



DATE: October 16, 2017

TO: Pima County Board of Supervisors

FROM: Tom Drzazgowski – Chief Zoning Inspector

SUBJECT: **P17CU00001 – ARIZONA IRONWORKS LLC – E. TANQUE VERDE RD.**

---

Attached is additional material for the conditional use permit request for a restaurant at 11011 E. Tanque Verde Rd. It is some of the background material that resulted in the transportation conditions that the Hearing Administrator included in his recommendation.



DEPARTMENT OF TRANSPORTATION  
201 NORTH STONE AVENUE, FOURTH FLOOR  
TUCSON, ARIZONA 85701-1207

PRISCILLA S. CORNELIO, P. E.  
DIRECTOR

(520) 724-6410  
FAX (520) 724-6439

## Memorandum

---

Date: August 9, 2017  
To: Tom Drzazgowski, Pima County Development Services  
From: Jeanette De Renne, AICP, Pima County Department of Transportation  
Subject: Conditional Use Permit – Barnyard Development, Tanque Verde Road

---

In response to the request for a Conditional Use Permit for a restaurant on Tanque Verde Road, just west of Tanque Verde Loop, the Department of Transportation has no objection to the request subject to conditions. The project would have approximately 4,000 square feet of restaurant space with seating for 160-180 people. Based on this use, the project will generate approximately 500 ADT. The developer is requesting the use of an existing access drive on the west side of the project site. An alternative driveway access was analyzed along an existing easement on the eastern boundary of the site.

Although both access points could work, the access on the easement would require extensive grading and relocation of several utility poles. The easement access would also have some sight visibility challenges, and it is generally the preference of DOT to see driveway access further away from major street intersections. The driveway preferred by the applicant is in a flatter, more visible, and potentially safer location than the easement alternative.

As part of the conditional use permit, the developer has asked to waive the development plan requirement. Due to this aspect of the request, the Department of Transportation requested a traffic statement to determine whether or not turn lanes were warranted for this development, and to determine the safest way to integrate this development into the transportation system. A turn lane warrant analysis was conducted. This analysis indicated an eastbound left turn lane would be warranted for this development, and a westbound right turn lane would not be warranted.

Pima County is currently designing and intersection improvement project (4TVTVL) for the intersection of Tanque Verde and Tanque Verde Loop Road. This project is scheduled to start construction near the end of Fiscal Year 2019. The 30% project plans include a two-way left turn lane on Tanque Verde Road adjacent to the proposed restaurant development. This left turn lane as proposed at this phase of the project design does not extend the full length of the left turn lane necessary to accommodate this development.

Upon discussions between the Department and the developer, two options could be suitable. First option would be for the developer to construct the left turn lane during development of his site. The second option would be for the developer to contribute to the Tanque Verde / Tanque Verde Loop project and

the county would extend the turn lane as part of the 4TVTVL project. The second alternative will be more cost effective and will also provide a more consistent extension of the roadway design. If the developer put the turn lane in prior to the 4TVTVL project, a significant amount of the work done by the developer would be torn out or redone.

The developer and the county are using the same traffic engineer, EPS Group. The developer had EPS group submit and estimate for constructing the extension of the left turn lane. The center left turn lane would need to be extended to 110 feet west of the proposed driveway, which equates to an additional \$14,000 project cost. The cost was estimated with the same methodology used to estimate the full 4TVTVL project. DOT is willing to accept \$14,000 to extend the turn lane, and thus not require the developer to construct the turn lane.

DOT requests the following conditions for the conditional use permit request.

- Access to the site shall be limited to the driveway shown on the site plan.
- Access to the easement along the eastern property line will be limited to employees and maintenance vehicles. Patrons will not be permitted to use the easement for access or parking.
- The developer will contribute \$14,000 to the 4TVTVL intersection project for the extension of the center left turn lane to accommodate this development.



**DRAFT**

**Traffic Memorandum**  
**Barnyard Crafthouse and Eatery**  
**Restaurant**

Prepared for  
Red Point Development, Inc.  
8710 N. Thornydale Road, Suite 120  
Tucson, AZ 85742

August 2017

8710 N. Thornydale Road, Suite 140  
Tucson, AZ 85742  
o: 520.408.1400  
f: 520.408.1403



**DRAFT**

## **Traffic Memorandum**

### **Barnyard Crafthouse and Eatery Restaurant**

Prepared for  
Red Point Development, Inc.  
8710 N. Thornydale Road, Suite 120  
Tucson, AZ 85742

August 21, 2017

Prepared by:  
EPS Group, Inc.  
8710 N. Thornydale Road, Suite 140  
Tucson, AZ 85742



## **TABLE OF CONTENTS**

	<b><u>Page</u></b>
INTRODUCTION AND SUMMARY	1
Development Description	2
Summary of Major Findings and Recommendations	2
PROPOSED DEVELOPMENT	4
STUDY AREA CONDITIONS	5
Study Area and Horizon Year	5
Land Uses Adjoining the Project	5
Site Accessibility and Circulation	5
EXISTING AND FUTURE CONDITIONS	6
Physical Characteristics	6
Sight Distance	6
Traffic Control Devices	6
Roadway Lighting	6
Multimodal Considerations	6
Programmed Roadway Improvements	7
TRAFFIC VOLUMES	8
Current Traffic Volumes	8
Trip Generation	9
Traffic Distribution and Assignment	10
Total Traffic	10
TRAFFIC AND IMPROVEMENT ANALYSIS	11
Roadway Performance	11
Intersection Performance	12
Auxiliary Lane Warrants	12
Crash Analysis	14
Sight Distance	15
CONCLUSIONS AND RECOMMENDATIONS	17
APPENDIX	
Traffic Count Data	
Florida DOT Level of Service (LOS) thresholds	
Synchro HCM Traffic Performance Reports	
Crash Data	
Contribution to Pima County CIP Project Documentation	





## ***LIST OF EXHIBITS***

		<u><b>Page</b></u>
Exhibit 1	Project Study Area	2
Exhibit 2	Project Site Plan	4
Exhibit 3	Planned Intersection Improvements at the Tanque Verde Road and Tanque Verde Loop Road Intersection	7
Exhibit 4	Existing (2017) Study Area Traffic Volumes	8
Exhibit 5	Existing (2017) Roadway Speed Data	9
Exhibit 6	Existing (2017) Roadway Vehicle Classification Data	9
Exhibit 7	Site Trip Generation Rates and Trips	9
Exhibit 8	Site Traffic Volumes	10
Exhibit 9	Year 2017 Estimated Total Traffic (Background + Site)	11
Exhibit 10	Year 2017 Roadway Volumes and Capacity	11
Exhibit 11	Intersection Delay & Level of Service Results for 2017 Total Traffic	12
Exhibit 12	Pima County Turn Lane Volume Warrants	13
Exhibit 13	Crash Data Summary	15
Exhibit 14	Intersection Sight Distance (ISD) Sight Triangles	16
Exhibit 15	Intersection Sight Distance (ISD) Required “b” Distance	16



## INTRODUCTION AND SUMMARY

This Traffic Memorandum (TM) was prepared for Jerry Kertesz for the Barnyard Craffhouse and Eatery restaurant planned on the north side of Tanque Verde Road, west of Tanque Verde Loop Road in Pima County, AZ. The restaurant development proposes to improve an existing access point to Tanque Verde Road within Pima County owned Right-of-Way, approximately 425 feet west of the intersection of Tanque Verde Road and Tanque Verde Loop Road. This Traffic Memorandum was prepared according to the procedures established by Pima County in their Subdivision and Development Street Standards (SDSS)<sup>1</sup>.

Additionally, a phone call and email correspondence with representatives from the Pima County took place on July 20, 2017 where the number and location of access points was discussed. It was decided that only one access point would be preferred with an accompanying left turn lane. Due to the need for a turn lane, a Traffic Memorandum (TM) was determined to be required. Additionally, allowing the proposed restaurant to open prior to upcoming roadway improvements on Tanque Verde Road, including a two-way left-turn lane in front of the restaurant property was discussed. This option would be subject to approval by Pima County Development Services and ultimately the Pima County Board of Supervisors.

Subsequently, a meeting took place on August 8<sup>th</sup>, 2017 with representatives from Pima County Department of Transportation (DOT), including representatives from the Traffic Engineering Division as well as Mr. Kertesz. During this meeting, the specific location of the preferred access point was agreed upon. The access point for the proposed Barnyard Craffhouse and Eatery restaurant will be located at an existing access for the property approximately 425' west of the intersection of Tanque Verde Road and Tanque Verde Loop Road. This access point does not currently have a left-turn lane for customers to use to make the eastbound left-turn movement into the site.

The future improvement project being sponsored by Pima County at the intersection of Tanque Verde Road and Tanque Verde Loop Road is currently in the design phase and does not include a left-turn lane into the proposed restaurant site, but it does include some pavement widening in the area due to a taper from a turn lane further east. During the August 8<sup>th</sup> meeting, Pima County DOT proposed that Mr. Kertesz have a consultant estimate the cost of additional pavement added to the intersection project required for the provision of an eastbound left-turn lane into the restaurant and propose to make that contribution to the intersection improvement project so that the project can include the turn lane into his property. Subsequently, Mr. Kertesz had a registered civil engineer estimate that cost and provide it to Pima County DOT in support of Mr. Kertesz' proposed financial contribution to the intersection project. It is understood that the Barnyard Craffhouse and Eatery restaurant is planned to open in late 2017 and the intersection improvement project is planned to begin construction in early 2019.

On August 16<sup>th</sup>, 2017, Pima County held a hearing for this restaurant as part of the Pima County Conditional Use Permit process during which time Pima County indicated that they would recommend approval of the Barnyard Craffhouse and Eatery restaurant to the Pima County Board of Supervisors. This recommendation is subject to the commitment from Mr. Kertesz to contribute financially to the Tanque Verde Road at Tanque Verde Loop Road intersection project for the addition of a left-turn lane into his restaurant. Information about this contribution is provided in the appendix.

The specific objectives of this TM were to document the need for a right-turn and/or left-turn lane from Tanque Verde Road into the site. These turn lanes were to be evaluated based on the Pima County Auxiliary Lane Warrant criteria found in the 2016 Pima County Subdivision and Development Street Standards. Additionally, Pima County requested an investigation of the sight distance at the proposed site access intersections.

---

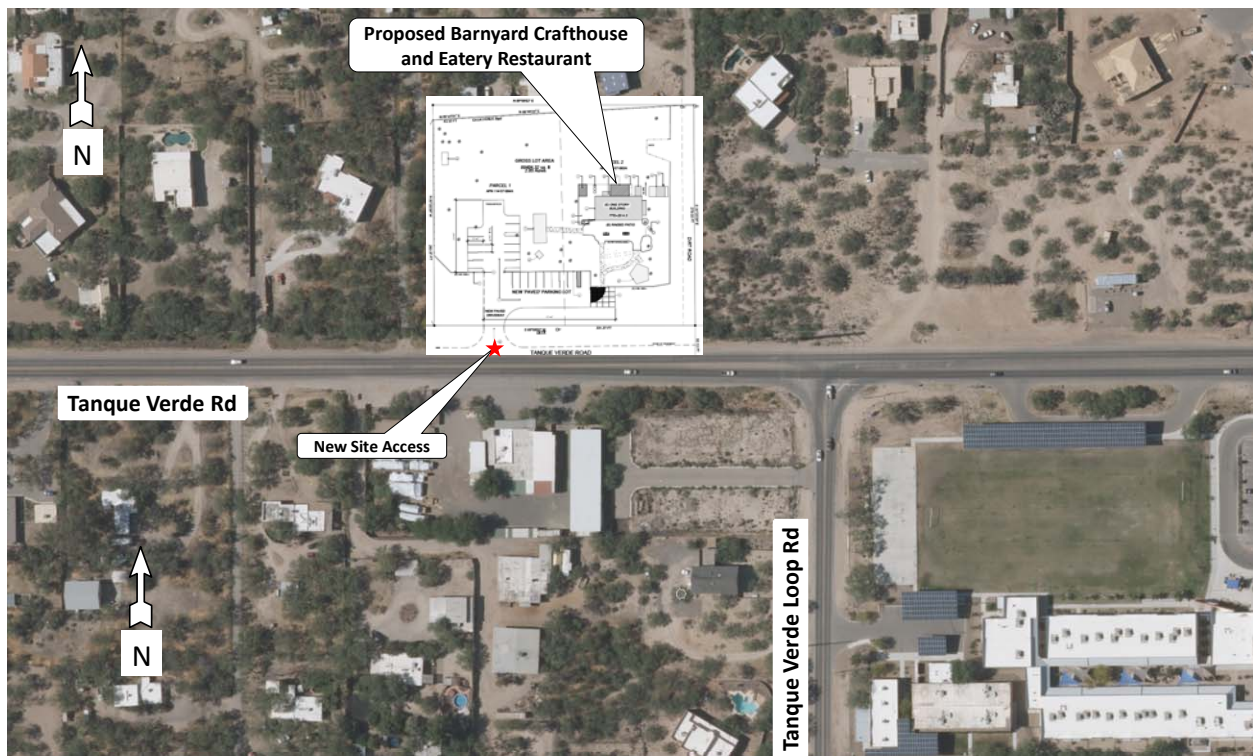
<sup>1</sup> *Pima County Subdivision and Development Streets Standards*, Pima County (2016).

## Development Description

The Barnyard Crafthouse and Eatery is a single phase restaurant development within Pima County, Arizona which is proposed for a single use as a high turnover sit down restaurant. The current project site land is made up of two parcels totaling approximately 2.13 acres. The Project Study Area Map is provided in Exhibit 1. The project site is currently zoned RVC, "Rural Village Center". The project proposes to improve an existing driveway located approximately 425 feet west of the intersection of Tanque Verde Road and Tanque Verde Loop Road. Mr. Kertesz is developing this land for the Barnyard Crafthouse and Eatery with an anticipated restaurant opening (build-out) in late 2017. The site access point from Tanque Verde Road west of Tanque Verde Loop Road is shown in the project study area map and site plan for the proposed development, provided in Exhibit 1.

According to Mr. Kertesz, the restaurant is anticipated to have approximately 4,000 square feet of space, both indoor and outdoor, with a seating capacity of 160-180. The proposed hours of operation would be 11 am – 9 pm or 10 pm Monday through Thursday. Friday through Sunday the restaurant would be open for Breakfast at 8 am. Friday and Saturday the restaurant would stay open until 10 or 11pm.

**Exhibit 1**  
**Project Study Area**



## Summary of Major Findings and Recommendations

- The proposed Barnyard Crafthouse and Eatery Development is anticipated to have approximately 4,000 square feet of space, both indoor and outdoor, with a seating capacity of 160-180. The proposed hours of operation would be 11 am – 9 pm or 10 pm Monday through Thursday. Friday through Sunday the restaurant would be open for Breakfast at 8 am. Friday and Saturday the restaurant would stay open until 10 or 11pm.
- The proposed Barnyard Crafthouse and Eatery Restaurant is estimated to generate approximately:
  - 508 total daily trips (254 entering, 254 exiting).
  - 43 morning peak-hour trips (24 entering, 19 exiting). This assumes the restaurant serves breakfast.

- 10 eastbound left-turns, 14 westbound right-turns entering in AM peak-hour.
  - 39 evening peak-hour trips (23 entering, 16 exiting).
    - 10 eastbound left-turns, 13 westbound right-turns entering in PM peak-hour.
- The proposed access for the Barnyard Crafthouse and Eatery restaurant is located approximately 425' west of Tanque Verde Loop Road as shown in Exhibits 1 and 2 herein.
- The planned site access intersection is proposed to be stop-controlled on the southbound approach. This intersection will not have turn restrictions.
- An eastbound left-turn lane is warranted for the proposed site access point on Tanque Verde Road west of Tanque Verde Loop Road. No other turn lanes are warranted for the proposed restaurant.
- The segment of Tanque Verde Road between Houghton Road and Tanque Verde Loop Road is currently under capacity using the 2017 volumes and will also be under capacity with the inclusion of the Barnyard Crafthouse and Eatery restaurant site traffic. This site traffic will represent approximately 2% of the projected total daily traffic on this segment of Tanque Verde Road in 2017.
- The traffic operations results for the proposed unsignalized site access intersection with Tanque Verde Road show that it will operate at LOS C or better for all movements using the 2017 total traffic volumes. The 95th Percentile Queue lengths (measured in vehicles) indicate that in general the site access intersection should operate without much traffic queuing.
- Based on AASHTO criteria, the available sight distance at the site access intersection is sufficient to meet this Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) requirements.
- The 3 year crash rate for this segment of Tanque Verde Road was 0.84 compared to a 3 year system crash rate of 1.23 for low volume (< 10,000 ADT) roadway segments and the 3 year crash rate for the Tanque Verde Road and Tanque Verde Loop Road intersection was 0.31 compared to a 3 year system crash rate of 0.34 for unsignalized intersections as published in the Pima County Department of Transportation Safety Management System Program Annual Update Report for Calendar Year 2014.
- An improvement project for the intersection of Tanque Verde Road and Tanque Verde Loop Road is scheduled to start construction near the end of Fiscal Year 2019. The project plans include the provision of a two-way left-turn lane (TWLTL) on Tanque Verde Road east of the proposed restaurant development access. This TWLTL will need to be extended approximately 110' to the west and then tapered down for the provision of an eastbound left-turn lane into the restaurant site access point.
- On August 16th, 2017, Pima County held a hearing for this restaurant as part of the Pima County Conditional Use Permit process during which time Pima County indicated that they would recommend approval of the Barnyard Crafthouse and Eatery restaurant to the Pima County Board of Supervisors. This recommendation is subject to the commitment from Mr. Kertesz to contribute financially to the Tanque Verde Road at Tanque Verde Loop Road intersection project for the addition of an eastbound left-turn lane into his restaurant.

The Barnyard Crafthouse and Eatery is a single phase restaurant development within Pima County, Arizona which is proposed for a single use as a high turnover sit down restaurant. The current project site land is made up of two parcels totaling approximately 2.13 acres. The project study area with site plan is provided in Exhibit 1. The project site is currently zoned RVC, "Rural Village Center". The project proposes to improve an existing driveway approximately 425 feet west of the intersection of Tanque Verde Road and Tanque Verde Loop Road. The restaurant is anticipated to have approximately 4,000 square feet of space, both indoor and outdoor, with a seating capacity of 160-180. Mr. Kertesz is developing this land for the Barnyard Crafthouse and Eatery with an anticipated restaurant opening (build-out) in late 2017. The project site plan is provided in Exhibit 2 which shows the proposed site access point.

[illegible]



## **STUDY AREA CONDITIONS**

### **Study Area and Horizon Year**

Phone calls and email correspondence with representatives from the Pima County took place in July and early August 2017. In addition, meeting took place on August 8<sup>th</sup>, 2017 with representatives from Pima County Department of Transportation (DOT), including representatives from the Traffic Engineering Division as well as Mr. Kertesz. During these conversations and meetings, the number and location of access points was discussed. It was decided that only one access point would be preferred with an accompanying left turn lane, requiring a Traffic Memorandum (TM) be completed. Specific direction was provided regarding the scope of this TM for the Barnyard Crafthouse and Eatery restaurant development; the primary focus of the TM should be the proposed site access intersection. Specifically, direction was provided to evaluate the need for a right-turn and/or left-turn lane from Tanque Verde Road into the site access point using the Pima County Auxiliary Lane Warrant criteria found in the 2016 Pima County SDSS. Additionally, Pima County requested a brief investigation of the sight distance at the proposed site access intersections.

The Barnyard Crafthouse and Eatery restaurant is anticipated to open in late 2017. This is the year that will be used for all analyses in this Traffic Memorandum.

### **Land Uses Adjoining the Project**

There are several different types of land use near the project study area. Directly southeast of the proposed restaurant is the Emily Gray Junior High School and Tanque Verde School District School Bus Storage facility. A Jehovah's Witness Kingdom Hall and a Circle K convenience store are also located east of the restaurant on the north side of Tanque Verde Road. South and west of the proposed restaurant there are a couple small businesses, namely Tanque Verde Hay Feed & Supply and Appleby's Ornamental Iron. Beyond that, the project area is surrounded by low density residential land uses.

The current zoning surrounding the study area is a variety of CB-1 (Local Business), CB-2 (General Business), RVC (Rural Village Center), CR-1 (Single Residence), and SR (Suburban Ranch).

### **Site Accessibility and Circulation**

This project is located on the north side of Tanque Verde Road, west of Tanque Verde Loop Road. The proposed access for the restaurant consists of improving an existing access point to Tanque Verde Road approximately 425 feet west of the intersection of Tanque Verde Road and Tanque Verde Loop Road as shown in Exhibit 1. Based on discussions with Pima County representatives, the restaurant should only have one main access point to serve the business. A secondary access may be used on the east side of the property for employees and deliveries. This access point would be shared with several residential properties to the north.

Residents in the Tanque Verde Valley area most likely to use Tanque Verde Road and/or Tanque Verde Loop Road to head west and south into the metropolitan Tucson area. There are also people who travel to this area to drop off students at Emily Gray Junior High School and Tanque Verde Elementary School as well as access the Forty Niners Golf Club further to the east.

The proposed restaurant plan consists of one main access point to be used by patrons, therefore there is no site circulation to evaluate as restaurant customers who use this access point would need to use the parking lot as a turnaround point to head back and access Tanque Verde Road.



## **EXISTING AND FUTURE CONDITIONS**

### **Physical Characteristics**

The proposed Barnyard Crafthouse and Eatery restaurant development site will have direct site access from Tanque Verde Road as shown previously in Exhibit 1. The proposed access point from Tanque Verde Road is proposed to be stop controlled on the approach to Tanque Verde Road.

### **Tanque Verde Road**

Near the proposed restaurant site, Tanque Verde Road is currently an urban minor arterial roadway that is not assigned a Federal Highway Administration (FHWA) roadway classification code. Tanque Verde Road near the proposed restaurant development has a cross section ranging from approximately 36-48 feet consisting of:

- One 12 foot travel lane in each direction.
- One 6 foot paved shoulder in each direction.
- Poor to fair pavement condition in the vicinity of the project site.
- 45 MPH posted speed limit west of Tanque Verde Loop Road.
- Striped median taper extending approximately 350' west of the intersection of Tanque Verde Road and Tanque Verde Loop Road ranging from 0-12 feet in width.

### **Sight Distance**

In the vicinity of the proposed restaurant site access intersection, Tanque Verde Road has a vertical roadway alignment generally following the existing, somewhat flat terrain with very minor longitudinal slopes providing good sight visibility. Tanque Verde Road has a slight crest vertical curve approximately 600' east of the proposed main access point. The available sight distance at this site access point extends approximately 900' to the east (475' beyond the Tanque Verde Loop Road intersection) and more than 1,000' feet to west. The proposed site access location from Tanque Verde Road is ideal in terms of sight distance because it provides good sight visibility for left-turning vehicles into and out of the site as well as right-turning vehicles into the site.

### **Traffic Control Devices**

The proposed Barnyard Crafthouse and Eatery restaurant development will have one main access point to Tanque Verde Road which will be stop-controlled on the southbound approach exiting the restaurant parking lot. Drivers will be entering a Tanque Verde Road facility that is near the Tanque Verde Loop Road intersection. This intersection, 425' to the east of the access point, is planned to be controlled by a traffic signal in the near future but is currently stop-controlled for the northbound Tanque Verde Loop Road approach. To the west, Tanque Verde Road traffic is subject to traffic signal at Houghton Road located approximately 4,700 feet west of the proposed access point. This segment of Tanque Verde Road between Tanque Verde Loop Road and Houghton Road intersects with several other residential streets and driveways which are all subject to stop control on their respective approaches to Tanque Verde Road.

### **Roadway Lighting**

There is currently no roadway lighting on Tanque Verde Road near the proposed site access intersection except for one street light at the Tanque Verde Road and Tanque Verde Loop Road intersection and one street light further east at the existing HAWK pedestrian signal. However, when the Tanque Verde Road and Tanque Verde Loop Road intersection becomes signalized, street lighting is planned to be present on each leg of the intersection as well as between this signal and the signalized HAWK pedestrian crossing further east.

### **Multimodal Considerations**

Currently there are no transit facilities or SunTran bus routes within the study area and there are no plans to expand transit service to this area in the near future. Tanque Verde Road has paved shoulders within the study area and is listed as a "Bike Route with Striped Shoulder, Bus / Bike Lanes" in the Pima County Regional Bike Map. These bike lanes were constructed as a roadway widening project in 2005. There are currently no sidewalks

present within the study area right-of-way except at the connection of the Emily Gray Junior High School sidewalk to the pedestrian HAWK signal located 725' east of the Tanque Verde Road and Tanque Verde Loop Road intersection. This HAWK signal was installed in 2015 as a federally funded Transportation Alternatives Program

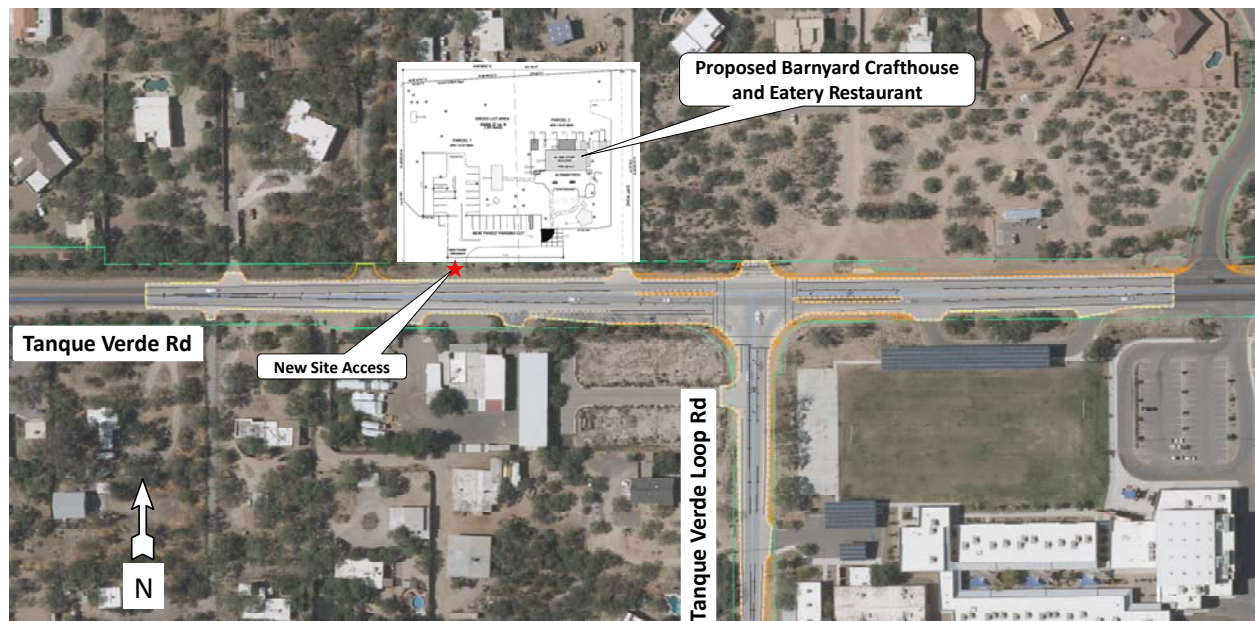
### **Programmed Roadway Improvements**

An improvement project for the intersection of Tanque Verde Road and Tanque Verde Loop Road is scheduled to start construction near the end of Fiscal Year 2019, or the summer of calendar year 2019. The 30% project plans include the provision of a two-way left-turn lane (TWLTL) on Tanque Verde Road just east of the proposed restaurant development access. Exhibit 3 shows the current design of the planned roadway improvements for the Tanque Verde Road and Tanque Verde Loop Road intersection. This TWLTL will need to be extended approximately 110' to the west and then tapered down west of that for the provision of an eastbound left-turn lane into the restaurant site access point.

As discussed previously in this document, on August 16<sup>th</sup>, 2017 Pima County indicated that they would recommend approval of the Barnyard Crafthouse and Eatery restaurant to the Pima County Board of Supervisors. This recommendation is subject to the commitment from Mr. Kertesz to contribute financially to the Tanque Verde Road at Tanque Verde Loop Road intersection project for the addition of a left-turn lane into his restaurant. Information about this contribution is provided in the appendix.

### **Exhibit 3**

#### **Planned Intersection Improvements at the Tanque Verde Road and Tanque Verde Loop Road Intersection**

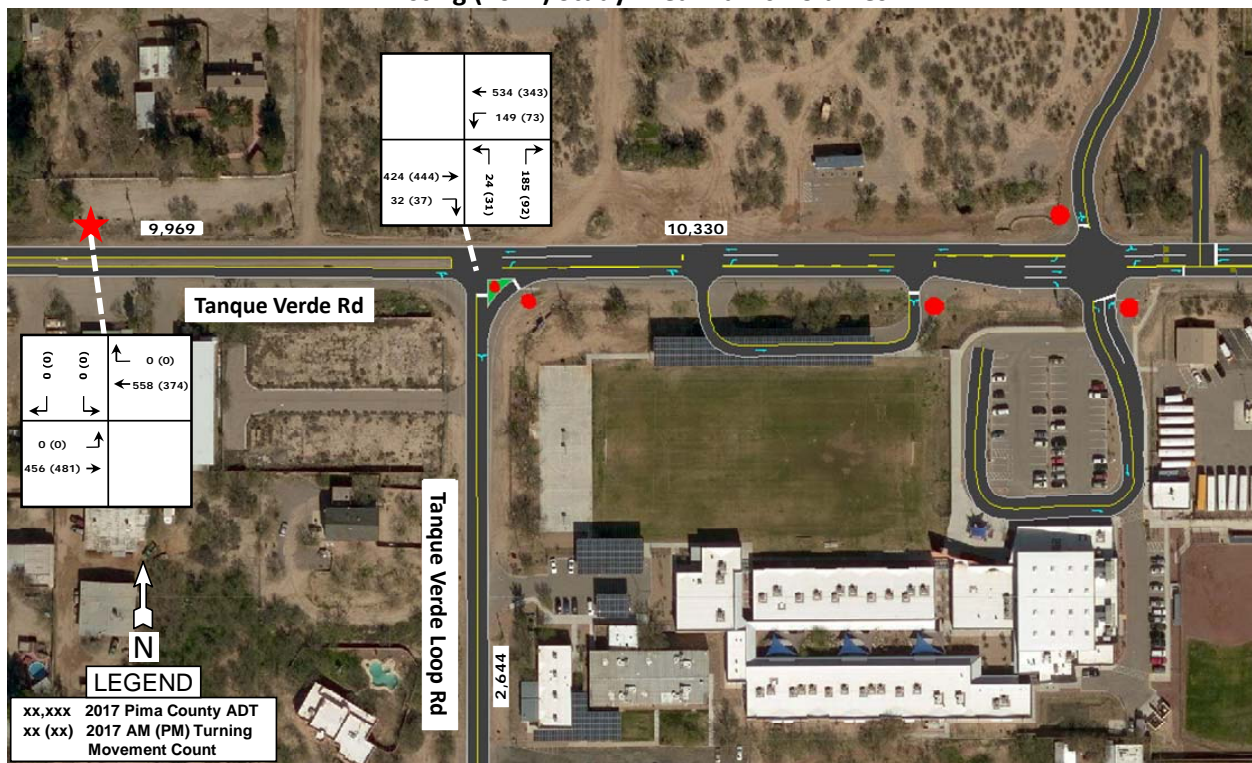


## TRAFFIC VOLUMES

### Current Traffic Volumes

Existing traffic volumes for Tanque Verde Road were obtained from the Pima County Department of Transportation Traffic Engineering Division. A 24-hour, 2-way average daily traffic (ADT) for the roadway directly adjacent to the restaurant site was collected between February 27th and 28th 2017. The ADT of Tanque Verde Road was counted at 9,969 vehicles per day. A turning movement count at the intersection of Tanque Verde Road and Tanque Verde Loop Road was collected on March 2, 2017. These counts are summarized in Exhibit 4. From this count, the hourly approach volumes to the proposed restaurant driveway are 456 eastbound vehicles and 558 westbound vehicles in the AM peak hour and 481 eastbound vehicles and 374 westbound vehicles in the PM peak hour. Existing traffic count data have been attached to this document as an appendix.

**Exhibit 4**  
**Existing (2017) Study Area Traffic Volumes**



The traffic data provided by PC DOT TED also included speed data which is summarized in Exhibit 5 and vehicle classification data which is provided in Exhibit 6. These data indicate that the 85th percentile speeds for both Tanque Verde Road and Tanque Verde Loop Road are slightly above the posted speeds of 45 MPH and 35 MPH respectively. The raw data show that the speed profiles during the school ingress and egress hours reflect considerably lower levels of speed.

The vehicle classification data indicate that the study area roadways are carrying primarily passenger cars and small trucks with 1-2% motorcycles and 1-3% heavy vehicles.

**Exhibit 5**  
**Existing (2017) Roadway Speed Data**

Roadway Segment	Posted Speed Limit (MPH)	Direction	Average Speed (MPH)	50 <sup>th</sup> Percentile Speed (MPH)	85 <sup>th</sup> Percentile Speed (MPH)
Tanque Verde Road (east leg)	45	EB	40.1	41.6	47.6
		WB	38.3	40.3	47.4
Tanque Verde Loop Road (south leg)	35	NB	34.0	35.5	40.8
		SB	32.2	33.0	38.4

**Exhibit 6**  
**Existing (2017) Roadway Vehicle Classification Data**

Roadway Segment	Direction	% Motorcycles	% Passenger Cars	% Pick-up Trucks, Vans	% Single Unit (2-Axle) Trucks	% Single Trailer (3- or 4-Axle) Trucks	% Multi-Trailer (5 or Less Axle) Trucks
Tanque Verde Road (east leg)	EB	1%	74%	22%	1%	0%	0%
	WB	1%	74%	23%	1%	1%	0%
Tanque Verde Loop Road (south leg)	NB	1%	70%	26%	1%	0%	1%
	SB	2%	71%	23%	1%	0%	2%

**Trip Generation**

The estimation of the traffic generated by the proposed restaurant is based on the information contained in the ITE Trip Generation Manual, 9th Edition, 2012 for 4,000 square feet of high turnover sit down restaurant. The site traffic estimates were developed for the AM and PM peak-hours of the adjacent street traffic. The number of trips generated is the mathematical product of land use intensity (number of dwelling units) and the trip generation rate. The result is the total number of one-way trips (not round trips) expected to be generated by the project. These trips represent the number of vehicles estimated to enter and leave the project. All of the estimates are based on average trip rates. The trip generation estimates for the site are provided in Exhibit 7. The adjustment of the site traffic for passerby trips is not applicable and was not considered.

It should be noted that the restaurant does not currently plan to be open during the AM peak hour on weekdays except for Friday mornings, therefore the values for the AM peak-hour are shown specifically for Friday mornings or in the event the restaurant changes its current plan and opens for breakfast on all weekdays.

**Exhibit 7**  
**Site Trip Generation Rates and Trips**

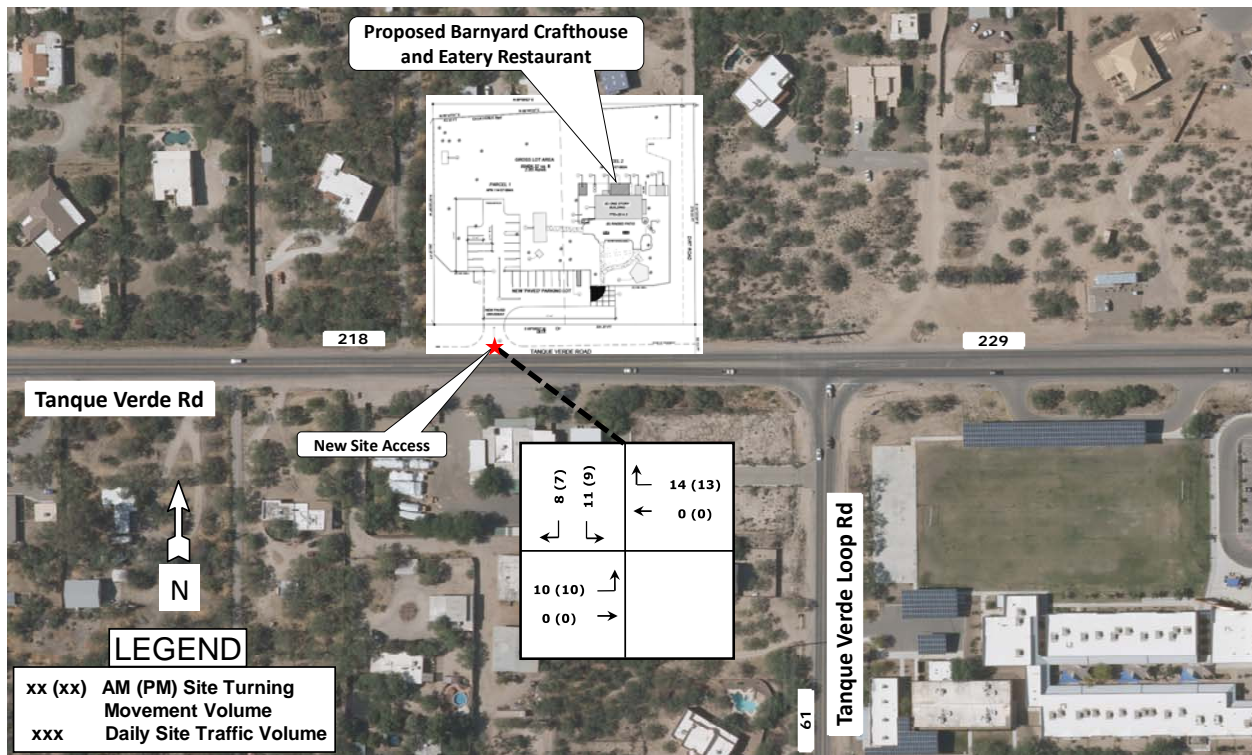
	AM Peak-Hour	PM Peak-hour	Daily
<b>Per 1,000 SF</b>	<b>10.81</b>	<b>9.85</b>	<b>127.15</b>
<b>Entering</b>	<b>24 (55%)</b>	<b>23 (60%)</b>	<b>254</b>
<b>Exiting</b>	<b>19 (45%)</b>	<b>16 (40%)</b>	<b>254</b>
<b>Total Trips</b>	<b>43</b>	<b>39</b>	<b>508</b>



## Trip Distribution and Assignment

The trip distribution for this development to be used for the analysis of the AM and PM peak-hours was based on the traffic distribution during the AM PM peak hour from the 24-hour traffic counts that were obtained from the Pima County Department of Transportation Traffic Engineering Division. This resulted in 43% of the trips on the west leg, 45% on the east leg and 12% on the south leg of the Tanque Verde Road and Tanque Verde Loop Road intersection. These percentages represent the amount of site traffic assigned to these roadways for both entering and exiting site traffic. The resultant site traffic volumes are provided in Exhibit 8.

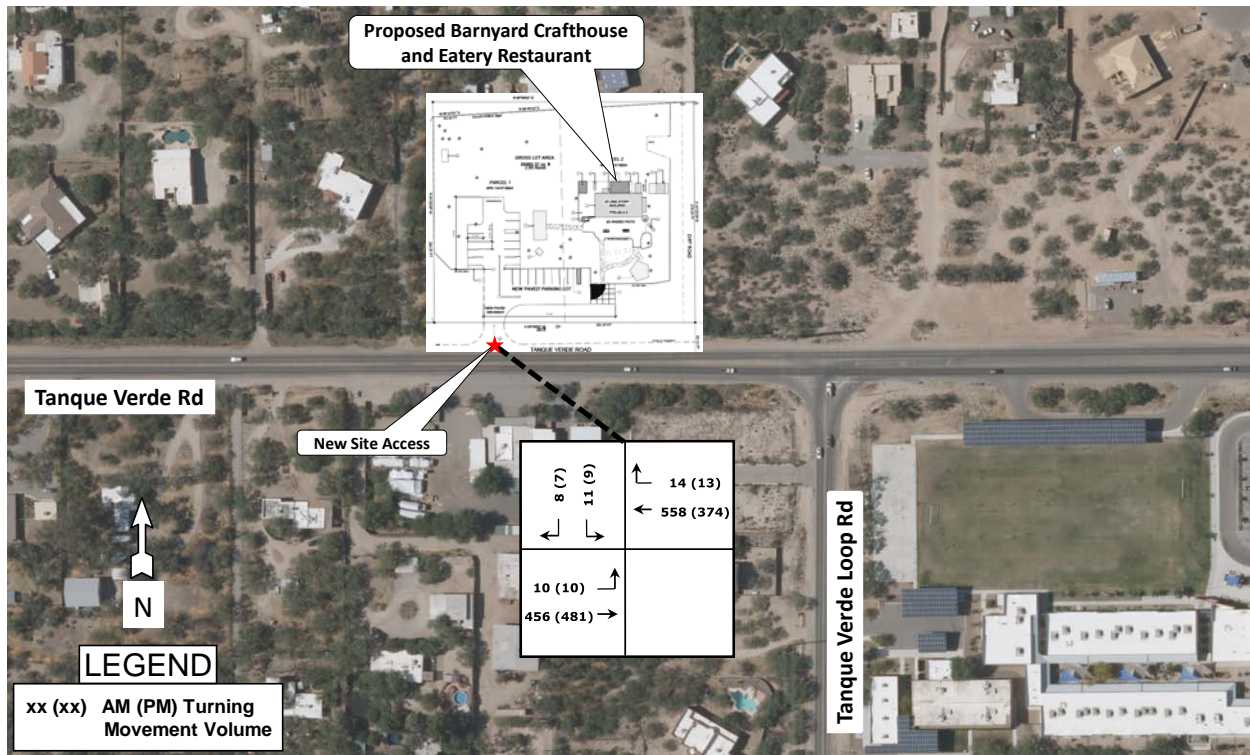
**Exhibit 8**  
**Site Traffic Volumes**



## Total Traffic

The total traffic for this analysis is the combination of the site traffic from the proposed Barnyard Crafhhouse and Eatery restaurant development shown in Exhibit 8 and the existing 2017 peak hour traffic shown in Exhibit 4. The 2017 total traffic for the AM and PM peak hours is expected to represent the traffic volume conditions on opening day of the proposed Barnyard Crafhhouse and Eatery restaurant. These volumes are shown in Exhibit 9.

**Exhibit 9**  
**Year 2017 Estimated Total Traffic (Background + Site)**



**TRAFFIC AND IMPROVEMENT ANALYSIS**

**Roadway Performance**

Exhibit 10 summarizes the ADT and daily volume capacity (LOS E) for Tanque Verde Road for the existing (2017) volumes with and without the restaurant site traffic. The table shows the LOS E daily volume thresholds from the Florida DOT Level of Service (LOS) thresholds<sup>2</sup>. The Florida DOT LOS thresholds are nationally recognized planning level volume thresholds for assessing the performance or expected performance of roadways at the planning level and are provided in the appendix. The table shown in Exhibit 10 shows the LOS thresholds for 2-lane signalized (interrupted flow) arterials in transitioning areas (not urban or rural).

The table indicates that the segment of Tanque Verde Road between Houghton Road and Tanque Verde Loop Road is currently under capacity using the 2017 volumes and will also be under capacity with the inclusion of the Barnyard Crafthouse and Eatery restaurant site traffic. This site traffic represents approximately 2% of the projected daily traffic on this segment of Tanque Verde Road in 2017.

**Exhibit 10**  
**Year 2017 Roadway Volumes and Capacity**

Roadway	Segment	2017 ADT	Site Traffic	2018 With Site Traffic	Lanes	Transitioning Area LOS E Threshold (Capacity) <sup>1</sup>	Capacity Exceeded?
Tanque Verde Road	Houghton Road to Tanque Verde Loop Road	9,969	218	10,187	2	16,200	No

1. Based On Florida DOT LOS Thresholds, Class I Roadway (40 mph or higher posted speed limit).

<sup>2</sup> 2013 *Quality / Level of Service Handbook*, State of Florida Department of Transportation (2013).

## Intersection Performance

The intersection traffic operations performance for the site access intersection at Tanque Verde Road was determined using the Synchro 9 software. This software employs the Highway Capacity Manual 2010 procedures for stop-controlled intersections. The traffic operations analysis was conducted for the AM and PM peak-hours for the 2017 Total Traffic using the traffic volumes provided in Exhibit 9. The southbound site access intersection approach was assumed to be stop-controlled.

The level of service (LOS) and delay estimates are summarized in Exhibit 11 for the 2017 Total Traffic volumes. The HCM 2010 methodologies for two-way stop controlled intersections only provide delay and queue estimates for movements which must yield to other movements, therefore only the eastbound left-turns and southbound approaches are shown. The detailed Synchro HCM performance analysis reports are provided in the appendix for the AM and PM peak-hours. The traffic operations results indicate that the proposed site access intersection will operate sufficiently with the 2017 Total Traffic volumes.

**Exhibit 11**  
**Intersection Delay & Level of Service Results for 2017 Total Traffic**

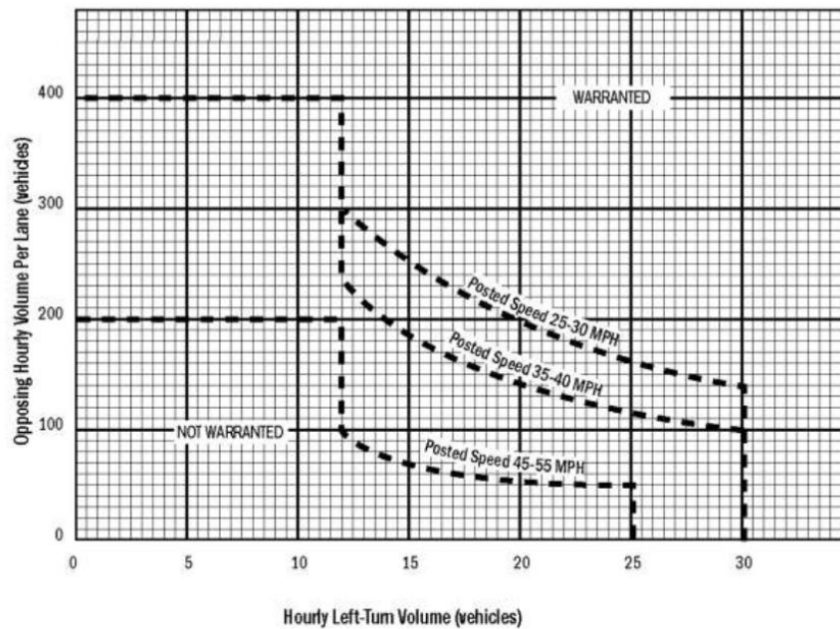
HCM 2010 TWSC Delay, LOS, & Queue Analysis		<i>Tanque Verde Road and Proposed Site Access</i>	
		EB Left-Turn	SB Approach
AM	LOS	A	C
	Delay/Veh (s)	8.8	18.4
	95th Percentile Queue (veh)	0.0	0.2
PM	LOS	A	C
	Delay/Veh (s)	8.2	15.1
	95th Percentile Queue (veh)	0.0	0.1

The traffic operations results for the proposed unsignalized site access intersection show that it will operate at LOS C or better for all movements. The 95<sup>th</sup> Percentile Queue lengths (measured in vehicles) shown in Exhibit 11 also indicate that in general the site access intersection should operate without much traffic queuing.

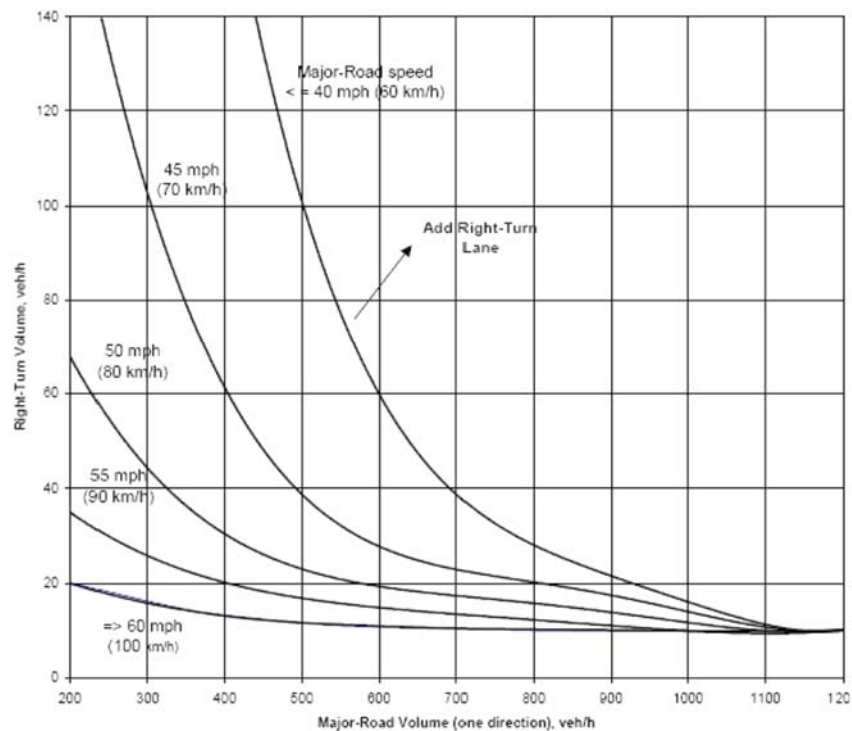
## Auxiliary Lane Warrants

A turn lane warrant analysis was conducted to determine whether a right turn lane or left turn lane is warranted at the site access driveway by using the auxiliary lane warrants from the 2016 Pima County Subdivision and Development Street Standards, as seen in Exhibit 12. The traffic volumes used are from those shown in Exhibit 9.

**Exhibit 12**  
**Pima County Turn Lane Volume Warrants**  
**A-1 LEFT TURN LANE GUIDELINES<sup>9</sup>**



**A-2 RIGHT TURN LANE GUIDELINES FOR TWO-LANE ROADS<sup>9</sup>**





The turn lane warrant analysis conditions and results for the site access intersection(s) are below.

- **Eastbound Left-Turn Lane**
  - Posted speed: 45-55 MPH (45 MPH).
  - Maximum opposing hourly Volume per lane: 558 vehicles
  - Maximum hourly left-turn volume without left-turn lane = > 0 (see graph).
  - Estimated maximum peak-hour eastbound left-turn volume = 10
  - Is left-turn lane warranted based on volume warrant? – **Yes**.
- **Westbound Right-Turn Lane**
  - Posted speed: 45-55 MPH (45 MPH).
  - Maximum hourly volume in advancing direction: 558 vehicles
  - Maximum hourly right-turn volume without right-turn lane = > 32 (see graph).
  - Estimated maximum hourly eastbound right-turn volume = 14.
  - Is right-turn lane warranted based on volume warrant? – **No**.
- **Turn Lane Recommendations:**
  - An eastbound left-turn lane at the proposed site access intersection(s) is warranted.

### Crash Analysis

Crash data were obtained from the Pima County Traffic Engineering Division for the following segment and intersection in the vicinity of the restaurant site for the five-year time period from 1/1/2012 to 12/31/2016. This crash data is summarized in Exhibit 13 and all the crash data is provided in the appendix.

- Tanque Verde Road (segment) from Willow Ranch Road to Rebecca Avenue (10900 E to 11030 E) (Only data from Willow Ranch Road to Tanque Verde Loop Road was considered).
- Tanque Verde Road at Tanque Verde Loop Road (intersection).

For the time period mentioned above there were 6 crashes along this segment of Tanque Verde Road, with two single vehicle crashes where one driver fell asleep and another where a driver swerved to avoid a collision and ran off the road. There was 1 pedestrian involved crash and one crash involving a cyclist. There was one turning crash involving a driver making a u-turn. One of the crashes involved impairment. The cyclist was hit by a distracted driver that failed to keep in the proper lane.

The 3 year crash rate for this segment of Tanque Verde Road was 0.84 compared to a 3 year system crash rate of 1.23 for low volume (< 10,000 ADT) roadway segments as published in the Pima County Department of Transportation Safety Management System Program Annual Update Report for Calendar Year 2014.

The crash data at the Tanque Verde Road and Tanque Verde Loop Road intersection consist of one fixed object crash, two rear-end crashes, and two turning crashes, one of which involved a cyclist. All 5 of the crashes involved northbound driver violations. One crash involved driver impairment and the single vehicle crash was a hit and run. The 3 year crash rate for the Tanque Verde Road and Tanque Verde Loop Road intersection was 0.31 compared to a 3 year system crash rate of 0.34 for unsignalized intersections as published in the Pima County Department of Transportation Safety Management System Program Annual Update Report for Calendar Year 2014. Existing crash data have been attached to this document as an appendix.

**Exhibit 13**  
**Crash Data Summary**  
**Tanque Verde Road (10900 E to 11030 E) Crash Data Summary**

<b>Crash Type</b>	<b>Frequency</b>	<b>Crash Severity</b>	<b>Frequency</b>
Single Vehicle/ Fixed Object	2	Property Damage Only	2
Rear-End	0	Possible Injury	1
Angle	1	Non-Incapacitating Injury	2
Turning	1	Incapacitating Injury	1
Bicycle	1	Fatality	0
Head-On	0	<b>Total</b>	<b>6</b>
Sideswipe	0		
Pedestrian	1		
<b>Total</b>	<b>6</b>		

**Tanque Verde Road at Tanque Verde Loop Road Intersection Crash Data Summary**

<b>Crash Type</b>	<b>Frequency</b>	<b>Crash Severity</b>	<b>Frequency</b>
Single Vehicle/ Fixed Object	1	Property Damage Only	3
Rear-End	2	Possible Injury	1
Angle	0	Non-Incapacitating Injury	1
Turning	1	Incapacitating Injury	0
Bicycle	1	Fatality	0
Head-On	0	<b>Total</b>	<b>5</b>
Sideswipe	0		
Pedestrian	0		
<b>Total</b>	<b>5</b>		

### **Sight Distance**

Based on a review of aerial imagery and ground level photos, there are no existing intersection or roadway sight distance deficiencies at the proposed site access intersection. As noted previously in this report the available sight distance at the site access point extends approximately 900' to the east and more than 1,000' feet to west. The available sight distance was compared to the required Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) according to AASHTO<sup>3</sup>.

### **Stopping Sight Distance**

AASHTO requires that a roadway provides adequate SSD continuously along a roadway stating that “the provision of stopping sight distance at all locations along each highway or street, including intersections is fundamental to intersection operation.” AASHTO SSD formula 3-2 and 3-3 can be used to determine the exact values for SSD. For a design speed of 50 MPH (assuming posted speed limit plus 5 MPH), the SSD values from these formulas range from 375 feet to 507 feet depending on the longitudinal grade of the roadway. Based on this criteria, the available sight distance listed above is sufficient to meet this SSD requirement.

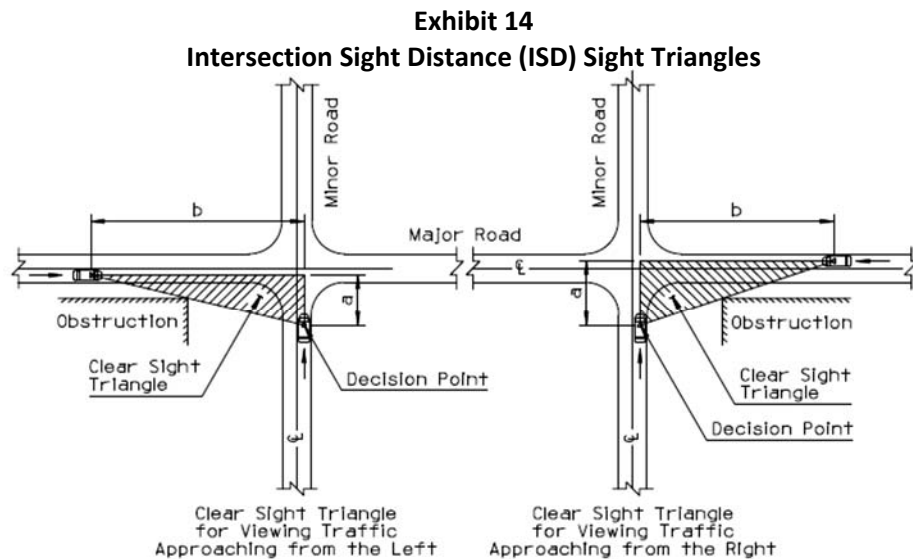
### **Intersection Sight Distance**

The available sight distance at an intersection must be adequate to provide clear sight triangles for viewing traffic approaching from the left and right as shown in Exhibit 14. The length of the “b” dimension of these sight triangles for various intersection traffic control cases can be calculated using the AASHTO formulas for ISD. For the

<sup>3</sup> A Policy on Geometric Design of Highways and Streets, 6<sup>th</sup> Edition, American Association of State Highway and Transportation Officials (2011).

proposed site access intersection on Tanque Verde Road, the relevant case is Case B – Intersections with Stop Control on the Minor Roadway. Specifically, at the proposed intersection two cases were investigated:

- Case B1 – Left-Turns from the Minor Road
- Case B2 – Right-Turns from the Minor Road



The required distances for leg “b” for these cases were calculated using the AASHTO formula 9-1 and are shown in Exhibit 15.

**Exhibit 15**  
**Intersection Sight Distance (ISD) Required “b” Distance**

Design Speed	50 MPH
Case B1	555 feet
Case B2	480 feet

The proposed site access intersection on Tanque Verde Road does not contain any obstructions that could block clear sight triangles for viewing traffic approaching from the left and right as shown in Exhibit 14. Therefore, in order to meet the ISD requirement, the available sight distance to the east and west of the proposed access point must be greater than the values shown in Exhibit 15. Consequently, the available sight distance is sufficient to meet this ISD requirement.

## CONCLUSIONS AND RECOMMENDATIONS

- The proposed Barnyard Crafthouse and Eatery Development is anticipated to have approximately 4,000 square feet of space, both indoor and outdoor, with a seating capacity of 160-180. The proposed hours of operation would be 11 am – 9 pm or 10 pm Monday through Thursday. Friday through Sunday the restaurant would be open for Breakfast at 8 am. Friday and Saturday the restaurant would stay open until 10 or 11pm.
- The proposed Barnyard Crafthouse and Eatery Restaurant is estimated to generate approximately:
  - 508 total daily trips (254 entering, 254 exiting).
  - 43 morning peak-hour trips (24 entering, 19 exiting). This assumes the restaurant serves breakfast.
    - 10 eastbound left-turns, 14 westbound right-turns entering in AM peak-hour.
  - 39 evening peak-hour trips (23 entering, 16 exiting).
    - 10 eastbound left-turns, 13 westbound right-turns entering in PM peak-hour.
- The proposed access for the Barnyard Crafthouse and Eatery restaurant is located approximately 425' west of Tanque Verde Loop Road as shown in Exhibits 1 and 2 herein.
- The planned site access intersection is proposed to be stop-controlled on the southbound approach. This intersection will not have turn restrictions.
- An eastbound left-turn lane is warranted for the proposed site access point on Tanque Verde Road west of Tanque Verde Loop Road. No other turn lanes are warranted for the proposed restaurant.
- The segment of Tanque Verde Road between Houghton Road and Tanque Verde Loop Road is currently under capacity using the 2017 volumes and will also be under capacity with the inclusion of the Barnyard Crafthouse and Eatery restaurant site traffic. This site traffic will represent approximately 2% of the projected total daily traffic on this segment of Tanque Verde Road in 2017.
- The traffic operations results for the proposed unsignalized site access intersection with Tanque Verde Road show that it will operate at LOS C or better for all movements using the 2017 total traffic volumes. The 95th Percentile Queue lengths (measured in vehicles) indicate that in general the site access intersection should operate without much traffic queuing.
- Based on AASHTO criteria, the available sight distance at the site access intersection is sufficient to meet this Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD) requirements.
- The 3 year crash rate for this segment of Tanque Verde Road was 0.84 compared to a 3 year system crash rate of 1.23 for low volume (< 10,000 ADT) roadway segments and the 3 year crash rate for the Tanque Verde Road and Tanque Verde Loop Road intersection was 0.31 compared to a 3 year system crash rate of 0.34 for unsignalized intersections as published in the Pima County Department of Transportation Safety Management System Program Annual Update Report for Calendar Year 2014.
- An improvement project for the intersection of Tanque Verde Road and Tanque Verde Loop Road is scheduled to start construction near the end of Fiscal Year 2019. The project plans include the provision of a two-way left-turn lane (TWLTL) on Tanque Verde Road east of the proposed restaurant development access. This TWLTL will need to be extended approximately 110' to the west and then tapered down for the provision of an eastbound left-turn lane into the restaurant site access point.
- On August 16th, 2017, Pima County held a hearing for this restaurant as part of the Pima County Conditional Use Permit process during which time Pima County indicated that they would recommend approval of the Barnyard Crafthouse and Eatery restaurant to the Pima County Board of Supervisors. This recommendation is subject to the commitment from Mr. Kertesz to contribute financially to the Tanque Verde Road at Tanque Verde Loop Road intersection project for the addition of an eastbound left-turn lane into his restaurant.

# Pima County DOT

Traffic Engineering Division  
TRAFFIC MOVEMENT COUNT

**March 02, 2017**

## Tanque Verde Lp @ Tanque Verde Rd

Default Comments

Change These in The Preferences Window

Select File/Preference in the Main Scree

Then Click the Comments Tab

File Name : TanqueVerdeLp@TanqueVerdeRd 2017.03.02

Site Code : 00000000

Start Date : 3/2/2017

Page No : 1

### Groups Printed- Unshifted

Start Time	TANQUE VERDE LOOP RD SB					TANQUE VERDE RD WB					TANQUE VERDE LOOP RD NB					TANQUE VERDE RD EB					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	
07:00 AM	0	0	0	0	0	14	83	0	1	98	5	0	15	0	20	0	45	2	0	47	165
07:15 AM	0	0	0	0	0	16	98	0	1	115	6	0	19	0	25	0	43	3	0	46	186
07:30 AM	0	0	0	0	0	25	99	0	7	131	9	0	23	0	32	0	45	3	0	48	211
07:45 AM	0	0	0	0	0	22	104	0	0	126	5	0	45	0	50	1	104	14	0	119	295
Total	0	0	0	0	0	77	384	0	9	470	25	0	102	0	127	1	237	22	0	260	857
08:00 AM	0	0	0	0	0	20	119	0	0	139	12	0	63	0	75	0	139	6	0	145	359
08:15 AM	0	0	0	0	0	56	152	0	0	208	4	0	56	0	60	0	116	8	0	124	392
08:30 AM	0	0	0	0	0	51	159	0	0	210	3	0	21	0	24	0	65	4	3	72	306
08:45 AM	0	0	0	0	0	20	95	0	1	116	1	0	16	1	18	0	55	8	1	64	198
Total	0	0	0	0	0	147	525	0	1	673	20	0	156	1	177	0	375	26	4	405	1255
*** BREAK ***																					
02:00 PM	0	0	0	0	0	12	86	0	1	99	6	0	33	1	40	0	85	2	0	87	226
02:15 PM	0	0	0	0	0	17	75	0	2	94	6	0	21	0	27	0	104	6	0	110	231
02:30 PM	0	0	0	0	0	15	81	0	1	97	1	0	35	0	36	0	119	11	3	133	266
02:45 PM	0	0	0	0	0	20	81	0	1	102	5	0	23	2	30	0	131	7	0	138	270
Total	0	0	0	0	0	64	323	0	5	392	18	0	112	3	133	0	439	26	3	468	993
03:00 PM	0	0	0	0	0	52	138	0	0	190	3	0	28	0	31	0	91	15	2	108	329
03:15 PM	0	0	0	0	0	30	103	0	0	133	8	0	21	0	29	0	102	19	0	121	283
03:30 PM	0	0	0	0	0	26	116	0	0	142	17	0	29	0	46	0	103	19	0	122	310
03:45 PM	0	0	0	0	0	18	94	0	1	113	8	0	14	0	22	0	120	9	1	130	265
Total	0	0	0	0	0	126	451	0	1	578	36	0	92	0	128	0	416	62	3	481	1187
04:00 PM	0	0	0	0	0	7	71	0	1	79	11	0	24	0	35	0	106	11	0	117	231
04:15 PM	0	0	0	0	0	13	82	0	0	95	7	0	17	0	24	0	97	8	0	105	224
04:30 PM	0	0	0	0	0	21	82	0	0	103	7	0	21	18	46	0	97	9	1	107	256
04:45 PM	0	0	0	0	0	15	89	0	0	104	11	0	23	1	35	0	120	12	0	132	271
Total	0	0	0	0	0	56	324	0	1	381	36	0	85	19	140	0	420	40	1	461	982
05:00 PM	0	0	0	0	0	24	83	0	0	107	8	0	23	0	31	0	97	11	0	108	246
05:15 PM	0	0	0	0	0	13	89	0	1	103	5	0	25	0	30	0	130	5	0	135	268
05:30 PM	0	0	0	0	0	9	63	0	0	72	8	0	31	0	39	0	109	7	3	119	230
05:45 PM	0	0	0	0	0	12	58	0	0	70	2	0	20	0	22	0	108	9	0	117	209
Total	0	0	0	0	0	58	293	0	1	352	23	0	99	0	122	0	444	32	3	479	953
Grand Total	0	0	0	0	0	528	2300	0	18	2846	158	0	646	23	827	1	2331	208	14	2554	6227
Apprch %	0	0	0	0	0	18.6	80.8	0	0.6		19.1	0	78.1	2.8		0	91.3	8.1	0.5		
Total %	0	0	0	0	0	8.5	36.9	0	0.3	45.7	2.5	0	10.4	0.4	13.3	0	37.4	3.3	0.2	41	

# Pima County DOT

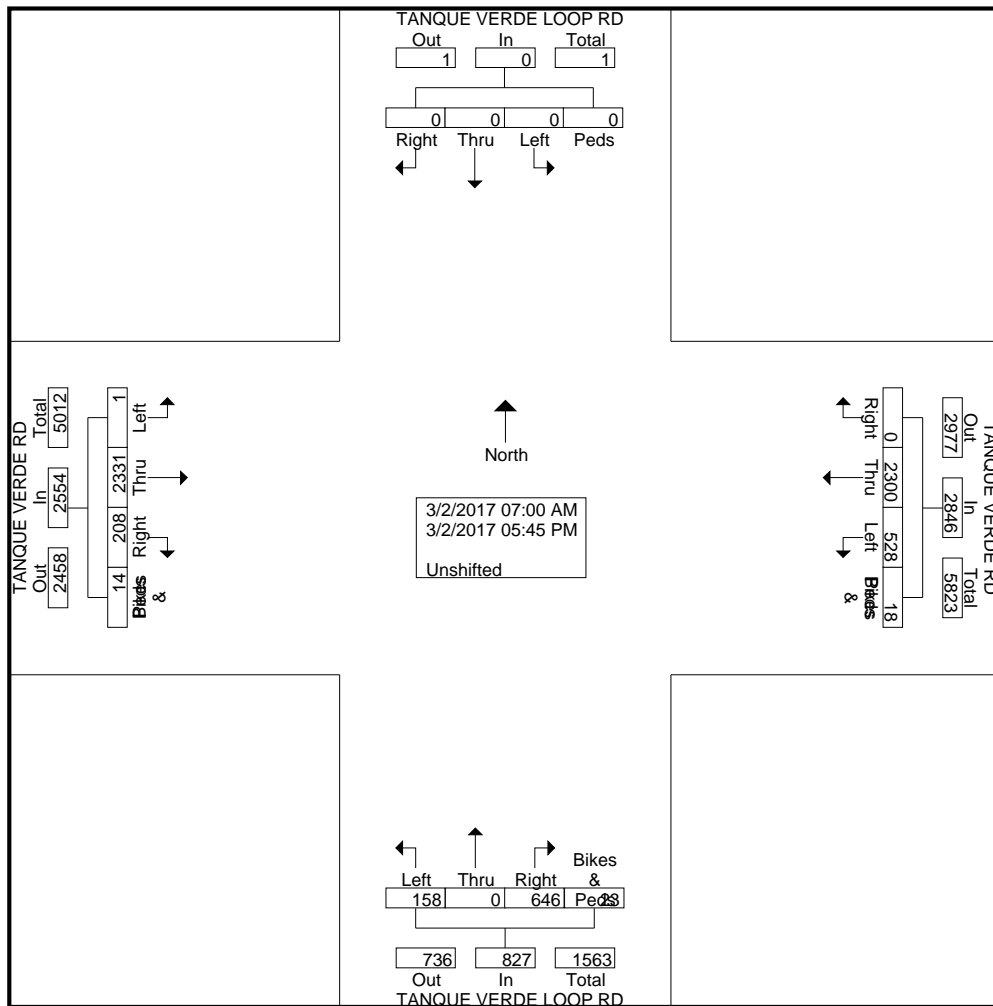
Traffic Engineering Division  
TRAFFIC MOVEMENT COUNT

**March 02, 2017**

## Tanque Verde Lp @ Tanque Verde Rd

Default Comments  
Change These in The Preferences Window  
Select File/Preference in the Main Scree  
Then Click the Comments Tab

File Name : TanqueVerdeLp@TanqueVerdeRd 2017.03.02  
Site Code : 00000000  
Start Date : 3/2/2017  
Page No : 2



# Pima County DOT

Traffic Engineering Division  
TRAFFIC MOVEMENT COUNT

**March 02, 2017**

## Tanque Verde Lp @ Tanque Verde Rd

### Default Comments

Change These in The Preferences Window

Select File/Preference in the Main Scree

Then Click the Comments Tab

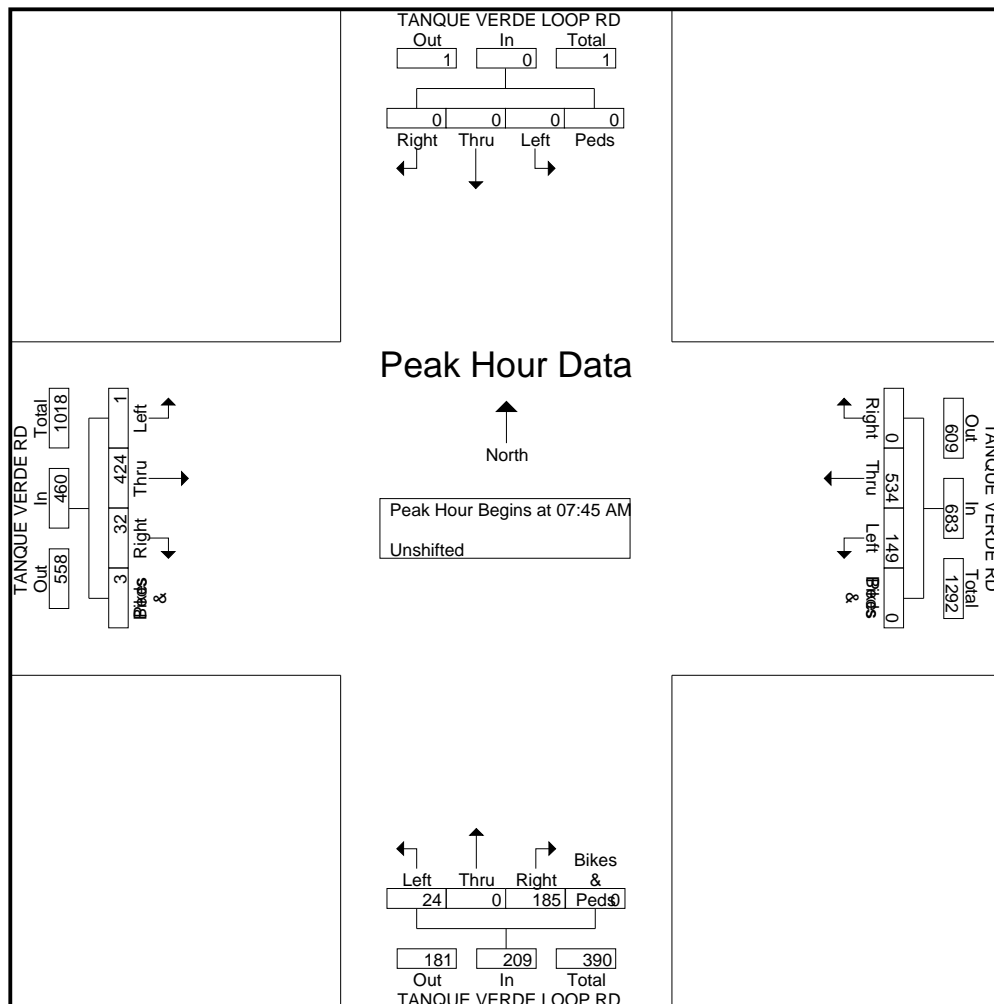
File Name : TanqueVerdeLp@TanqueVerdeRd 2017.03.02

Site Code : 00000000

Start Date : 3/2/2017

Page No : 3

	TANQUE VERDE LOOP RD SB					TANQUE VERDE RD WB					TANQUE VERDE LOOP RD NB					TANQUE VERDE RD EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	22	104	0	0	126	5	0	45	0	50	1	104	14	0	119	295
08:00 AM	0	0	0	0	0	20	119	0	0	139	12	0	63	0	75	0	139	6	0	145	359
08:15 AM	0	0	0	0	0	56	152	0	0	208	4	0	56	0	60	0	116	8	0	124	392
08:30 AM	0	0	0	0	0	51	159	0	0	210	3	0	21	0	24	0	65	4	3	72	306
Total Volume	0	0	0	0	0	149	534	0	0	683	24	0	185	0	209	1	424	32	3	460	1352
% App. Total	0	0	0	0	0	21.8	78.2	0	0	0	11.5	0	88.5	0	0	0.2	92.2	7	0.7	0	0
PHF	.000	.000	.000	.000	.000	.665	.840	.000	.000	.813	.500	.000	.734	.000	.697	.250	.763	.571	.250	.793	.862



# Pima County DOT

Traffic Engineering Division  
TRAFFIC MOVEMENT COUNT

**March 02, 2017**

## Tanque Verde Lp @ Tanque Verde Rd

Default Comments

Change These in The Preferences Window

Select File/Preference in the Main Scree

Then Click the Comments Tab

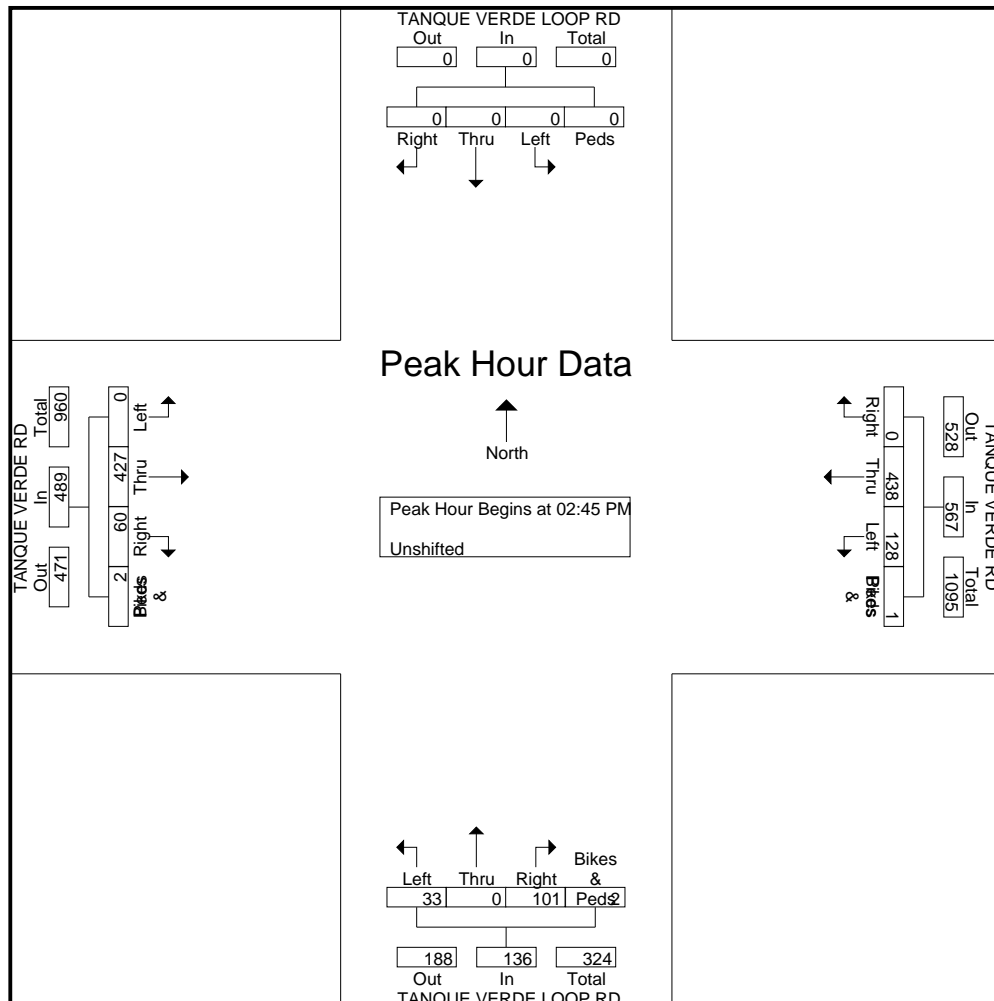
File Name : TanqueVerdeLp@TanqueVerdeRd 2017.03.02

Site Code : 00000000

Start Date : 3/2/2017

Page No : 4

	TANQUE VERDE LOOP RD SB					TANQUE VERDE RD WB					TANQUE VERDE LOOP RD NB					TANQUE VERDE RD EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	0	0	0	0	0	20	81	0	1	102	5	0	23	2	30	0	131	7	0	138	270
03:00 PM	0	0	0	0	0	52	138	0	0	190	3	0	28	0	31	0	91	15	2	108	329
03:15 PM	0	0	0	0	0	30	103	0	0	133	8	0	21	0	29	0	102	19	0	121	283
03:30 PM	0	0	0	0	0	26	116	0	0	142	17	0	29	0	46	0	103	19	0	122	310
Total Volume	0	0	0	0	0	128	438	0	1	567	33	0	101	2	136	0	427	60	2	489	1192
% App. Total	0	0	0	0	0	22.6	77.2	0	0.2		24.3	0	74.3	1.5		0	87.3	12.3	0.4		
PHF	.000	.000	.000	.000	.000	.615	.793	.000	.250	.746	.485	.000	.871	.250	.739	.000	.815	.789	.250	.886	.906





# Pima County DOT

Traffic Engineering Division  
TRAFFIC MOVEMENT COUNT

**March 02, 2017**

## Tanque Verde Lp @ Tanque Verde Rd

Default Comments

Change These in The Preferences Window

Select File/Preference in the Main Scree

Then Click the Comments Tab

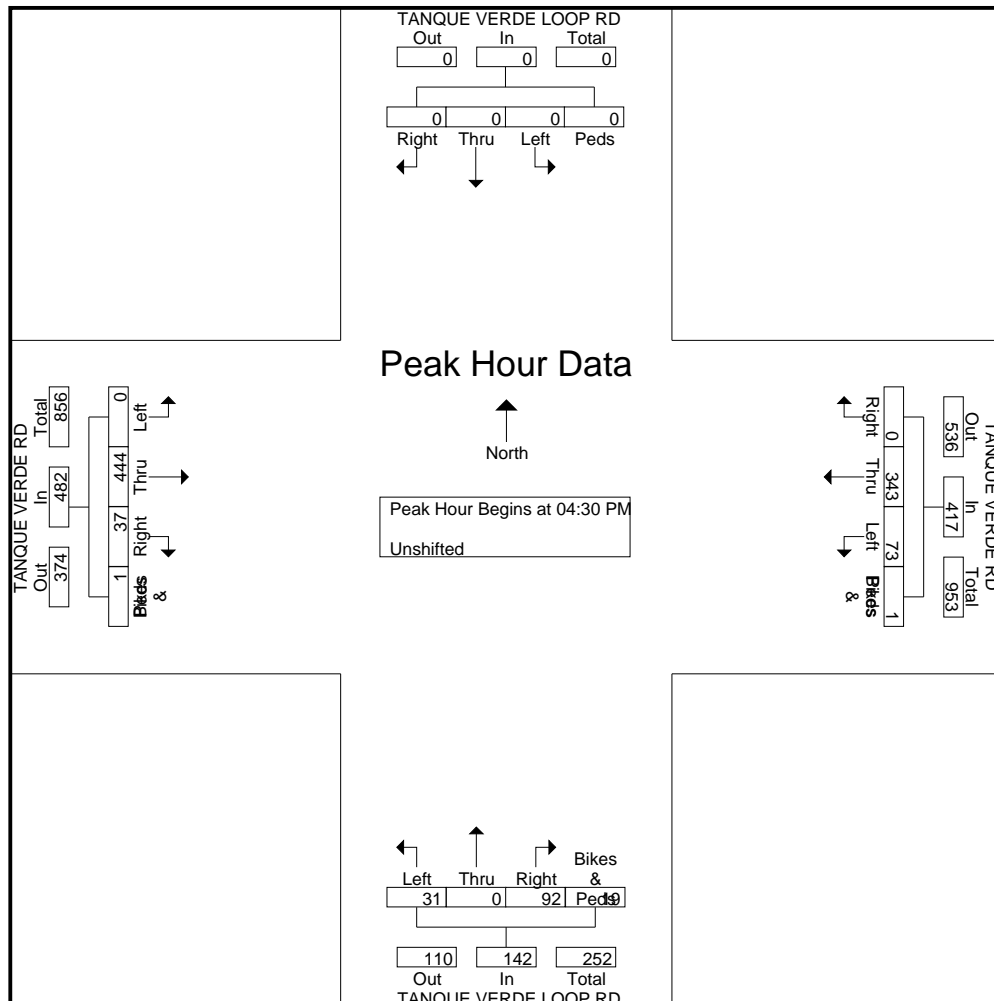
File Name : TanqueVerdeLp@TanqueVerdeRd 2017.03.02

Site Code : 00000000

Start Date : 3/2/2017

Page No : 5

	TANQUE VERDE LOOP RD SB					TANQUE VERDE RD WB					TANQUE VERDE LOOP RD NB					TANQUE VERDE RD EB					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Left	Thru	Right	Bikes & Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	0	0	0	0	0	21	82	0	0	103	7	0	21	18	46	0	97	9	1	107	256
04:45 PM	0	0	0	0	0	15	89	0	0	104	11	0	23	1	35	0	120	12	0	132	271
05:00 PM	0	0	0	0	0	24	83	0	0	107	8	0	23	0	31	0	97	11	0	108	246
05:15 PM	0	0	0	0	0	13	89	0	1	103	5	0	25	0	30	0	130	5	0	135	268
Total Volume	0	0	0	0	0	73	343	0	1	417	31	0	92	19	142	0	444	37	1	482	1041
% App. Total	0	0	0	0	0	17.5	82.3	0	0.2		21.8	0	64.8	13.4		0	92.1	7.7	0.2		
PHF	.000	.000	.000	.000	.000	.760	.963	.000	.250	.974	.705	.000	.920	.264	.772	.000	.854	.771	.250	.893	.960



PIMA COUNTY DEPARTMENT OF TRANSPORTATION  
TRAFFIC ENGINEERING

24HR AVERAGE DAILY TRAFFIC TOTALS FOR:  
LOCATION:  
BLOCK NUMBER:

TANQUE VERDE RD  
50'E MESQUITE THICKET CT  
11025 E / 2400 N

DATE	TIME	EB	WB
2/27/2017	10:00	256	298
Monday	11:00	291	285
	12:00	315	323
	13:00	315	292
	14:00	431	321
	15:00	466	558
	16:00	455	374
	17:00	504	278
	18:00	360	190
	19:00	229	140
	20:00	176	99
	21:00	104	26
	22:00	45	28
	23:00	25	7
	00:00	13	11
	01:00	9	2
	02:00	7	6
	03:00	9	14
	04:00	7	24
	05:00	22	115
	06:00	118	242
	07:00	294	421
Tuesday	08:00	389	527
2/28/2017	09:00	216	332
LANE TOTALS:		5,056	4,913
24HR TOTAL:		9,969 ADT	

Report Generated By:

C. Godoy

3/7/2017

**Generalized Annual Average Daily Volumes for Florida's  
Transitioning Areas and  
Areas Over 5,000 Not In Urbanized Areas<sup>1</sup>**

12/18/12





INTERRUPTED FLOW FACILITIES						UNINTERRUPTED FLOW FACILITIES					
STATE SIGNALIZED ARTERIALS						FREEWAYS					
Class I (40 mph or higher posted speed limit)						Lanes	B	C	D	E	
Lanes	Median	B	C	D	E	4	44,100	57,600	68,900	71,700	
2	Undivided	*	14,400	16,200	**	6	65,100	85,600	102,200	111,000	
4	Divided	*	34,000	35,500	**	8	85,100	113,700	135,200	150,000	
6	Divided	*	52,100	53,500	**	10	106,200	141,700	168,800	189,000	
Class II (35 mph or slower posted speed limit)						Freeway Adjustments					
Lanes	Median	B	C	D	E	Auxiliary Lanes Present in Both Directions + 20,000			Ramp Metering + 5%		
2	Undivided	*	6,500	13,300	14,200						
4	Divided	*	9,900	28,800	31,600						
6	Divided	*	16,000	44,900	47,600						
Non-State Signalized Roadway Adjustments (Alter corresponding state volumes by the indicated percent.)											
Non-State Signalized Roadways - 10%											
Median & Turn Lane Adjustments											
Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors							
2	Divided	Yes	No	+5%							
2	Undivided	No	No	-20%							
Multi	Undivided	Yes	No	-5%							
Multi	Undivided	No	No	-25%							
—	—	—	Yes	+ 5%							
One-Way Facility Adjustment Multiply the corresponding two-directional volumes in this table by 0.6											
BICYCLE MODE <sup>2</sup> (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)											
Paved Shoulder/Bicycle Lane Coverage						B	C	D	E		
0-49%						*	2,600	6,100	19,500		
50-84%						1,900	5,500	18,400	>19,500		
85-100%						7,500	19,500	>19,500	**		
PEDESTRIAN MODE <sup>2</sup> (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)											
Sidewalk Coverage						B	C	D	E		
0-49%						*	*	2,800	9,400		
50-84%						*	1,600	8,600	15,600		
85-100%						3,800	10,500	17,100	>19,500		
BUS MODE (Scheduled Fixed Route) <sup>3</sup> (Buses in peak hour in peak direction)											
Sidewalk Coverage						B	C	D	E		
0-84%						> 5	≥ 4	≥ 3	≥ 2		
85-100%						> 4	≥ 3	≥ 2	≥ 1		
						Source: Florida Department of Transportation Systems Planning Office <a href="http://www.dot.state.fl.us/planning/systems/sm/los/default.shtm">www.dot.state.fl.us/planning/systems/sm/los/default.shtm</a>					

HCM 2010 TWSC  
18: Tanque Verde Road & Site Access

08/18/2017

Intersection

Int Delay, s/veh 0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	456	558	14	11	8
Future Vol, veh/h	10	456	558	14	11	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	496	607	15	12	9





Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	622	0	1131
Stage 1	-	-	614
Stage 2	-	-	517
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	959	-	225
Stage 1	-	-	540
Stage 2	-	-	598
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	959	-	222
Mov Cap-2 Maneuver	-	-	222
Stage 1	-	-	540
Stage 2	-	-	591

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	18.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	959	-	-	-	289
HCM Lane V/C Ratio	0.011	-	-	-	0.071
HCM Control Delay (s)	8.8	-	-	-	18.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2











HCM 2010 TWSC  
18: Tanque Verde Road & Site Access

08/18/2017

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	481	374	13	9	7
Future Vol, veh/h	10	481	374	13	9	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	110	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	523	407	14	10	8
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	421	0	-	0	959	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	545	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1138	-	-	-	285	638
Stage 1	-	-	-	-	667	-
Stage 2	-	-	-	-	581	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1138	-	-	-	282	638
Mov Cap-2 Maneuver	-	-	-	-	282	-
Stage 1	-	-	-	-	667	-
Stage 2	-	-	-	-	575	-
Approach	EB		WB		SB	
HCM Control Delay, s	0.2		0		15.1	
HCM LOS					C	
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1138	-	-	-	373	
HCM Lane V/C Ratio	0.01	-	-	-	0.047	
HCM Control Delay (s)	8.2	-	-	-	15.1	
HCM Lane LOS	A	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

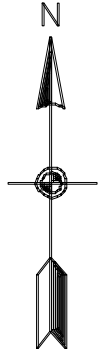
**TANQUE VERDE LOOP RD@TANQUE VERDE RD**  
**1/1/2012 to 12/31/2016**

**LEGEND**

-  REAR END
-  TURNING
-  ANGLE
-  OUT OF CONTROL
-  MISC
-  FIXED OBJ
-  BACKING
-  HEAD ON
-  BODILY INJURY
-  FATALITY

**TANQUE VERDE RD**

TANQUE VERDE LOOP RD



36



3



7

**CRASH AND INJURY  
SEVERITY SUMMARY**

PROPERTY	3
INJURY	2
FATALITY	0
<b>TOTAL</b>	<b>5</b>



TRAFFIC ENGINEERING DIVISION

TANQUE VERDE LOOP RD @ TANQUE VERDE RD

1/1/2012 to 12/31/2016

Page 1 of 1

TYPE	DATE	TIME	DAY	SEVERITY	DISTRACTED DRIVING	VIOLATIONS CITED	NARRATIVE
CASE #		LIGHT		BLOCK #			
3	9/1/2015	18:44	Tue	INJURY - 3	DR 1: UNKNOWN DISTRACTIONS	** VEH 1: FAILURE TO YIELD VEH 2: NONE	NBLT FTY & HIT EB BICYCLE IN BIKE LANE
150901302		Dark--lighted		11100 E			
7	1/23/2014	17:36	Thu	INJURY - 2	DR 1: UNKNOWN DISTRACTIONS	VEH 1: FOLLOWED TOO CLOSELY VEH 2: NONE	NB RE NB RT
140123224		Day		2400 N			
	6/11/2013	13:33	Tue	PROPERTY	DR 2: UNKNOWN DISTRACTIONS	VEH 1: NONE VEH 2: SPEED TOO FAST FOR CONDITIONS	NB RT RE NB RT
130611168		Day		2400 N			
3	9/20/2012	08:19	Thu	PROPERTY		VEH 1: NONE VEH 2: MADE IMPROPER TURN	NB LT HIT EB
120920069		Day		12510 E			
36	4/28/2012	22:55	Sat	PROPERTY		VEH 1: UNKNOWN	NB RT LEFT RDWY & HIT TREE (HIT & RUN)
120428360		Dark--lighted		2400 N			



**TRAFFIC ENGINEERING DIVISION**

**TANQUE VERDE RD FROM 10900E TO 11300E**

**1/1/12 THROUGH 12/31/16**

**LEGEND**

- REAR END
- TURNING
- ANGLE
- OUT OF CONTROL
- MISC.
- FIXED OBJ.
- BACKING
- HEAD ON
- SIDE SWIPE
- PEDESTRIAN OR ANIMAL
- BODILY INJURY
- FATALITY

**CRASH AND INJURY SEVERITY SUMMARY**

PROPERTY	8
INJURY	4
FATALITY	0
<b>TOTAL</b>	<b>12</b>



11300E

TANQUE VERDE RD

10900E





TYPE	DATE	TIME	DAY	SEVERITY	DISTRACTED DRIVING	VIOLATIONS CITED	NARRATIVE
	CASE #	LIGHT		BLOCK #			
17	9/25/2016	9:57	Sun	PROPERTY		** VEH 1: SPEED TOO FAST FOR CONDITIONS	WB CROSSED CENTERLINE, LEFT RDWY & HIT TREES/BRUSH (FELL ASLEEP)
	160925099	Day		11030 E		OTHER	
11	3/23/2016	13:44	Wed	PROPERTY		VEH 1: FOLLOWED TOO CLOSELY	WB RE WB STOPPED AT SCHOOL CROSSWALK
	160323143	Day		11240 E		VEH 2: NONE	
5	12/23/2015	17:42	Wed	PROPERTY		VEH 1: NONE	EB U-TURN HIT EB
	151223250	Dusk		11190 E		VEH 2: FAILURE TO YIELD	
9	1/13/2015	15:40	Tue	PROPERTY	DR 2: UNKNOWN DISTRACTIONS	VEH 1: NONE	EB HIT PEDESTRIAN (CROSSING GUARD) IN CROSSWALK
	150113231	Day		11200 E		VEH 2: UNKNOWN	
15	11/16/2014	14:7	Sun	INJURY - 3		VEH 1: NONE	WB U-TURN HIT A WB
	141116113	Day		11050 E		VEH 2: MADE IMPROPER TURN FAILURE TO YIELD	
1	9/16/2014	17:50	Tue	INJURY - 4	DR 1: UNKNOWN DISTRACTIONS	VEH 1: FAILED TO KEEP IN PROPER LANE OTHER UNSAFE PASSING	EB LEFT RDWY & RE EB PEDACYLIST
	140916273	Day		10960 E		VEH 2: NONE	
	4/9/2014	08:4	Wed	PROPERTY	DR 3: UNKNOWN DISTRACTIONS	VEH 1: NONE	EB RE EB
	140409051	Day		11080 E		VEH 2: NONE VEH 3: SPEED TOO FAST FOR CONDITIONS	
9	11/22/2013	20:17	Fri	INJURY - 2		** VEH 1: NONE	EB HIT A NB PEDESTRIAN CRAWLING ACROSS THE RDWY (ALCOHOL)
	131122306	Dark		10990 E		VEH 2: DID NOT USE CROSSWALK WALKED ON WRONG SIDE OF ROAD	
2	7/19/2013	20:17	Fri	PROPERTY		VEH 1: MADE IMPROPER TURN	EB LT INTO PVT DRWY HIT A WB
	130719276	Dark		11270 E		VEH 2: NONE	
13	12/31/2012	13:11	Mon	INJURY - 3	DR 1: UNKNOWN DISTRACTIONS	VEH 2: NONE	SB LT EXITING PRV DRV HIT WB
	121231123	Day		11280 E			
7	11/15/2012	10:13	Thu	PROPERTY	DR 1: UNKNOWN DISTRACTIONS		EB AVOIDING A WB IN EB LANE, SWERVED RIGHT & HIT A MAILBOX
	121115111	Day		10990 E			
1	10/30/2012	16:22	Tue	PROPERTY	DR 2: UNKNOWN DISTRACTIONS	VEH 1: NONE	EB REAR-ENDEDED AN EB STOPPED FOR PEDESTRIAN (SCHOOL CROSSING MARKED)
	121030221	Day		11200 E		VEH 2: SPEED TOO FAST FOR CONDITIONS	

## James Beier

---

**From:** James Beier  
**Sent:** Wednesday, August 09, 2017 3:49 PM  
**To:** 'Jerry Kertesz'  
**Subject:** Cost of Turn Lane Extension  
**Attachments:** Cost Estimate Turn Lane Contribution.xlsx

Jerry,

If the center turn lane were to be extended to 110' west of your proposed access point, the additional asphalt would result in approximately \$14,000 cost for the project. This is a rough number obviously, but I don't think this number will increase much if at all.

Thanks,

**James Beier, PE, PTOE | EPS Group**  
8710 N Thornydale Road, Suite 140 | Tucson, AZ 85742  
T: 520.408.1400 | F: 520.408.1403  
Tucson | Mesa | Avondale  
[james.beier@epsgroupinc.com](mailto:james.beier@epsgroupinc.com)

**TANQUE VERDE AND TANQUE VERDE LOOP  
INTERSECTION IMPROVEMENTS  
EXTEND CENTER TURN LANE TO RESTAURANT ENTRANCE  
CONSTRUCTION COST ESTIMATE  
8/9/2017**

ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
3030003	Aggregate Base	C.Y.	71	\$35.00	\$2,476.25
4060001	Asphaltic Concrete	TON	94	\$85.00	\$8,010.32
	CONSTRUCTION SUBTOTAL:				<b>\$10,487</b>
	CONTINGENCY (20%):				<b>\$2,097</b>
	CONSTRUCTION TOTAL:				<b>\$12,584</b>
	CONSTRUCTION ADMIN (12%):				<b>\$1,510</b>
	PROJECT TOTAL				<b>\$14,094</b>

PRELIMINARY NOT FOR CONSTRUCTION

PREPARED BY EPS GROUP - J. BEIER