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Engineering an environment of excellence.

Audra E. Merrick, P.E.
Northern Region Traffic Engineer (ADOT)
1801 S. Milton Road
Flagstaff, Arizona 86001

January 23, 2019
SWI # 17034

Re: The Village at Saddlerock Crossing

Dear Mrs. Merrick:

The purpose of this letter is to prepare a trip generation & distribution analysis for the proposed mixed use development, The Village at Saddlerock Crossing, located on the south side of the intersection of State Route (SR) 89A and Soldier Pass Road in Sedona, Arizona.

TRIP GENERATION

The proposed development will include a 104 unit hotel, 24 multi-family residential units, a 1,300 square foot museum, three apparel stores with a combined 7,600 square feet of space, and a 3,100 square foot high turnover restaurant. An overall site plan is included as an attachment.

The Institute of Transportation Engineer (ITE) *Trip Generation Manual, Tenth Edition* was used to determine the estimated trips generated from the proposed development. ITE land use code 310: Hotel was used to determine the trips generated by the hotel. Land use code 220: Multi-Family Housing (Low Rise) was used to determine trips generated by the multi-family units. Land use code 876: Apparel Store was used to determine trips generated by the retail stores. Land use code 932: High-Turnover (Sit-Down) Restaurant was used to determine trips generated by the café. Land use code 580: Museum was used to determine trips generated by the museum. These uses result in an unadjusted total of 1,740 weekday trips including 105 in the weekday AM peak hour and 131 in the weekday PM peak hour, and an unadjusted total of 1,250 Saturday trips including 171 in the peak hour of the generator. See the attached trip generation tables for a full list of generated traffic.

The proposed site will have a wide variety of uses; based on *ITE's Trip Generation Handbook* spreadsheet, a thirty-one percent reduction due to internal trips can be expected for mixed use development versus their uses individually as some people will come to a mixed-use development for more than one purpose. A deduction for site interaction of thirty-one percent has been applied to the overall site's unadjusted numbers. See the attached internal trip capture calculations for more information as to

how the internal trip capture percentage was derived, and the attached trip generation tables for the subtotal trips with applied internal trip capture.

Pass-by traffic, traffic that is already on the surrounding roadway network, has been deducted from the site generated traffic. This deduction only applies to the surrounding roadway network; it does not apply to the Site Access locations. Chapter 10 of the *ITE Trip Generation Handbook* includes graphs and equations related to expected pass-by traffic for a variety of expected land uses. In order to simplify the trip generation table and ensure the pass-by traffic was accounted for after the internal trip capture reduction, a pass-by percentage is shown at the bottom of the table instead of directly applying the pass-by percentage to the use individually. The pass-by percentage of thirty-eight percent was only applied to Land Use Code 932 for weekday, PM peak hour trips per Table E.30. Pass-by traffic adjusts the expected additional weekday PM peak hour trips to the surrounding roadway network to 79. The pass-by percentage was also applied to the Saturday peak hour of generator trips for an adjusted value of 108.

TRIP DISTRIBUTION

State Route 89A is the main thoroughfare through the City of Sedona while, Saddlerock Circle and Elk Road are the primary roads for access to residential areas east, west and south of the site. Weekday traffic volumes for SR 89A, obtained from the ADOT Transportation Data Management System indicate an approximate 49/51 directional split between eastbound and westbound traffic. ADOT has indicated that the weekend trip volumes are approximately 15% more than weekday trips. The ITE Land Development Manual was used to distribute the site generated traffic to the proposed access points. Based on the site's proximity to the traffic light at SR 89A and Soldier Pass Road, it is assumed that 60% of all vehicles entering the site will access the site using the driveway located at the traffic light at SR 89A/Soldier Pass Road. It is estimated that 20% of all vehicles entering the site will use the driveway on Elk Road, while the remaining 20% will access the site using the driveways on Saddlerock Circle. It is assumed that 70% of all vehicles exiting the site will leave the site using the driveway located at the traffic light at SR 89A/Soldier Pass Road. It is estimated that 15% of all vehicles exiting the site will use the driveway on Elk Road. It is estimated that 10% of all vehicles exiting the site will use the northwest driveway on Saddlerock Circle, while the remaining 5% will leave the site using the southwest driveway on Saddlerock Circle. Refer to the attached trip distribution exhibits from the ITE Land Development Manual and the Site Traffic Exhibit for how the generated trips are distributed.

Weekend Vehicles per day

$$EB\ 11,341 * 1.15 = 13,042\ VPD \quad 13,042\ VPD * 10\% = 1,304\ VPH$$

RIGHT TURN LANE ANALYSIS

A right turn lane warrant analysis was conducted using Arizona Department of Transportation (ADOT) Traffic, Guidelines, and Processes (TGP) 245. Based on the 35 mph posted speed limit, two existing thru lanes in each direction, and the number of right turning vehicles entering the site, a right turn lane is warranted at the intersection

of SR 89A/Soldier Pass Road. Refer to the attached turn lane warrant analysis for the results.

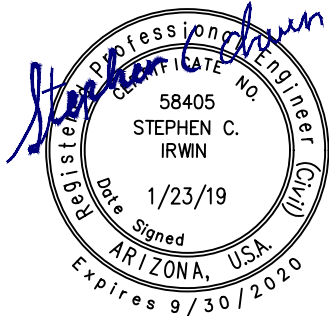
ADOT TGP 430 was used to determine preliminary right turn lane dimensions. A 60 foot gap is required based on a 35 mph speed limit. The total right turn lane storage will consist of 115 feet of braking distance and a minimum 50 foot queue length (based on two passenger cars) for a total storage length of 165 feet. A right turn lane is shown on the attached site plan.

TIA SCOPE

ADOT requires a traffic impact analysis for all new developments which generate 100 or more trips during any hour of the day. Although there will be 108 Saturday peak hour trips generated by the development, a TIA is not recommended. In addition to the new right turn lane the project is providing on eastbound SR89A at Soldier Pass Road, the project is also providing a safer option for vehicles traveling north on Saddle Rock Road to turn left onto SR 89A at the traffic signal at Soldier Pass Road instead of using the stop control intersection at Saddle Rock Road/SR 89A.

Please call if you have any questions or comments.

Sincerely,
Shephard – Wesnitzer, Inc.















Stephen C. Irwin, P.E.




Attachments-

- Overall Site Plan
- Trip Generation Tables
- Internal Trip Capture Calculations
- Trip Distribution Exhibit
- ITE Trip Distribution Figures
- Turn Lane Warrant Analysis

SITE PLAN ELEMENTS:

-  Lodging
-  Lodging / Penthouse Units.
-  Lodging / Affordable Housing.
-  Multi-Family Residential, 16 Units.
-  Public Rest Rooms.
-  Cafe & Retail / Lodging above
-  Historic Venue
-  Retail, 1 & 2 Story.
-  Monument Sign, 27 feet high.
-  Transit Shelter
-  Public Plaza.
-  Large Trees to be Preserved

CIRCULATION ELEMENTS:

-  West Sedona Trail Link
-  Sidewalks
-  Connector Walks



Building/ Description:	Units	Unit Area (s.f.)	Total Area (s.f.)	Parking required
RETAIL ELEMENT				
Northeast Bldg				
Retail - (1 story)		4,200 s.f.	1 Space/250 s.f.	17 sp.
Cafe / Restaurant - (1 story)		3,100 s.f.	1 space / 100 s.f.(red.)	16 sp.
Hotel Guest Rooms-(2nd story)	10 Lodging Units	6,300 s.f.	10 Units	10 sp.
Kiosk/ Stairs/ Circulation		1,000 s.f.		- sp.
Total	10 Lodging Units	13,600 s.f.		

Building/ Description:	Units	Unit Area (s.f.)	Total Area (s.f.)	Parking required
MULTI-FAMILY ELEMENT				
Northwest Quadrant				
Retail - (1 story)		3,400 s.f.	1 Space/250 s.f.	14 sp.
Multi-Family units-(1 & 2 Story)	16 Resid. Units	18,900 s.f.		17 sp.
Museum/Restrooms/Tower		1,300 s.f.		- sp.
Total		22,300 s.f.		Public Parking 5 sp.

Building/ Description:	Units	Unit Area (s.f.)	Total Area (s.f.)	Parking required
HOTEL ELEMENT				
Far West Wing				
Hotel Guest Rooms - King & 2 Queen	13 Lodging Units	9,600 s.f.		13 Units 13 sp.
Stairs/ Circulation/ Stor./Mech.		600 s.f.		
Total	13 Lodging Units	10,200 s.f.		

Building/ Description:	Units	Unit Area (s.f.)	Total Area (s.f.)	Parking required
West Wing				
Hotel Guest Rooms - King & 2 Queen	46 Lodging Units	21,800 s.f.		46 Units plus employees 60 sp.
Stairs/ Circulation/ Stor./Mech.		3,800 s.f.		
Total	46 Lodging Units	25,600 s.f.		

Building/ Description:	Units	Unit Area (s.f.)	Total Area (s.f.)	Parking required
East Wing				
Hotel Guest Rooms - King & 2 Queen	28 Lodging Units	16,300 s.f.		35 Units 35 sp.
Affordable housing units	7 Penthouse Units	6,900 s.f.		
Hotel Lobby-Admin-(1st floor)	8 Resid. Units	6,300 s.f.		8 sp.
Restaurant - Bar-(1st floor)		2,200 s.f.		
Restaurant - Bar-(Ext. Terrace)		4,300 s.f.		
Hotel Meeting Space- (Bsm.)		9,200 s.f.		N/A (Staff) 5 sp.
Hotel Support Space		3,500 s.f.		N/A
Hotel Admin- (2nd floor)		700 s.f.		
Hotel Bar (2nd floor)		1,100 s.f.		
Stairs/ Circulation/ Stor./Mech.		10,000 s.f.		
Total	35 Lodging Units	60,500 s.f.		

Total Lodging Units:	104 Lodging Units	Total Bldg Area:	s.f.	Parking Required:	199 sp.
				Parking Provided:	206 sp.



SITEPLAN
10/10/2018

Stephen Thompson Architect. Sedona/Del Mar
 Studio@StephenThompsonArchitect.com
 C: 928.301.5922

the Village at Saddlerock Crossing
 Soldiers Pass Road & Highway 89A
 Sedona Arizona

TABLE 1 - WEEKDAY SITE GENERATED TRAFFIC

LAND USE	ITE CODE	VARIABLE	TIME PERIOD	EQUATION	% ENTERING	WEEKDAY TOTAL	AM TOTAL	AM		PM TOTAL	PM		
								in	out		in	out	
The Village at Saddlerock Crossing Lodging Units	310	104	<i>Weekday</i>	$T=11.29(X)-426.97$	50%	747							
Hotel			<i>AM peak</i>	$T=0.5(X)-5.34$	59%		47	28	19				
Variable: Rooms			<i>PM peak</i>	$T=0.75(X)-26.02$	51%					52	27	25	
The Village at Saddlerock Crossing Residential Units	220	24	<i>Weekday</i>	$T=7.56(X)-40.86$	50%	141							
Multi-Family Housing (Low-Rise)			<i>AM peak</i>	$T=e^{(0.95(\ln(X)))-0.51}$	23%		20	5	15				
Variable: Dwelling Units			<i>PM peak</i>	$T=e^{(0.89(\ln(X)))-0.02}$	63%					17	11	6	
The Village at Saddlerock Crossing Retail	876	7.6	<i>Weekday</i>	$T=66.40(X)$	50%	505							
Apparel Store			<i>AM peak</i>	$T=1(X)$	80%		8	6	2				
Variable: 1,000 Sq. Ft. Gross Floor Area			<i>PM peak</i>	$T=4.12(X)$	51%					31	16	15	
The Village at Saddlerock Crossing Café	932	3.1	<i>Weekday</i>	$T=112.18(X)$	50%	348							
High-Turnover (Sit-Down) Restaurant			<i>AM peak</i>	$T=9.94(X)$	55%		31	17	14				
Variable: 1,000 Sq. Ft. Gross Floor Area			<i>PM peak</i>	$T=9.77(X)$	62%					30	19	11	
The Village at Saddlerock Crossing Museum	580	1.3	<i>Weekday</i>										
Museum			<i>AM peak</i>	$T=0.28(X)$	86%		0.4	0.3	0.1				
Variable: 1,000 Sq. Ft. Gross Floor Area			<i>PM peak</i>	$T=0.18(X)$	16%					0.2	0.0	0.2	
Subtotal Trips						1,740	105	55	50	131	73	58	
Internal Trip Capture (for ITE codes 310, 220, 876, 932)						31.0%	539	33	17	15	41	23	18
Subtotal Trips With Internal Trip Capture (Site Entrance/Exit Total)							1,201	73	38	34	90	50	40
Passer-by Traffic (for ITE code 932 for Weekday, PM Peak - Table E.30)						38.0%	0	0	0	0	12	6	6
Total Trips With Internal Trip Capture and Passer-by Traffic (Surrounding Area Traffic Increase)							1,201	73	38	34	79	44	34

TABLE 2 - SATURDAY SITE GENERATED TRAFFIC

LAND USE	ITE CODE	VARIABLE	TIME PERIOD	EQUATION	% ENTERING	SATURDAY TOTAL	PEAK TOTAL	PEAK HOUR OF GENERATOR		
								in	out	
The Village at Saddlerock Crossing Lodging Units	310	104	Saturday	$T=9.62(X)-294.56$	50%	706				
Hotel			Peak Hour of Generator	$T=0.69(X)+4.32$	56%		76	43	33	
Variable: Rooms										
The Village at Saddlerock Crossing Residential Units	220	24	Saturday	$T=8.14(X)$	50%	195				
Multi-Family Housing (Low-Rise)			Peak Hour of Generator	$T=0.70(X)$	50%		17	8	8	
Variable: Dwelling Units										
The Village at Saddlerock Crossing Retail	876	7.6	Saturday							
Apparel Store			Peak Hour of Generator	$T=5.32(X)$	50%		40	20	20	
Variable: 1,000 Sq. Ft. Gross Floor Area										
The Village at Saddlerock Crossing Café	932	3.1	Saturday	$T=122.40(X)$	50%	348				
High-Turnover (Sit-Down) Restaurant			Peak Hour of Generator	$T=11.19(X)$	51%		35	18	17	
Variable: 1,000 Sq. Ft. Gross Floor Area										
The Village at Saddlerock Crossing Museum	580	1.3	Saturday							
Museum			Peak Hour of Generator	$T=2.11(X)$	71%		2.7	1.9	0.8	
Variable: 1,000 Sq. Ft. Gross Floor Area										
Subtotal Trips						1,250	171	91	80	
Internal Trip Capture (for ITE codes 310, 220, 876, 932)						29.0%	362	50	26	23
Subtotal Trips With Internal Trip Capture (Site Entrance/Exit Total)						887	121	65	57	
Passer-by Traffic (for ITE code 932 for Weekday, PM Peak - Table E.30)						38.0%	0	13	7	6
Total Trips With Internal Trip Capture and Passer-by Traffic (Surrounding Area Traffic Increase)						887	108	58	50	

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	The Village at Saddlerock Crossing			Organization:	Shephard-Wesnitzer, Inc
Project Location:	Sedona, Arizona			Performed By:	KMF
Scenario Description:	Weekday			Date:	7-Nov-18
Analysis Year:	2018			Checked By:	SCI
Analysis Period:	PM Street Peak Hour			Date:	7-Nov-18

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	876	1	7.6	31	16	15
Restaurant	932	1	3.1	30	19	11
Cinema/Entertainment				0		
Residential	220	1	24	17	11	6
Hotel	310	1	104	52	27	25
All Other Land Uses ²	580	1	1.3	0		
				130	73	57

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office						
Retail	100.00			100.00		
Restaurant	100.00			100.00		
Cinema/Entertainment						
Residential	100.00			100.00		
Hotel	100.00			100.00		
All Other Land Uses ²	100.00			100.00		

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					500	
Restaurant					500	
Cinema/Entertainment						
Residential		500	500			
Hotel					500	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		435	0	390	75
Restaurant	0	451		0	176	77
Cinema/Entertainment	0	0	0		0	0
Residential	0	146	115	0		18
Hotel	0	32	95	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	13,000	7,300	5,700
Internal Capture Percentage	31%	28%	35%
External Vehicle-Trips ⁵	90	53	37
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	39%	60%
Restaurant	34%	64%
Cinema/Entertainment	N/A	N/A
Residential	51%	47%
Hotel	6%	5%

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	The Village at Saddlerock Crossing			Organization:	Shephard-Wesnitzer, Inc
Project Location:	Sedona, Arizona			Performed By:	KMF
Scenario Description:	Saturday			Date:	7-Nov-18
Analysis Year:	2018			Checked By:	SCI
Analysis Period:	Saturday, Peak Hour of Generator			Date:	7-Nov-18

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	876	1	7.6	40	20	20
Restaurant	932	1	3.1	35	18	17
Cinema/Entertainment				0		
Residential	220	1	24	17	8	8
Hotel	310	1	104	76	43	33
All Other Land Uses ²				0		
				168	89	78

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office						
Retail	100.00			100.00		
Restaurant	100.00			100.00		
Cinema/Entertainment						
Residential	100.00			100.00		
Hotel	100.00			100.00		
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail					500	
Restaurant					500	
Cinema/Entertainment						
Residential		500	500			
Hotel					500	

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		522	0	368	100
Restaurant	0	697		0	128	119
Cinema/Entertainment	0	0	0		0	0
Residential	0	182	153	0		24
Hotel	0	40	90	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	16,700	8,900	7,800
Internal Capture Percentage	29%	27%	31%
External Vehicle-Trips ⁵	119	65	54
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	46%	50%
Restaurant	43%	56%
Cinema/Entertainment	N/A	N/A
Residential	62%	45%
Hotel	6%	4%

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

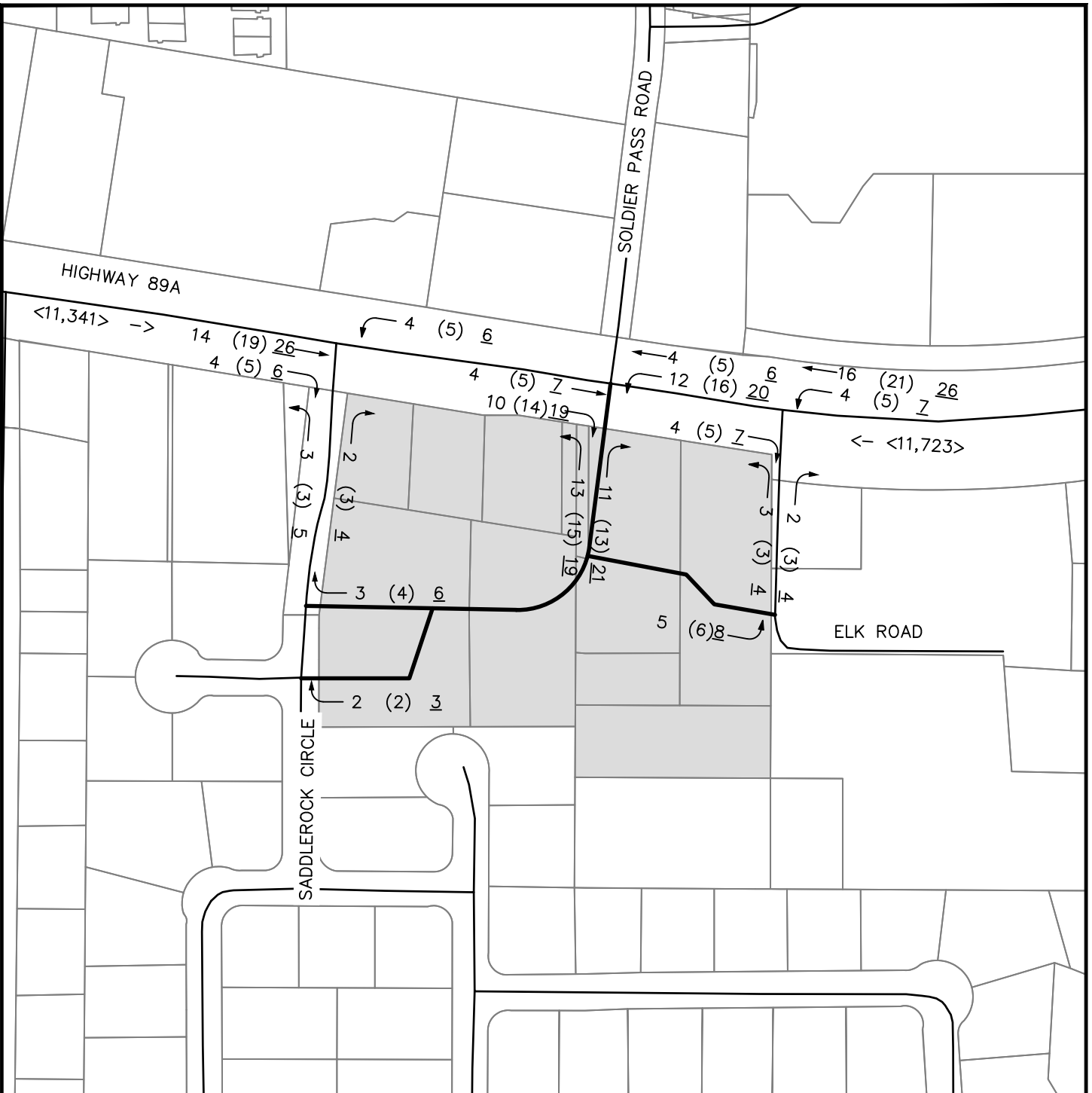
³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

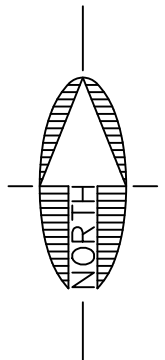
⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.



LEGEND

- AM (PM) SAI →
- <AADT>
- PROPOSED ROAD ☒
- EXISTING ROAD ☒
- EXISTING LOT
- PROJECT SITE



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JOB NO.	16034
DATE	NOV 18
SCALE	1"=200'
DRAWN	KMF
DESIGN	KMF
CHECKED	SCI

THE VILLAGE AT SADDLEROCK CROSSING
 SEDONA ARIZONA
 2019 SITE TRAFFIC

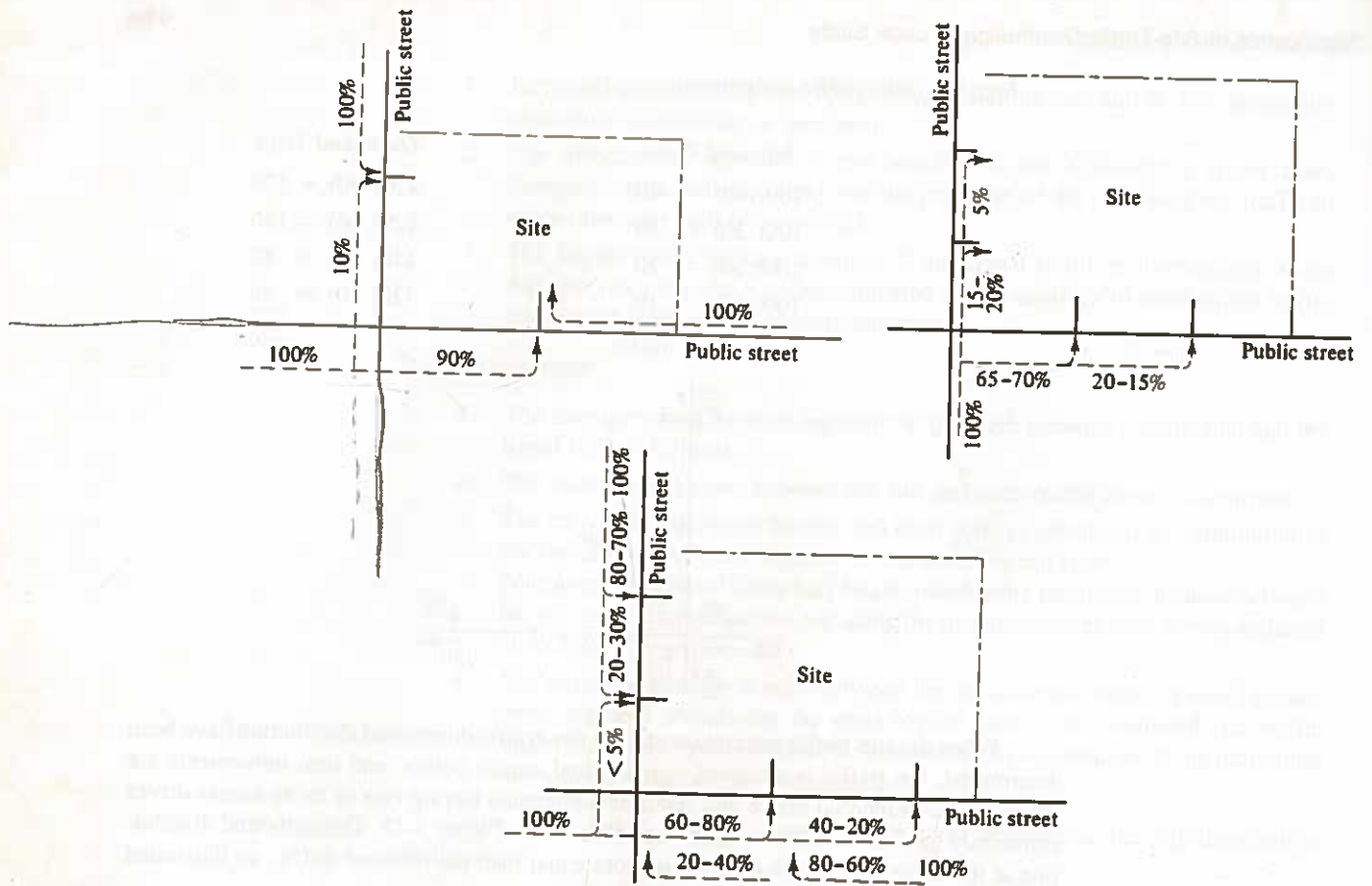


Figure 3-15 Typical distribution of inbound trips at commercial office and retail sites.

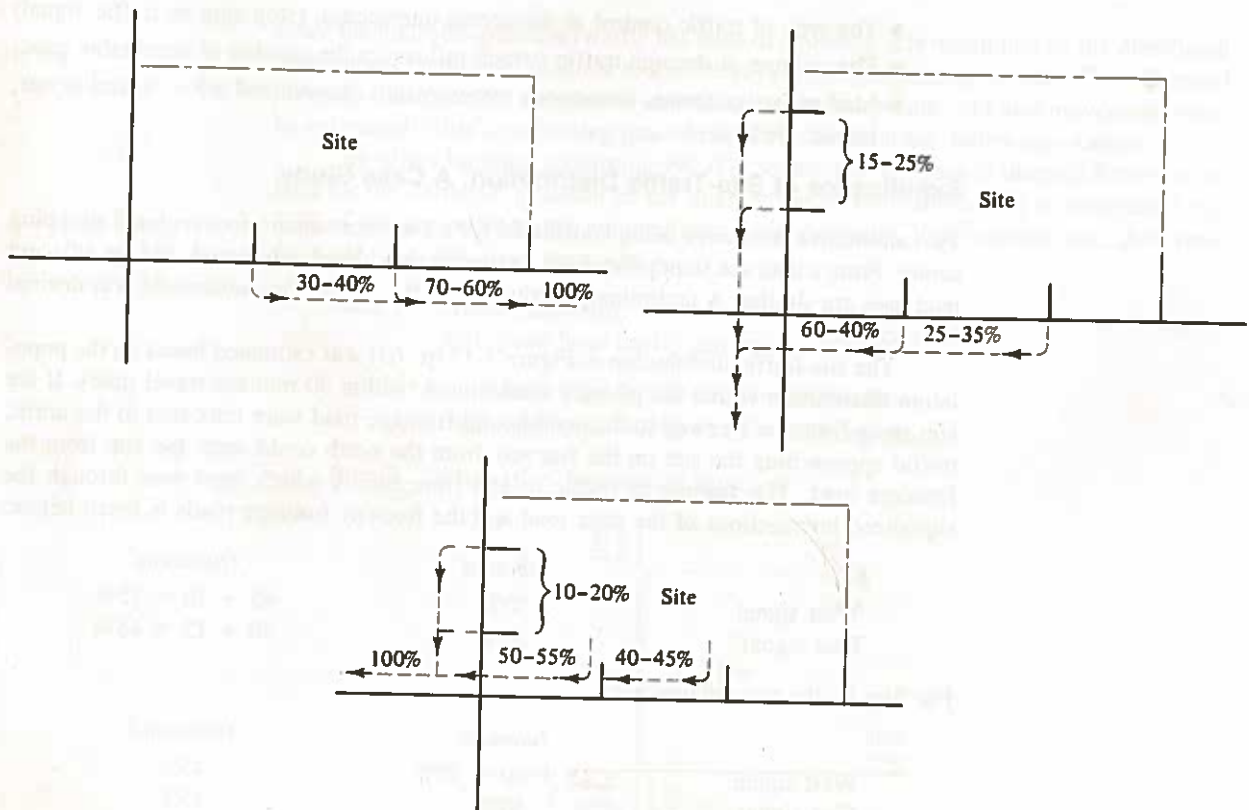


Figure 3-16 Typical distribution of outbound trips.

245 TURN LANE WARRANTS

The intent of this document is to offer guidance to warrant the installation of dedicated left or right turn lanes on state routes, whether during new construction, major reconstruction, or in the course of the encroachment permitting process. **The primary determining factors to warrant an exclusive turn lane shall be: (a) the combination of through traffic volume and turning traffic volume, (b) the posted roadway speed, and (c) the number of through lanes on the roadway.** Note: Dual right- or left-turn lanes should be considered when the turning volume exceeds 300 vehicles per hour. In addition to the criteria presented in the tables below, other factors should be taken into consideration when performing a warrant study such as: shoulder width, percentage of trucks, sight distance, highway grade, horizontal and vertical curvature and crash history.

Right-Turn Lane Warrants

Peak Hour Traffic Volume on the Highway in Advancing Direction	Minimum Peak Hour Right-turn Traffic Volume				
	# of thru lanes per direction				
	1		2		3
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	≤ 45 MPH Posted Speed	≥ 45 MPH Posted Speed	All Speeds
≤ 200					
201 – 300	-	30	-	-	-
301 – 400	-	19	-	55	-
401 – 500	85	14	-	30	-
501 – 600	58	12	140	25	-
601 – 700	27	9	80	18	-
701 – 800	20	8	53	15	-
801 – 900	12	7	40	12	-
901 – 1000	9	6	30	11	-
1001 – 1100	8	5	23	9	18
1101 – 1200	7	5	18	8	16
1201 – 1300	6	4	14	8	15
1301 – 1400	6	4	11	6	12
1400+	5	3	8	6	10

Left-Turn Lane Warrants

Peak Hour Traffic Volume on the Highway in Advancing Direction	Minimum Peak Hour Left-turn Traffic Volume			
	# of thru lanes per direction			
	1		2 (Undivided)*	
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	≤ 45 MPH Posted Speed	≥ 45 MPH Posted Speed
≤ 200	30	15	-	-
201 – 300	12	12	40	30
301 – 400	12	12	30	25
401 – 500	12	12	25	18
501 – 600	12	12	15	12
601 – 1000	12	12	10	8
1000+	12	8	10	8

* On non-freeway divided highways, left-turn or U-turn lanes should be provided at median breaks.

Volumes and traffic factors utilized should be based on data from ADOT's Multimodal Planning Division, or should be based on current traffic counts as approved by the Regional Traffic Engineer. For encroachment permits, analysis of the relevant through and turning traffic volumes should be completed in the design year as identified in ADOT Traffic Engineering Guidelines and Processes 240. For new construction and major reconstruction, analysis should be performed based on data for the appropriate design year. Turn lane warrant studies should be reviewed and approved by the Regional Traffic Engineer. In cases where the State Highway section in question intersects a route under other jurisdiction, it is recommended that a turning movement analysis be performed on the intersecting route as well.

When it is determined that a turn lane is warranted, shoulder width should be provided as part of the turn lane design in accordance with the ADOT Roadway Design Guidelines, which should be used to determine the minimum continuous usable width of paved shoulder along the turn lanes. Turn lane design should also conform to the guidance in ADOT Traffic Engineering Guidelines and Processes 430.