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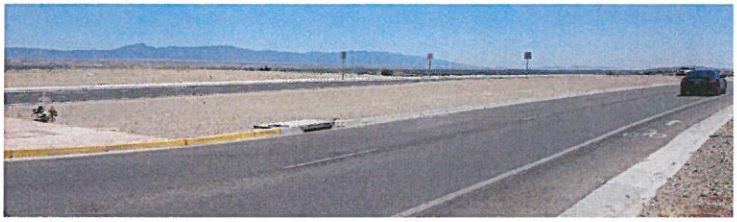
TRAFFIC IMPACT STUDY FOR RESIDENTIAL DEVELOPMENT ON 98TH STREET BETWEEN DENNIS CHAVEZ BOULEVARD AND COLOBEL AVENUE

N-9

Final Report August 2016



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Traffic Impact Study for Residential Development on 98th Street between Dennis Chavez Boulevard and Colobel Avenue

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Executive Summary

This report contains a Traffic Impact Study (TIS) for a proposed residential development in Albuquerque, NM. This work was completed by Lee Engineering, LLC, for D. Mark Goodwin and Associates, P.A.

Background

A proposed residential subdivision development is to be located on the west side of 98th Street between Dennis Chavez Boulevard and Colobel Avenue on the west side of Albuquerque, NM. The proposed site is within the jurisdiction of the City of Albuquerque. The development site will contain 250 single family housing units. The site plan is presented in **Figure 2** of this report.

The development site is proposed to incorporate two new access streets connecting to Colobel Avenue and 98th Street. The Colobel Avenue access, named Pauza Drive, is proposed to accommodate full right-in/right-out and left-in/left-out movements. The intersection of Colobel Avenue and 98th Street currently accommodates full right-in/right-out and left-in/left-out movements. The 98th Street access, named Sacate Blanco Avenue, is proposed to accommodate only right-in/right-out movements. The two new access streets and development layout are presented in **Figure 1** of this report.

The opening of this development is set to take place in 2019. This assessment was performed for the opening year of 2019 based on forecasted traffic volumes. Forecasted traffic volumes were grown from data collected in May of 2016. Peak hour trips were then added to the forecasted 2019 background volumes to facilitate the analysis of the impact from the proposed development on the surrounding roadway network.

Conclusions and Recommendations

Based on the findings of this report and traffic analysis performed, the conclusions and recommendations are as follows:

- Based on the warrant analyses contained herein, neither the 98th Street/Blake Road nor did the 98th Street /Colobel Avenue intersections satisfy 2009 Manual of Uniform Traffic Devices (MUTCD) warrants (Warrants 1 through 4).
- Aside from the intersection of 98th Street and Colobel Avenue, and Dennis Chavez Boulevard and 98th Street, all study intersections and movements are expected to operate at an acceptable level of service with existing geometry and control.
- All existing auxiliary lane storage lengths are anticipated to accommodate 95th percentile queue demands.
- A 150-foot eastbound left-turn lane is recommended for the intersection of 98th Street and Colobel Avenue and is to be constructed and striped per the latest City of Albuquerque standards.
- As mentioned Colobel Avenue is categorized as a local street and thus standard City of Albuquerque local street cross-section widths and striping would apply.
- Morrissey Street is also categorized as a local street and thus standard City of Albuquerque local street cross-section widths and striping would apply.

- Curb, gutter, sidewalks, and any remaining street width needed to complete Colobel Avenue will be constructed to complete the south side of Colobel Avenue from 98th Street to Morrissey Street.
- Curb ramps at the south-west corner of 98th Street and Colobel Avenue are recommended to be reconstructed to accommodate proposed sidewalks on the south side of Colobel Avenue.

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Introduction

This report summarizes the findings of a Traffic Impact Study (TIS) performed by Lee Engineering. Shown in **Figure 1**, the TIS performed is for a residential development to be located on 98th Street between Dennis Chaves Boulevard and Colobel Avenue. The proposed development site falls under the jurisdiction of the City of Albuquerque. Therefore, City of Albuquerque standards were used.

This report and the analysis contained were completed in agreement with the scoping requirements set forth by Raquel Michel of the City of Albuquerque and Doug Hughes of Goodwin and Associates (See Scoping Meeting Notes in **Appendix A**). The *ITE Trip Generation Manual 9th Edition, Highway Capacity Manual 2010 Edition, Manual on Uniform Traffic Control Devices 2009 Edition*, and the *New Mexico State Access Management Manual* were used to develop analysis procedures, conclusions, and recommendations for this study.

The proposed development will construct 250 single family housing units in a neighborhood subdivision. The site plan is presented in **Figure 2**. Traffic access for the proposed development site will be on located on both Colobel Avenue and 98th Street. The Colobel Avenue access will accommodate full right-in/right-out and left-in/left-out movements. Colobel Avenue currently accommodates full right-in/right-out and left-in/left-out movements at its intersection with 98th Street. The development site's 98th Street access will be restricted to only right-in/right-out movements. Access points to the site are shown in **Figure 2.** Study intersections affected by the proposed development are shown in **Figure 1**.

Full buildout of the development is planned for 2019. Traffic capacity and queue analyses will be conducted for the following scenarios:

1. Existing year 2016
2. Background Year 2019 without the proposed development
3. Background Year 2019 with the proposed development

Study intersections for this analysis include:

1. 98th Street and Blake Road
2. 98th Street and Colobel Avenue
3. Colobel Avenue and Pauza Drive/Mesa Arenoso
4. 98th Street and Sacate Blanco Avenue
5. 98th Street and Dennis Chavez

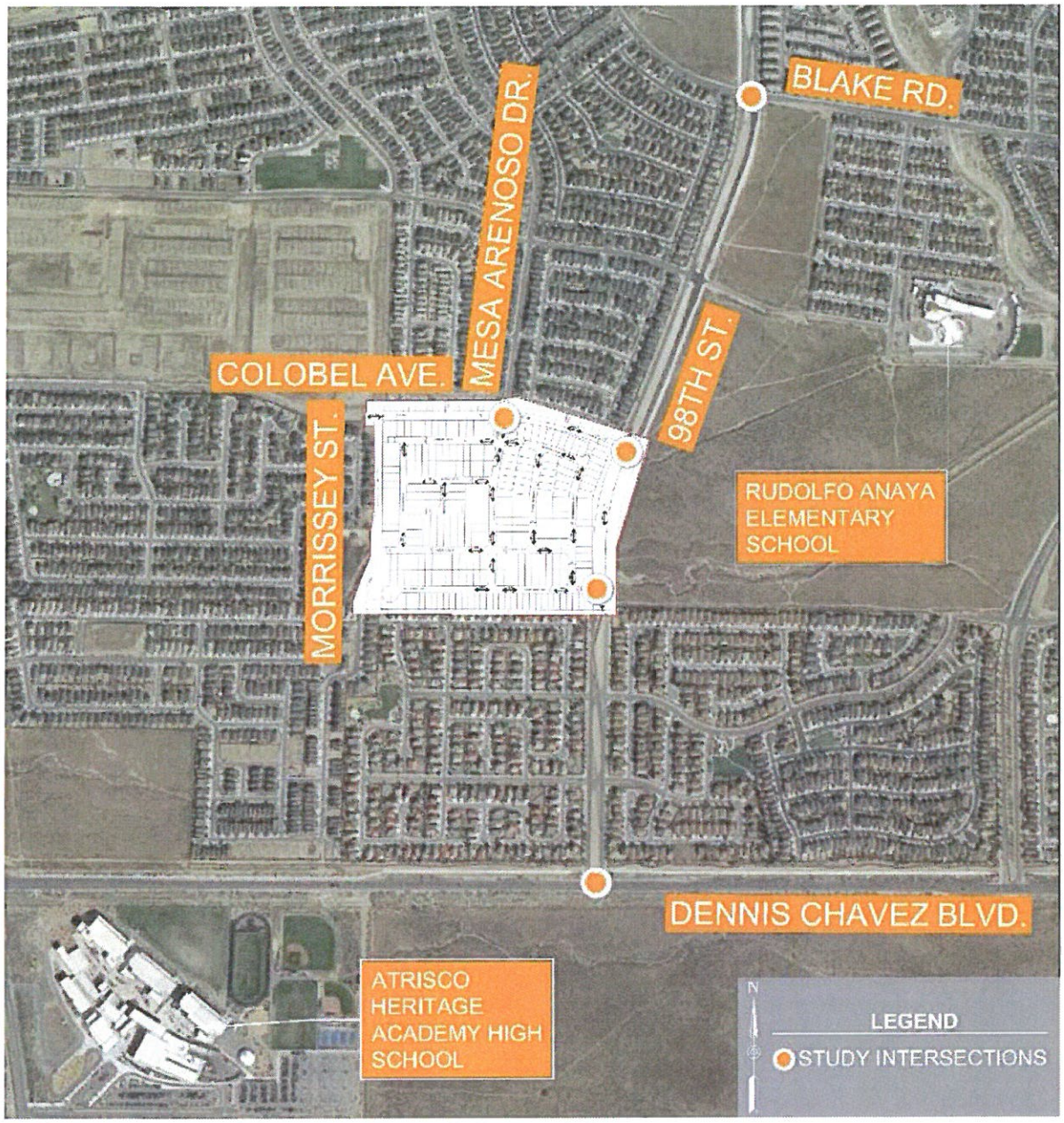

Figure 1: Vicinity Map

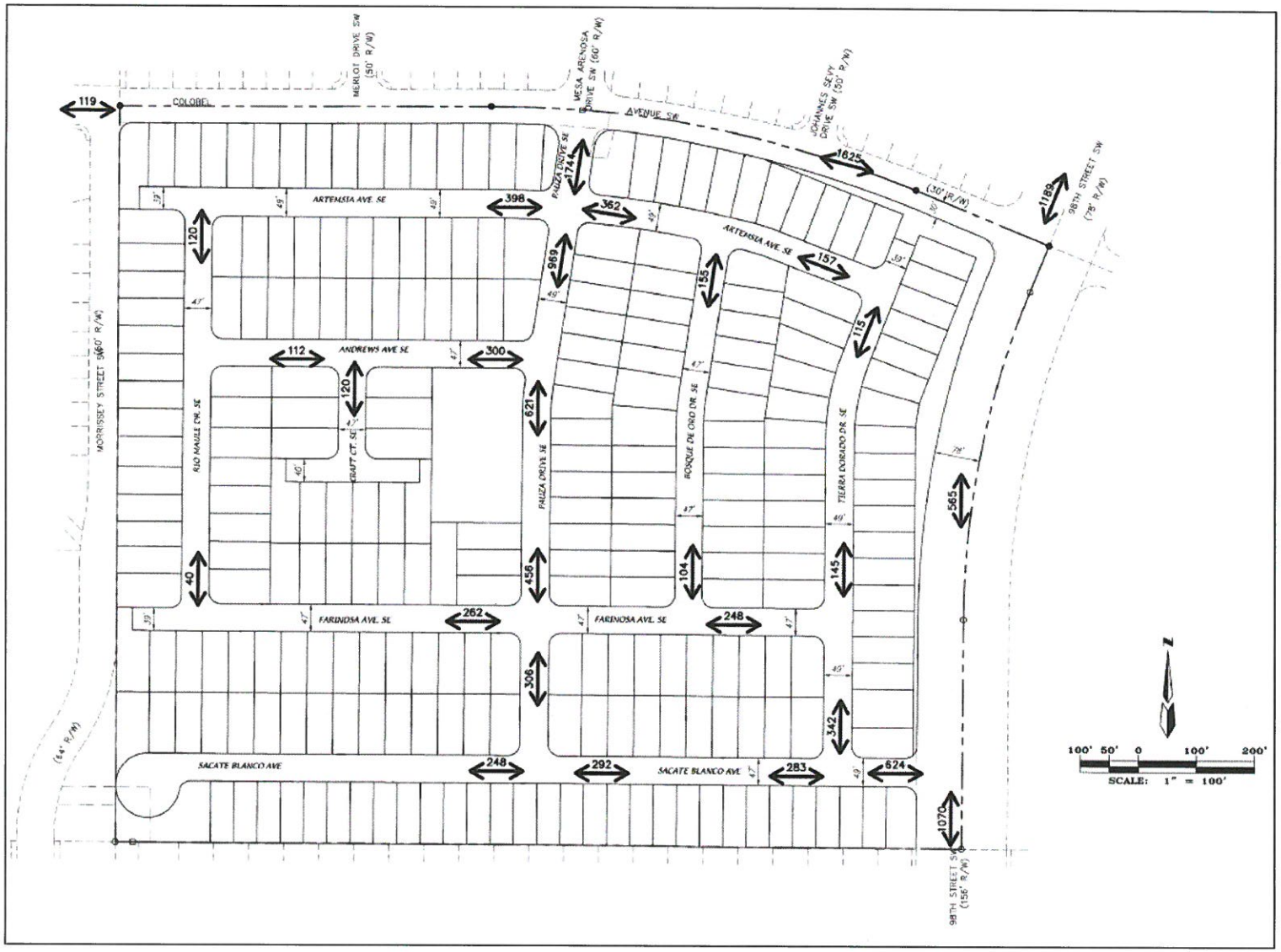

Figure 2: Site Plan

Area Land use and Streets

As stated, the development site is located on the west side of 98th Street between Dennis Chavez Boulevard and Colobel Avenue. Adjacent area land use consists of the following:

- Undeveloped/Not Improved Desert: The east side of 98th Street near the development site is undeveloped; this includes a large parcel of land between 98th Street and Unser, and from Sacate Blanco Avenue to Blake Road.
- Residential: The majority of land surrounding the development site is residential housing. This residential housing includes several parks throughout the area as well as two schools; Atrisco Heritage Academy High School, located to the South West of the development site on Dennis Chavez Boulevard, and Rudolfo Anaya Elementary School, located to the north west of the development site on Unser Boulevard.
- Light Commercial: There is a small commercial area to the north of the project site. The commercial area is located on 98th Street and Gibson Boulevard and currently only includes a pharmacy store.

Based on the land use, proposed land use, and the existing street network, no pass-by trips are expected for the development site. 98th Street and Colobel Avenue are the two primary streets that will serve the development site.

Current Roadway Network and Facilities

98th Street is a divided four lane primary arterial with pedestrian facilities and a bike lane in each direction. The speed limit is signed as 30 MPH. Per current City of Albuquerque street classifications, Colobel Avenue is a two-lane residential roadway with pedestrian facilities on the north side of the street and no existing bike facilities. Colobel serves subdivisions to the north and the west of the development site, and connects to 98th Street on the northeast corner of the development site. There are no sidewalks present on the south side of Colobel Avenue and the curb ramp on the south-west corner of 98th Street and Colobel Avenue does not accommodate the construction of a side walk on the south side of Colobel Avenue. It should be noted that, upon review of the long range plan within the 2040 Metropolitan Transportation Plan (MTP), Colobel Avenue designation as a local street is not identified to change classification. Morrissey Street that borders the west side of the development site currently has sidewalk facilities on both sides of the street. The Morrissey Street sidewalks do not continue at the intersection of Morrissey Street and Colobel Avenue. Per City of Albuquerque street classification, Morrissey Street is also classified as a local street.

Current Adjacent Projects

At the time of this study, there are no current adjacent projects.

Site Access

As shown in **Figure 2**, two new access points are proposed for the development site; one full access to Colobel Avenue and one partial access to 98th Street. Left turns at the 98th Street will not be allowed. The Colobel Avenue access will align with Mesa Arenoso Drive to make a four-legged intersection. The 98th Street access will be right-in/right-out only. The 98th Street access is proposed to be located approximately 920 feet south of Colobel Avenue and 98th Street. Study Intersections

The study intersections consist of:

1. 98th Street and Blake Street
2. Colobel Avenue and Mesa Arenoso Drive
3. 98th Street and Colobel Avenue
4. 98th Street and Dennis Chavez Boulevard
5. 98th Street and Site Access (Sacate Blanco Avenue)

Existing Traffic and Future Traffic Projections

Existing Traffic in 2016

Turning movement counts were collected on May 24, 2016, for the intersections of 98th Street and Blake Street, Colobel Avenue and Mesa Arenoso, and 98th Street and Colobel Avenue. Turning movement counts were collected on October 1, 2015 for 98th Street and Dennis Chavez Boulevard. Turning movement counts were not collected for the unconstructed intersection of 98th Street and Sacate Blanco Avenue. All turning movement counts were collected from 6:30 AM to 6:30 PM. Review of the 12 hour count data shows a typical highway distribution throughout the day with observable AM and PM peak hour periods. The existing lane geometry and turning movement counts for the existing study intersections are presented in **Figure 3.** Full Turning Movement Counts can be found in **Appendix A.**

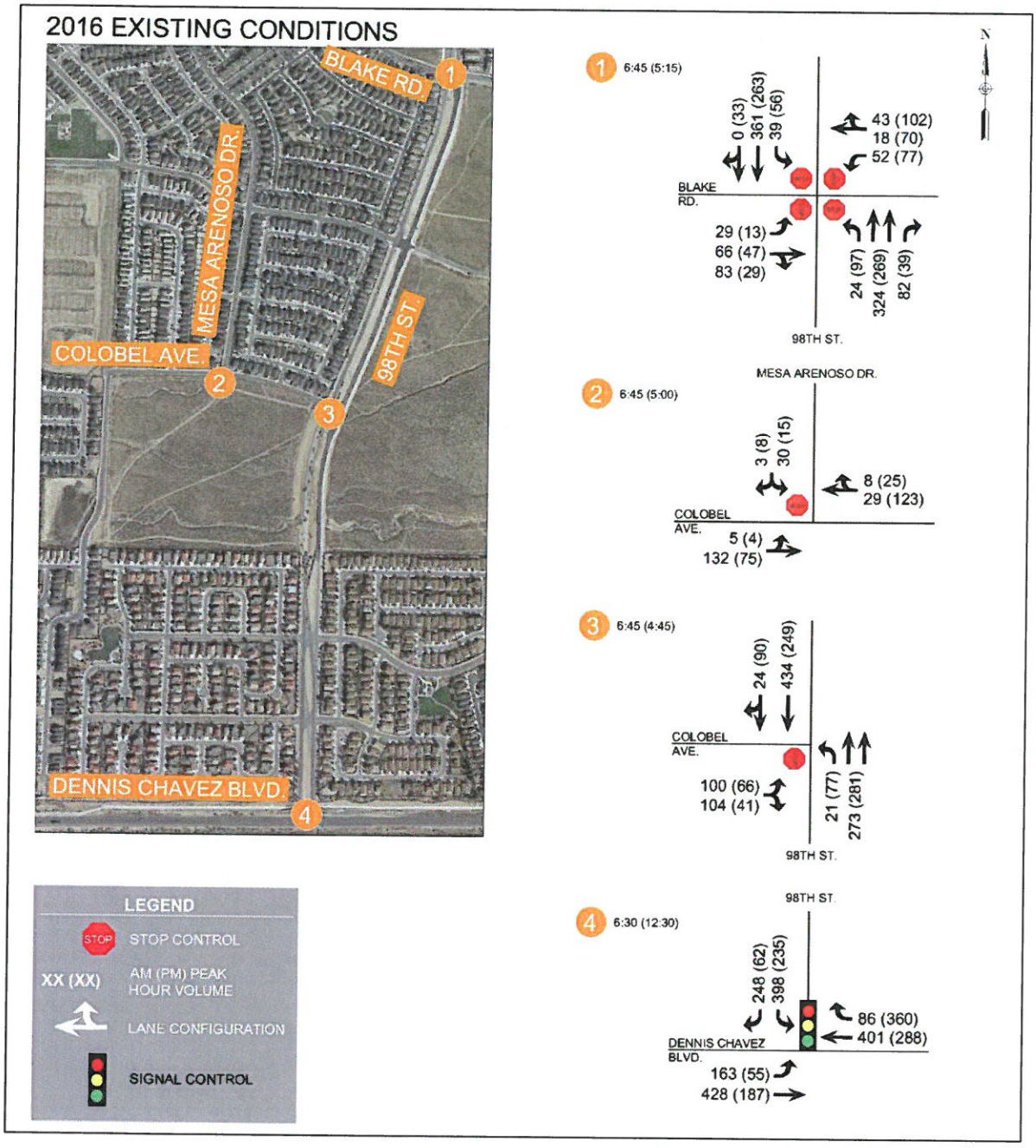

Figure 3: 2016 Existing Conditions

Traffic Projections for Background Traffic Volumes

Opening of the development is planned for 2019. Therefore, traffic analysis was performed for a build out year of 2019. Traffic planning models were obtained from the Mid Region Council of Governments (MRCOG) to forecast traffic volumes for the year 2019. Growth rates for 98th Street, Blake Street, and Dennis Chavez were determined by comparing the 2012 MRCOG and 2040 MRCOG planning models. The traffic analysis revealed that these three streets showed an annual average growth rate of 1.1% per year. This growth rate was applied to the turning movement counts collected to determine future 2019 traffic volumes. The 2019 traffic volumes are shown in **Figure 4.**

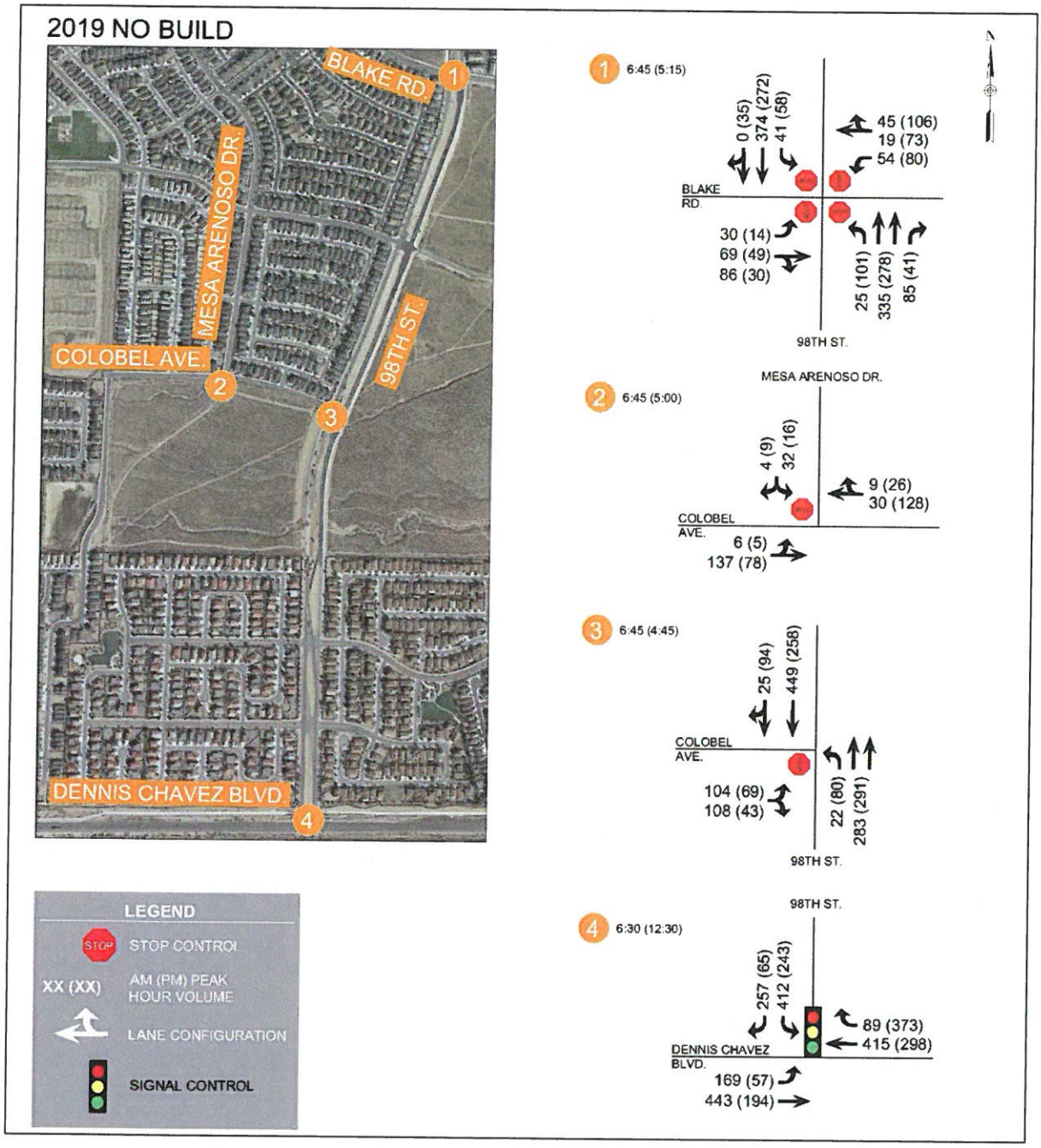

Figure 4: 2019 Forecasted Traffic Volumes

Trip Generation

Trip generation analysis was performed based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 9th Edition.* The land use categories Single Family Detached Housing (210) and Residential Condominium / Townhouse (230) were used to generate trips for the proposed development. Projected trips were calculated using the average rate for the peak hour generator. Due to the nature of residential developments, no pass-by trips were calculated. Trips generated are presented in **Table 1.**

Table 1: Desert Sands Trip Generation

Use	Units		TRIP GENERATION							TRIPS				
			Daily Rate	AM Peak			PM Peak			Daily	AM Peak		PM Peak	
				Rate	Enter	Exit	Rate	Enter	Exit		In	Out	In	Out
Single Family Detached Housing(210)	216	Dwelling Units	9.87	0.75	25%	75%	0.97	63%	37%	2132.94	40	121	132	78
Residential Condominium / Townhouse (230)	31	Dwelling Units	7.49	0.65	17%	83%	0.74	67%	33%	232	3	17	15	8
Total	-	-	-	-	-	-	-	-	-	2132.94	43	138	147	86

Notes:

Single Family Detached Housing Daily Rate: Ln(T) = 0.92 Ln(X) + 2.72 AM Rate: T = 0.70X + 9.74 PM Rate:Ln(T) = 0.9 Ln(X) + 0.51
Residential Condominium/Townhouse Daily Rate: Ln(T) = 0.87 Ln(X) + 2.46 AM Rate: Ln(T) = 0.8 Ln(X) + 0.26 PM Rate:Ln(T) = 0.82 Ln(X) + 0.32

Trip Distribution and Assignment

Trip distribution of primary trips was determined based on analysis of existing intersection demand characteristics and expected routing for home based employment and commercial trips. Southbound trips were distributed within the site using an approximate 50/50 split of the southbound trips between Colobel Avenue and Sacate Blanco Avenue. Primary Trip Distribution and Assignment values are shown in **Figure 5** and **Figure 6.** Opening day traffic volumes with trips is shown in **Figure 7.**

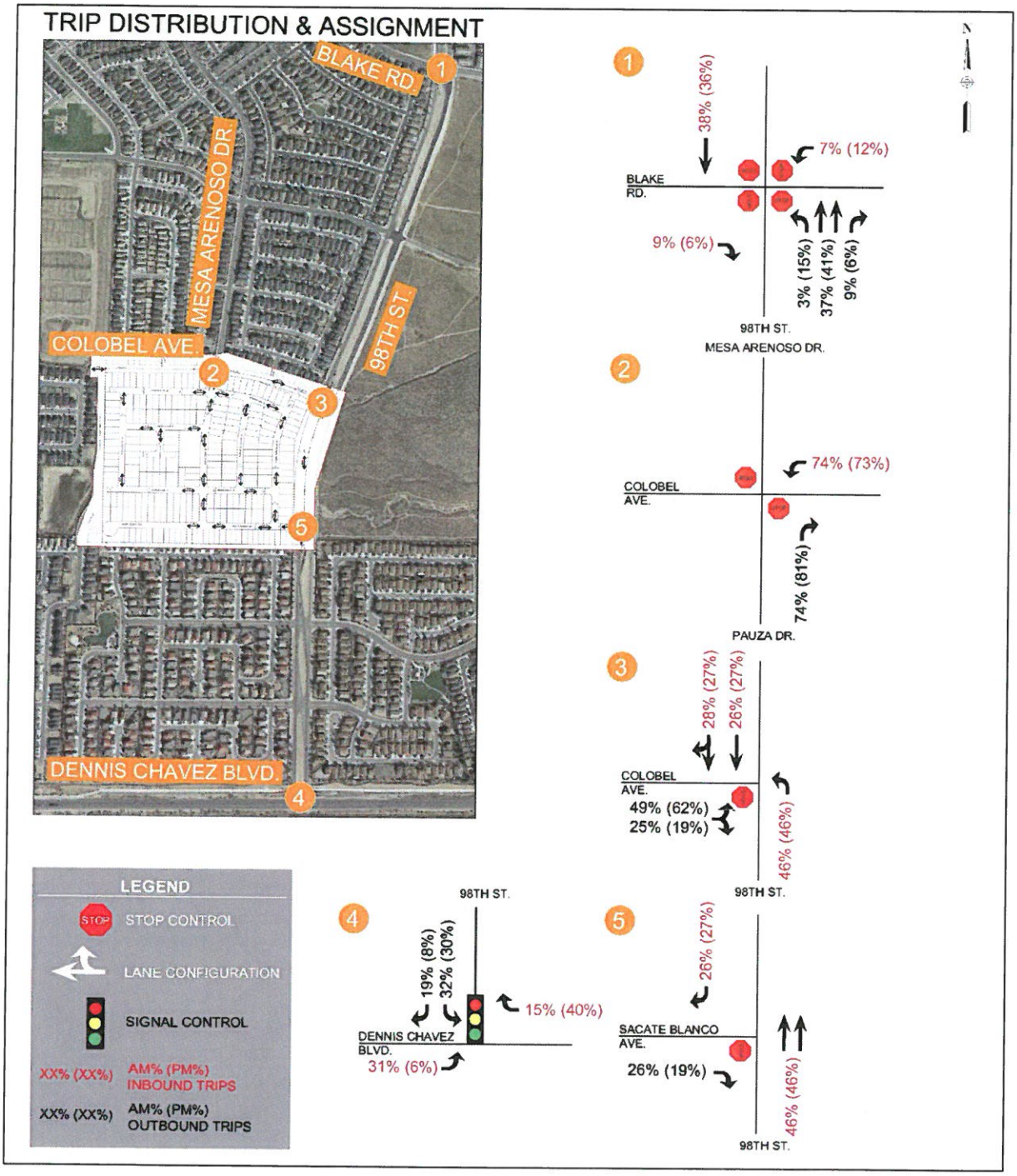

Figure 5: Trip Distribution and Assignment

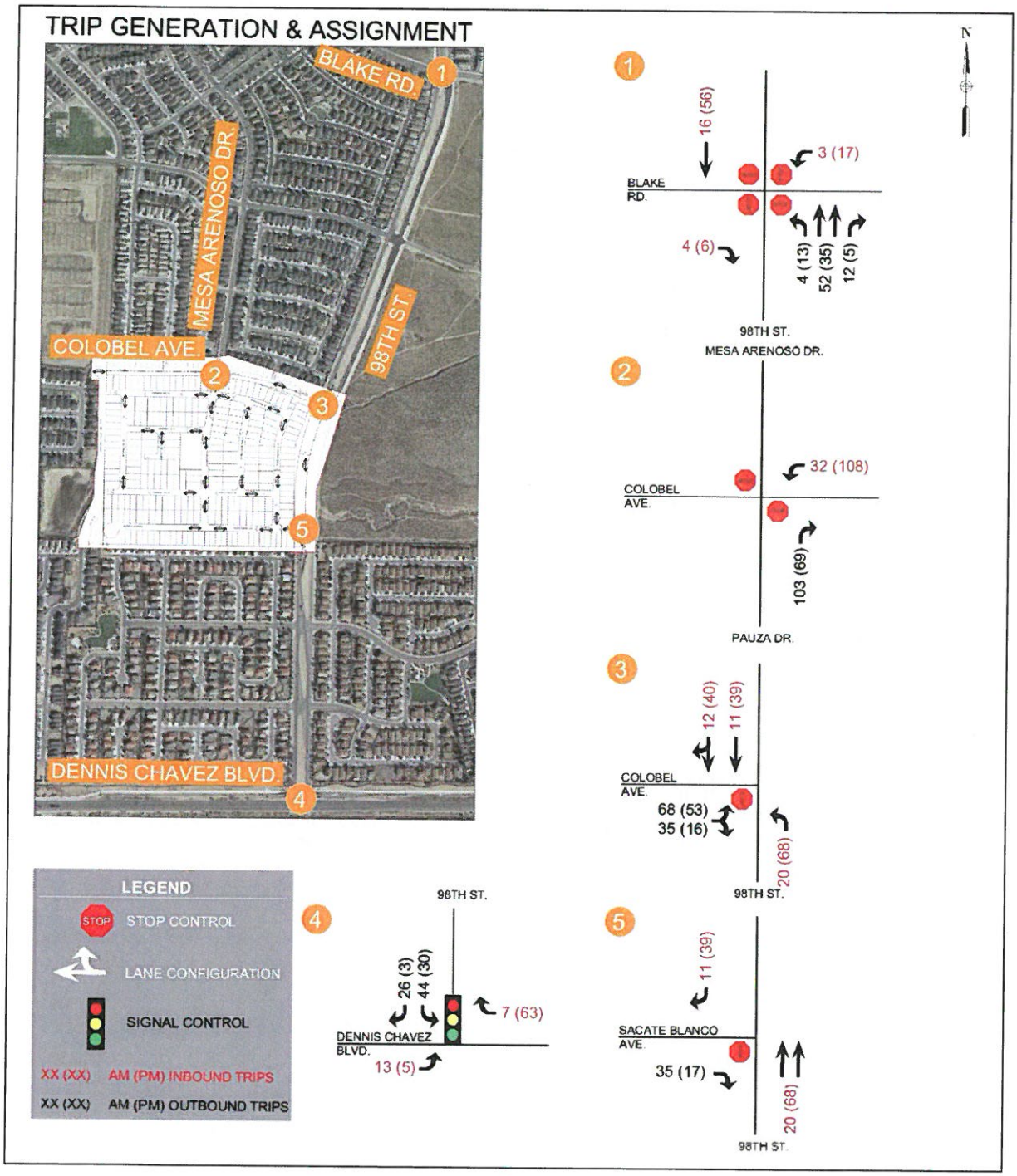

Figure 6: Trip Generation and Assignment

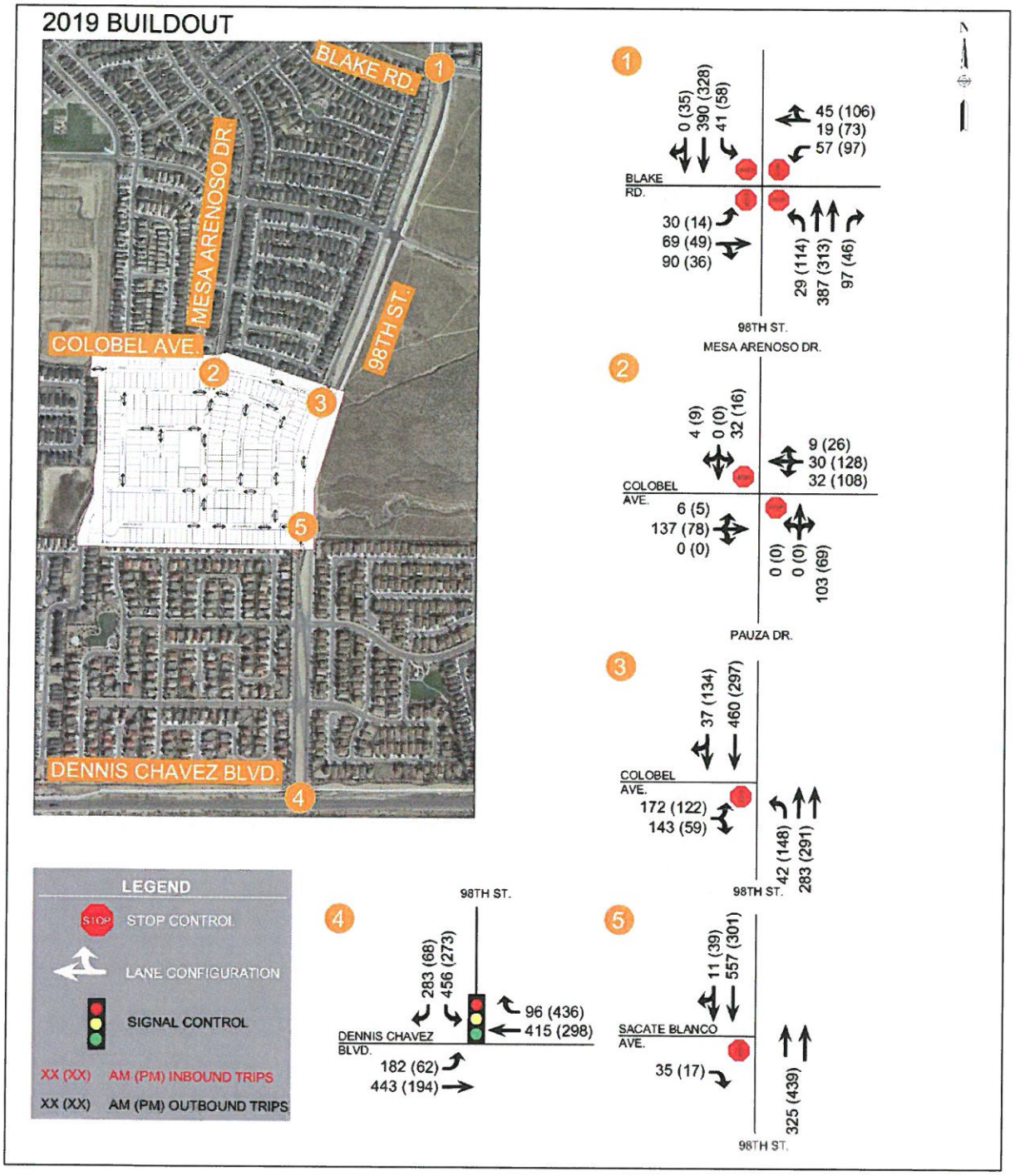

Figure 7: 2019 Forecasted Traffic Volumes with Trips

Signal Warrant Analysis

Signal warrant analyses for 2009 Manual of Uniform Traffic Control Devices (MUTCD) warrant numbers 1 through 4 were performed for the intersections of 98th Street and Blake Street and 98th Street and Colobel Avenue. The summarized results are shown in **Table 2.**

Table 2: Signal Warrant Analysis Summary

98th Street Study Intersection with	2009 MUTCD Warrants Satisfied									
	Warrant 1 (8 Hour)	Warrant 2 (4 Hour)	Warrant 3 (Peak Hour)	Warrant 4 (Pedestrian)	Warrant 5 (School Crossing)	Warrant 6 (Coordinated Signal System)	Warrant 7 (Crash)	Warrant 8 (Roadway Network)	Warrant 9 (Intersection Near a Grade Crossing)	All-Way Stop Control
Blake Street	✗	✗	✗	✗	NA	NA	Not Measured	NA	NA	NA
Colobel Avenue	✗	✗	✗	✗						✗

✗ Not Satisfied

✓ Satisfied

Based on the warrant analysis, neither Blake Street nor Colobel Avenue satisfied any warrant. It is recognized that Colobel Avenue is spaced one half mile from the existing signal at Dennis Chavez Boulevard to the south and a potential signal at Blake Road, which is considered ideal signal spacing from a planning perspective. Therefore, even though traffic signals are not warranted at this time, it is recommended that the city periodically reanalyze the 98th Street/Colobel Avenue for traffic signal warrants as developments continues to fill the surrounding area.

Operational and Safety Analysis

Intersection Capacity and LOS

Intersection capacity and Level of Service (LOS) analysis was performed using procedures and methods outlined in the *2010 Highway Capacity Manual*. Synchro 9.0 software was used to conduct the analysis. Detailed output sheets from the analysis can be found in **Appendix C.** Capacity and LOS are summarized below in **Table 3** for the following scenarios: Existing (2016), Background (2019), and Opening Year with Buildout (2019).

Table 3: Level of Service Summary

Study Intersection	Scenario	Worst Case Movement LOS				Intersection LOS			
		AM		PM		AM		PM	
		Movement	LOS	Movement	LOS	Delay[1]	LOS[2]	Delay[1]	LOS[2]
98th Street and Blake Street	Existing (2016)	NBR	C	NBR	B	17.4	C	13.7	B
	Background (2019)	NBT	C	SBT	B	13.4	B	13.5	B
	Opening Year (2019) With Proposed Development	NBT	C	SBT	C	14.8	B	15.2	C
Colobel Avenue and Mesa Arenoso Drive/Pauza Drive	Existing (2016)	SBL	A	SBL	B	2.4	A	1.3	A
	Background (2019)	SBL	A	EBL	A	1.8	A	1.1	A
	Opening Year (2019) With Proposed Development	SBL	B	SBL	B	4.8	A	4.1	A
98th Street and Colobel Avenue	Existing (2016)	EBL	C	EBL	B	3.2	A	2.6	A
	Background (2019)	EBL	B	EBL	B	3.3	A	2.4	A
	Opening Year (2019) With Proposed Development	EBL	E	EBL	D	10.8	B	7.1	A
	Opening Year (2019) With Proposed Development Mitigated	EBL	C	EBL	C	4.2	A	3.8	A
98th Street and Sacate Blanco Avenue	Opening Year (2019) With Proposed Development	EBR	B	EBR	A	0.4	A	0.2	A
98th Street and Dennis Chavez Boulevard	Existing (2016)	SBL	F	SBL	D	25.4	C	12.8	B
	Background (2019)	SBL	D	SBL	D	18.8	B	13.3	B
	Opening Year (2019) With Proposed Development	SBL	D	SBL	D	20.4	C	14.5	B

[1]Average delay in seconds per vehicle.

[2]LOS stands for Level of Service.

[3] Average Delay and LOS for the highest delay movement is reported for unsignalized intersections

It should be noted that the 2010 *Highway Capacity Manual* does not provide analysis procedures for all-way-stop-control intersections whose approach/approaches have more than three lanes. This includes through lanes as well as turning lanes. Therefore, for the intersection of 98th Street and Blake Street, the northbound right turn lane was combined with the outermost northbound through lane. This allows for analysis according to 2010 *Highway Capacity Manual* procedures and provides a more conservative approach to analyzing the northbound approach.

Base on the summarized results in **Table 3**, the following observations are noted:

- All study intersections and movements, are expected to operate at a LOS C or better during both AM and PM peak hours for traffic demand scenarios, except for 98th Street and Colobel Avenue, and Dennis Chavez Boulevard and 98th Street.
- The eastbound left-turn at 98th Street and Colobel Avenue is expected to operate at a LOS E for the 2019 Build Out scenario during the AM peak hour.
- With the addition of an eastbound left turn lane at 98th Street and Colobel Avenue the AM eastbound left-turn LOS is expected to improve from LOS E to LOS C and the PM eastbound left-turn LOS is expected to improve from a D to a C.
- 98th Street and Dennis Chavez shows a LOS F for the worst case movement in the Existing 2016 scenario using the existing signal timings. Optimizing the signal timings of 98th Street and Dennis Chavez could improve the Existing 2016 LOS. LOS for the southbound left-turn at 98th Street and Dennis Chaves currently operates at an LOS F. However, signal timing optimization can improve the southbound left-turn LOS to an LOS D. The City of Albuquerque is currently in the process of re-timing several corridors including Dennis Chavez Boulevard to reflect the latest traffic demands and patterns.

The study corridor of 98th Street from Dennis Chavez to Blake Street operates adequately under current conditions. Background 2019 and Opening Year 2019 with Proposed Development also operate satisfactorily except for the eastbound left movement at 98th and Colobel Avenue. When an exclusive left-turn lane is added to the eastbound Colobel Avenue approach, the AM eastbound movement LOS is improved to an acceptable level of LOS C. Therefore, an exclusive eastbound left turn and right-turn lane is recommended for the intersection of 98th Street and Colobel Avenue. The Synchro output sheets can be found in Appendix C.

Queue Storage and Auxiliary Lane Analysis

Queuing analysis was performed for the study corridor for all auxiliary turn lanes where the proposed project contributes additional traffic demand. The results are presented in **Table 4.**

Table 4: Queuing Analysis

Intersection	Movement	Existing (2016)		Background (2019)		Opening Year with Development (2019)		Opening Year with Development (2019) Mitigated		Storage Length Present or Proposed
		AM	PM	AM	PM	AM	PM	AM	PM	
		95th Percentile (ft.)	95th Percentile (ft.)	95th Percentile (ft.)	95th Percentile (ft.)	95th Percentile (ft.)	95th Percentile (ft.)	95th Percentile (ft.)	95th Percentile (ft.)	
98th Street and Blake Street	NBL	<25	<25	<25	<25	<25	<25	<25	<25	90
	NBR	60	26	38	<25	48	28	48	28	105
	WBL	<25	<25	<25	<25	<25	<25	<25	<25	200
Colobel Avenue and Mesa Arenoso Drive / Pauza Drive	WBL	-	-	-	-	<25	<25	<25	<25	-
98th Street and Colobel Avenue	NBL	<25	<25	<25	<25	<25	<25	<25	<25	200
	EBL	46	<25	36	<25	140	78	34	26	150
98th Street and Dennis Chavez Boulevard	EBL	56	<25	101	26	113	30	113	30	120
	SBL	456	212	378	217	419	241	419	241	-
	SBR	68	<25	56	26	74	26	74	26	-
	WBR	<25	41	34	44	35	49	35	49	490

Generally, all movements are accommodated by existing storage capacities. The 95th percentile queue under 2019 buildout demands for the eastbound left and right turns at 98th Street and Colobel Avenue is expected to be 140 feet if only on shared lane approach is provided. However, this queue for the eastbound left turn movement at the 98th Street and Colobel intersection is reduced from an expected queue of 140 feet to 34 feet if an exclusive left turn lane is added to the approach.

Therefore, the proposed eastbound left-turn lane at the 98th Street and Colobel Avenue intersection is recommended to be constructed to provide 150 feet of left-turn storage, which is consistent with City of Albuquerque standards for this street classification and will accommodate the worst-case expected 95th percentile queue lengths. The left-turn lane should be constructed in compliance with City of Albuquerque standards including appropriate taper rates and striping.

Recommended Street Improvements

Based on traffic analysis and existing conditions, the following street improvements are recommended:

- A 150-foot eastbound left-turn lane is recommended at the intersection of 98th Street and Colobel Avenue.
- As mentioned Colobel Avenue is categorized as a local street and thus standard City of Albuquerque local street cross-section widths and striping would apply.

- Morrissey Street is also categorized as a local street and thus standard City of Albuquerque local street cross-section widths and striping would apply.
- Sidewalk, curb, and gutter should be constructed on the south side of Colobel Avenue from 98th Street to Morrissey Street.
- Curb ramps on the south-west corner of 98th Street and Colobel Avenue and on the south-east corner of Morrissey Street and Colobel Avenue should be reconstructed to accommodate sidewalk, curb, and gutter on the south side of Colobel Avenue.

Conclusions and recommendations are provided in the Executive Summary.