

# San Ygnacio Commercial Plaza Traffic Impact Study

March 2012



## FINAL REPORT

*Prepared for*

Stone Bridge  
Commercial Realty,  
LLC

*Prepared by*



**LEE ENGINEERING**

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**Stone Bridge Commercial Realty, LLC**

Submitted by:



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## **Executive Summary**

### **Background**

The proposed development, San Ygnacio Commercial Plaza, is located in the southeast quadrant of the Coors Boulevard and Tower Road intersection. The study site is in the Bernalillo County jurisdiction and is adjacent to Coors Boulevard, a NMDOT maintained roadway.

The proposed use of study site is commercial development, which will include 30,000 square feet gross building area of Shopping Center use. The proposed land use is categorized into the Institute of Transportation Engineer's (ITE) land use category 820, Various Shops (Shopping Center). The study site is expected to be constructed in a single stage and expected to open in early 2013. Upon build-out in early 2013, it will generate approximately 1,290 average daily trips, out of which, 31 trips are in the AM peak hour and 75 trips are in the PM peak hour. This level of peak hour trip generation requires a Traffic Impact Study, which needs to address conditions at site driveways, and major signalized intersections adjacent to the study site during existing year (2012) and the development's anticipated opening year (2013). Proposed development will have three (3) access driveways, one each on Tower Road (Driveway D1), San Ygnacio Road (Driveway D2), and Coors Boulevard (Driveway D3). The driveway that warrants a right turn deceleration lane under NMDOT standards is the Driveway D3 on Coors Boulevard.

### **Conclusions and Recommendations**

The traffic operational analysis shows that for Existing Year (2012) all of the intersections, except Coors and Sage during AM peak hour, are experiencing acceptable traffic operations and LOS equal to or better than D. During Opening Year (2013), all of the intersections and individual turning movements are expected to have a LOS equal to or better than D during morning and evening peak hour traffic conditions. It was found that the traffic flow operations at the study intersections can be improved for the opening year by optimizing the existing signal timings. In addition, the eastbound and westbound left turn movements on Coors and Bridge intersection should be converted to protected + permitted phase from the existing permitted phase to improve traffic operations.

No significant increase in average delay or reduction in LOS are found between with and without proposed development scenarios for the opening year (2013) projected traffic demand. Thus, the proposed development is not expected to adversely impact the traffic operations on the study intersections.

All driveways will provide exclusively right-in and right-out access to the incoming and outgoing traffic. The driveway design and construction should incorporate elements which will better encourage that the driveways will be used for right-in and right-out access only and attempt to avoid queue backup from prohibited turning movements. As indicated on the site plan, driveway access on Tower Road is approximately 100 feet east of the face of the curb on Coors Boulevard, driveway access on San Ygnacio

Road is approximately 70 feet east of face of the curb on Coors Boulevard, and driveway access on Coors Boulevard is approximately 530 feet north of the face of the curb on San Ygnacio Road. According to the Bernalillo County guidelines on driveway spacing from the nearest intersection, the driveway spacing is adequate.

Access connection depth (driveway throat length) for all the three site access driveways is recommended to be 30 feet as per the *State Access Management Manual*. Driveway D3 on Coors Boulevard is recommended to have 270 feet of deceleration length and 100 feet of taper length (8:1 taper) providing a total of 370 feet of deceleration distance. All existing storage links where site traffic will be contributing demand look to be adequate.

Peak hour warrant analysis was performed for three site driveways using the traffic signal warrants outlined in the *Manual on Uniform Traffic Control Devices, 2009 Edition*. It is not recommended at this time to provide traffic signal control at any of three site driveways.

As part of this project, a 6-foot wide sidewalk per NMDOT standards will be provided on the project side of Coors Boulevard between Tower Road and San Ygnacio Road. Additionally, sidewalks per Bernalillo County standards will be provided on Tower Road and San Ygnacio Road for the project limits only.

There is an existing 6-foot bike lane on Coors Boulevard along the Project frontage except along the northbound right turn lane on Coors Boulevard and Tower Road intersection. As part of this project, a 5-foot bike lane at the intersection will be provided by reducing the right lane width from 13 to 10 feet and by realigning Coors Boulevard towards the median by 2 feet. At the intersection, appropriate taper and striping will be provided to transition and align the traveled lanes on Coors Boulevard north with lane lines on south side of Tower Road.

The improvements on or near Coors Boulevard and Tower Road intersection proposed in this study would be coordinated with the Bernalillo County on the future typical sections and alignment of Tower Road at Coors Boulevard. In addition, the sidewalk and pedestrian ramps as part of the proposed development will be provided in accordance with the latest American Disabilities Act (ADA) standards and guidelines.

The construction plans for the right turn deceleration lane and bike lane on Coors Boulevard will be coordinated with the NMDOT. Right of Way will be provided for the sidewalk, bike lane, and deceleration lane proposed as part of this project.

Crash analyses indicate that higher than expected crashes occur at Bridge Boulevard and Sage Road. It is likely that the skew at Bridge Boulevard is contributing factor to this. Therefore it is recommended that protected left-turn phasing be investigated for Bridge Boulevard. For Sage Road it was recommended that protected only left-turn phasing be investigated for the Coors Boulevard approaches, and that the yellow and red clearance interval be reviewed.

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## Introduction

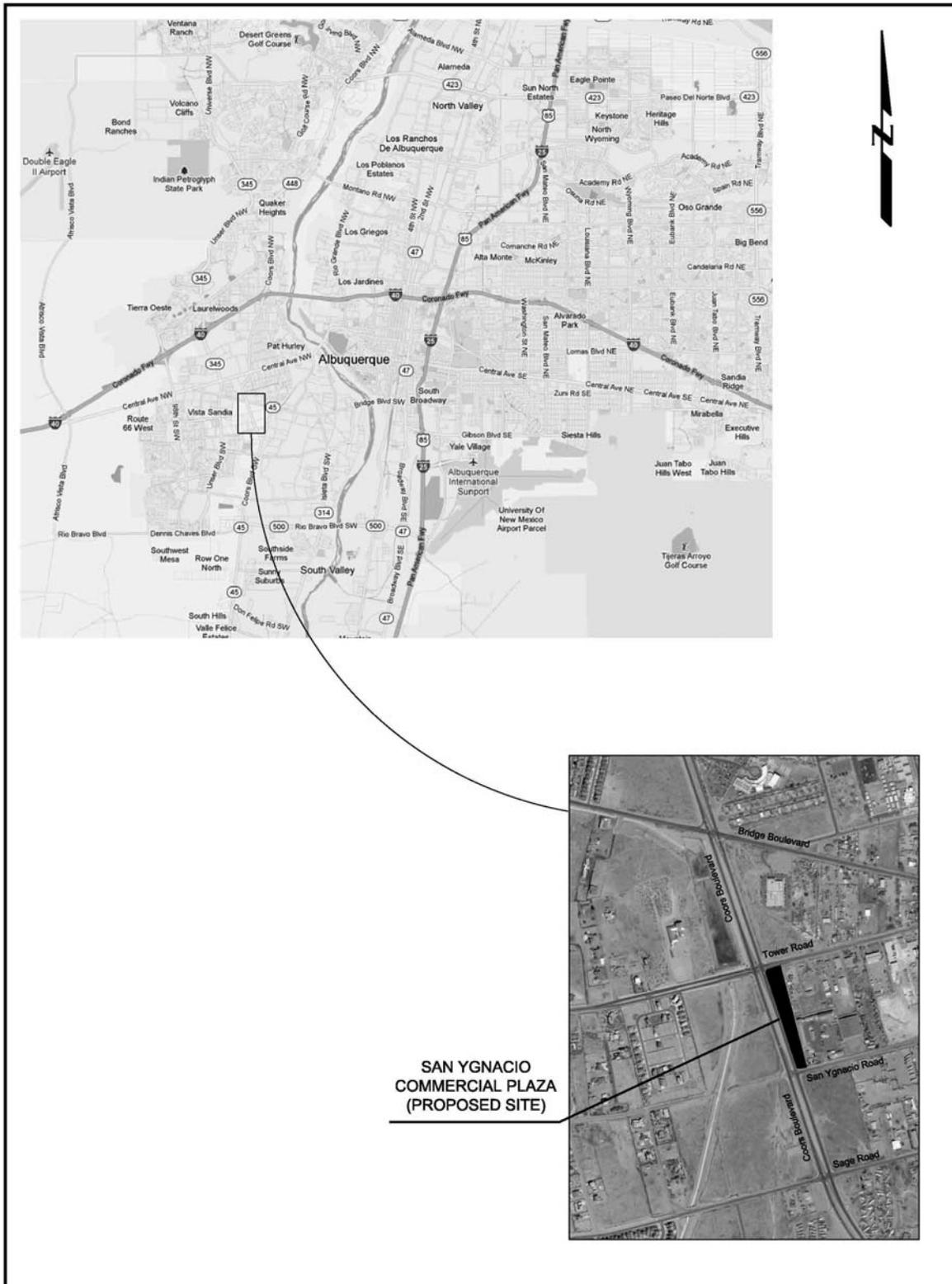
This report summarizes the findings of a traffic impact analysis performed by Lee Engineering for a commercial development, San Ygnacio Commercial Plaza, proposed for the site located in the southeast quadrant of Coors Boulevard and Tower Road in Albuquerque, New Mexico. **Figure 1** shows the location of the proposed development situated in the southeast Albuquerque near the intersection of Coors Boulevard and Bridge Boulevard.

The analysis and this report were completed in accordance with the *Bernalillo County 2010 TIA Procedures*, *New Mexico Department of Transportation's (NMDOT) State Access Management Manual*, *ITE Trip Generation Manual 8<sup>th</sup> Edition*, *Highway Capacity Manual 2000 Edition*, *Manual on Uniform Traffic Control Devices 2009 Edition*, and *AASHTO Green Book*.

The proposed commercial site will include 30,000 square feet gross building area of Shopping Center use. The most recent site plan is presented in **Figure 2** and is enclosed in the Appendices. Proposed development will have three (3) access driveways, one each on Tower Road (Driveway D1), San Ygnacio Road (Driveway D2), and Coors Boulevard (Driveway D3). The development will be accessible to pedestrians, cyclists, and motorists. All driveways will provide right-in right-out access to the incoming and outgoing traffic. There are proposed 150 parking spaces in total, out of which eight (8) will be handicapped access, and four (4) will be provided for motor cycles.

The proposed development is scheduled to be open in a single phase in early 2013, i.e. the opening year for traffic analysis is 2013. The traffic analysis will be performed for two horizon years, 2012 and 2013, resulting in the following three study scenarios:

1. Existing year (2012)
2. Opening Year (2013) without the proposed development
3. Opening Year (2013) with the proposed development



**Figure 1. Vicinity Map.**

# SAN YGNACIO PLAZA STRIP MALL ALBUQUERQUE, NM

**GENERAL NOTES:**

1. TOTAL MAXIMUM OF 30,000 SQUARE FEET OF BUILDING AREA
2. 1150 PARKING SPACES TOTAL
3. 8 HANDICAPPED SPACES
4. 4 MOTOR CYCLE SPACES
5. PROPERTY LINE

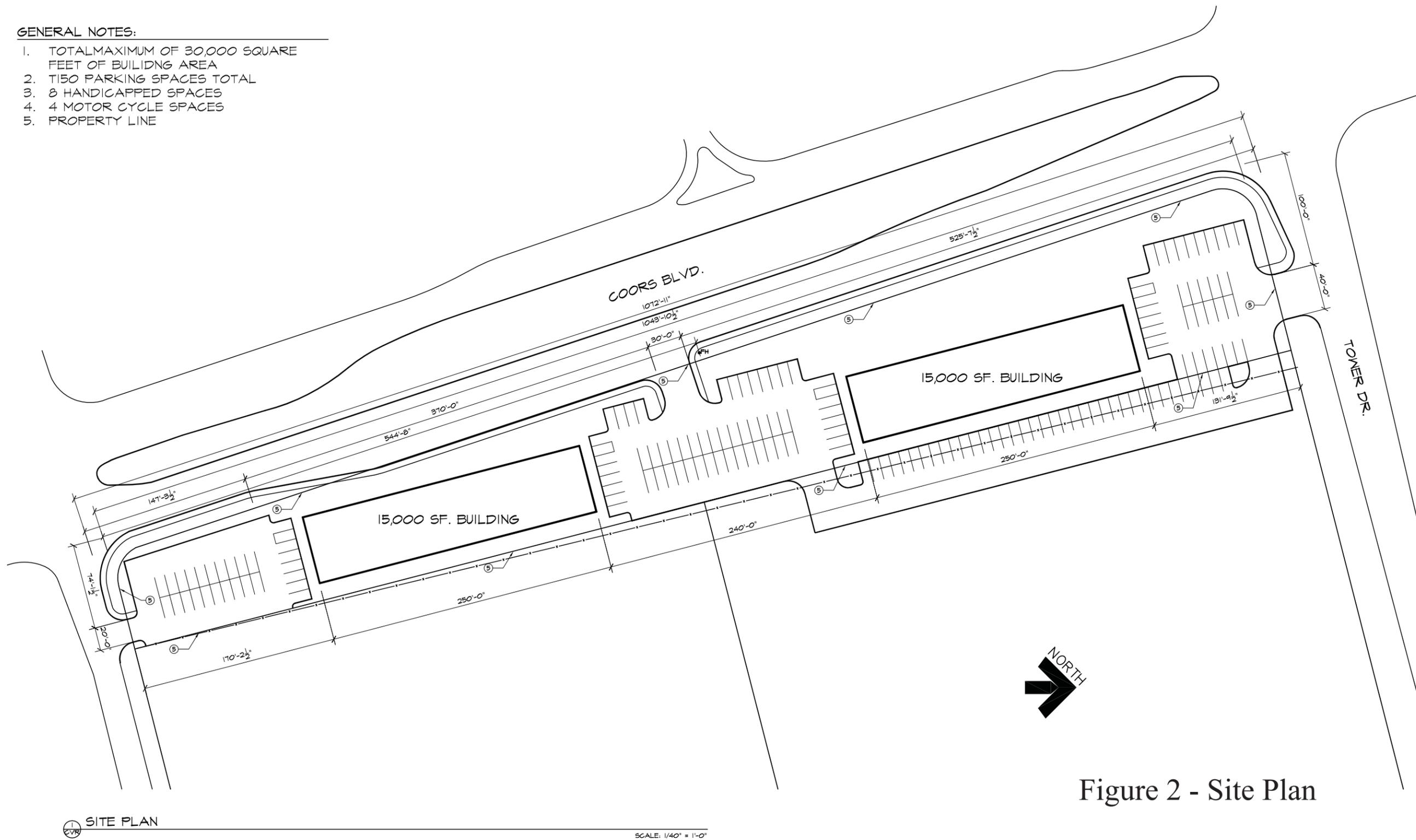
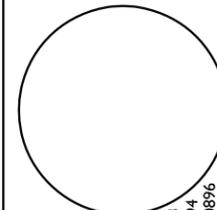


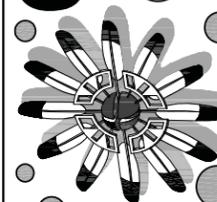
Figure 2 - Site Plan

"Let's make it Fun"



**CORE** CUSTOM HOME DESIGN, LLC.

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ALBUQUERQUE, NM 87113  
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job no:	-
drawn:	CORE
checked:	UM
date:	OCT-28-2011

www.core-ltd.com

SAN YGNACIO PLAZA  
PRELIMINARY DESIGN  
TOWER DR. SW  
ALBUQUERQUE NM, 87121

COVER SHEET  
sheet no: **CVR**

SITE PLAN

SCALE: 1/40" = 1'-0"

## Area Land Use and Streets

The site is located in the southeast quadrant of Coors Boulevard and Tower Road. Though, there are no major developments in ½ mile radii circle of the site, there are many residential and commercial developments outside this ½ mile radii circle. Near the site, Bridge Boulevard is the closest arterial providing a Rio Grande river crossing. There are mostly residential developments east of the site between Coors Boulevard and Rio Grande, but many lots are yet to be developed. Comparatively, the west side of Coors is more densely developed with residential developments. Therefore, it is expected that more traffic from west of Coors Boulevard than the east of Coors Boulevard will access the proposed development. North and South of the site have similar residential development characteristics. However, further north of the proposed site significant commercial developments are near Coors Boulevard and Central Avenue. Therefore, it is expected that more traffic from south than north of the site will access the proposed site.

The following are the major roads that provide access to the proposed site:

1. **Coors Boulevard**, is a four lane north south major arterial. Coors Boulevard is a New Mexico DOT maintained facility and the road south of Bridge Boulevard is under jurisdiction of the Bernalillo County. There are two lanes in each direction separated by a 50 feet wide raised median. The posted speed limit on Coors is 45 miles per hour. There are no existing striped bicycle lanes in either direction near the site. Coors Boulevard forms the west boundary of the proposed development.
2. **Tower Road**, is a two lane minor arterial east of Coors Boulevard, and is a four lane roadway separated by a raised median west of Coors Boulevard. Tower Road is also under jurisdiction of the County. The posted speed limit on Tower Road near the site is 40 miles per hour. Tower Road forms the north boundary of the proposed development.
3. **San Ygnacio Road**, is a two lane local road under jurisdiction of the County. San Ygnacio is currently constructed only east of Coors Boulevard and connects to the Old Coors Drive further east. The posted speed limit on Sage Road near the site is 30 miles per hour. San Ygnacio Road forms the south boundary of the proposed development.
4. **Bridge Boulevard**, a major arterial is a two lane roadway and is also under jurisdiction of the County. The posted speed limit on Bridge Boulevard near the site is 40 miles per hour.
5. **Sage Road**, a minor arterial is a two lane roadway under jurisdiction of the County. The posted speed limit on Sage Road near the site is 35 miles per hour.

### **Future Plans for Tower Road and Bridge Boulevard Realignment**

It is our understanding that the Bernalillo County is currently planning for a planning level study to evaluate realignment of Tower Road and Bridge Boulevard west of Old Coors Drive. Currently, Bridge Boulevard runs diagonally west of Old Coors Drive and connects with Central Avenue east of 98<sup>th</sup> Avenue. The future plans are to develop Tower Road as a stronger connection between Coors Boulevard and 98<sup>th</sup> Street by realigning Bridge Boulevard with the Tower Road alignment. It is expected that in this scenario, Tower Road will carry additional traffic diverted from Bridge Boulevard. For the scope of this

study, this scenario was not evaluated as the realignment plans are not formal and would take more than three years to be in place.

## Site Access

Proposed development will have three (3) access driveways, one each on Tower Road (Driveway D1), San Ygnacio Road (Driveway D2), and Coors Boulevard (Driveway D3). All driveways will provide exclusively right-in and right-out access to the incoming and outgoing traffic. The driveway design and construction should incorporate elements which will better encourage that the driveways will be used for right-in and right-out access only and attempt to avoid queue backup from prohibited turning movements. As indicated on the site plan, driveway access on Tower Road is approximately 100 feet east of the face of the curb on Coors Boulevard, driveway access on San Ygnacio Road is approximately 70 feet east of face of the curb on Coors Boulevard, and driveway access on Coors Boulevard is approximately 530 feet north of the face of the curb on San Ygnacio Road. According to the Bernalillo County and NMDOT guidelines on driveway spacing from the nearest intersection, the driveway spacing is adequate.

## Study Intersections

**Figure 3** presents the lane configurations and traffic control for the study intersections. Both existing configurations and new improvements as part of the proposed development are shown. The study intersections for the proposed site are as follows:

1. Coors Boulevard and Bridge Boulevard
2. Coors Boulevard and Tower Road
3. Coors Boulevard and San Ygnacio Road
4. Coors Boulevard and Sage Road
5. Tower Road and Driveway D1
6. San Ygnacio Road and Driveway D2
7. Coors Boulevard and Driveway D3

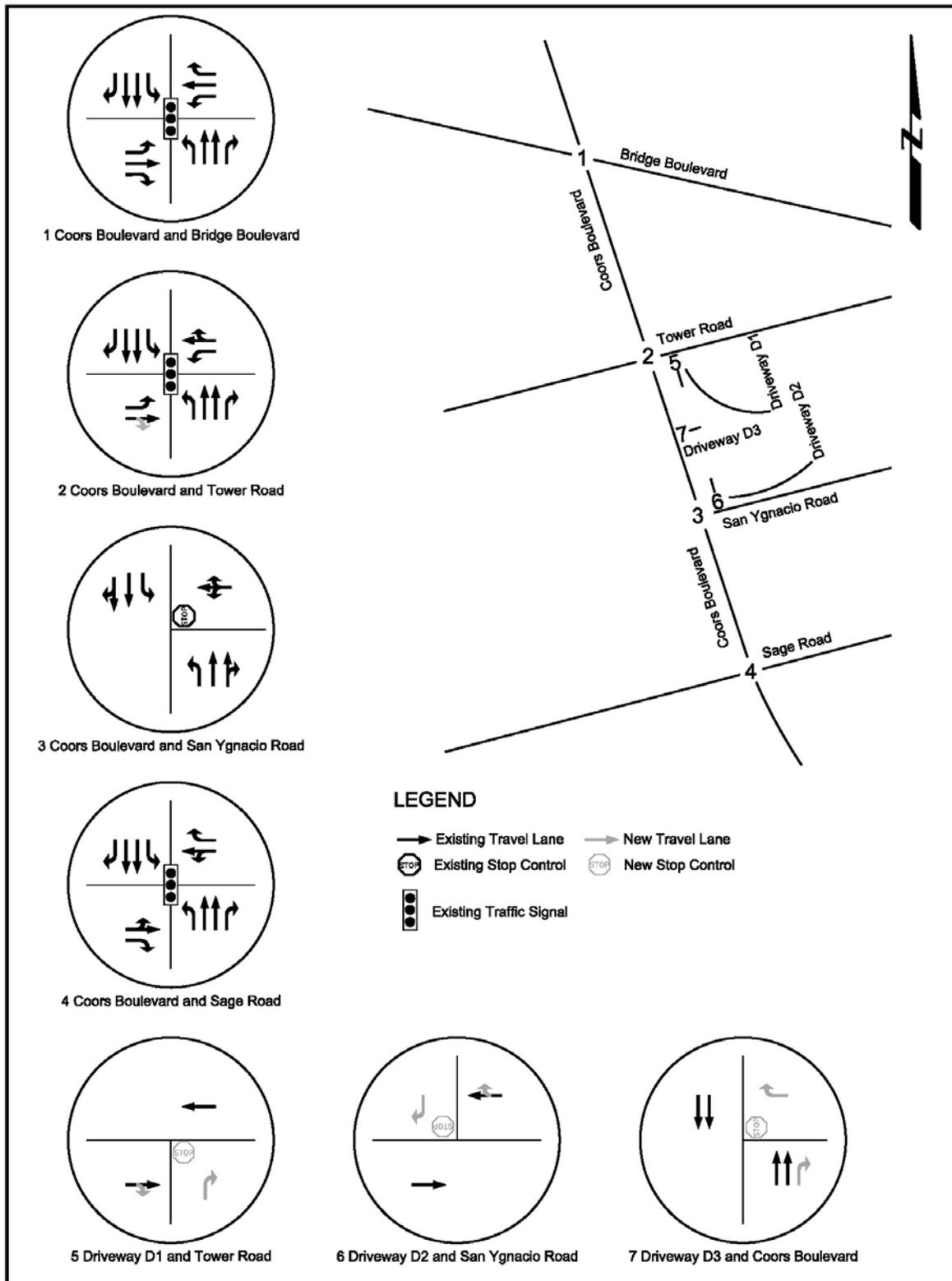


Figure 3. Lane Configuration and Intersection Control (Existing and New Improvements).

## Existing Traffic and Future Traffic Projections

### Existing Traffic in 2012

Intersection turning movement counts were collected for Coors/Bridge and Coors/Tower on February 2, 2012 (Thursday), and for Coors/San Ygnacio and Coors/Sage on February 7, 2012 (Tuesday). All counts were collected between 7:00 AM and 6:00 PM for 9 hours in total to capture peak hour conditions in the morning, mid-day, and evening on a typical weekday. Collected traffic volumes are provided in the Appendices. **Figure 4** presents the existing peak hour turning movement volumes for the study intersections.

### Trip Generation

The trip generation analysis was performed based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 8<sup>th</sup> Edition*. The proposed development is categorized into the ITE land use category 820, Various Shops (Shopping Center). The weighted average rate provided in the ITE manual was used to determine the site generated trips. **Table 1** presents the net site generated trips (gross trips generated minus pass-by trips). In an average weekday, the development in its full build out is expected to generate 1,290 trips, out of which, 31 trips are in the AM peak hour and 90 trips are in the PM peak hour. Truck traffic will be mostly delivery trucks, which tend to access the site outside of peak hours. Truck traffic on major streets is assumed 2% of the total traffic for this type of development. Per scoping meeting, held February 1, 2011, it was agreed between NMDOT and the County that a 20% Pass-By rate is acceptable.

**Table 1. Project Trip Generation**

Proposed Land Use	ITE Code	ITE Land Use Name	Gross Building Area	Unit	Trips Generated						
					Daily	A.M. Peak Hour			P.M. Peak Hour		
						In	Out	Total	In	Out	Total
Various Shops	820	Shopping Center	30,000	S.F.	1,290	19	12	31	54	59	113
Gross Trips Generated					1,290	19	12	31	54	59	113
Pass-by Trips (0% AM, 20% PM)					0	0	0	0	11	12	23
<b>Net of Pass-By Trips Generated</b>					<b>1,290</b>	<b>19</b>	<b>12</b>	<b>31</b>	<b>43</b>	<b>47</b>	<b>90</b>

### Trip Distribution and Assignment

The distribution of San Ygnacio site trips was based on surrounding residential and commercial developments discussed earlier in the section on 'Area Land Use and Streets'. The traffic from residential developments located west of Coors Boulevard is expected to access the site using Bridge Boulevard, Tower Road, and Sage Road. It is determined that 55% of site trips will be generated from the west of Coors Boulevard. On the other hand, 25% of the site trips are expected from the east side of Coors Boulevard. Both north of Bridge Boulevard and south of Sage Road developments are expected to

generate each 10% of site trips. Site generated trips are assigned on the study network according to the determined trip distribution percentages and existing traffic movement patterns in the study network. **Figure 5** presents trip distribution percentages and assigned project generated trips on the study intersections. Pass-by trips assignment on the study network is provided in the Appendices.

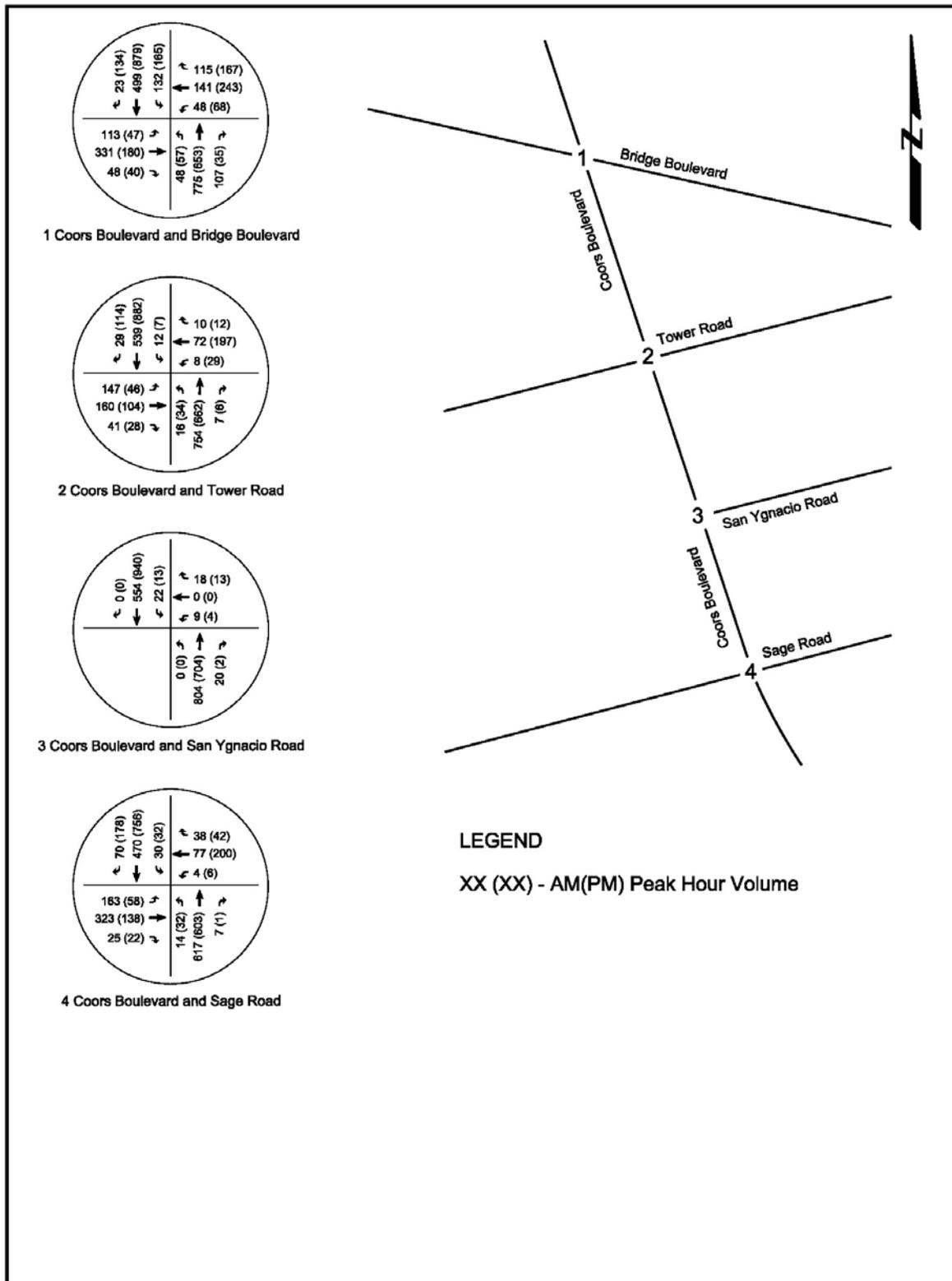


Figure 4. Existing Traffic in 2012.

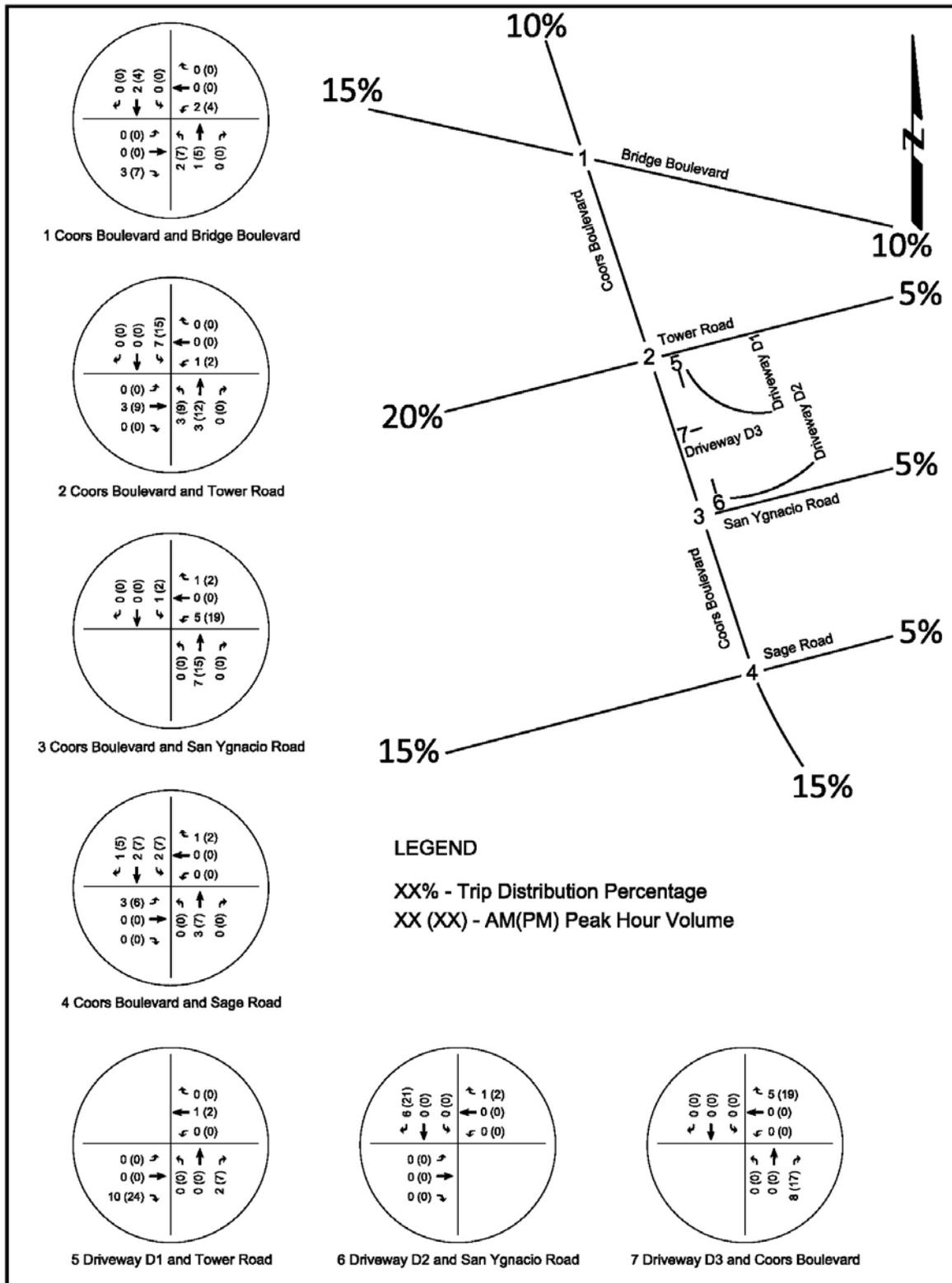


Figure 5. Trip Distribution and Project Generated Trips in 2013.

## Traffic Projections for Opening Year 2013

Existing traffic shown in **Figure 4** was then grown by the annual traffic growth expected in the study network for a one year duration. *Traffic Flows for the Greater Albuquerque Area*, developed by the Mid-Region Council of Governments (MRCOG), was used to determine the annual growth rate. **Table 2** shows the historical annual traffic growth in the four years between 2007 and 2010. It can be seen that traffic has mostly not grown and has been on a decline in recent years. Thus, it is estimated that a 1% annual growth applied to collected turning movements in 2012 will provide a conservative background traffic estimate for the opening year 2013.

**Table 2. Average Weekday Traffic Historical Growth and Estimated Growth Between 2012 and 2013**

Study Road	Average Weekday Traffic				Annual Growth %			
	2007	2008	2009	2010	Annual growth % (2007-2008)	Annual growth % (2008-2009)	Annual growth % (2009-2010)	Estimated Annual growth % (2012-2013)
Coors Boulevard	24,200	24,300	19,800	19,500	0.4%	-18.5%	-1.5%	1.0%
Bridge Boulevard	8,400	7,700	7,700	7,700	-8.3%	0.0%	0.0%	1.0%
Tower Road	4,200	4,300	5,000	4,900	2.4%	16.3%	-2.0%	1.0%
Sage Road	5,000	6,100	6,100	6,000	22.0%	0.0%	-1.6%	1.0%

**Figure 6** presents the opening year without proposed development traffic demand (background) on the study intersections after applying 1% annual growth to the existing traffic in 2012.

Site generated traffic presented in the **Figure 5** was then added to the opening year background traffic demands without the proposed development to determine the background plus site trip demands. **Figure 7** presents turning movement volumes on the study intersection in the opening year, 2013, with the proposed development.

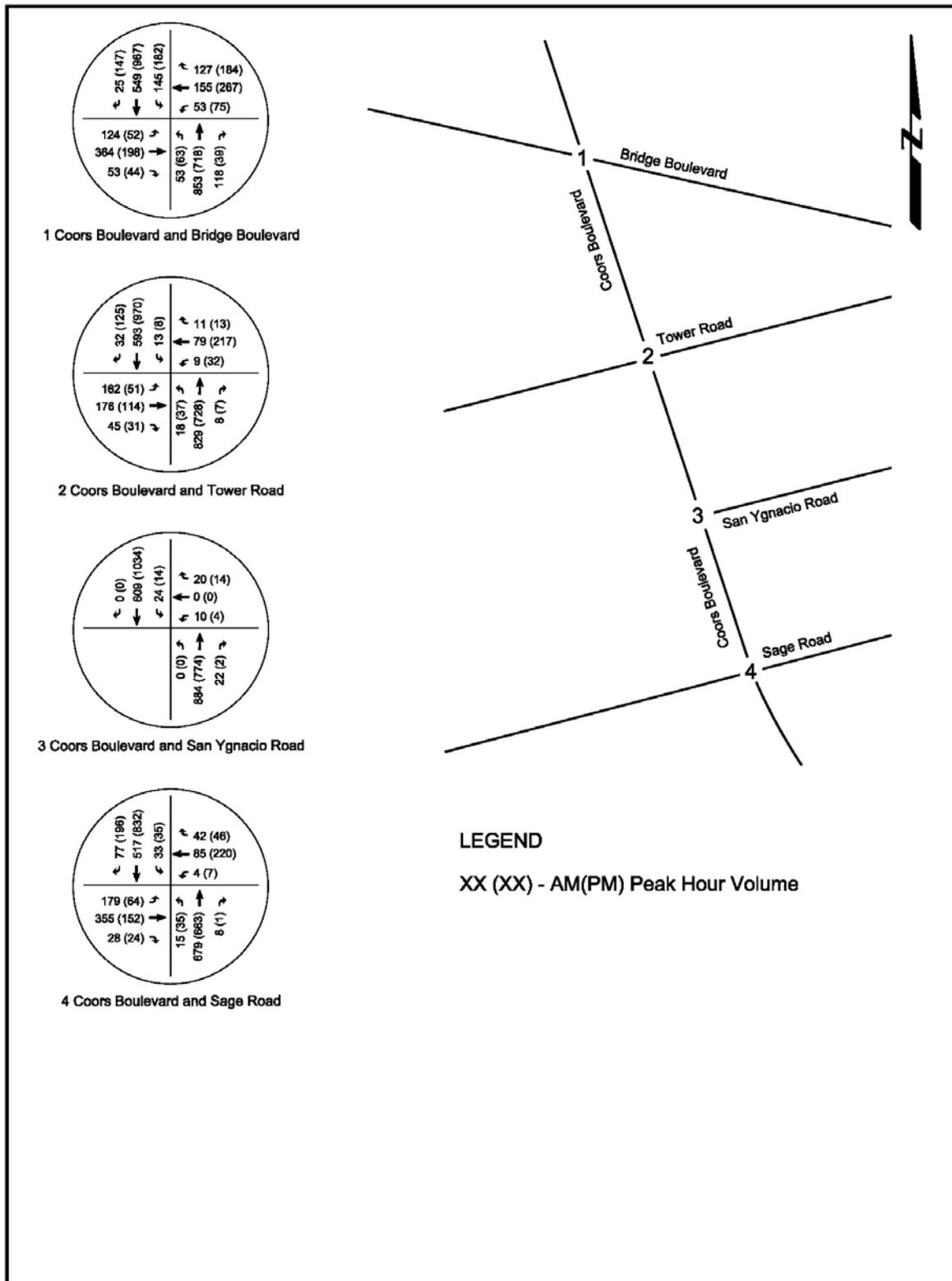


Figure 6. Opening Year (2013) Traffic Without the Proposed Development.

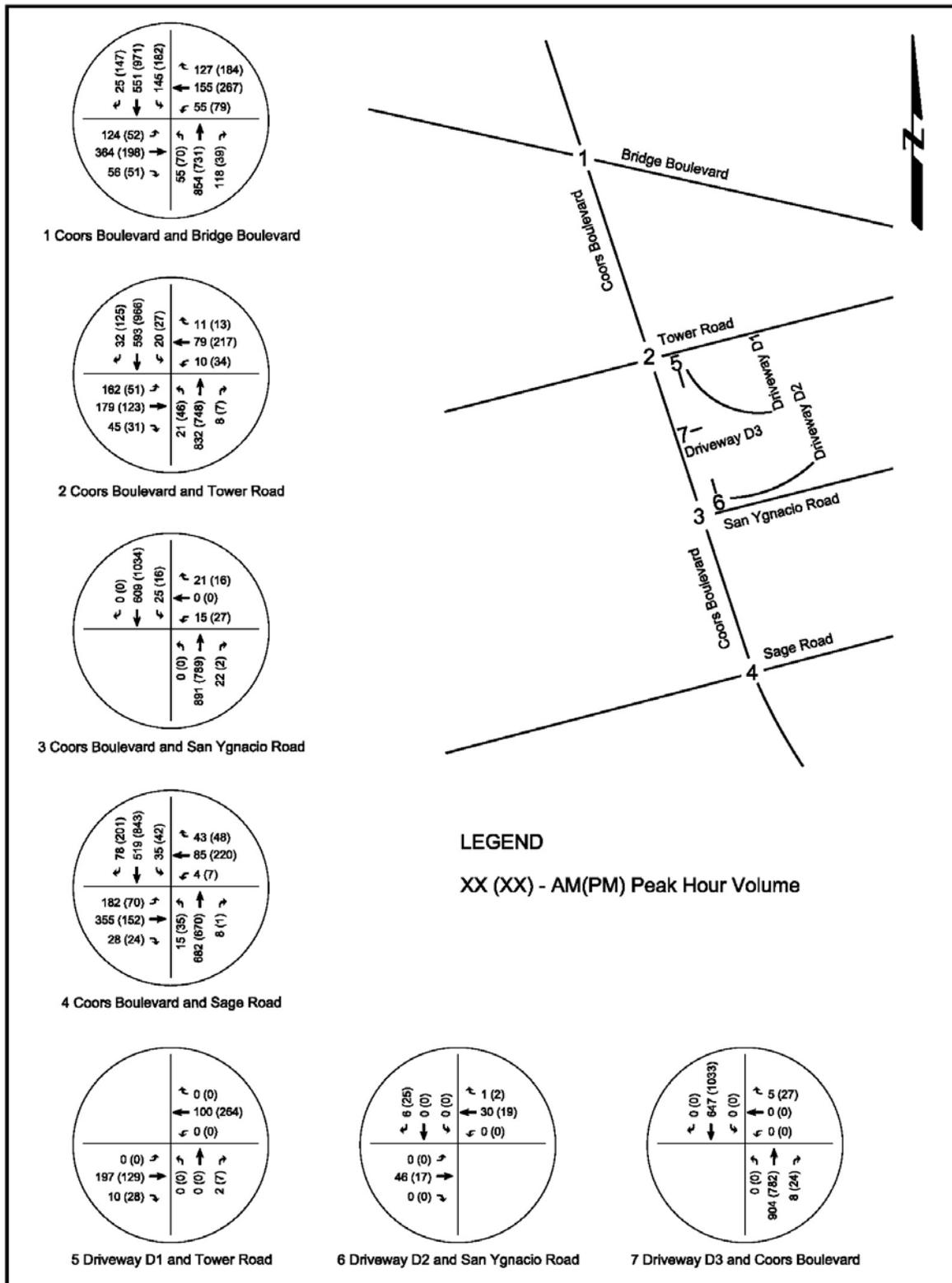


Figure 7. Opening Year (2013) Traffic With the Proposed Development.

## Operational and Safety Analysis

### Intersection Capacity and LOS

Intersection capacity and Level of Service (LOS) analysis was conducted using procedures outlined in the *Highway Capacity Manual*. Synchro traffic software was used to perform the analysis and detailed results are included in the Appendices. The LOS analysis for Existing Year (2012) scenario was performed using the signal timings provided by the Bernalillo County and the City of Albuquerque. For Opening Year (2013) Without Proposed Development the cycle lengths and the green splits were optimized for each intersection. However, the same optimized signal timing scheme was used to analyze the With Proposed Development scenario. This approach provides a fair comparison of the impact of the site generated traffic on the study intersections.

**Table 3** presents the LOS value for AM and PM peak hours for the study intersections under three scenarios. LOS value for individual turning movements is provided to compare the improvements in traffic operations between Existing (2012) and Opening Year (2013) that can result from optimization of signal timings. **Table 3** also summarizes the intersection average delay and LOS value for both signalized and unsignalized intersections in the study network.

According to the *State Access Management Manual (page 51)*, the minimum acceptable LOS for signalized or unsignalized intersections on arterials is D. LOS analysis for Existing Year (2012) scenario shows that all of the intersections, except Coors and Sage during AM peak hour, are experiencing acceptable traffic operations and LOS equal to or better than D. All of the intersections and individual turning movements are expected to have a LOS equal to or better than D during Opening Year (2013). The existing year analysis shows LOS F for the westbound left turn movements on Coors and Bridge intersection. It is recommended that both the eastbound and westbound left turn movements at Coors and Bridge be converted to protected + permitted phase from the existing permitted phase to reduce delay for left turn traffic.

It should be noted that signal timings were optimized for the Opening Year scenarios. Hence, for various turning movements, the LOS value improved when compared to Existing Year scenario values. In addition, no significant increase in delay or reduction in Level of Service is anticipated between Without and With Proposed Development scenarios. Detailed HCM reports from Synchro software are included in the Appendices.

No significant changes in average delay or LOS are found in the **Table 3** between with and without proposed development scenarios for the opening year (2013) projected traffic demand. Thus, the proposed development is not expected to adversely impact the traffic operations on the study intersections.

**Table 3. Average Delay and Level of Service**

Study Intersection	Scenario	Turning Movement LOS - AM(PM)												Intersection LOS			
														AM		PM	
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Delay <sup>1</sup>	LOS <sup>2</sup>	Delay <sup>1</sup>	LOS <sup>2</sup>
Coors and Bridge	Existing (2012)	D(D)	D(D)	D(E)	F(D)	D(E)	D(E)	B(B)	B(B)	B(B)	B(A)	B(B)	B(B)	29	C	27	C
	Opening Year (2013) Without Proposed Development	C(D)	D(D)	D(D)	D(C)	D(D)	D(D)	B(B)	C(C)	C(B)	C(B)	C(C)	B(B)	33	C	28	C
	Opening Year (2013) With Proposed Development	C(D)	D(D)	D(D)	D(C)	D(D)	D(D)	B(B)	C(C)	C(B)	C(B)	C(C)	B(B)	33	C	28	C
Coors and Tower	Existing (2012)	C(C)	C(C)	C(C)	C(C)	C(C)	C(C)	A(A)	B(B)	B(A)	A(B)	B(B)	B(B)	18	B	18	B
	Opening Year (2013) Without Proposed Development	D(D)	C(C)	C(C)	C(C)	C(D)	C(D)	A(A)	B(B)	B(A)	B(A)	B(B)	B(B)	19	B	20	C
	Opening Year (2013) With Proposed Development	D(D)	C(C)	C(C)	C(C)	C(D)	C(D)	B(B)	B(B)	B(B)	B(A)	B(B)	B(B)	20	B	21	C
Coors and San Ygnacio <sup>3</sup>	Existing (2012)	-	-	-	C(B)	-	C(B)	-	A(A)	A(A)	A(A)	A(A)	-	1	A	1	A
	Opening Year (2013) Without Proposed Development	-	-	-	C(B)	-	C(B)	-	A(A)	A(A)	A(A)	A(A)	-	1	A	1	A
	Opening Year (2013) With Proposed Development	-	-	-	C(C)	-	C(C)	-	A(A)	A(A)	A(A)	A(A)	-	1	A	1	A
Coors and Sage	Existing (2012)	F(D)	F(D)	C(C)	C(D)	C(D)	C(C)	B(A)	C(B)	B(B)	B(A)	B(B)	B(B)	63	E	20	C
	Opening Year (2013) Without Proposed Development	D(C)	D(C)	B(B)	B(C)	B(C)	B(B)	C(B)	D(B)	C(B)	C(B)	C(B)	C(B)	35	D	18	B
	Opening Year (2013) With Proposed Development	D(C)	D(C)	B(B)	B(C)	B(C)	B(B)	C(B)	D(B)	C(B)	C(B)	C(B)	C(B)	36	D	18	B
Tower and Driveway D1 <sup>3</sup>	Existing (2012)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Opening Year (2013) Without Proposed Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Opening Year (2013) With Proposed Development	-	A(A)	A(A)	-	A(A)	-	-	-	A(A)	-	-	-	1	A	1	A
San Ygnacio and Driveway D2 <sup>3</sup>	Existing (2012)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Opening Year (2013) Without Proposed Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Opening Year (2013) With Proposed Development	-	A(A)	-	-	A(A)	A(A)	-	-	-	-	-	A(A)	1	A	3	A
Coors and Driveway D3 <sup>3</sup>	Existing (2012)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Opening Year (2013) Without Proposed Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Opening Year (2013) With Proposed Development	-	-	-	-	-	B(B)	-	A(A)	A(A)	-	A(A)	-	1	A	1	A

<sup>1</sup>Average delay in seconds per vehicle.

<sup>2</sup>LOS stands for Level of Service.

<sup>3</sup>Average delay and LOS for highest delay movement is reported in the case of unsignalized intersections.

- indicates not applicable values.

## Queue Storage and Auxiliary Lane Analyses

The auxiliary lanes in the study network were evaluated for existing and needed storage length in the opening year with the proposed development. It should be noted that only those auxiliary lanes are summarized here, which are going to experience additional trips generated by the proposed development. **Table 4** presents the identified auxiliary lanes, calculated storage length from Synchro traffic analysis, and existing storage length available. In almost all cases, except as noted in the **Table 4**, existing storage length is sufficient to accommodate traffic growth. Moreover, storage length requirements between opening year (2013) scenarios of with and without proposed development are similar. The following findings are noted:

1. Access connection depth (driveway throat length) for all the three site access driveways is recommended to be 30 feet as per the *State Access Management Manual*.
2. Driveway D3 on Coors Boulevard is recommended to have 270 feet of deceleration length and 100 feet of taper length (8:1 taper) providing a total of 370 feet of deceleration distance. The construction plans for the right turn deceleration lane on Coors Boulevard will be coordinated with the NMDOT. Right of Way will be provided for the deceleration lane proposed as part of this project.

## Traffic Signal Warrant Evaluations

Peak hour warrant analysis was performed for three site driveways using the traffic signal warrants outlined in the *Manual on Uniform Traffic Control Devices, 2009 Edition*. None of the three site driveways meet the threshold of 100 vehicles on minor street approach in any one hour according to the traffic projections presented in the **Figure 7**. Therefore, it is not recommended at this time to provide traffic signal control at any of three site driveways. Even if the site driveways were found to satisfy MUTCD signal warrants in the future, they are all closely spaced to current adjacent signalized intersections and would not satisfy NMDOT signal spacing standards.

**Table 4. Storage Length Recommendations for Auxiliary Lanes in the Study Network**

Study Intersection	Traffic Movement	Calculated Storage Length (feet)		Existing Storage Length	Storage Length Recommendations
		Opening Year (2013) Without Proposed Development <sup>1</sup>	Opening Year (2013) With Proposed Development <sup>1</sup>		
Coors and Bridge	EBR	50	50	280	Same as existing
	WBL	100	100	110	Same as existing
	NBL	50	50	240	Same as existing
Coors and Tower	WBL	50	50	100	Same as existing
	NBL	25	50	250	Same as existing
	SBL	25	25	250	Same as existing
Coors and San Ygnacio	WBL	25	50	Shared Through Lane	Same as existing
	SBL	25	25	215	Same as existing
Coors and Sage	SBL	50	50	250	Same as existing
	SBR	50	50	300	Same as existing
Tower and Driveway D1	NBR	None	25	None	30 feet <sup>A</sup>
San Ygnacio and Driveway D2	SBR	None	25	None	30 feet <sup>A</sup>
Coors and Driveway D3	WBR	None	25	None	30 feet <sup>A</sup>
	NBR	None	0	None	270 feet <sup>B</sup>

<sup>1</sup> Storage length is calculated from 95th percentile queue obtained from Synchro analysis.

<sup>A</sup> Access connection depth (driveway storage for incoming and outgoing traffic) is recommended to be 30 feet for small strip shopping center in the State Access Management Manual (page 91).

<sup>B</sup> The State Access Management Manual recommends 370 feet and 150 feet in deceleration length and taper length respectively. However, considering an urban environment and restrictions in spacing, it is recommended that deceleration length include a shorter taper length in this case. Thus, it is recommended that 270 feet of deceleration length and 100 feet in taper length (8:1 taper) should be provided.

## Multimodal Access to the Proposed Development

### Pedestrian Access

There are no existing sidewalks near the project site except at the Tower Road and San Ygnacio Road curb returns. As part of this project, a 6 feet wide sidewalk per NMDOT standards will be provided on the project side of Coors Boulevard between Tower Road and San Ygnacio Road. Additionally, sidewalks per Bernalillo County standards will be provided on Tower Road and San Ygnacio Road for the project limits only. Sidewalks and pedestrian ramps will meet the American Disabilities Act (ADA) standards and guidelines. Right of Way for proposed sidewalk improvements will be provided as part of the project.

### Bike Access

According to the latest 2035 Metropolitan Transportation Plan (MTP) Long Range Bikeway System, bicycle lanes should be incorporated into the Coors Boulevard lane geometry. There is an existing 6-foot bike lane on Coors Boulevard along the Project frontage except along the northbound right turn lane on

Coors Boulevard and Tower Road intersection. As part of this project, a 5-foot bike lane at the intersection will be provided by reducing the right lane width to 10 feet and by realigning Coors Boulevard towards the median. At the intersection, appropriate taper and striping will be provided to transition and align the traveled lanes on Coors Boulevard north and south of Tower Road. The construction plans for the bike lane on Coors Boulevard will be coordinated with the NMDOT. Right of Way for proposed bike lane improvements will be provided as part of the project.

### **Transit Access**

ABQ Ride (City of Albuquerque’s Transit Department) operates bus route #155 on Coors Boulevard near the proposed development. The bus route #155 would primarily provide transit access to the proposed development. There are four bus stops located near the site on the far-side of Coors/Tower and Coors/San Ygnacio intersections. It is our understanding from our conversations with the ABQ Ride that no near-future plans are underway to change locations of these bus stops significantly. However, new bus shelters may be installed at these stops by ABQ Ride to improve the transit experience for users.

### **Crash Analysis**

Per the agreed TIA scope, crash data from 2008 to 2010 was collected for all study intersections. The data was reduced and crash characteristics are summarized in **Table 5**. As depicted in the table, the following key characteristics are observed:

1. The highest crash rates were observed at the Coors Boulevard/Bridge Boulevard (16.3 per year) and Coors Boulevard/Sage Boulevard (9.7 per year) intersections.
2. Generally, the most common type of crashes were where both vehicles were going in the same direction and one vehicle was stopped (22% overall) or angle crashes (15% overall). The top crash type was not specified in the data, but likely were either rear-end or sideswipe crashes due to the fact that both vehicles were in the same direction. It should be noted that specified rear-end, sideswipe, and crashes where both vehicles were heading the same direction occurred 13%, 9%, and 15%, respectively. This means that rear-end and sideswipe rates could be occurring at much greater rate than our data shows.
3. There were no fatalities on any of the study intersections within the study period, and approximately two-thirds of the crashes were property damage only.
4. The most common identified reason for crashes was “Driver Inattention” and “Following Too Close” with 31% and 20%.
5. Crashes tended to occur during the day and many of those crashes occurred during commuter peak times.

### **Prediction of Crash Rates using Highway Safety Manual**

Predicted crash rates were then calculated using the 2010 Highway Safety Manual. Specifically, predictive equations for urban or suburban intersections were utilized (Section 2.6.2 of the HSM). Additionally, crash modification factors were also considered by utilizing HSM Worksheet 2A. Final

predicted crash rates are indicated in **Table 6** with worksheets provided in Appendices. As shown, just about all observed crash rates are greater than predicted. Observed rates are especially greater at the Bridge Boulevard and Sage Road.

One thing to consider for high crash rates at Bridge Boulevard is the significant skew (60 degrees between Bridge and Coors) at the intersection. Though there is no crash modification factors for signalized skewed intersections, the HSM does indicate as much as a 70% increase in overall crash rates for 60 degree skewed unsignalized intersections with minor street stop-control. This statistic would not have any bearing on a signalized intersection except for the fact that Bridge Boulevard currently operates under permitted left-turn phasing only, in which case the skew could have significant impact on their operation. Coors also utilizes a protected-permitted phase. Therefore, crash rates could be significantly reduced by simply eliminating the permitted phases at this intersection. The HSM predicts that there is a 6% drop in crash rates between permissive and protected only phasing and a 5% drop in crash rates between protected/permissive and protected only phasing. However, it is likely that greater savings could be realized at a skewed intersection. It should be noted that with the re-routing of Bridge Boulevard into Tower Road, crash rates will likely significantly decrease with the major reduction in traffic demands.

At the Sage Road intersection, a closer review of the crashes indicates that most of the crashes occur on Coors Boulevard and involve crashes with vehicles heading in the same direction. It would be recommended for the county to further study the potential of going from protected/permitted left-turn phasing on Coors or additional study of the yellow and red change interval based on prevailing 85<sup>th</sup> percentile speeds.

As mentioned, Bridge Boulevard is planned to be realigned into Tower Road at Old Coors. Therefore, significant changes will be made to the Tower Road intersection including street widening, addition of raised medians, and additional auxiliary lanes. The realignment itself will likely increase crash rates due to the simple fact that traffic demands increase. However, the increased demands should be countered by typical widening improvements like raised medians, additional auxiliary lanes and potential protected left-turn phasing from Tower Road.

## Sight Distance Evaluation

Sight distance triangles were prepared for the three site driveways to allow the drivers to perceive the presence of potentially conflicting vehicles and yield as required. Sight distance triangles were prepared in accordance with the procedures outlined in the *State Access Management Manual* and the *AASHTO Green Book*. At a site driveway, the driver's eye of the outgoing vehicle turning right is assumed 15 feet back from the edge of the traveled way and 8 feet west of the face of curb of the driveway. The stopping distance as per the posted speed limit were used from the Exhibit 9-57 of the Green Book. The sight distance triangles for each access driveway are included in the Appendices.

**Table 5. Crash Pattern Analysis for Study Intersections**

Coors Boulevard intersection with		Bridge Blvd	Tower Road	San Ygnacio Road	Sage Road
<b>Total Crashes</b>		<b>49</b>	<b>15</b>	<b>3</b>	<b>29</b>
	2008	21	6	2	14
	2009	14	5	1	7
	2010	14	4	0	8
by Crash Type	Rear-End	4	1		7
	Angle	8	3	2	4
	Sideswipe	6	1		2
	Sideswipe Opposite Dir	1			
	Fixed Object				
	Overturn	1			
	Pedestrian	1			
	Both Straight Same Direction	6	1	1	6
	One Stopped Same Direction	11	7		3
	Both Straight Oppos. Direction	2			1
	Right Turn Opposite	1			
	Both Right Turn Same Direction	2			2
	Left Turn Opposite	3	1		1
	Both Left Turn Same Direction	1			2
	One Stopped in Traffic				1
	Other	1			
	Vehicle Backing Same Direction		1		
	Back from Driveway	1			
		<i>% One Stopped Same Direction</i>	<i>22%</i>	<i>47%</i>	<i>0%</i>
	<i>% Angle</i>	<i>16%</i>	<i>20%</i>	<i>67%</i>	<i>14%</i>
by Severity	PDO	28	14	2	22
	Injury	21	1	1	7
	Fatality				
		<i>% Injury</i>	<i>43%</i>	<i>7%</i>	<i>33%</i>

**Table 5. Crash Pattern Analysis for Study Intersections (Continued)**

Coors Boulevard intersection with		Bridge Blvd	Tower Road	San Ygnacio Road	Sage Road
by Time of Day	Day	39	9	3	22
	Night	8	4		5
	Dawn/Dusk	1	2		2
	Raining	1			
	AM / PM Peak Periods <sup>^</sup>	23	8		12
	<i>% during peak periods</i>	<i>47%</i>	<i>53%</i>	<i>0%</i>	<i>41%</i>
by Cause	Alcohol Involved	1			1
	Failure to Yield	5		1	3
	Excessive Speed	6	2	1	2
	Following Too Close	14	2		3
	Improper Lane Change	1			
	Ran Red Light	2	1		3
	Driver Inattention	12	6	1	11
	Avoid other Vehicle	1	1		
	Improper Backing	1			
	Improper Overtaking	1	1		
	Improper Turn				2
	Other Improper Driving				1
	Went Left of Center				1
	Unknown		1		2
	Other		1		
	<i>% Driver Inattention</i>	<i>24%</i>	<i>40%</i>	<i>33%</i>	<i>38%</i>
<i>% Following Too Close</i>	<i>29%</i>	<i>13%</i>	<i>0%</i>	<i>10%</i>	

<sup>^</sup> peak periods considered to be 6:30 AM to 8:30 AM and from 3:30 PM to 5:30 PM, as described by NMDOT HSIP application

**Table 6. Existing and Predicted Crashes using the Highway Safety Manual**

Coord Boulevard Intersection with		Bridge Blvd	Tower Road	San Ygnacio Road	Sage Road
<b>Total Crashes</b>		<b>49</b>	<b>15</b>	<b>3</b>	<b>29</b>
2008	Existing Crashes	21	6	2	14
	Predicted Crashes	3.8	3.3	0.5	3.3
	<b>Difference</b>	<b>17.2</b>	<b>2.7</b>	<b>1.5</b>	<b>10.7</b>
2009	Existing Crashes	14	5	1	7
	Predicted Crashes	3.1	2.8	0.6	2.7
	<b>Difference</b>	<b>10.9</b>	<b>2.2</b>	<b>0.4</b>	<b>4.3</b>
2010	Existing Crashes	14	4	0	8
	Predicted Crashes	3	2.7	0.7	2.7
	<b>Difference</b>	<b>11</b>	<b>1.3</b>	<b>-0.7</b>	<b>5.3</b>

**For Conclusions and recommendations see Executive Summary.**