TRANSPORTATION IMPACT ANALYSIS

NOVEMBER 2017

MARANA AZ

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INTRODUCTION

One of Marana's major responsibilities is to plan, build, operate and maintain a safe and efficient transportation system for Town residents, businesses, and visitors. The practices contained in this document are established to help meet this goal. The procedures explain the process and content of the studies, and provide some technical requirements specific to the Town. The procedures outline the general analysis approach and methods. However, the Town of Marana's transportation procedures are not intended to supplant the technical expertise in transportation systems analysis and traffic engineering necessary to evaluate transportation impacts.

The purpose of this document is to provide criteria for the preparation of a Traffic Impact Analysis (TIA) or a Traffic Impact Statement (TIS) for new land developments or additions to existing developments and to establish the report format for these studies.
The TIA is a useful tool for early identification and mitigation of potential traffic problems. They often play an important role in the success or failure of a development project. When insufficient attention is given to traffic impacts, the following problems could result:

- On-site traffic congestion, circulation, and access problems
- Unacceptable congestion on adjacent roadways
- Inadequate access for various modes and vehicle types
- Increased crash experience

The procedures contained herein assist developers through the approval process by outlining the requirements and level of detail of traffic analysis that will be required of them during the approval process, to standardize the types and details of analysis required in the assessment of traffic impacts and to ensure consistency in the preparation and review of a TIA. The preparation of a TIA provides an opportunity for the Town and the developer to share information and jointly address traffic related problems. It provides a means of balancing development needs with the functional integrity of the roadways that serve both the development and the region.

Almost all land development projects will need some level of TIA. The level of detail and extent of the study area depends on the type and size of the land development, how much traffic it will create, and its location within the Town. For small projects in uncongested rural areas, the report will be quite brief and only require a TIS. Conversely, larger projects in congested urban areas may be very extensive because they need to resolve how traffic problems are mitigated. These procedures, along with the judgment of Town staff, will define if a study is required and how extensive it needs to be.

The Town Engineer or designee in accordance with Table 1 and the intent of these guidelines will determine the scope for the initial TIA, a revised TIA, or a TIS. This can be done through the Town's pre-application process or through a separate meeting for this purpose. If a TIA was done for the project at a site plan review level or with discretionary entitlement, an addendum or update will be required if the original study is greater than two years old. An addendum or update will also be required if additional intersections or driveways are being added, if the new development is different from what was assumed in the master study causing an increase in trips generated, or if surrounding development has changed the background assumptions in the original study.

ANALYSIS REQUIREMENTS

This section describes the contents of a TIA or a TIS, how it should be prepared, and submitted to the Town. The key to a successful study is coordination with Town staff. Most reports can be accepted on the first or second submittal if there is adequate communication with staff about the report's scope and any special concerns or problems areas that need to be emphasized. A TIA or TIS must be prepared by a Registered Professional Engineer (PE) within the State of Arizona.

At the request of the applicant, a pre-TIA meeting may be scheduled to discuss TIA requirements. Traffic assumptions and other relevant transportation related topics will be discussed and vetted to ensure the applicant and Town have an understanding of what analysis will be expected within the TIA. The TIA review process may also be discussed during the meeting. The meeting is optional but strongly encouraged. It may also take place over the phone or electronically via email. Prior to the applicant submitting a TIA, the TIA Checklist must be submitted and reviewed by the Town Engineer or designee. The TIA Checklist gives preliminary information to establish the scope of analysis, influence area, and provides related studies near the proposed project location. An accepted checklist shall be submitted with the TIA or TIS.

Table 1 provides general guidelines on the analysis category requirements and horizon years according to the size of the proposed project.

LEVELS OF ANALYSIS

Table 1: Criteria for Defining Analysis Requirements

ANALYSIS CATEGORY	DEVELOPMENT CHARACTERISTIC	ANALYSIS HORIZON	ANALYSIS AREA
I	Less than 100 peak hour trips	1. Opening Year	1. Site access drives 2. Any existing driveways or intersections in the vicinity of the project
II	Small Development 100-499 peak hour trips	1. Opening Year 2. 5 years in the future	1. Site access drives 2. All major signalized and unsignalized intersections within ¼ mile and all major driveways within 500 feet 3. All roadway segments within ¼ mile of the project site boundary
III	Moderate Development 500-999 peak hour trips	1. Opening Year 2. 5 years in the future 3. 10 years in the future	1. Site access drives 2. All major signalized and unsignalized intersections and all major driveways within a ½ mile radius of the project site boundary 3. All roadway segments within ½ mile of the project site boundary
IV	Large Development 1000-1500 peak hour trips	1. Opening Year 2. 5 years in the future 3. 10 years in the future 4. 20 years in the future	1. Site access drives 2. All major signalized and unsignalized intersections and all major driveways within a 1 mile radius of the project site boundary 3. All roadway segments within 1 mile of the project site boundary
V	Regional Development 1500 plus peak hour trips	1. Opening Year 2. 5 years in the future 3. 10 years in the future 4. 20 years in the future 5. As specified in the Phasing Schedule	1. Site access drives 2. All major signalized and unsignalized intersections and all major driveways within an impact area defined during the methodology meeting 3. All roadway segments within an impact area defined during the methodology meeting

The analysis horizon and/or analysis area may be modified by the Town Engineer or his designee.

TRAFFIC IMPACT STATEMENT (CATEGORY I)

Developments that generate less than 100 vehicle trips during either the AM or PM peak hour may submit a Traffic Impact Statement in lieu of a Traffic Impact Analysis report. A TIS analysis evaluates existing traffic conditions and may include but is not limited to, existing driveways or intersections adjacent to the project, including preliminary sight distance evaluation, vehicle trip generation, the number of access driveways and spacing, access queuing evaluation, and onsite circulation assessment. Projects that require a TIS

are anticipated to have minimal impacts on the adjacent transportation system. In some instances, a TIS may be used to confirm or modify a TIA that was previously approved. The TIS should be signed and sealed by a Registered Professional Engineer in the State of Arizona.

Traffic Impact Analysis (TIA)

Developments that generate 100 or more vehicle trips during either the AM or PM peak hour are required to submit a TIA. The most recent ITE Trip Generation Manual version shall be used for all trip generation calculations for TIA or TIS analysis, unless alternative means are necessary and deemed acceptable by the Town Engineer or designee.

Traffic Impact Analysis will be classified into the following categories:

Category II: Projects within this category are deemed to have minor or minimal traffic impacts.

Category III: Projects within this category have localized impacts to the Town's transportation system.

Category IV: Developments within this category have significant impacts to the transportation system that may extend beyond the vicinity of the site.

Category V: Developments within this category are anticipated to have regional impacts to the transportation system that extend beyond the vicinity of the site and may cross jurisdictional boundaries.

Pre-TIA Meeting

Applicants are encouraged to contact the Planning Department or the Engineering Department to request a pre-TIA Meeting. The purpose of the meeting is to discuss the project scope and required level of analysis for the TIA. The pre-TIA meeting is not mandatory but is recommended for all projects. This meeting may also be conducted via conference call or other meeting formats (i.e. online interface, etc.).

Analysis Area

See Table 1.

Analysis Horizon

See Table 1.

Analysis Time Periods

The study should include an analysis of the impact of the development traffic for the typical adjacent street peak hour conditions on a typical weekday and an analysis of the impact of the development daily weekday traffic generation on the adjacent street system and site driveways. The typical weekday peak hours usually occurs in the AM (7:00-9:00) and PM (4:00-6:00). The town may require the analysis of additional or different time periods if the proposed project has non-typical peak hour characteristics or if adjacent non-site traffic conditions warrant an analysis of other peak traffic time periods.

Data Collection

The Traffic Impact Analysis should include information on the following existing and proposed conditions within the study area:

Traffic Volumes

- The TIA will provide current turning movement volumes in 15 minute intervals for the AM and PM peak hours for all intersections of streets that are classified as collector (major or minor), arterial (major or minor), road of regional significance, parkway, expressway, or freeway in the study area. The results of a Level-of-Service analysis for the peak fifteen-minute periods in the morning and evening for the existing conditions will be included in the report. Twenty-four hour approach volumes and/or 24 hour directional volume counts may be required upon request or as determined through preliminary discussions with the Town.
- Available counts may be extrapolated a maximum of two years with concurrence of the Town Engineer or designee. Where daily count data are not available, mechanical counts may be required at the Town Engineer's discretion.
- Projected traffic volumes should be based on available traffic projections from the Pima Association of Governments (PAG), other appropriate documented traffic projection sources or historical traffic volume trends as approved by the Town Engineer or designee. Projected traffic volumes shall include adjustments, as necessary, to reflect other adjacent future development

Land Use

1. Existing and proposed land use in the study area that has been approved should be discussed and included in the study as it impacts the proposed development street system or driveways.

Roadway Conditions

2. Existing and proposed roadway characteristics shall be identified including pavement type, number of lanes, type of medians and location of median openings, speed limits, functional classification, maximum service volume, and existing traffic control devices.

Crash Experience

3. When deemed necessary through preliminary discussions or analysis, crash experience should be documented for the past 36 month time period for the adjacent roadway system included within the study area. This data is to be used to help determine traffic control and identify potential corrections to the roadway system. If necessary, the Town will assist the consultant with obtaining this information.

TRIP GENERATION

The trip generation for all proposed development shall be estimated using the latest edition of *Trip Generation Manual* published by ITE. Exceptions to the use of this document must be approved by the Town and may include actual trip generation counts from an existing facility of similar size, land use and surrounding area characteristics or from other recognized sources that provide trip generation data not included in the ITE Manual.

INTERNAL CAPTURE AND PASS-BY PERCENTAGE

Internal capture and pass-by percentage reductions may be allowed for certain types and sizes of mixed use developments. Sources that can be used for internal capture and pass-by reduction rates for developments generally include:

1. The internal capture rates or equations contained in the most recent version of the ITE Trip Generation Manual as approved by the Town.

2. The internal capture rate from a previously approved TIA within the Town of Marana for a similar type development.

Adjustments to the site traffic generation should be documented to reflect pass-by traffic, internal capture, modal split, carpooling (TDM), or other means of trip reduction. ***Trip reduction methods should be discussed with the Town prior to use within the report.***

TRIP DISTRIBUTION AND TRAFFIC ASSIGNMENT

Project site traffic shall be assigned to the proposed site driveways, street intersections, and street network corridors included within the study area based on the gravity model principle using experience, judgement, and knowledge of local conditions. Further, traffic may be distributed based on existing traffic count data, analysis of future land development within the study area, or through computer based modeling software. Larger projects, generating more than 300 peak-hour trips, may be required to use PAG's model or as identified during the pre-TIA meeting.

TRAFFIC ANALYSIS

The study should include an analysis of the current year existing traffic conditions, the future 'no-build' traffic conditions, and traffic conditions with the addition of site traffic. The varying conditions of the development should be shown graphically on figures displaying the analysis area. Additional analysis years may be required if the project is phased. The study should include the following minimum items for analysis:

Capacity Analysis

1. Level of service shall be computed for signalized and un-signalized intersections as identified in the Study Area in Table 1, in accordance with the latest edition of the Highway Capacity Manual.

2. For signalized intersections, operational analysis shall be performed for time horizons up to 5 years. Operational analyses for street sizing shall also be performed to ensure the appropriate classification street widths are adequate for the given demand. Project Traffic Forecasting will be acceptable for time horizons beyond 5 years and is also acceptable for Traffic Impact Analysis prepared at the Development Master Plan level.

3. For urban roadways, and rural highways where signalized intersections are at or less than 1 mile apart, the capacity of the roadway is generally dominated by the capacity of the adjacent signalized intersections. Roadway levels of service need not be computed for these facilities.

4. For rural highways where the signalized intersections are more than 1 mile apart, the level of service on the highway shall be estimated in accordance with the latest

edition of the Highway Capacity Manual.

Traffic Control Devices

All development intersections and driveways shall be analyzed to determine the traffic control device requirements using the latest edition of the Federal Highway Administration's (FHWA's) Manual on Uniform Traffic Control Devices (MUTCD).

Traffic Signal Warrants

A traffic signal warrant analysis shall be conducted as deemed necessary by the Town or through preliminary analysis. The traffic signal warrant analysis shall be conducted for the opening year and if not met shall be evaluated based on the analysis categories shown in Table 1. The Traffic Impact Analysis shall establish the projected installation date or development criteria that will trigger the need for the signal. Traffic signal warrant analysis shall be performed based on the traffic signal warrants provided within the MUTCD. It is recommended that coordination with the Town occurs prior to TIA submittal.

Intersection and Driveway Geometrics

The TIA should use recognized formulas as specified in the latest edition of the AASHTO Green Book with documentation provided in the report. All roadway improvements need to comply with the Town of Marana approved development documents, such as the General Plan, Subdivision Street Standards, Marana Standard Details, etc.

1. Determine if existing intersections are adequate or if there is a need for additional through traffic lanes or auxiliary left or right turn lanes including any storage requirements. Please note required taper lengths must be accounted for within the design and are additional to storage lengths.

2. Potential conflicts of proposed driveway locations with existing and/or planned adjacent driveways or intersection traffic lane configurations for future traffic conditions shall be analyzed.

3. Driveway spacing shall adhere to the criteria set forth in the latest edition of the *Pima County Roadway Design Manual*.

Auxiliary Lanes

All access points for a development shall be evaluated to determine if an auxiliary left or right turn lane is warranted.

Please refer to the latest edition of the *Pima County Subdivision and Development Street*

Standards and the *Pima County Department of Transportation (PCDOT) Traffic Engineering Division Pavement Marking Standards* for auxiliary lane criteria.

Queuing Analysis

A queuing analysis shall be conducted for all turn lanes under stop or signal control within the study area. Examples for estimating queue lengths for signal controlled and un-signalized intersections are given below. In addition to these calculations, the TIA can use software that provides analysis supported by HCM methodologies and represent 95th percentile conditions. The minimum required queue storage length shall adhere to the latest version of the PCDOT Traffic Engineering Division Pavement Marking Standards.

For signal controlled intersections, find the number of vehicles arriving at the intersection.

Vehicles/cycle (for random arrivals) = (vehicles/hour) / (cycles/hour)

Storage length =2 x (vehicles/cycle) x (25 feet)

> **Example**: Find the storage length required for 300 vph turning left if the signal cycle is 90 seconds. Vehicles/cycle = (300 veh/hr) / ((1 cycle/90 sec) x (3600 sec/hr)) = 7.5 veh/cycle
>
> Storage length = 2 x (7.5 veh/cycle) x (25 feet) = 375 feet **USE 375 feet**

For un-signalized intersections, find the number of vehicles per average 2-minute period (AASHTO Green Book).

Vehicles/2 min period = (vehicles/hour) / (30 periods/hour)
Storage length = (vehicles/2 min period) x 25 feet

> **Example**: Find the storage length required for 150 vehicles turning left at an un-signalized controlled intersection.
>
> Vehicles/2 min period = (150 veh/hr) / (30 periods/hr) = 5 vehicles
>
> Storage length = 5 veh x 25 feet = 125 feet **USE 125 feet**

Crash Summary

Include crash summary and identification of trends and/or potential safety hazards.

Speed Considerations

Vehicle speed is used to estimate safe stopping and cross-corner sight distances. Sight distance shall conform to the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) standards. The design speed used shall be five miles above the posted speed limit.

Other Analyses

Other analyses as requested by the Town or as may be required due to the type and location of the proposed development

1. Weaving Analyses
2. Parking Analyses
3. On-site and off-site circulation including queuing analyses at major on-site turning movement locations
4. Site access quantity, location and traffic lane configuration
5. Drive-through window analysis

IMPROVEMENT ANALYSIS

The roadways and intersections within the study area shall be analyzed with and without the proposed development to identify any projected impacts in regard to level of service (LOS) and safety. Level of Service (LOS) is a qualitative measure of how well an intersection or roadway performs under prevailing or forecasted traffic conditions.

Intersection LOS: This is a measure of the average delay experienced by each vehicle passing through an intersection. It can be measured for the vehicles making each directional turning movement, using each approach leg, or as a composite average value for all vehicles using the intersection. Similar to roadway level of service, it is reported with a letter grade designation ranging from A to F. An LOS A represents insignificant delay (less than 10 seconds per vehicle); LOS F represents significant waiting. This means more than 50 seconds per vehicle for unsignalized intersections or more than 80 seconds per vehicle for intersections with signals.

Roadway LOS: This is a measure of the amount of roadway congestion ranging from LOS A—no congestion, free flowing conditions -- to LOS F—extreme congestion. LOS is one of the most common terms used to describe how "good" or how "bad" traffic is

projected to be. LOS serves as a benchmark to determine whether new development will comply with an existing LOS or if it will exceed the preferred or adopted LOS. Traffic impact studies determine how specific streets and intersections will function currently and with increased traffic volumes either with or without roadway improvements or other mitigation techniques.

There are six levels of service letter grades typically recognized by transportation planners and engineers, as follows:

Level of Service A - LOS A describes a condition of free flow, with low volumes and high speeds.

Level of Service B - LOS B is the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation.

Level of Service C - LOS C is the zone of mostly stable flow, but speeds and maneuverability are more closely constricted by the higher volumes.

Level of Service D - LOS D is a zone that approaches unstable flow, with tolerable operating speeds, however driving speed is considerably affected by changes in operating conditions.

Level of Service E - LOS E is a zone that cannot be described by speed alone. Operating speeds are lower than in Level D, with volume at or near the capacity of the highway.

Level of Service F - LOS F is a zone in which the operating speeds are controlled by stop-and-go mechanisms, such as traffic signals. This is called forced flow operation. The stoppages disrupt the traffic flow so that the volume carried by the roadway falls below its capacity; without the stoppages, the volume of traffic on the roadway would be higher, i.e., it would reach capacity. It should be noted that LOS is a measure of a roadway segment's efficiency at moving motor vehicles.

Current roadway performance is determined using **Table 2**, which provides maximum traffic service volumes for various roadway types at LOS C, D, and E. The minimum design requirements for all intersections and roadway segments shall be Level of Service (LOS) D with no intersection through lane movement falling below or worse than LOS D. Intersection turning movements shall not fall below LOS E on Collector and larger roadways while minor street turning movements may experience more delay. If the TIA indicates the impact of a development will bring the LOS below those thresholds during the study horizon, mitigation alternatives to improve the LOS to at least those thresholds must be analyzed as part of the study.

If the performance of the existing intersection or roadway is already below LOS thresholds or anticipated to fall below based on traffic growth (e.g. below LOS D for through movements) the study must also evaluate the need for turning lanes on all major un-signalized intersections. The traffic analysis will be performed by comparing future horizons and establishing traffic conditions with and without project traffic projections, the horizons will be based on those stated in Table 1.

Table 2: Town of Marana Roadway LOS Thresholds

	Maximum Daily Service Volumes		
Through Lanes (Total)	LOS C	LOS D	LOS E
2	7,300	14,800	15,600
4	14,500	32,400	33,800
6	23,300	50,000	50,900

Retrieved from 2013 Florida DOT Quality/Level of Service Handbook Tables

Coordination with Other Public Agencies

If applicable, the requirements for a Traffic Impact Analysis as noted in this document may need to be coordinated with the requirements of other local agencies such as adjacent cities or towns, the Pima County Department of Transportation, or the Arizona Department of Transportation. Any deviation from the requirements of this document due to the requirements of other agencies should be presented in written form to the Town for review and approval or denial.

Report Format

Analysis Category I will require a Traffic Impact Statement. The Traffic Impact Statement will be a lesser report and shall include at a minimum the following: The existing condition analysis, including any existing driveways or intersections in the vicinity, a sight distance evaluation, the proposed traffic generation, the access number and spacing, an access queuing evaluation, and an on-site circulation evaluation.

TIA Categories II, III, IV, and V will require a full Traffic Impact Analysis and shall include

the following items and report sections:

INTRODUCTION AND SUMMARY

1. Title Page
2. Table of Contents and List of Figures and Tables
3. Introduction and Executive Summary
    - Site location and study area
    - Development description
    - Principal findings
    - Conclusions/Recommendations

PROPOSED DEVELOPMENT (Site and Nearby)

1. Site location
2. Land use and intensity
3. Site plan (copy must be legible)
    - Access geometrics
4. Development phasing and timing

STUDY AREA CONDITIONS

1. Study area
    - Area of significant traffic impact (including road segments, intersections and driveways)
2. Land use
    - Existing land use
    - Anticipated future development
3. Site accessibility
    - Existing and future area roadway system
    - Site circulation

ANALYSIS OF EXISTING CONDITIONS

1. Physical characteristics
    - Roadway characteristics (number of lanes, classification, etc.)
    - Traffic control devices
    - Transit service
    - Pedestrian/bicycle facilities
    - Nearby driveways
2. Traffic volumes
    - Daily, morning, afternoon peak periods and others as required

3. Level of service
    - Morning peak hour, afternoon peak hour, and others as required
4. Safety related deficiencies, crash experience
5. Data sources

PROJECTED TRAFFIC

1. Site traffic forecasting (each horizon year)
    - Trip generation
    - Mode split (if applicable)
    - Pass-by traffic (if applicable)
    - Trip distribution
    - Trip assignment
2. Non-site traffic forecasting (each horizon year)
    - Projections of non-site traffic by Pima Association of Governments (PAG) may be used. For larger developments and study areas, a transportation planning model run may be required.
    - Total traffic (each horizon year)

TRAFFIC AND IMPROVEMENTS ANALYSIS

1. Site access
2. Level of service analysis
    - Without project (including programmed improvements for each horizon year)
    - With project (including programmed improvements for each horizon year)
3. Roadway improvements
    - Improvements by Town of Marana or others to accommodate non-site traffic
    - Additional improvements necessary to accommodate site traffic
4. Traffic safety
    - Sight distance
    - Deceleration lanes, left-turn lanes
    - Adequacy of location and design of driveway access
5. Pedestrian considerations
6. Speed considerations
7. Traffic control needs
8. Traffic signal needs (base plus 5-year horizon)
9. Effect on Signal Progression (if applicable)

INTERNAL PROJECT SITE CIRCULATION (IF APPLICABLE)

1. Conflict points
    - Vehicle/vehicle

    - Vehicle/pedestrian
    - Sight distances
    - Building access delivery points
    - Drive-through lanes
2. Design features
    - Widths of internal circulation roadways
    - Parking dimensions
    - Sight distance per AASHTO Standards
3. Other features
    - Fire lanes
    - Delivery truck circulation/truck docks
    - Access to waste containers

CONCLUSIONS / RECOMMENDATIONS

1. Roadway improvements
    - Phasing
2. Site access
3. Internal site circulation
4. Transportation demand management actions (if appropriate)
5. Other

APPENDICES

1. Traffic counts
2. Capacity analyses worksheets
3. Traffic signal needs studies
4. All supporting documentation for any warrants, studies, etc.

EXHIBITS

The following information shall be provided on clear and legible tables or figures:

1. Site location
2. Site plan
3. Existing transportation system(s) (Number of lanes, traffic control, etc.)
4. Existing and future area development
5. Existing daily traffic volumes
6. Existing peak hour turning volumes
7. Future transportation system
8. Estimated site traffic (daily and peak periods)
9. Directional distribution of site traffic (daily and peak periods)

10. Total future traffic (peak periods)
11. Queuing distance at study intersections, per lane (total traffic in peak periods)
12. Projected levels of service including existing, horizon year non-site and horizon year total (with site development) conditions
13. Recommended improvements

Report Submittals

A minimum of two hard copies and one electronic version of the report shall be submitted to the Town for review. Additional copies of the report may be required for review by other adjacent public agencies.

APPENDIX A

Additional Criterial for K-12 School Sites

The following is adapted from the City of Peoria Traffic Impact Analysis Additional Criteria for K-12 School Sites.

ADDITIONAL CRITERIA FOR K-12 SCHOOL SITES

The study for any public, charter, or private school with students ranging in grades K-12 shall provide the following additional information:

a) Student Enrollment

The maximum student enrollment at build out shall be indicated in the study Introduction and Summary. Partial student enrollment may be discussed, but will not impact site queuing requirements.

b) Parking

The total number of parking spaces onsite shall be provided in the study Introduction, Traffic Circulation Overview, and Summary. Additional off-site parking available through shared-use facilities, such as adjacent parks or community center, or on-street parking may be discussed as well.

c) Minimum Required Parent Vehicle Queue Calculation

The site shall accommodate a minimum parent vehicle queue for student drop-off and pick-up.

1. The minimum number of parent vehicles to be accommodated shall be calculated by multiplying the school's maximum enrollment by .08 for traditional K-8 public elementary schools. A higher value shall be required for magnet, charter, and private schools that generate a greater number of parent vehicles trips than an average neighborhood school. This value may range from .1 to .3, depending on busing, staggering of arrival and dismissal times, and number of parking spaces available. The engineer may provide values based on observations of existing comparable school sites, subject to approval.
2. The minimum parent vehicle queue length shall be calculated by multiplying the number of parent vehicles by 20' for schools with a formal student drop-off/pick-up procedure characterized by centralized student loading locations. For schools with no organized process, multiply the number of parent vehicles by 25'.

    a. The entire parent vehicle queue should be contained within the school site and/or on a consenting adjacent shared-use site.
    b. The length of an adjacent right turn lane may be added to the minimum required queue if approved by Traffic Engineering.

d) School Traffic Circulation Overview

A school traffic circulation overview with diagrams shall detail motor vehicle, bus, bicycle, and pedestrian circulation on site, including:

1. Direction of traffic flow and number of lanes throughout diagram;
2. Ingress and egress from the site;
3. Minimum required parent vehicle queue;
4. School bus loading areas; and
5. Pedestrians and bicycle routes that avoid crossing school driveways, when possible.
6. School-related Traffic Control - Anticipated school traffic control in compliance with the current adopted version of the MUTCD, ADOT *Guidelines for School Traffic Safety*, and Town of Marana practices shall be addressed, including, but not limited to:

    a. 15mph School Crossing;
    b. Adult crossing guards;
    c. NO PARKING restrictions on streets adjacent to the school site

APPENDIX B

Pre-Submittal TIA Form

Development Services / permits@maranaaz.gov
11555 West Civic Center Drive / Marana, AZ 85653
Ph (520) 382-2600 / Fax (520) 382-2641 / maranaaz.gov

PRE-SUBMITTAL TRANSPORTATION IMPACT ANALYSIS FORM

CONTACT INFORMATION

NOTE: Complete this form and return to Marana Traffic Engineering Division for review and acceptance. Submit the completed and accepted form with your study. Studies will not be reviewed without the accepted form attached. Acceptance of this form does not constitute acceptance of the study.

Consultant:	Contact Name:		
Address:	City:	State:	Zip:
Email:	Phone No.:		

Was the consultant actively involved in the site circulation, roadway layout and selection of access locations: ❑ Yes ❑ No

PROJECT INFOMATION

Project Name:

Project Location/Address:

Description of Work:

Current Zoning:	Proposed Zoning:
Pre-submittal held on (date):	Applicant/Developer:

Pre-submittal Meeting Summary:

Nature of the Transportation Study:
❑ Rezoning ❑ Development Plan ❑ Block Plat ❑ Subdivision Plan

Proposed Access Location(s):

New Median Openings Requested: ❑ Yes ❑ No	Access via Non-Town Roadways: ❑ Yes ❑ No	Coordination with Non-Town Agency(s): ❑ Yes ❑ No

Development Services / permits@maranaaz.gov
11555 West Civic Center Drive / Marana, AZ 85653
Ph (520) 382-2600 / Fax (520) 382-2641 / maranaaz.gov

TRANSPORTATION STUDY PARAMETERS

Trip Generation (Land Use Categories and Rates):

Traffic Impact Analysis Category: ❑ I ❑ II ❑ III ❑ IV ❑ V

Horizon Year(s):

Trip Distribution To/From - North: South: East: West: Other:

Passer-by Traffic and Internal Capture (Rates):

Alternate Mode Considerations
Bike:
Pedestrian:
Transit:

Traffic Data and Preliminary Trip Generation:

ANALYSIS ELEMENTS AND METHODS

Roadways:

Intersections:

Traffic Safety and other special considerations:

I, the undersigned, certify that all of the facts set forth in this form are true and correct to the best of my knowledge and that the study will include the parameters and elements described above. I understand that additional study parameters or elements (other than those discussed in this form) may be required following the first submittal of the study, if the Town deems that they are critical to the study findings.

Consultant Signature	Date
Consultant Name (PRINT)	Title

FOR OFFICIAL USE ONLY

Project No._____ **Date Received** _____

❑ Form Accepted Accepted Date _____ Accepted By _____

Town Authorized Signature _____ Title _____

Revision Date 11/1/2017


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