution as traffic growth trends on a roadway should be based on sound assumptions. When available, traffic growth projections should be based on data covering the most representative consecutive 10 year period.

Bernalillo County posts intersection and roadway traffic count data from previous, approved TIA's on its website at [www.bernco.gov/infrastructure-planning-and-geo-resources](http://www.bernco.gov/infrastructure-planning-and-geo-resources). If traffic data needed for analysis of the proposed development are older than three years or if BCPWD staff determines that traffic patterns have changed and will affect the outcome of the study, the developer must acquire current traffic counts at the agreed upon locations.

Traffic data for most TIAs will be collected on Tuesday through Thursday so the data represent typical weekday traffic. Site trip generation characteristics that require traffic monitoring on other days of the week may be proposed in the scoping report for approval by Bernalillo County prior to the data being collected and analyzed.

When there is a need to determine mainline and/or side street traffic volumes and roadway peaking characteristics, Bernalillo County will require data collection utilizing traffic tube counters or other approved methods. Traffic tube count data will consist of a minimum of 48 consecutive hours of data collected by direction reported from each collection site. This standard will apply for volume, classification, and speed.

1. The data must be collected directionally
2. The data must be collected in 15 minute intervals
3. The data must be collected for consecutive hours within the identified peak periods for turning movements and for 48 hour counts for road segments

Turning movement count data will include the 15-minute volume of each movement by approach lane. Intersection turning movements should minimally report passenger cars, trucks, bicycles and pedestrians. **Intersection turning movement counts without bicycle and pedestrian information will not be accepted.**

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<sup>7</sup> *Standard Practice for Acquiring Intersection Vehicle Turning Movement Data*, ASTM, E17.52, WK20203

The recommended period of intersection turning movement counts will follow one of two procedures consistent with state traffic monitoring standards.

- 1) Fixed Intersection Count Period – Intersection turning movement counts should be conducted from 07:00 to 10:00, 11:00 to 14:00, and 15:00 to 18:00 hours. This provides monitoring of three daily peak traffic periods during the same weekday, each of three-hour duration, for a total of nine hours of data collection.
- 2) Flexible Intersection Count Period – Intersection turning movement counts may be conducted based on observed peaking characteristics from standard 48-hour road segment traffic volume counts. Seasonal adjustments may be required. Morning, noon, and evening peak hours will be defined using fifteen-minute intervals. At a minimum, one half hour before and one half hour after each anticipated peak hour will be defined. This will result in three traffic-monitoring periods of two hours duration for a total of six hours of reported data.
- 3) Changes to the Data Collection Period – The proposed development may have trip generation characteristics that are not included in the two stated count periods. In this circumstance, the traffic data collection period may be extended.

The developer may recommend a change in or reduction to the data collection period in the scoping report. The reduction should be based on the specific land use and proposed site. It should be anticipated, however, that intersection turning movement traffic counts will be a minimum of four hours, generally two hours for each of the AM and PM peaks. The data must be collected and reported consistent with standard practice.

Traffic data collection will be consistent with the transportation industry standards stated above. Data may not be estimated and reported as traffic measurements. In special circumstances, alternate data collection methods may be requested. The County will evaluate the request and approve, deny, or suggest other options that may be approved.

### 3.5 Safety Analysis

Bernalillo County may request a safety analysis of the transportation system in the area of influence of the development. The scope of the study will be discussed and agreed upon and may include collision diagrams, analysis of crash data compared to statewide averages, accident patterns, and identification of areas that may require safety improvements.

### 3.6 Content Organization

The draft TIA should use the following outline to organize the study content. Some points in the outline will not be applicable to all proposed developments. For example, not all developments have multiple phases. The developer or the developer's representative will either use the following draft TIA outline for all applicable points or propose an alternative outline in the scoping study.

### 3.6.1 TIA Outline

- 1) Introduction and Summary
  - a) Purpose of report and study objectives
  - b) Executive summary
    - i) Site location, study area
    - ii) Development description
    - iii) Types of studies in report (impacts, signal warrant, site access, etc.)
    - iv) Principal findings
    - v) Conclusions
    - vi) Recommendations
- 2) Proposed development (site and nearby)
  - a) Other relevant developments or programed transportation improvements
  - b) On site development
    - i) Land use and intensity, site generated traffic table
    - ii) Location
    - iii) Site plan
    - iv) Zoning
    - v) Phasing and timing
- 3) Existing area Conditions
  - a) Adjacent Roadways
    - i) Functional classification
    - ii) Lane configuration
    - iii) ADT
    - iv) Posted speed
  - b) Study area
    - i) Area of influence
    - ii) Area of significant transportation impact (may be part of the area of influence)
  - c) Study area land use
    - i) Existing land uses
    - ii) Existing zoning
    - iii) Anticipated future development
  - d) Site accessibility
    - i) Area roadway system
      - (1) existing
      - (2) future
    - ii) Traffic volumes and conditions
    - iii) Transit service
    - iv) Pedestrians and bicyclists
    - v) Existing relevant transportation system management programs
    - vi) Others as applicable
- 4) Projected traffic
  - a) Site traffic by horizon year
    - i) Trip generation
    - ii) Trip distribution

- iii) Modal split (bike, pedestrian, transit)<sup>8</sup>
    - iv) Trip assignment<sup>9</sup>
    - v) Internal capture, diverted, and pass-by trips
  - b) Baseline traffic by horizon year
    - i) Turning movement counts for selected intersections
    - ii) Modal split (bike, pedestrian, transit)
    - iii) Growth factors
    - iv) Other planned development(s) in study area
  - c) Total traffic by horizon year
- 5) Transportation Analysis
  - a) Site access
  - b) Capacity and Level of Service
    - i) Existing Conditions
    - ii) Baseline (existing plus growth in area)
    - iii) Total traffic (baseline plus site) for each horizon year
  - c) Queuing analysis
  - d) Traffic signal analysis
  - e) Site circulation and parking
- 6) Safety analysis if requested
  - a) collision diagram
  - b) 3 year crash history
  - c) hazardous locations
  - d) mitigation measures
- 7) Findings
  - a) Site accessibility
  - b) Transportation impacts
  - c) Need for improvement
    - (i) to accommodate existing traffic
    - (ii) to accommodate background traffic
    - (iii) to accommodate background plus site traffic
  - d) Driveway, roadway, intersection site traffic mitigation
    - (i) sight distance
    - (ii) signal/intersection spacing – access control
    - (iii) signal warrants → traffic signal(s)
    - (iv) turning radii
    - (v) Intersection control, MUTCD signing & marking
    - (vi) speed change lane warrants → speed change lanes (taper, length)
- 8) Recommendations
  - a) Site access/circulation plan

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<sup>8</sup> The presence of bicycle traffic, as a primary example of non-motorized vehicle traffic, is not the sole way in which a proposed development should address the need for bicycle service as part of a traffic analysis. The final TIA must address the ways in which the proposed development can support current regional plans for non-motorized transportation. This assessment should be based on need and opportunity as well as presence identified during traffic monitoring.

<sup>9</sup> The City of Albuquerque trip distribution model may be used as well as alternative approaches if consistent with the recommended practices identified in the most current edition of the *Transportation Impact Analysis for Site Development*, Institute of Transportation Engineers; Washington, D.C.

- b) Adequate sight distance evaluation and requirements
- c) Transportation system improvements by phase
  - i) On-site
  - ii) Off-site
- d) Transit, pedestrian, and bicycle improvements
- e) Other
- 9) Conclusions
- 10) Appendix
  - a) Vicinity map, road inventory map, site plan, etc.
  - b) Worksheets
  - c) Graphics, e.g. turning movement counts, DAZ subareas, etc.
  - d) Approved scoping report**
  - e) Miscellaneous

#### **4.0 Public, charter, private, and school-related land uses**

- 1) School peak hour traffic periods shall be evaluated and, if needed, adjacent side street traffic peak periods. The peak periods that result in the highest baseline plus site generated traffic are the most critical.
- 2) School TIAs will evaluate pedestrian and bicycle routes to the site including internal traffic circulation and the effect of driveway locations on the adjacent transportation system
  - a) The site drawing shall include:
    - i) The location of new and existing buildings, driveway locations
    - ii) A circulation plan showing driveway access, employee parking, parent parking, student parking, as well as parent and bus pick-up and drop-off locations.
    - iii) ADA facilities, pedestrian crosswalks, walkways, bikeways, and bike rack locations.
    - iv) Roadway school zone locations and warning devices
  - b) Reference the draft MRCOG *School Traffic Study Procedures* dated September 19, 2010 for additional information on school related land uses.

#### **5.0 Review and Comment**

BCPWD has adopted a target of ten working days for initial review and comment on a draft TIA for sites generating less than 100 peak hour trips, and a target of 20 working days for sites generating 100 peak hour trips or more. Comments will be provided in writing to the developer or developer's representative. BCPWD comments will identify concerns that must be addressed and technical corrections that are recommended to improve the document. BCPWD may require the draft TIA be resubmitted or may state that after revising the draft document the final TIA may be submitted. The County, the developer or the developer's representative may request a meeting to discuss the comments. Discussions and ultimate approval are dependent on the level of initial comments, additional analysis requested, and scope of improvements to be considered to mitigate any negative impacts to the local transportation network.

#### **6.0 Final Traffic Impact Analysis**

When notified by BCPWD, the developer or developer's representative may submit three copies of the final TIA with the agreed upon changes. The final TIA must include the approved scoping report in the appendix. The developer may be requested to deliver a presentation of findings to County staff. The final document is not considered approved until stated in writing by BCPWD.

After the review and approval process, the final TIA will be converted to pdf format containing all traffic data and submitted with the required number of final hard copies of the document. The pdf file will be made available on Bernalillo County's website for public information. The pdf file can be delivered on a readable CD or transmitted via other means with concurrence from Bernalillo County Staff.

## **7.0 Changes to the Final Traffic Impact Analysis**

### 7.1 Traffic Impact Analysis Re-submittal

Some developments change the site plan, site access, and land uses after the Final TIA has been approved. In this case, the Final TIA approval for the proposed development is withdrawn and the Final TIA must be resubmitted. Re-submittal of the Final TIA must include all changes to the site plan and calculation of their impact on traffic safety and operations. The resubmitted document is subject to the same review and approval process as the previously submitted Final TIA.

### 7.2 Traffic Impact Analysis Update

Some developments are completed long after the final TIA is approved. Approved TIA's are in effect for three years from the approval date. After three years, if the development is not complete, an update is required. The update is subject to the same review process as the original approved TIA. The developer or developer's representative will prepare a scoping report, and upon approval will prepare a draft and then final document. Depending on changes in site generated traffic and background traffic, a validation of the original TIA's recommendations may be appropriate at the sole discretion of Bernalillo County.

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