UNM South Gibson Commercial District Traffic Impact Study

Initial Submittal

August 18, 2011

Prepared For:
UNM Real Estate Development Department
Lobo Development Corporation
2811 Campus Boulevard, NE
Albuquerque, NM 87131

Prepared By:

Bohannan Huston

Engineering
Spatial Data
Advanced Technologies

UNM SOUTH GIBSON COMMERCIAL DISTRICT
TRAFFIC IMPACT STUDY

INITIAL SUBMITTAL

AUGUST 18, 2011

PREPARED BY:

BOHANNAN HUSTON, INC.
7500 JEFFERSON ST NE
COURTYARD ONE
ALBUQUERQUE, NM 87109

PREPARED FOR:

UNM REAL ESTATE DEVELOPMENT DEPARTMENT
LOBO DEVELOPMENT CORPORATION
2811 CAMPUS BOULEVARD, NE
ALBUQUERQUE, NM 87131

Prepared By:

Eric J. Wrage 8/18/11

ERIC J. WRAGE, P.E., P.T.O.E **DATE**

UNM SOUTH GIBSON COMMERCIAL DISTRICT
TRAFFIC IMPACT STUDY
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I. INTRODUCTION

The University of New Mexico Real Estate Department (Lobo Development Corporation, solely owned by UNM) is charged with developing non-educational land owned by UNM in order to raise funds for educational services and provide campus amenities through appropriate commercial development. A vicinity map of the proposed UNM South Gibson Commercial District is shown in Figure 1. Detailed site determination has not been completed at this time, however an initial land use plan has been developed based on market analysis and development opportunities. The Preliminary lot layout is shown in Figure 2.

A. STUDY PURPOSE

The purpose of the traffic study is to determine the impacts of the proposed development on the existing street network and to recommend any mitigation measures that may be necessary to support the additional traffic generated by the proposed development.

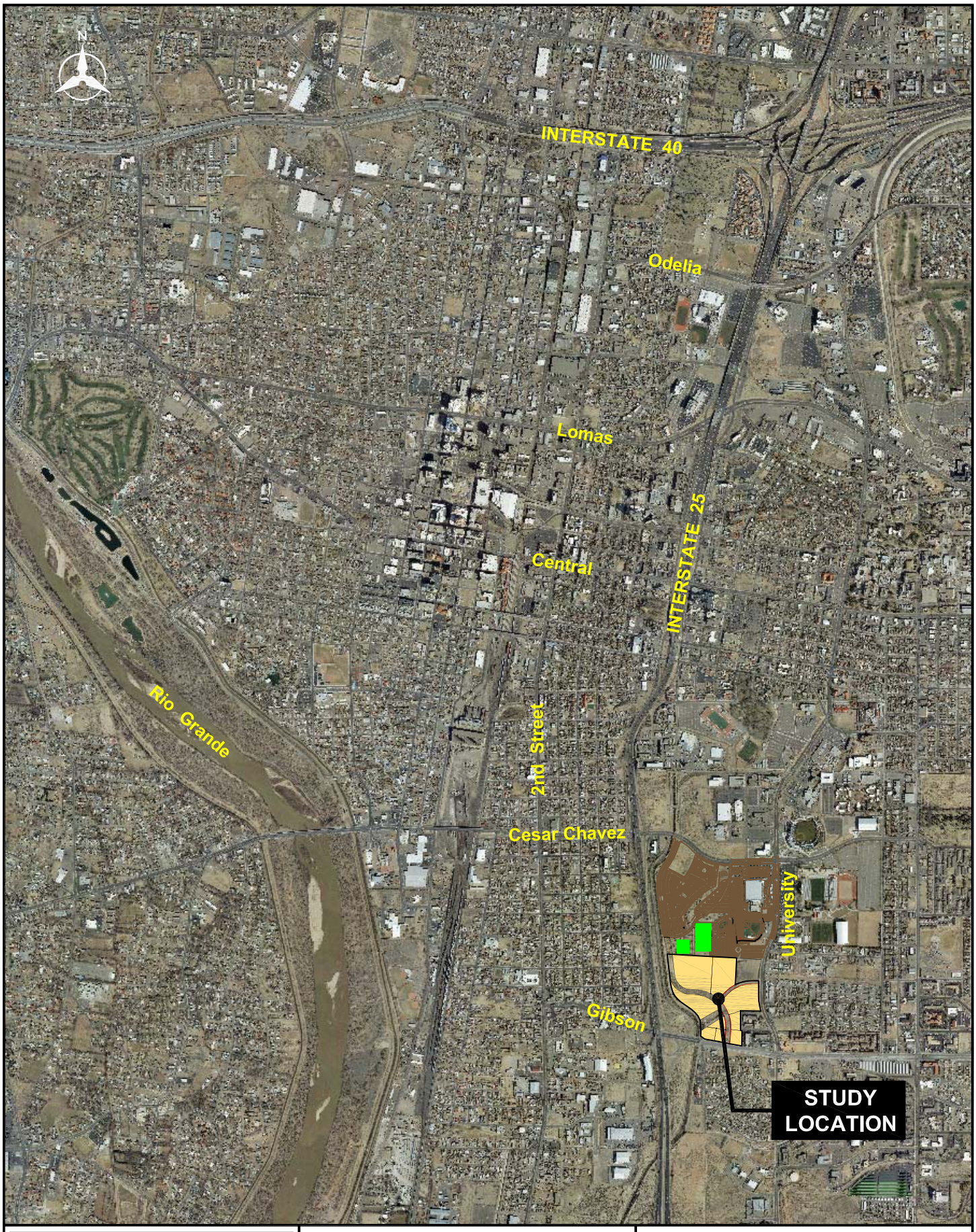
B. STUDY PROCEDURE

The study was conducted using established traffic engineering procedures. Discussions were held with the City of Albuquerque Planning Department and the NMDOT District Traffic Engineer to develop the scope of study. The study will include analysis of the following intersections:

- Gibson Boulevard and Mulberry Street (full access unsignalized)
- Gibson Boulevard and Future Entrance/West Road (full access)
- Gibson Boulevard and University Boulevard (signalized)
- University Boulevard and Future Entrance/East Road (full access unsignalized)
- Avenida Cesar Chavez and University Boulevard (signalized)
- Avenida Cesar Chavez and West Road/Langham Road (unsignalized)

The intersection evaluations include analysis for the AM and PM peak hours for the following traffic conditions:

- Existing (2011) traffic
- Future Completion Year without proposed development or future access points (2015 No Build)
- Future Completion Year (2015 Build) with full buildout of the site



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Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
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UNM Gibson Commercial District
Traffic Impact Analysis

FIGURE 1
VICINITYMAP

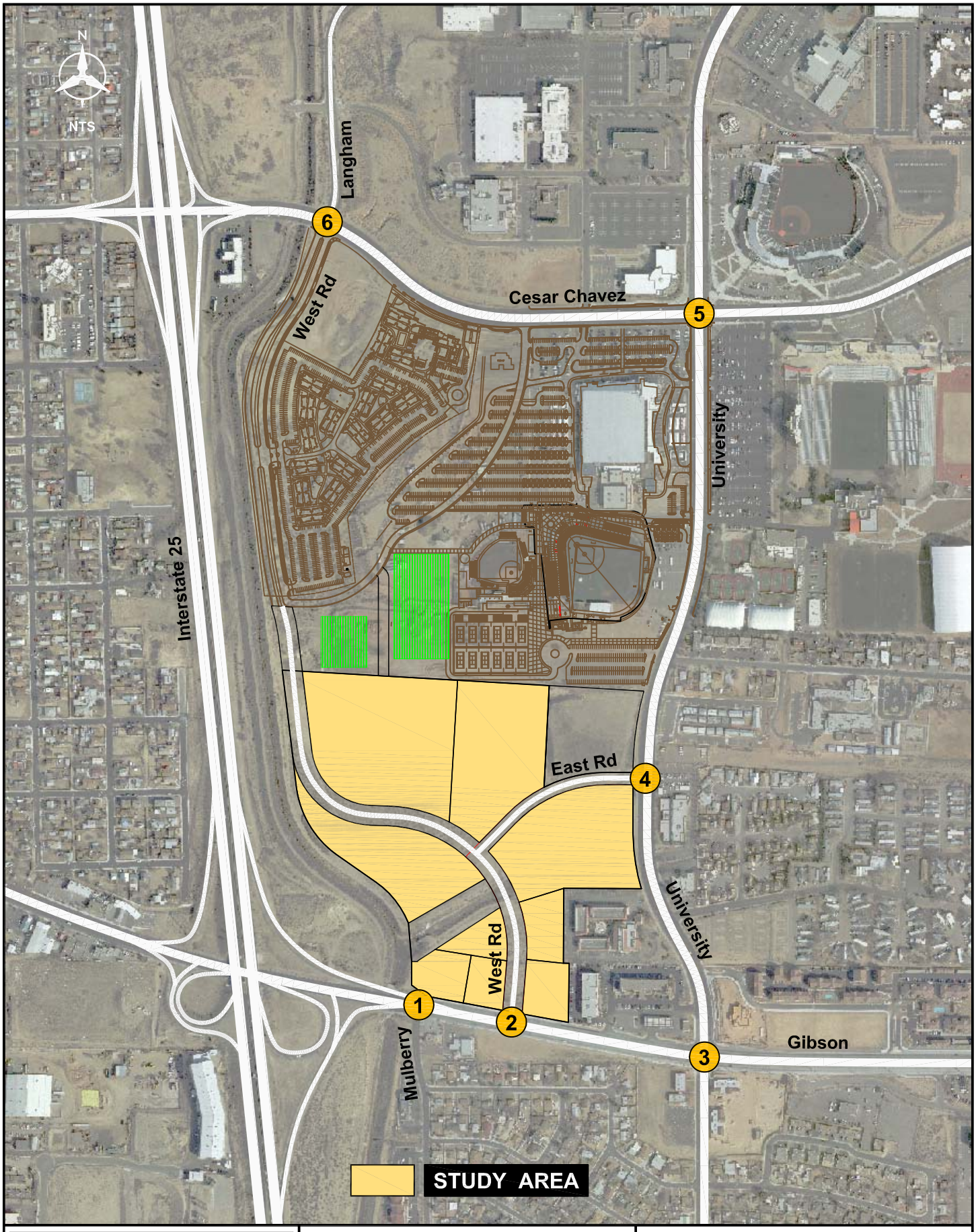

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FIGURE 2
Preliminary Site Layout

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II. EXISTING AREA CHARACTERISTICS

A. GENERAL AREA CHARACTERISTICS

The site is bordered by Gibson Boulevard on the south, the AMAFCA Channel on the west, University Boulevard on the east, and the UNM Athletic fields on the north. See Figure 2. North and east of the site are the campuses of UNM and CNM. Areas to the east are residential, commercial and hotel uses. South of the site is an area of residential development, offices, and the Albuquerque International Sunport. To the west is I-25, with additional residential development west of the interstate.

The site will primarily be served by I-25, Gibson Boulevard, University Boulevard and West Road via Avenida Cesar Chavez.

I-25 is an access controlled freeway with access to the site via the Gibson and Avenida Cesar Chavez ramp junctions. North of Gibson, the 2010 MRCOG Traffic Flow Map shows that I-25 carries 113,200 vehicles per day.

Gibson Boulevard is a six-lane urban principal arterial with a raised median along the site frontage. The 2010 Traffic Flow Map indicates that Gibson carries 28,600 vehicles per day across the site frontage. Traffic on Gibson during the peak hours is highly directional due to employment traffic at Kirtland Air Force Base and Sandia National Laboratory. In the AM Peak Hour 70% of the traffic is headed east, with approximately the same proportion headed west in the PM Peak Hour.

University Boulevard is a four-lane urban minor arterial, with a raised median. Left turn lanes are provided at select locations, including the future East Road entrance. The future East Road entrance also aligns with an existing driveway that serves the City of Albuquerque Housing Services offices. The 2010 Traffic Flow map indicates that University has 6,700 vehicles per day traveling north of Gibson.

Avenida Cesar Chavez is a six-lane urban minor arterial with raised median. A median opening provides full access to the West Road/Langham Street intersection. The 2010 Traffic Flow Map shows that Cesar Chavez carries 26,200 vehicles per day. Traffic on Cesar Chavez during the peak hours is also highly directional due to UNM and CNM student traffic. In the AM Peak Hour 70% of the traffic is headed east, with approximately 60% headed west in the PM Peak Hour.

West Road/Langham is a two-lane local street that serves CNM and the UNM Science and Technology Park to the north. Currently the south leg (West Road) will serve the new UNM Lobo Village student housing complex, but will be extended to Gibson to serve this commercial development. This intersection is not ideal for a traffic signal due to the

proximity of the Northbound I-25 ramp; however the level of traffic to be generated by this proposed development, in addition to future commercial development on UNM property to the northwest of this intersection, will likely drive the need for a traffic signal at this intersection in the future. At Gibson, previous MRCOG Metropolitan Transportation Board actions have provided for a full-access T-intersection midway between Mulberry Street and University Boulevard (MRCOG Resolution R-03-31, adopted January 22, 2004). Resolution R-03-31 foresaw a future signalized intersection at this location. This resolution also allows a right-in/right-out only driveway on the north side of Gibson aligned with Mulberry Street on the south. A copy of Resolution R-03-31 is included in Appendix A.

Mulberry Street is two-lane a local street that serves a residential development south of Gibson. It currently has full movement, unsignalized access to Gibson.

East Road will be a new full access intersection with University Boulevard that will serve the site. This intersection will align with the entrance to City of Albuquerque Housing Services.

B. EXISTING TRAFFIC VOLUMES

Traffic counts for the existing city intersections analyzed in the study area were collected by Mike Henderson Consulting June 28 and 29, 2011. The City of Albuquerque Housing Services driveway on University was counted by Bohannan Huston on July 12, 2011. Figure 3 is a summary of the existing peak hour traffic volumes, existing laneage, turning movements, and intersection levels of service. Traffic counts are included in Appendix B.

C. EXISTING LEVELS OF SERVICE

The 2000 Highway Capacity Manual (HCM) defines Level of Service (LOS) for signalized and un-signalized intersections as follows:

Table 1 – LOS Definitions

Level of Service	Signalized (sec/veh)	Definition	Un-Signalized (sec/veh)
A	<10	Most vehicles do not stop.	<10
B	>10 and <20	Some vehicles stop.	>10 and <15
C	>20 and <35	Significant numbers of vehicles stop.	>15 and <25
D	>35 and <55	Many vehicles stop.	>25 and <35
E	>55 and <80	Limit of acceptable delay.	>35 and <50
F	>80	Unacceptable delay.	>50

LOS D is generally considered acceptable in urban areas and is the City's design standard for major intersections.

Existing intersection traffic volumes were analyzed using intersection methodology from the *2000 Highway Capacity Manual* (HCM). Synchro version 7 was used to perform the level of service calculations. Individual intersection output is included in Appendix C. The signalized intersection results are summarized in Table 2.

The results indicate that both of the signalized intersections operate at an acceptable level of service under existing traffic conditions.

Table 2 – 2011 Existing Signalized Intersection Capacity Analysis Results

Signalized Intersections	2011 AM Peak			2011 PM Peak		
	Delay (sec.)	V/C	LOS	Delay (sec.)	V/C	LOS
Gibson & University	15.4	0.86	B	15.4	0.91	B
Cesar Chavez & University	13.3	0.61	B	15.8	0.71	B

* - some movements LOS E
** - some movements LOS F

The unsignalized intersection results are summarized in Table 3. The analysis shows that the minor street left movements at Mulberry & Gibson, and West Road/Langham & Cesar Chavez, have high delay. Mulberry is too close to the I-25 NB-to-EB off-ramp to be signalized. The West Road/Langham intersection does not meet the Peak Hour traffic signal warrant. The existing traffic entering or exiting the City of Albuquerque Housing Services driveway has low average delay.

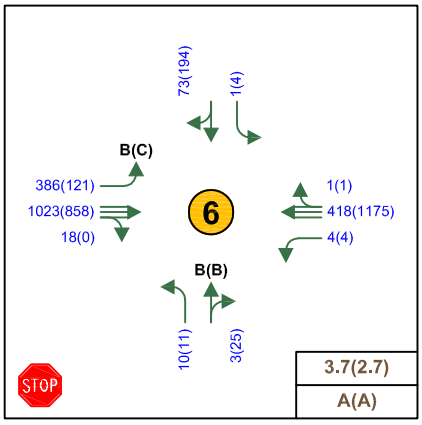
Table 3 – 2011 Existing Unsignalized Intersection Capacity Analysis Results

Un-signalized Intersections	2011 AM Peak				2011 PM Peak			
Movement	Delay (sec.)	v/c	Queue (ft.)*	LOS	Delay (sec.)	v/c	Queue (ft.)	LOS
Gibson & Mulberry								
WB Left	27.4	0.08	25	D	11.8	0.04	25	B
NB Left/Right	148.5	0.66	75	F	38.6	0.39	50	E
University & Future East Road								
WB Left/Right	10.6	0.01	0	B	10.1	0.03	25	B
SB Left	8.0	0.01	25	A	7.9	0.01	25	A
Cesar Chavez & Langham/West Rd								
EB Left	10.8	0.42	75	B	15.3	0.29	50	C
WB Left	11.3	0.01	25	B	10.3	0.01	25	B
NB Left	220	0.44	50	F	82.4	0.24	25	F
NB Through/Right	11.1	0.01	0	B	10.7	0.04	25	B
SB Left	50.8	0.01	25	F	43.3	0.05	25	E
SB Through/Right	9.7	0.10	25	A	16.2	0.42	75	C

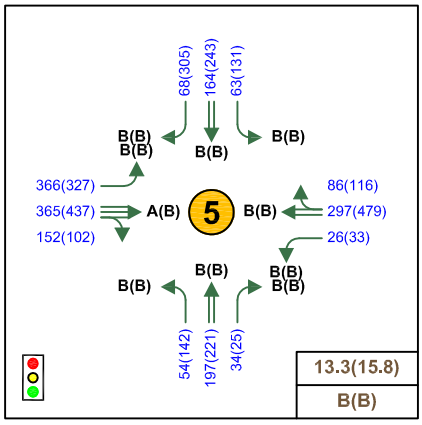
* - delay calculated with 2-stage maneuver at Gibson/Mulberry and Cesar Chavez & Langham/West Road
** - HCM queue rounded to next 25-foot increment

LEGEND

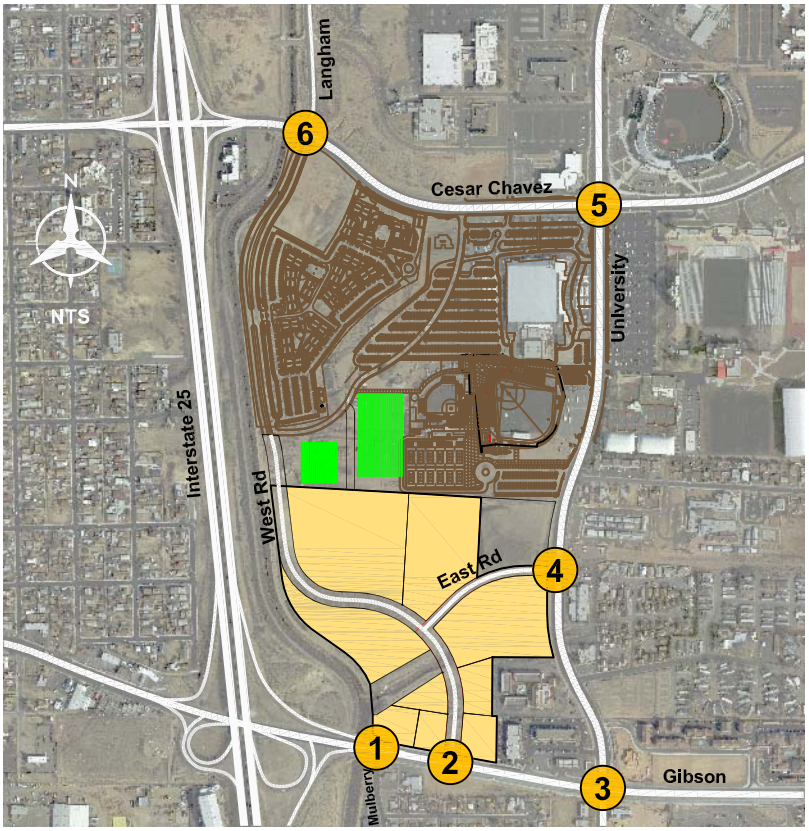
- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- X(X) AM(PM) Level of Service (LOS)

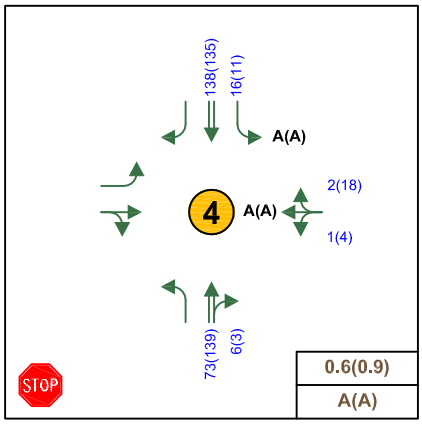


Cesar Chavez/Langham

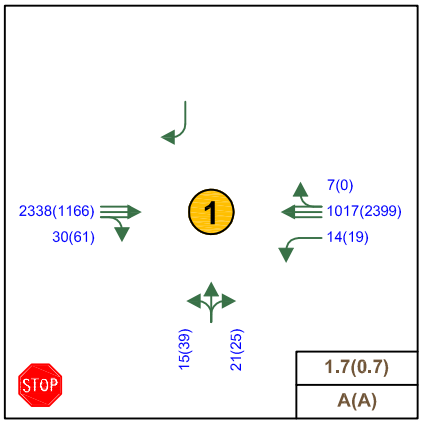


Cesar Chavez/University

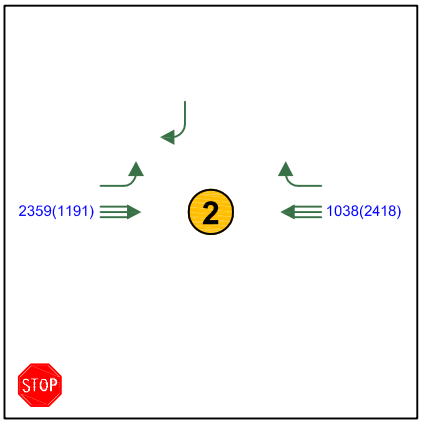




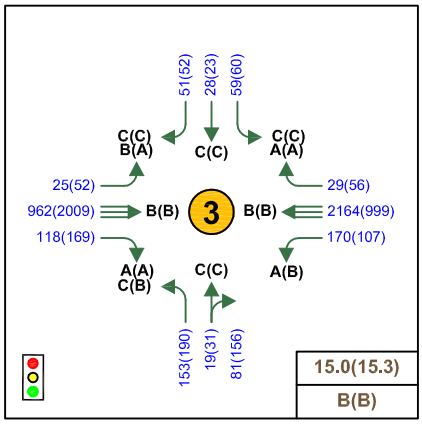
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

Bohannan Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
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FIGURE 3
2011 PEAK HOUR TRAFFIC VOLUMES - AM (PM)

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III. BACKGROUND TRAFFIC PROJECTIONS

A. 2015 NO-BUILD TRAFFIC PROJECTIONS

Background traffic was increased to represent 2015 levels without the future development. The 2006 – 2010 MRCOG Traffic Flow Maps were used to evaluate traffic growth in the vicinity of the site. Reported values for I-25, north and south of Gibson; Gibson, east and west of I-25; and University, north of Gibson, were used in the determination. Traffic growth on I-25 has been 1.8% – 2.1%, while traffic growth on Gibson and University has been flat to negative. A background growth rate of 1.4% a year was used. Spreadsheets and graphs showing the development of the growth rate are included in Appendix D.

Figure 4 on page 11 shows the No Build traffic volumes, number of lanes, and level of service.

The No Build analysis also assumes that the proposed development and future access points are not constructed.

B. 2015 NO-BUILD INTERSECTION CAPACITY ANALYSIS

The intersections were again analyzed using Synchro version 7. Synchro output is included in Appendix E. The signalized intersection results are summarized in Table 4.

The signalized intersections again operate at acceptable levels of service.

Table 4 – 2015 No Build Signalized Intersection Capacity Analysis Results

Signalized Intersections	2015 No Build AM Peak			2015 No Build PM Peak		
	Delay (sec.)	V/C	LOS	Delay (sec.)	V/C	LOS
Gibson & University	14.8	0.82	B	16.8	0.80	B*
Cesar Chavez & University	14.0	0.62	B	18.5	0.81	B

* - some movements LOS E
** - some movements LOS F

Table 5 is a summary of the unsignalized intersection No-Build results. As in the existing condition, both the Mulberry & Gibson, and West Road/Langham & Cesar Chavez intersections have LOS F for the minor street left turn movements. A Peak Hour Volume traffic signal warrant analysis was performed for the no build traffic volumes at West Road/Langham and is included in Appendix E. Mulberry was not evaluated due to the proximity to the I-25 NB-to-EB off ramp onto Gibson. A traffic signal at West Road/Langham is not warranted by volume, but the calculated total delay for the northbound

left turn is 11 vehicle hours, exceeding the warrant value of 4 hours of vehicle delay. It is important to note that this delay includes the two-stage gap maneuver.

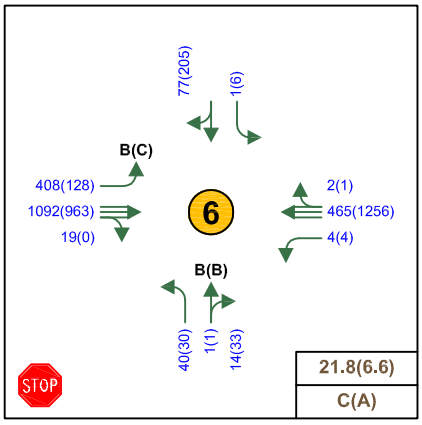
Table 5 – 2015 No Build Unsignalized Intersection Capacity Analysis Results

Un-signalized Intersections	2015 No Build AM Peak				2015 No Build PM Peak			
Movement	Delay (sec.)	v/c	Queue (ft.)*	LOS	Delay (sec.)	v/c	Queue (ft.)	LOS
Gibson & Mulberry								
WB Left	31.1	0.10	25	D	12.3	0.04	25	B
NB Left/Right	225	0.86	100	F	45.4	0.44	50	E
University & Future East Road								
WB Left/Right	10.8	0.01	0	B	10.2	0.03	25	B
SB Left	8.1	0.02	25	A	8.0	0.01	25	A
Cesar Chavez & Langham/West Rd								
EB Left	11.5	0.46	75	B	16.9	0.33	50	C
WB Left	11.8	0.01	25	B	10.9	0.01	25	B
NB Left	1,008	2.32	175	F	355	1.06	100	F
NB Through/Right	23.5	0.08	25	C	15.6	0.11	25	C
SB Left	65.3	0.2	25	F	52.5	0.09	25	F
SB Through/Right	9.9	0.11	25	A	17.7	0.46	75	C

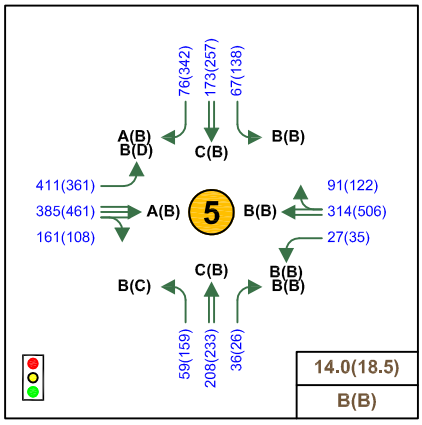
* - HCM queue rounded to next 25-foot increment

LEGEND

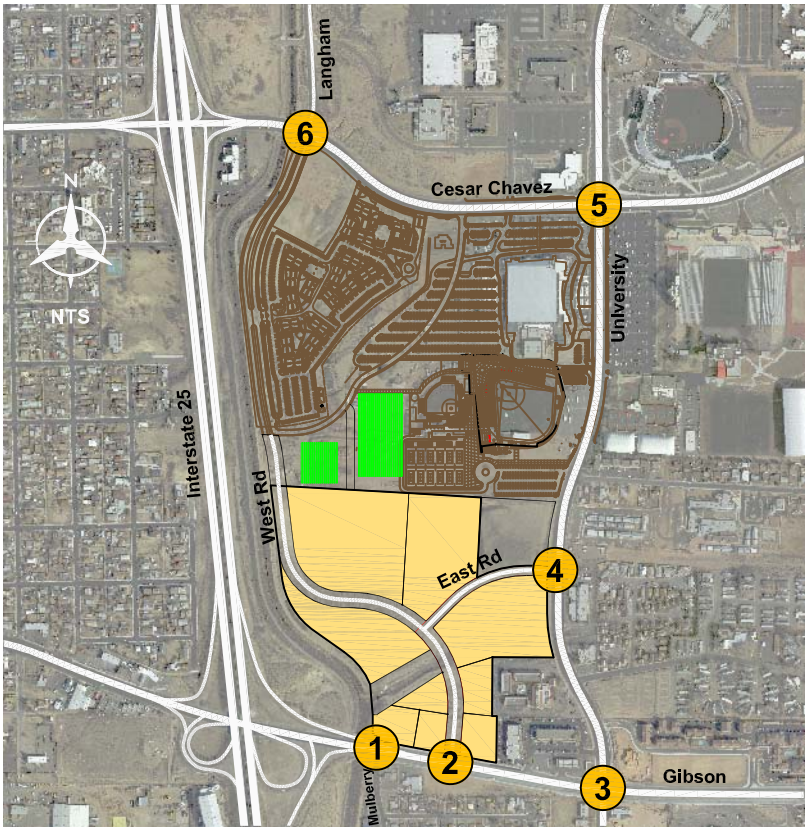
- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- X(X) AM(PM) Level of Service (LOS)

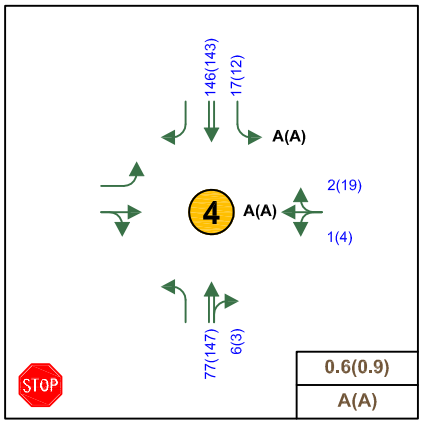


Cesar Chavez/Langham

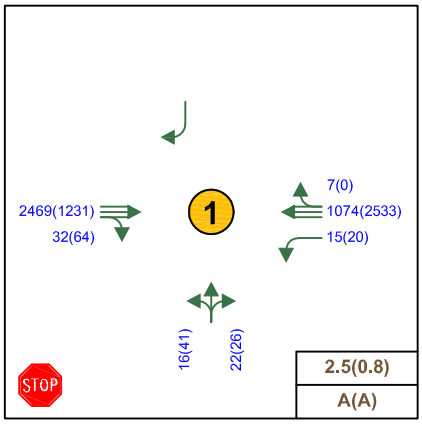


Cesar Chavez/University

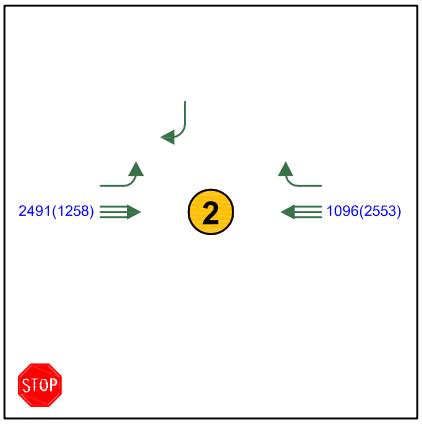




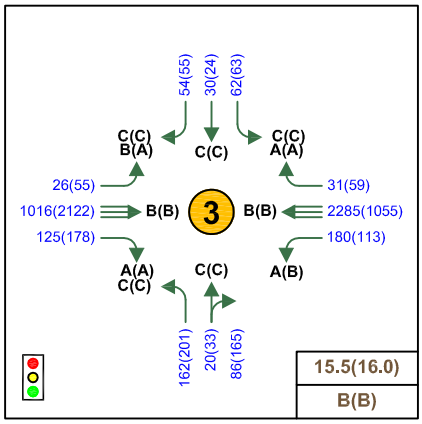
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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FIGURE 4
2015 NO BUILD PEAK HOUR TRAFFIC VOLUMES - AM (PM)

IV. PROPOSED SITE CHARACTERISTICS

A. PROPOSED DEVELOPMENT

The precise land uses for the site are still under development, although UNM Real Estate Department (Lobo Development) has identified anticipated or "target" uses for the parcels. The land uses used for this traffic study are 1) 90,000 square foot (sf) sporting goods superstore, 2) 75,000 sf supermarket, 3) 60,000 sf of specialty retail, 4) 75,000 of specialty retail, 5) 5,000 sf of specialty retail, 6) 6,000 sf of specialty retail, 7) 2,500 sf fast-food restaurant with drive-thru, 8) 2,500 sf service station with convenience mart, 9) a City of Albuquerque fire station, and 10) 6,000 sf high-turnover sit-down restaurant. Items 7) and 8) will be combined into one site and will be located at the right-in/right-out only driveway aligned with Mulberry on the west side of the site.

B. TRIP GENERATION

Generated trips are broken down into three types; 1) primary, 2) pass-by trips, and 3) diverted link. The *Trip Generation* report defines these trips as follows:

- **Primary Trips** - These trips are made for the specific purpose of visiting the generator. The stop at that generator is the primary reason for the trip. For example, a home to shopping to home combination of trips is a primary trip set.
- **Pass-by Trips** - These trips are made as intermediate stops on the way from an origin to a primary trip generation. Pass-by trips are attracted from the traffic passing the site on an adjacent street that contains direct access to the generator site. These trips do not require a diversion from another roadway. For example, stopping at the store on the way home from work is an example of a pass-by trip. The supermarket was assumed to have 20% pass-by in the PM peak hour only. The fast-foot restaurant with drive-thru was assumed to have 30% pass-by in the AM and PM peak hours. The service station with convenience mart was assumed to have 35% pass-by in the AM and PM peak hours. The high turnover restaurant was assumed to have 15% pass-by in the PM peak hour only. All of these values do not exceed the averages for each land use as reported in the *Trip Generation Handbook*.
- **Diverted Linked Trips** - These trips are attracted from the traffic volume on the roadway within the vicinity of the generator, but which require a diversion from that roadway to another roadway to gain access to the site. The roadways could include streets or freeways adjacent to the generator, but without access to the generator.

For this study, the diverted link trips have been included in with the primary trips. All trips to the site were considered primary trips.

Trips generated by the proposed development are summarized as follows:

Table 6 – Trip Generation

Land Use	ITE Land Use Code	Size	24 Hour Two-Way Volume**	AM Peak Hour***		PM Peak Hour***	
				Enter	Exit	Enter	Exit
Sporting Goods Superstore	861	90 TGSF	-	-	-	131	148
Supermarket	850	75 TGFA	7,668	164	105	322	309
Pass-By – 20% PM						80	77
Specialty Retail Center	814	60 TGFA	2,604	-	-	73	93
Specialty Retail Center	814	75 TGFA	3,246	-	-	89	113
Specialty Retail Center	814	5 TGFA	222	-	-	6	8
Specialty Retail Center	814	6 TGFA	266	-	-	7	9
Fast Food with Drive-Thru	934	2.5 TGFA	1,240	44	42	31	29
Pass-By – 30% AM & PM				19	18	13	12
Service Station with Convenience Mart	946	2.5 TGFA	-	66	63	79	79
Pass-By – 35% AM & PM				35	34	42	42
Fire Station*		10.1 TGFA	100	10	10	10	10
High-Turnover (Sit-Down) Restaurant	932	6 TGFA	763	36	33	33	23
Pass-By – 15% PM						6	4
Total Generated Volume			**16,109**	**374**	**305**	**922**	**956**
Total Peak Hour Pass-By Trips				54	52	142	136
Internal Capture (assumes 15% in PM Peak only – excludes Fast-Food/Conv Mart on separate pad)						101	107
Total Peak Hour Volume Added to Adjacent Street				**320**	**253**	**680**	**713**
Total Driveway Volume (excludes internal capture)				**374**	**305**	**821**	**849**

TGFA – thousand gross floor area
- no data available in the Trip Generation Manual
* - Trip Generation Manual does not have Fire Station - estimated

C. TRIP DISTRIBUTION AND ASSIGNMENT

Three different trip distributions were developed for this project. One of the lots is anticipated to be "destination retail," meaning that it is expected to draw patrons from across the metropolitan area. The distribution for this parcel was developed using the entire metropolitan area as the travel shed. The other two distributions considered a 2-mile radius and is referred to as "community retail" in the following figures. The third distribution was developed for the fast-food restaurant/service station with convenience mart parcel which will be served primarily by right-in/right-out only access.

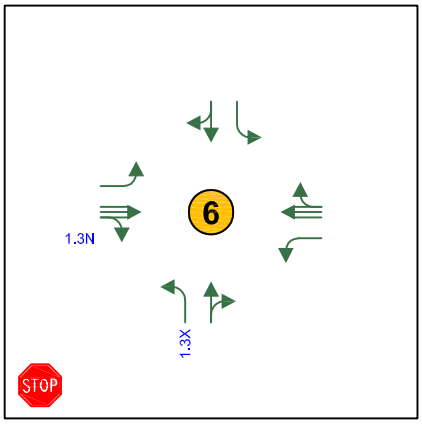
The destination retail trip distribution percentages are shown in Figure 5 on page 15. The destination retail trip assignment of the total project trips to the individual intersections is shown on Figure 6 on page 16.

The percentage trip distribution for the community retail trips are shown in Figure 7 on page 17, with the peak hour trips assigned to the individual intersection is shown in Figure 8 on page 18.

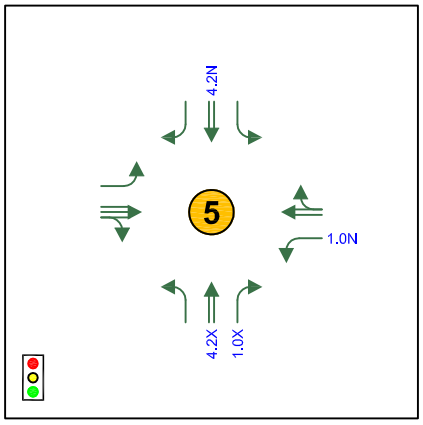
Similarly the right-right-out only, fast-food restaurant/service stations with convenience mart figures are shown in Figure 9 and Figure 10 on page 19 and page 20.

LEGEND

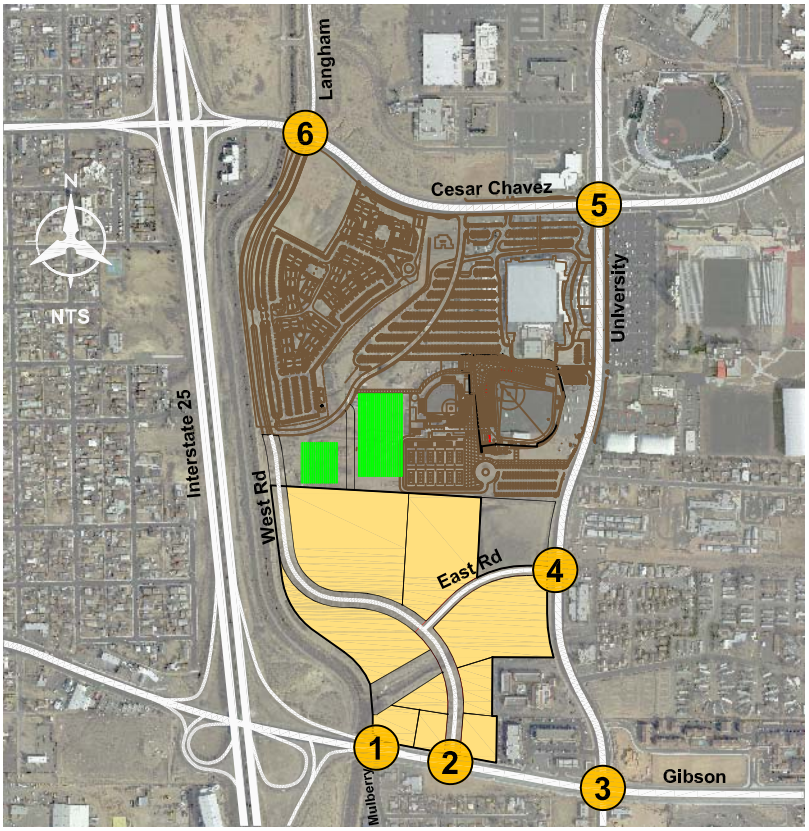
- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- N Entering
- X Exiting

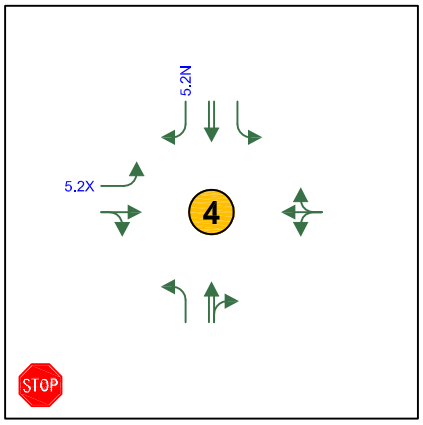


Cesar Chavez/Langham

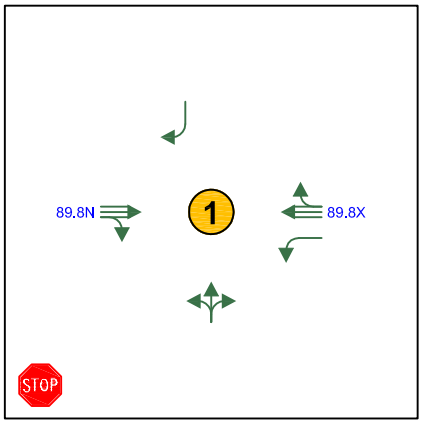


Cesar Chavez/University

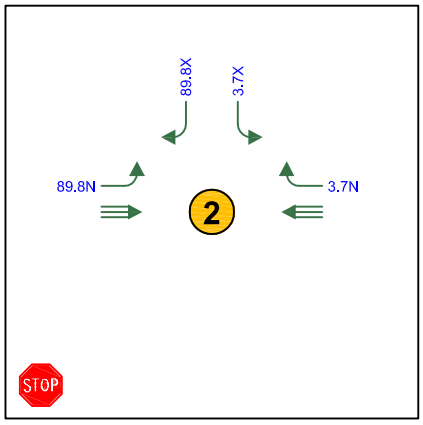




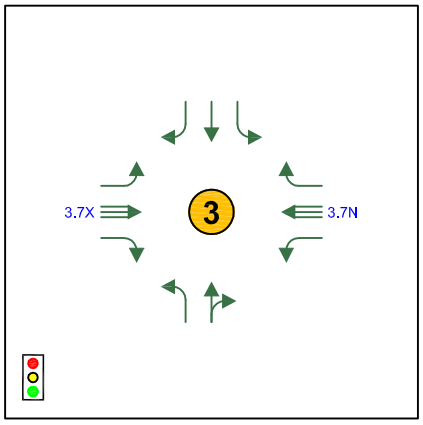
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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FIGURE 5
Destination Retail
TRIP DISTRIBUTION PERCENTAGES

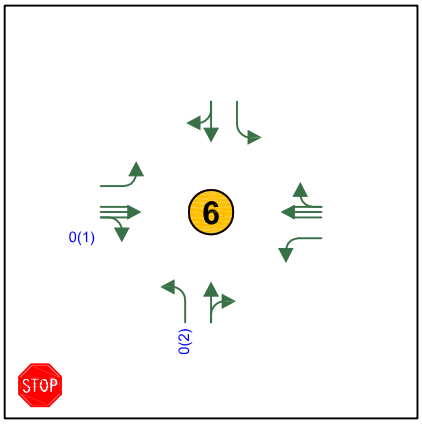
P:\20120122\TRANS\Study\Report-Production\Report Figures\Fig5-20120122-Dest_Trip_Dist_Per.dwg Aug 16, 2011 - 10:19am

LEGEND

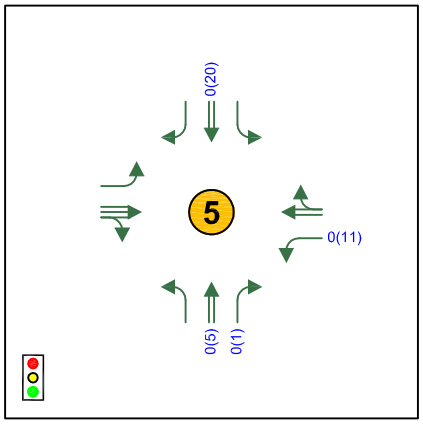
Thru Lanes (# as indicated)

Turning Lanes (# as indicated)

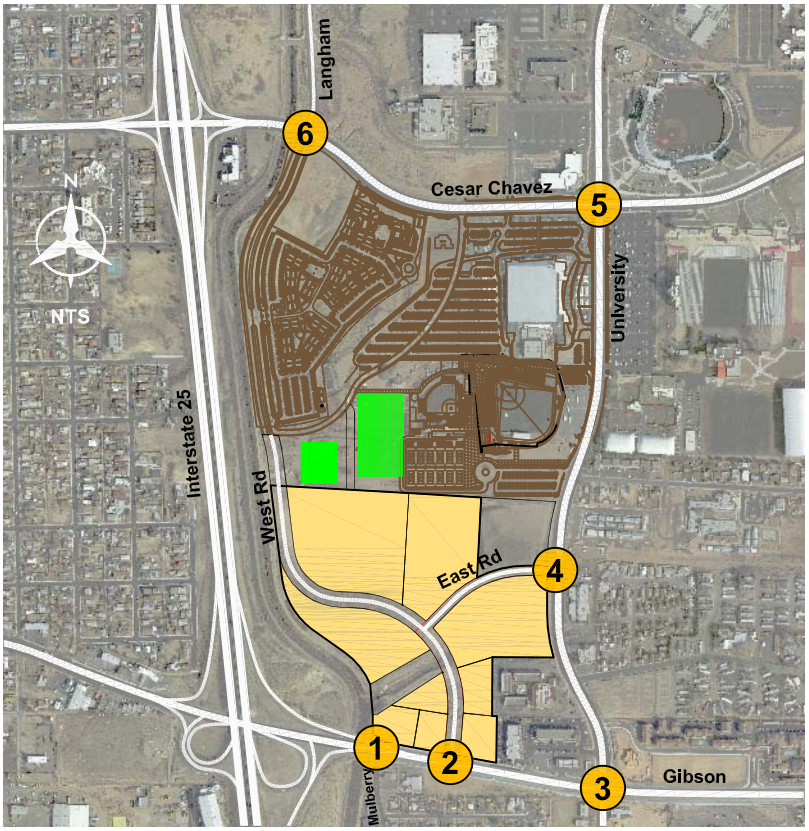
1234(1234) AM(PM) Traffic Counts

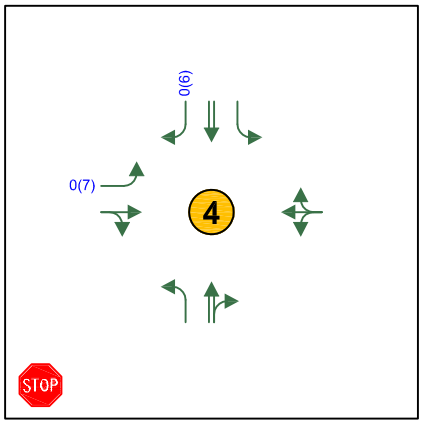


Cesar Chavez/Langham

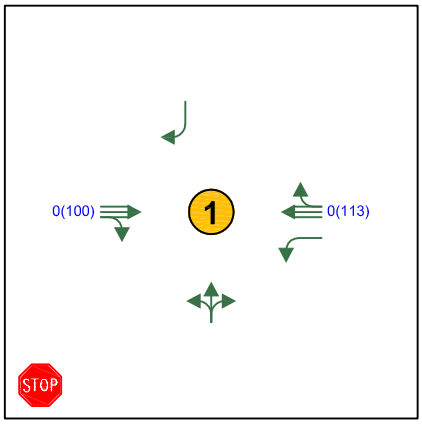


Cesar Chavez/University

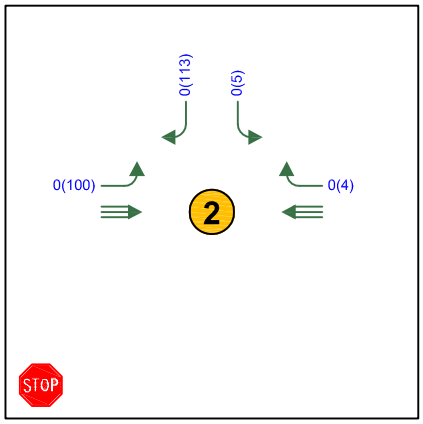




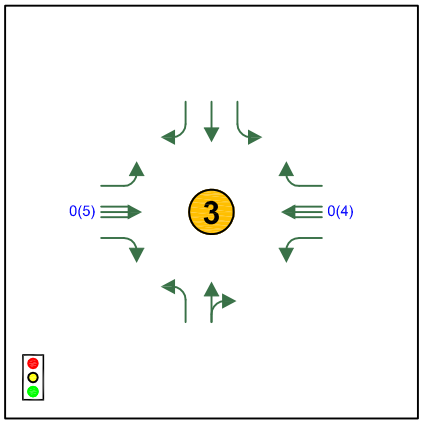
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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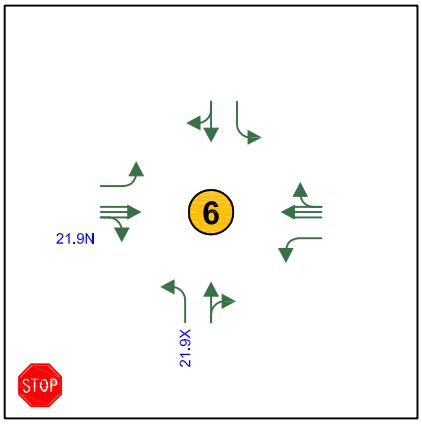
FIGURE 6
Destination Retail TRIP ASSIGNMENT VOLUMES - AM (PM)

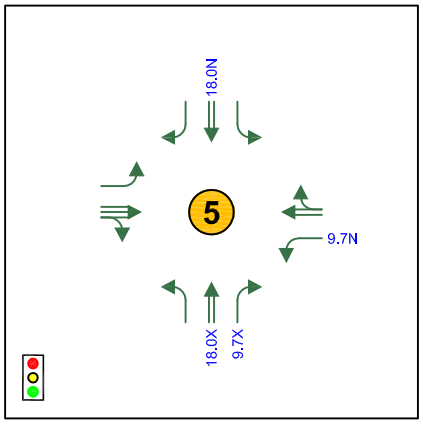
P:\20120122\TRANS\Study\Report-Production\Report Figures\Fig6-20120122-Dest_Trip_Dist_Vol.dwg Aug 16, 2011 - 10:20am

LEGEND

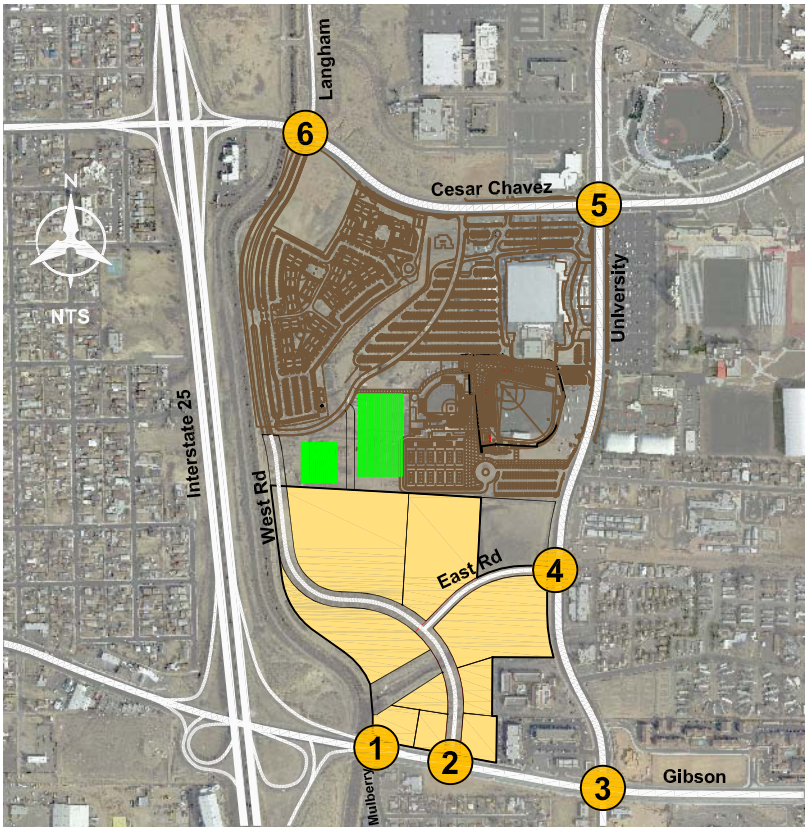
- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- N Entering
- X Exiting

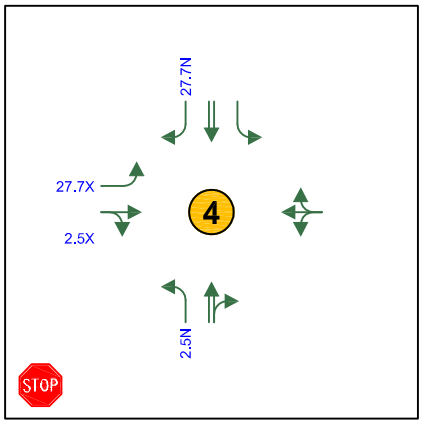


Cesar Chavez/Langham

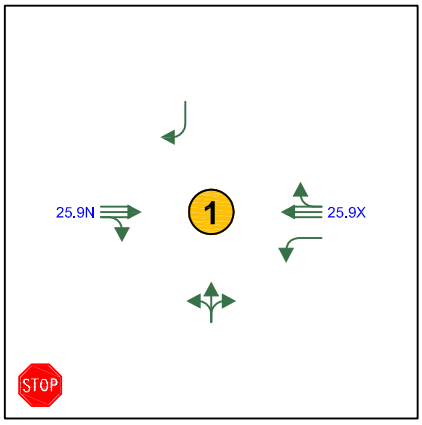


Cesar Chavez/University

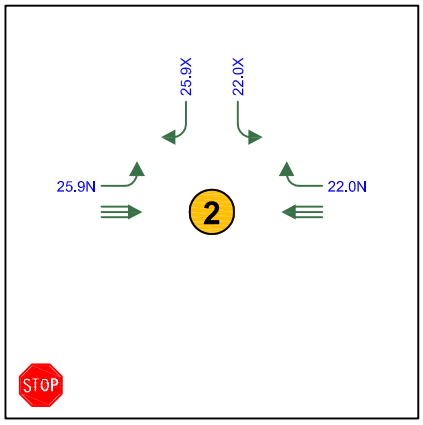




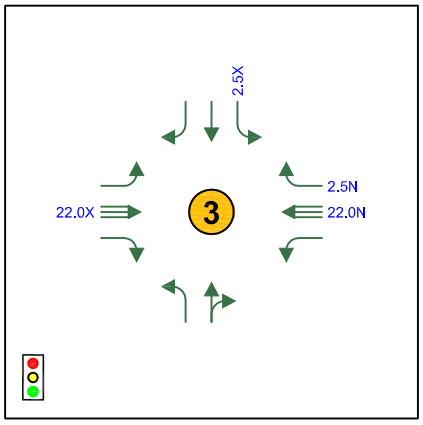
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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FIGURE 7
Community Retail
TRIP DISTRIBUTION PERCENTAGES

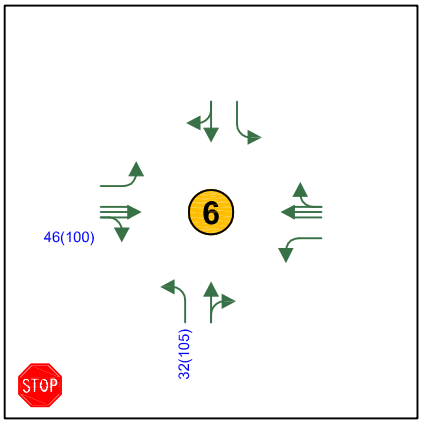
P:\20120122\TRANS\Study\Report-Production\Report Figures\Fig7-20120122-Comm_Trip_Dist_Per.dwg Aug 16, 2011 - 10:20am

LEGEND

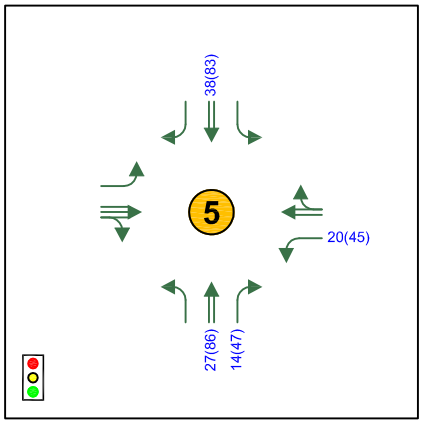
Thru Lanes (# as indicated)

Turning Lanes (# as indicated)

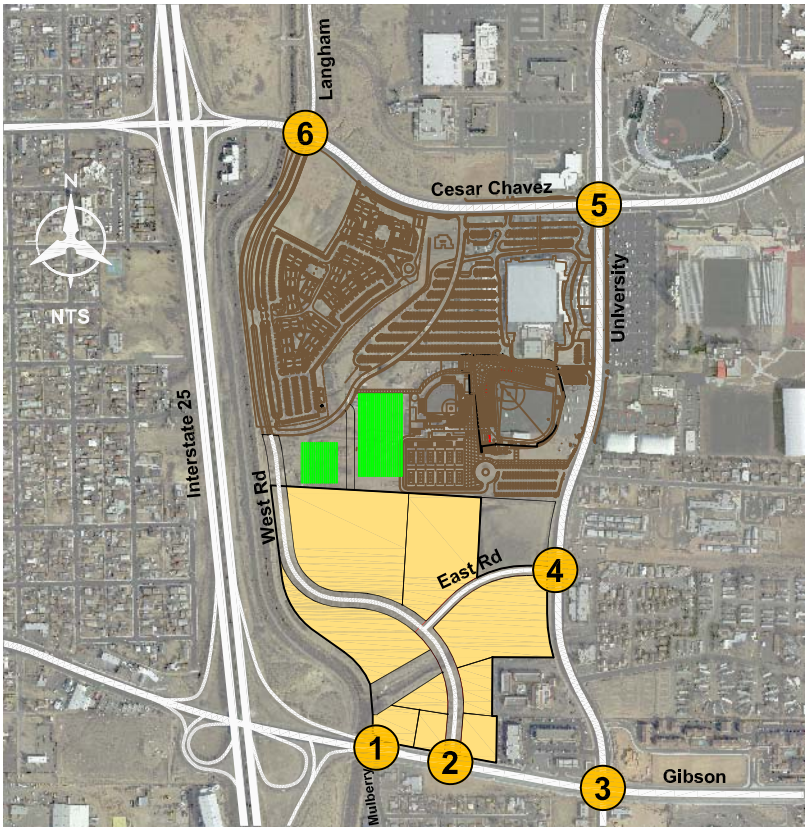
1234(1234) AM(PM) Traffic Counts

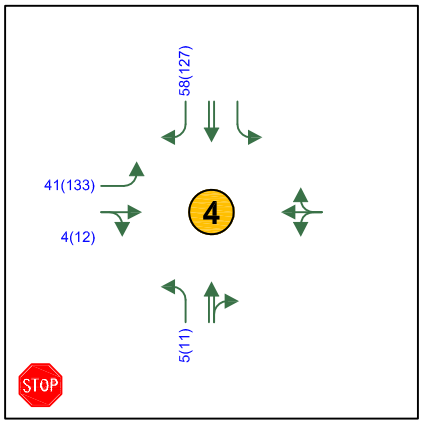


Cesar Chavez/Langham

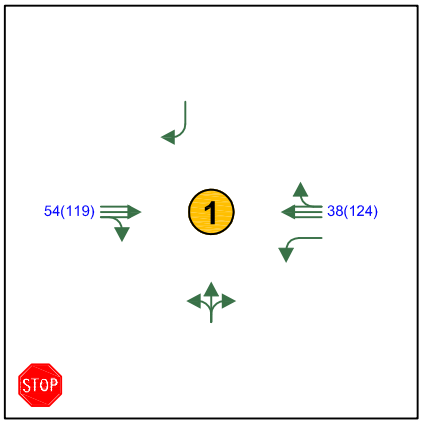


Cesar Chavez/University

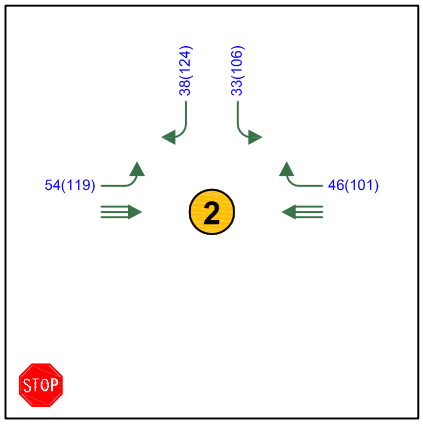




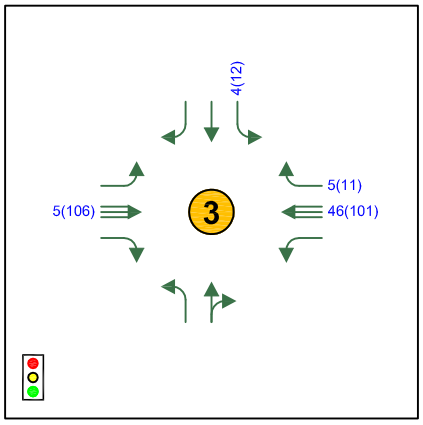
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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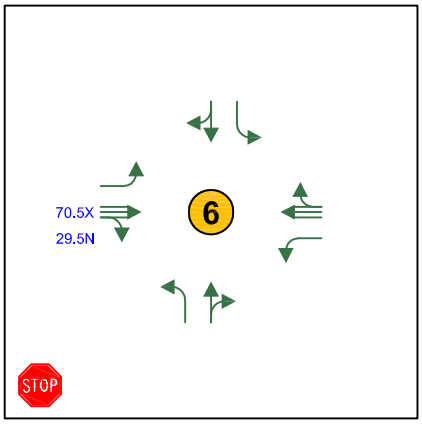
FIGURE 8
Community Retail TRIP ASSIGNMENT VOLUMES - AM (PM)

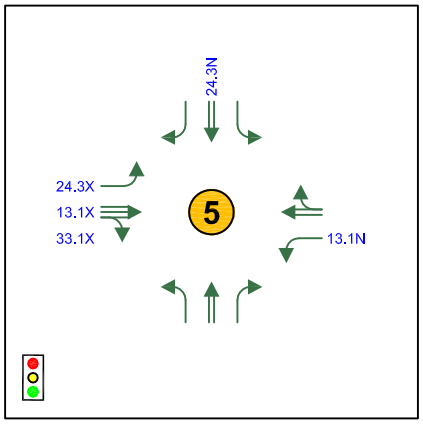
P:\20120122\TRANS\Study\Report-Production\Report Figures\Fig8-20120122-Comm_Trip_Dist_Vol.dwg Aug 16, 2011 - 10:21am

LEGEND

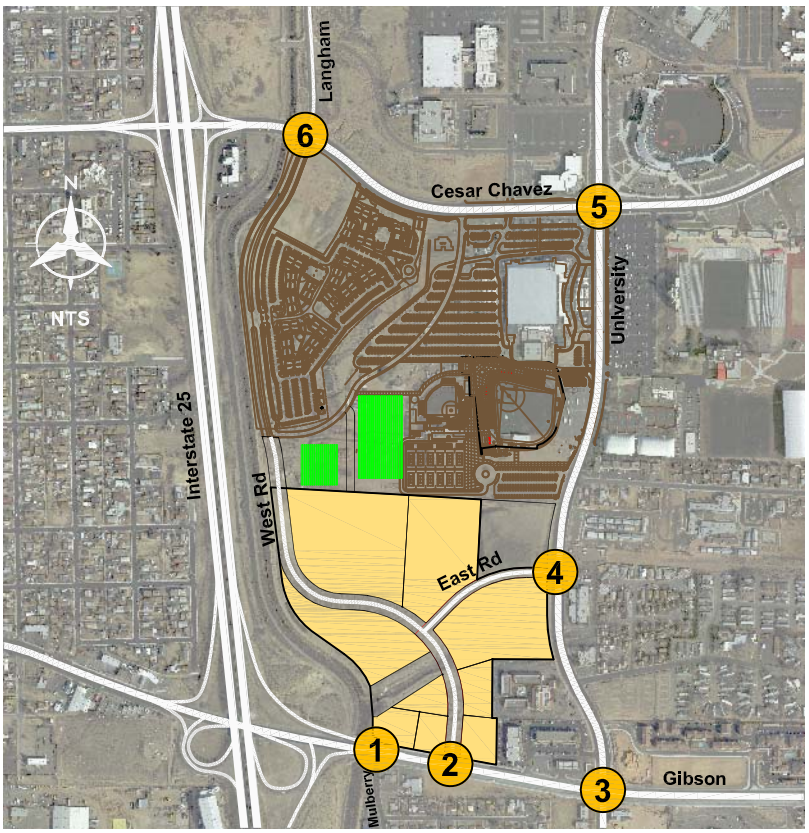
- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- N Entering
- X Exiting

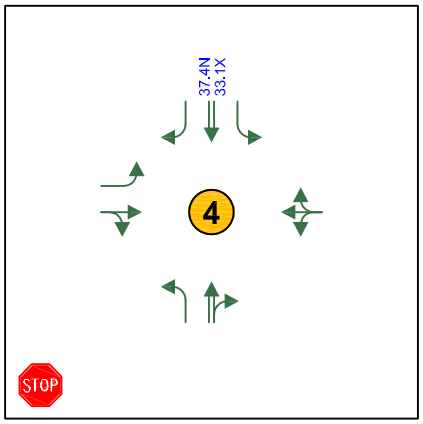


Cesar Chavez/Langham

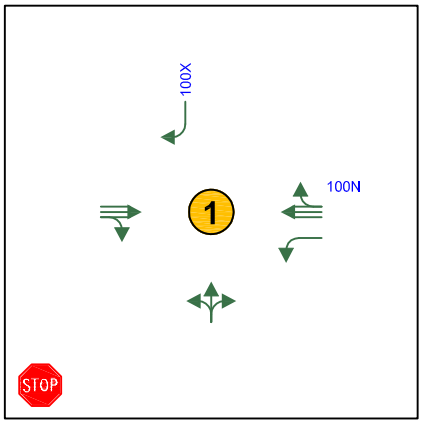


Cesar Chavez/University

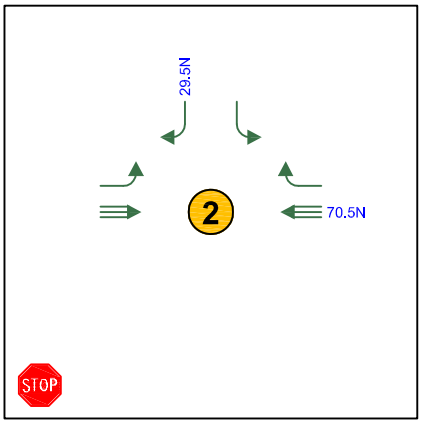




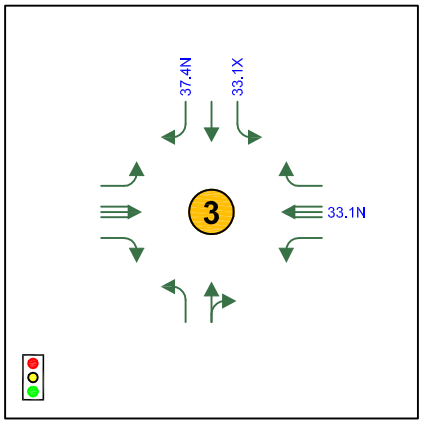
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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FIGURE 9
Right-In/Right-Out Fast Food/Gas/Conv Mart
TRIP DISTRIBUTION PERCENTAGES

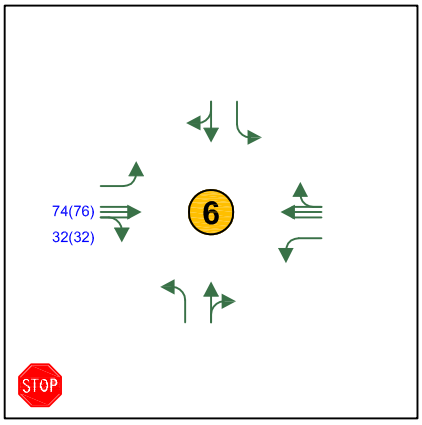
P:\20120122\TRANS\Study\Report-Production\Report Figures\Fig9-20120122-FF_RIRO_Dist_Per.dwg Aug 16, 2011 - 10:22am

LEGEND

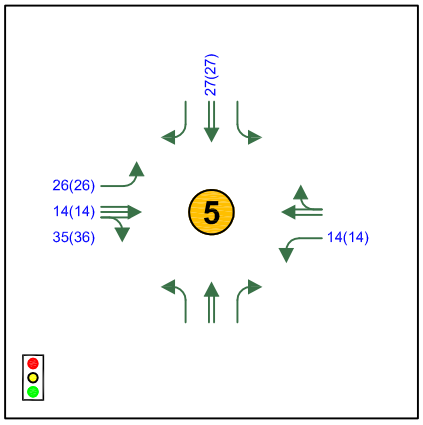
Thru Lanes (# as indicated)

Turning Lanes (# as indicated)

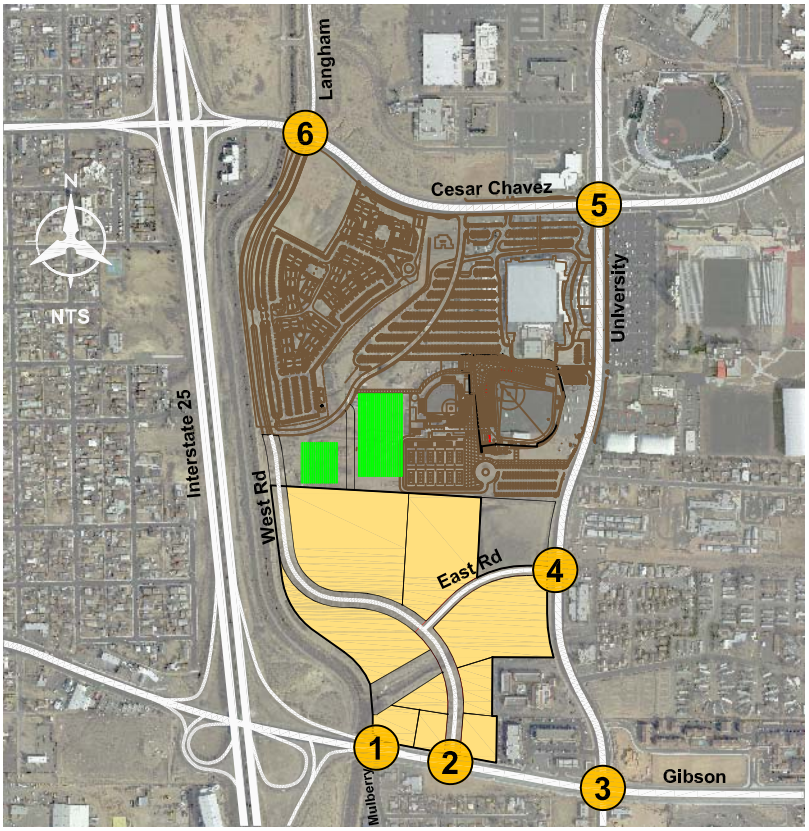
1234(1234) AM(PM) Traffic Counts

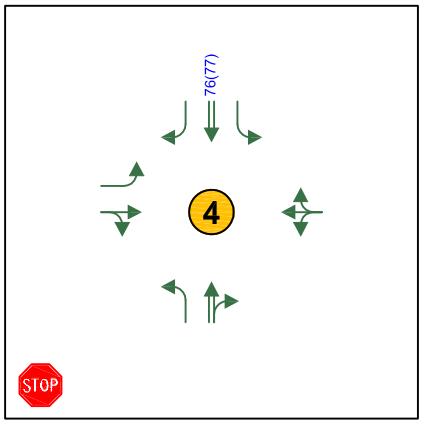


Cesar Chavez/Langham

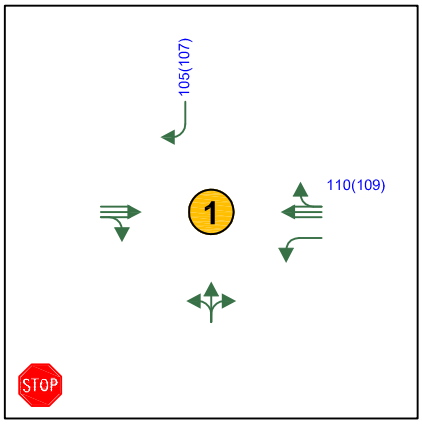


Cesar Chavez/University

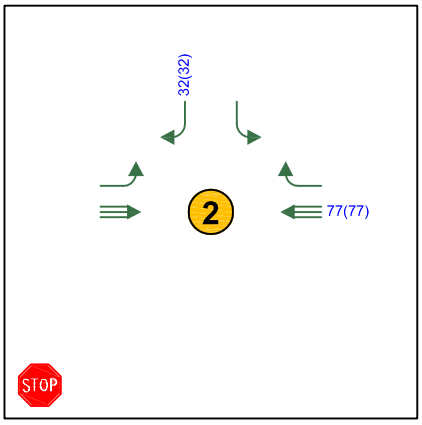




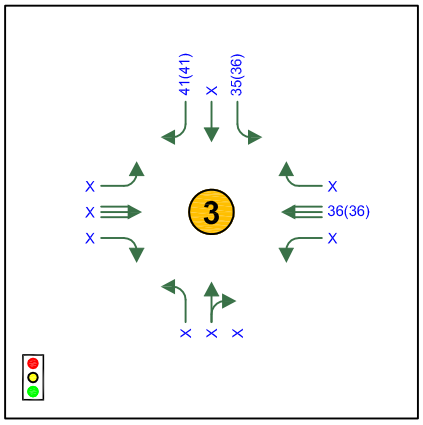
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

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UNM Gibson Commercial District Traffic Impact Analysis

FIGURE 10
Right-In/Right-Out Fast-Food/Conv Mart
TRIP ASSIGNMENT VOLUMES - AM (PM)

P:\20120122\TRANS\Study\Report-Production\Report Figures\Fig10-20120122-FF_RIRO_Trip_Dist_Vol.dwg Aug 16, 2011 - 10:23am

V. BUILD TRAFFIC ANALYSIS

The following section will discuss the results of the build traffic analysis.

A. 2015 BUILD TRAFFIC VOLUMES

Based on the trip distribution and assignments discussed above, the estimated traffic generated by the proposed site development was then added to the No-Build traffic projections. Details of the Build traffic volume computations are included in Appendix D.

Figure 11, page 24, is a summary of the 2015 Build Peak hour traffic projections, lane geometry, and movement and intersection level of service for the build year analysis

B. RESULTS AND DISCUSSION

The intersections were again analyzed using Synchro version 7. Table 7 and Table 8 show the results for the signalized and unsignalized intersections, respectively. The Synchro output is included in Appendix G.

Table 7 – 2015 Build Signalized Intersection Capacity Analysis Results

Signalized Intersections	2015 Build AM Peak			2015 Build PM Peak		
	Delay (sec.)	V/C	LOS	Delay (sec.)	V/C	LOS
Gibson & University						
	16.2	0.86	B*	24.3	0.95	C**
2nd SB Left	15.1	0.64	B	20.2	0..69	C*
Cesar Chavez & University						
No signal at Langham/West Road	15.0	0.66	B	21.6	0.74	C
With signal at Langham/West Road	13.8	0.60	B	19.5	0.72	B
Gibson & Entrance/West Road	6.0	0.58	A	14.4	0.77	B*
Cesar Chavez & Langham/West Rd	13.2	0.56	B	20.9	0.68	C
Cesar Chavez & I-25 NB Ramp	10.4	0.76	B*	9.5	0.72	A

* - some movements LOS E
** - some movements LOS F

It can be seen from the table that the forecast build volumes will operate at an acceptable level of service at the Cesar Chavez and University intersection. With the addition of the build traffic, the intersection of Gibson and University will require a second southbound left turn lane in order to have no movements that operate at LOS F; however the intersection as a whole will operate at an acceptable level of service with a single

southbound left turn lane. A review of the aerial photography appears to show a lane that has been chevroned out that could be used as a second southbound left turn lane.

The intersections of Gibson & West Road/Future Entrance and Cesar Chavez & West Road/Langham were also evaluated with traffic signals due to their poor performance as unsignalized intersections (see Table 8 below). Both intersections satisfy the Peak Hour volume traffic signal warrant and both are anticipated to have minor street of delay greater than 5 vehicle hours in the build scenario. The Peak Hour Volume traffic signal warrant analysis for each intersection is included in Appendix G. The Gibson & West Road Entrance traffic signal was assumed to be coordinated with the signal at University, and the Cesar Chavez & West Road/Langham traffic signal was assumed to be coordinated with the Cesar Chavez & University and I-25 Northbound Ramp & Cesar Chavez traffic signals.

The intersection of Gibson and West Road/Future Entrance is already anticipated to be signalized per the MTB Resolution R-03-01, stating that "in order to preserve the mobility function of Gibson Boulevard between Interstate 25 and University Boulevard a traffic analysis has shown there should be no more than three (3) signalized intersections in the future along this approximately one-half mile of roadway, including the existing signal at University." The three signalized intersections in the future were anticipated to be 1) the existing traffic signal at University and Gibson, 2) this proposed intersection, and 3) a future traffic signal at a future re-aligned northbound ramp intersection with I-25.

As mentioned in Section II.A, General Area Characteristics, on page 4, the Avenida Cesar Chavez and West Road/Langham Street intersection is not an ideal location for a traffic signal, due to the proximity of the northbound ramp with I-25. However to fulfill its mission to the University of New Mexico, the UNM Real Estate Department (Lobo Development) has an obligation to maximize benefit of property that it holds in trust for the University. Lobo Development anticipates future commercial development of the lands west of the UNM Science and Technology Park, particularly north of Cesar Chavez and west of Langham Street, as well as the southeast corner of the intersection. This will inevitably lead to additional traffic in the area, further demonstrating the need for a traffic signal. The large forecast delays will likely lead to motorists to start to take additional chances (i.e., shoot shorter gaps in traffic) in order to try and make the left turn movement if a traffic signal is not present.

Traffic from the site studied in this report does have the opportunity to use the West Road exit onto Gibson or East Road exit onto University. This is considered likely for a substantial portion of the traffic that will use the West Road/Cesar Chavez exit, particularly repeat customers who know that there is a long delay. However, as the no build analysis

demonstrated, even a small number of exiting left turns will have substantial delay. Concerns about queue back-up will be discussed in Section V.D, Queues of Interest, on page 26.

Table 8 – 2015 Build Unsignalized Intersection Capacity Analysis Results

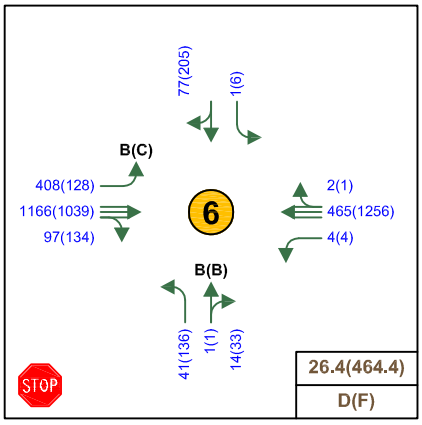
Un-signalized Intersections	2015 Build AM Peak				2015 Build PM Peak			
Movement	Delay (sec.)	v/c	Queue (ft.)*	LOS	Delay (sec.)	v/c	Queue (ft.)	LOS
Gibson & Mulberry no signal at entrance								
WB Left	32.7	0.11	25	E	14.0	0.05	25	B
NB Left/Right	273	0.95	100	F	294	1.18	150	F
SB Right	14.4	0.30	50	C	50.9	0.71	125	F
Gibson & Mulberry with signal at entrance								
WB Left	32.7	0.11	25	E	14.0	0.05	25	B
NB Left/Right	260.3	0.95	125	F	50.1	0.47	75	F
SB Right	13.0	0.27	50	B	13.1	0.27	50	B
Gibson & Entrance/West Road								
EB Left	10.5	0.08	25	B	115	1.05	275	F
SB Left	31.0	0.20	25	D	Err	Err	Err	F
SB Right	9.1	0.08	25	A	17.3	0.53	100	C
University & Future East Road								
EB Left	15.7	0.12	25	C	28.5	0.50	75	D
EB Right	9.4	0.01	0	A	10.1	0.06	25	B
WB Left/Right	11.1	0.01	0	B	10.7	0.04	25	B
NB Left	8.3	0.00	0	A	8.9	0.02	25	A
SB Left	8.1	0.02	25	A	8.0	0.01	25	A
Cesar Chavez & Langham/West Road								
EB Left	11.5	0.46	75	B	16.9	0.33	50	C
WB Left	13.0	0.01	25	B	12.4	0.01	25	B
NB Left	1,320	2.87	175	F	Err	5.37	Err	F
NB Through/Right	25.8	0.09	25	D	17.2	0.12	25	C
SB Left	68.4	0.02	25	F	53.7	0.09	25	F
SB Through/Right	9.9	0.11	25	A	17.7	0.46	75	C

* - HCM queue rounded to next 25-foot increment
Err – demand exceeds capacity and delay, queue and v/c cannot be calculated

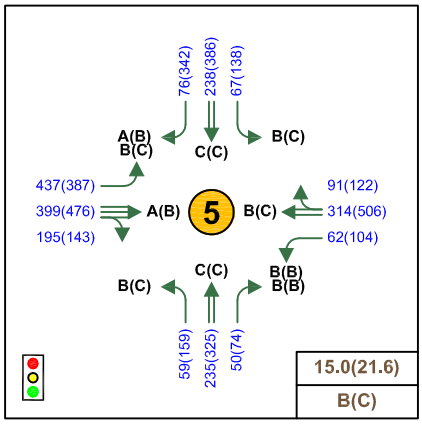
The unsignalized intersection results show that the minor street left turn from Mulberry onto westbound Gibson will continue to perform at a poor level of service with high delay. This movement does have direct access to the traffic signal at University Boulevard, albeit through neighborhood streets. The analysis also shows that the performance of this movement will improve with signalization of the West Road Entrance to the site.

LEGEND

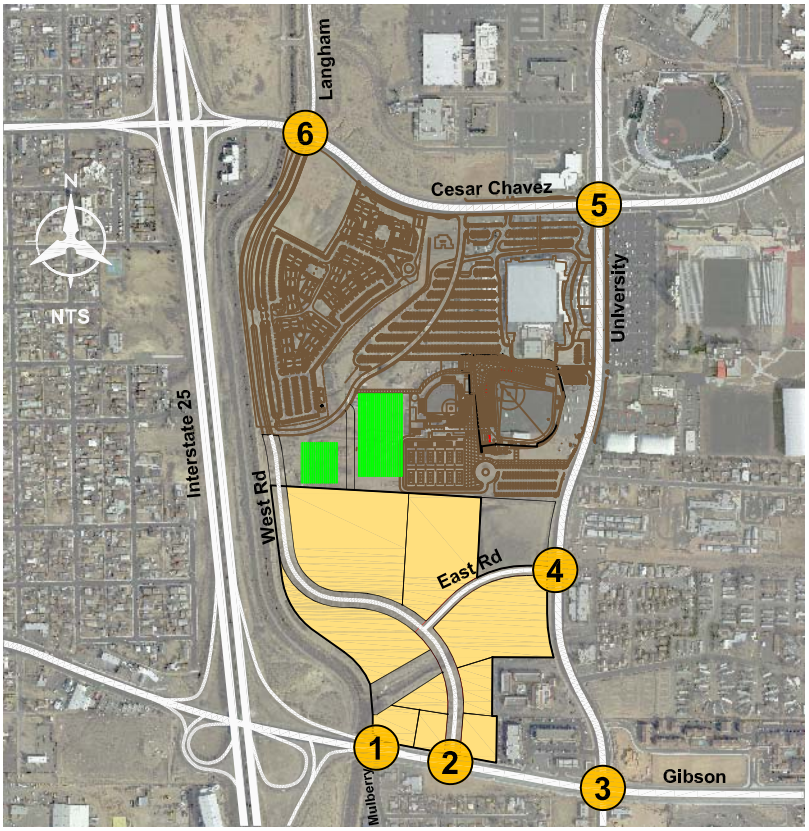
- Thru Lanes (# as indicated)
- Turning Lanes (# as indicated)
- 1234(1234) AM(PM) Traffic Counts
- X(X) AM(PM) Level of Service (LOS)

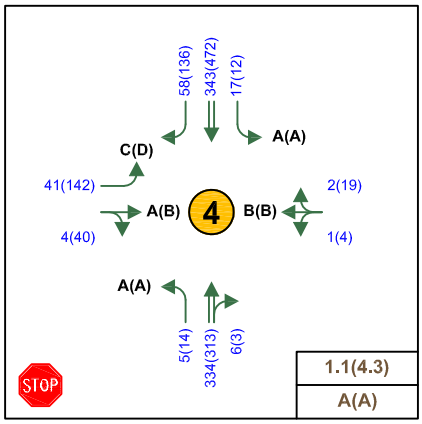


Cesar Chavez/Langham

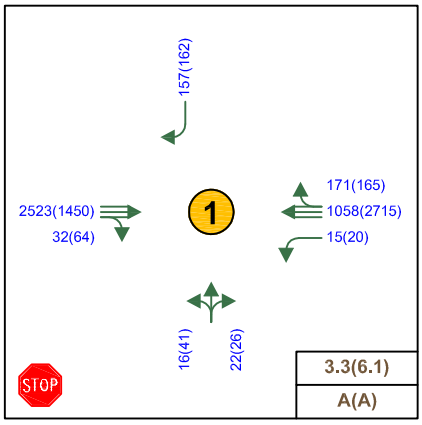


Cesar Chavez/University

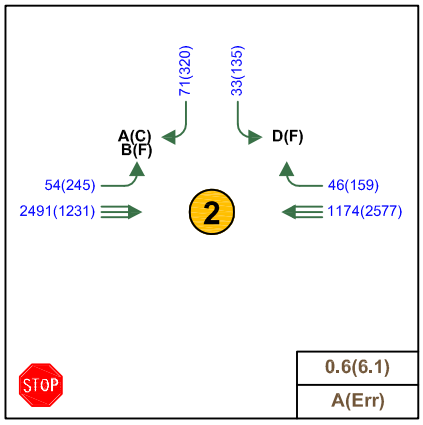




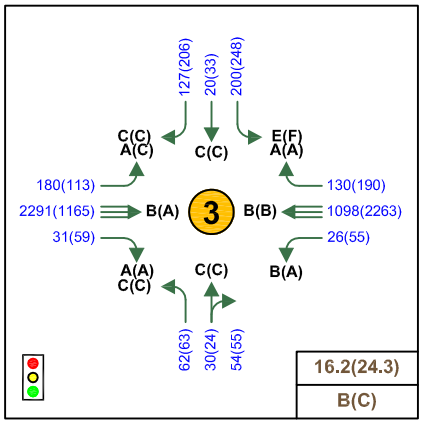
East Road/University



Gibson/Mulberry



Gibson/Entrance



Gibson/University

Bohannan Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
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FIGURE 11
2015 BUILD PEAK TRAFFIC VOLUMES - AM (PM)

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The University and East Road/City of Albuquerque Housing Services intersection is expected to operate at acceptable levels of service in the build scenario.

C. I-25 GIBSON ON-RAMP EVALUATION

Table 9 shows the results from the 2010 HCM ramp analysis procedures for the Gibson on-ramp to northbound I-25. As actual counts are not available for the I-25 mainline, the 2010 MRCOG Traffic Flow Map was used to estimate interstate traffic volumes. For both AM and PM peak hours a K value of 0.10 was used (10% of the daily traffic is assumed to occur in the peak hour). For the AM Peak Hour a D of 0.55 for northbound traffic was used, with a D value of 0.45 for the PM Peak Hour. The analysis indicates that the existing ramp operates at LOS D, with LOS E anticipated in the 2015 no build peak hours. The HCM analysis summaries are included in Appendix H.

Table 9 – Gibson I-25 NB On-Ramp Analysis Summary

Scenario	AM Peak Hour	PM Peak Hour
2011 Existing Conditions – Ramp analysis	D / 34.2 / 54.4	D / 34.9 / 53.9
2015 No Build – Ramp analysis	E / 36.1 / 53.0	E / 36.7 / 52.3
2015 Build (existing acceleration lane length of 670 feet) – Ramp analysis	F / 37.5 / 51.6	F / 40.4 / 47.2
2015 Build (1,500-foot acceleration lane)** - Ramp analysis	F / 33.4 / 51.8	F / 36.1 / 46.9
2015 Build Weave Analysis – NB Gibson On-Ramp to NB Cesar Chavez Off-Ramp	E / 35.5 / 49.4	E / 38.9 / 45.0

* - Legend: LOS / ramp vehicle density (passenger cars per mile per lane / average speed in segment (MPH)
** - 2010 HCM procedures limit acceleration lane length to 1,500 feet for merge segments

For the 2015 Build scenario, the ramp operation (merge) deteriorates to LOS F. The 2010 HCM ramp procedures limit the acceleration (or deceleration) lane length to 1,500 feet. Lengthening the acceleration lane from its present length of 670 feet, to the maximum analysis length of 1,500 feet, still results in LOS F. It should be noted that this 670 feet of existing acceleration lane length includes approximately 360 feet of acceleration lane that is tangent to, but not adjacent to the freeway mainline. As there is approximately 1,900 feet (including the 360 feet of adjacent acceleration lane) between the Gibson and Cesar Chavez ramps, any improvements would result in the construction of an auxiliary lane between the two ramps. This would then become a weaving segment. Data was not collected for this

report at the Cesar Chavez off-ramp; however data was collected at this intersection in 2009 for the UNM Off-Campus Student Housing Access Study.

Using those traffic counts, the 2010 HCM weave segment analysis was completed for the 2015 Build scenario. The results are LOS E and are shown in the table above. As this project is anticipated to develop over a period of years, there is opportunity to work with the NMDOT to determine the best approach to improve this segment, however typically interstate improvements are the purview of the NMDOT and FHWA.

D. QUEUES OF INTEREST

Several vehicle queues are of interest in this study, particularly at the West Road Entrance on Gibson and the West Road/Langham intersection on Cesar Chavez.

The queues of interest are shown in Table 10. All queues reflect the HCM 95th percentile signalized queue as computed by Synchro, rounded up the the next 25-foot increment (to reflect vehicle lengths).

Gibson and Mulberry Street Westbound-to-Southbound Left

The expected westbound-to-southbound left turn queue into Mulberry is limited to a single vehicle, 25 feet. Due to the low left turn volume at this intersection, the DPM allows a 50 feet westbound left turn lane onto Mulberry.

Gibson and West Road Entrance Eastbound-to-Northbound Left

The 95th percentile eastbound left turn queue into the West Road Entrance on Gibson is approximately 250 feet when a traffic signal is present. The average queue is reported to be 150 feet. To provide the 250 feet of required storage length for the eastbound left turn into West Road will require re-design of the existing westbound-to-southbound left turn lane onto Mulberry.

However to provide the 50-foot westbound left turn lane into Mulberry does not allow for the full 250 feet to be provided for the eastbound left turn lane. This raises concerns regarding queue spillover from the left turn bay into eastbound through traffic lanes. Further review of the table shows that the 250-foot queue is in the PM Peak Hour, when eastbound through traffic on Gibson is lower than the AM Peak Hour. In the AM Peak Hour the expected queue is just 25 feet and will fit into the available 200-foot turn bay without affecting the heavy eastbound traffic. In the PM Peak Hour there will be short periods of time when the eastbound left turn queue may spillover into the eastbound through lane, blocking one of the three eastbound through lanes. Analysis of the PM Peak Hour with just two eastbound through lanes shows that the eastbound through movement will still operate at LOS A. In addition the analysis shows that the eastbound through queue is 100 feet for three lanes of

eastbound traffic, and 160 feet for two lanes. Therefore, the eastbound queue should not block the entering or exiting traffic from Mulberry Street.

Gibson and West Road Entrance Southbound Left and Right

The southbound turn queues for traffic leaving the site at the Gibson Entrance is also a concern for providing access to parcels on the south end of the site. Without a traffic signal, demand for the southbound-to-eastbound left turn exceeds capacity and a queue length cannot be calculated. With a traffic signal the southbound left queue is 225 feet after two cycles. The HCM does not provide a procedure to estimate vehicle queue beyond 2 cycles. The first proposed median break north of Gibson to serve these parcels should be no closer than 250 feet so as not to be blocked by traffic queued to turn onto Gibson.

Cesar Chavez and West Road/Northbound I-25 Ramp

The queue interaction on Cesar Chavez and the I-25 Northbound Ramp also requires discussion. Although not included in previous analysis results, the traffic counts from the UNM Housing Access Analysis at the I-25 Northbound Ramp were evaluated to determine the queue lengths between these two intersections. The concern is whether the eastbound queue from West Road/Langham will back up into the ramp intersection.

The analysis shows that in the AM Peak Hour both the eastbound left turn and eastbound through queue at West Road will be 200 feet. This 200-foot eastbound through queue will also be present in the PM Peak Hour. As there is approximately 500 feet between the northbound-to-eastbound I-25 Ramp off-ramp and the West Road/Langham intersection, there is not expected to be a back-up of traffic from West Road/Langham that will block or extend to the ramp intersection. However, northbound-to-eastbound off-ramp traffic will likely encounter congestion, and possible stopped vehicles, shortly after entering the Cesar Chavez traffic stream.

Table 10 – Queues of Interest		
Intersection/Movement	**AM Peak**	**PM Peak**
Gibson & Proposed Entrance/West Road – **No signal**		
EB Left	25	275
EB Through	does not stop	does not stop
SB Right	25	100
SB Left	25	Err
Gibson & Proposed Entrance/West Road– **With signal**		
EB Left	25	250
EB Through	300	100
WB Through	50	150
SB Right	50	#225
SB Left	75	175
Gibson & University		
EB Left (1 SB Left)	75	#75
EB Left (2 SB Lefts)	100	100
EB Through (1 SB Left)	#450	150
EB Through (2 SB Lefts)	250	250
SB Left (1 Left)	#200	#225
SB Left (2 Lefts)	125	#175
Cesar Chavez & Langham/West Road - **No signal**		
EB Left	75	50
EB Through	n/a	n/a
Cesar Chavez & Langham/West Road – **With signal**		
EB Left	200	75
EB Through	200	200
Cesar Chavez & I-25 NB Ramp – **With Signal at West/Langham**		
WB Through	200	175

Err – volume exceeds capacity and queue cannot be calculated

95th percentile volume exceeds capacity, queue may be longer. Queue shown is max after two cycles.

M Volume for 95th percentile queue is metered by upstream signal

Queue lengths rounded to next 25-foot increment

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

All of the existing intersections operate at acceptable levels of service in the AM and PM Peak Hours for existing conditions and anticipated 2015 No Build conditions, except for the northbound-to-westbound left turn movement at the Gibson and Mulberry intersection. That intersection cannot be signalized due to its close proximity to the I-25 NB Off-ramp (less than 250 feet).

The Gibson/ Avenida Cesar Chavez/ University Boulevard corridor is expected to have substantial development in the coming years. This project, and future commercial development of other parcels owned by UNM Real Estate Department (Lobo Development), will increase traffic in the area. The density of development anticipated will require the construction of infrastructure and reconsideration and re-evaluation of traffic operations in the area.

With the completion of the project, all signalized intersections will operate at acceptable conditions. The intersection of Gibson and University will operate at an overall acceptable level of service; although the southbound left turn will operate at LOS F. A second southbound left turn lane allows this movement to operate at an acceptable level of service. This lane is available, however currently is striped out with chevrons.

The University and East Road intersection will operate at an acceptable level of service as an unsignalized intersection with the addition of the build traffic.

The West Road Entrance on Gibson to the site will have minor street left turn and entering left turn movements operating at LOS F in an unsignalized condition in the PM Peak Hour. A traffic signal is warranted in the PM Peak Hour for both volume and delay, based on the calculated delay determined in this analysis. The westbound left turn queue onto Mulberry was found to be 25 feet, and the eastbound left turn into the site at the West Road Entrance is 250 feet. Analysis has shown that PM peak hour eastbound through traffic on Gibson will operate at LOS A in the remaining two through lanes in the event that there is queue spillover from the eastbound left through lane that blocks one of the three eastbound through lanes. The AM eastbound left turn volume is low and will not exceed the available turn bay length.

The southbound left turn at West Road and Gibson has a 175-foot queue in the PM Peak. The first median cut to access the parcels on the west should be no closer than 250-feet from Gibson, which satisfies DPM driveway location requirements. In addition, a short

50-75-foot northbound left turn lane should be cut into the median to remove left turning traffic from West Road through traffic.

The West Road/Langham entrance of Avenida Cesar Chavez will also have minor street left turn movements that operate at LOS F in the AM and PM Peak Hours. This intersection satisfies the Peak Hour Volume Warrant in the PM Peak Hour and the Peak Hour Delay Warrant in both the AM and PM peak hours. Analysis of the 95th percentile queues indicates that the eastbound through and left queue at West Road/Langham will not back up into the I-25 Northbound Off-Ramp intersection. Although traffic from the site has the opportunity to use the Gibson West Road intersection as an exit, this intersection will have high delays for the minor street left turn movements onto Cesar Chavez as an unsignalized intersection. Future, anticipated additional development in the area will require the eventual construction of a traffic signal in order to allow the highest and best use of the surrounding land.

Evaluation of the operation of the Gibson westbound-to-northbound I-25 on-ramp shows that the ramp is operating at LOS D with existing volumes, LOS E for 2015 no-build volumes, and LOS F for 2015 Build volumes. Extending the ramp length to the maximum analysis level of 1,500 feet still results in LOS F. Constructing a single northbound auxiliary lane between the Gibson on-ramp and Avenida Cesar Chavez off-ramp will result in LOS D for the weave segment, although typically interstate improvements are the purview of the NMDOT and FHWA.

B. RECOMMENDATIONS

The recommendations are listed below. They are also shown in Figure 12.

Locate the West Road Entrance on Gibson approximately midway between Mulberry and University as allowed by the MRCOG MTB Resolution R-03-31. Signalize the intersection and coordinate traffic signal operation with the Gibson and University traffic signal.

Provide a 50-foot westbound left turn lane into Mulberry to maintain full access to this intersection, consistent with MRCOG MTB Resolution R-03-31.

Provide the most eastbound left turn lane storage length as possible into the West Road entrance to the site. The 95th percentile queue is expected to be 250 feet, however to maintain westbound left-in access at Mulberry requires a shorter eastbound left turn lane. Initial evaluations indicate that the maximum eastbound left turn lane that can be accommodated is 200 feet, while still providing 50 feet for the westbound left into Mulberry.

The first median break on West Road north of Gibson should be no closer than 250 feet so as not to be blocked by southbound traffic queued to turn onto Gibson. In addition, a short 50-75-foot northbound left turn lane should be cut into the median to remove left turning traffic from West Road through traffic.

Right-in/right-out driveways on the approach and departure leg of West Road at Gibson should follow DPM driveway location criteria and should be a minimum of 150-feet north of Gibson. Fire Station requirements may require a waiver of this criteria. The driveway for the Fire Station site should be signed so that queued vehicles do not block the driveway prohibiting emergency egress. In addition, a median break should be provided to allow the fire station to have emergency left-out access to northbound West Road.

Construct a 150-foot westbound right turn lane at both the West Road Entrance and Right-In/Right-Out Entrance on Gibson, and a 150-foot southbound right turn lane at the East Road entrance on University. If the 150 feet cannot be achieved at the West Road Entrance on Gibson due to existing development, provide the longest practicable right turn lane. The bridge over the AMAFCA Channel prevents an eastbound right turn lane to be constructed at the West Road/Langham intersection with Cesar Chavez.

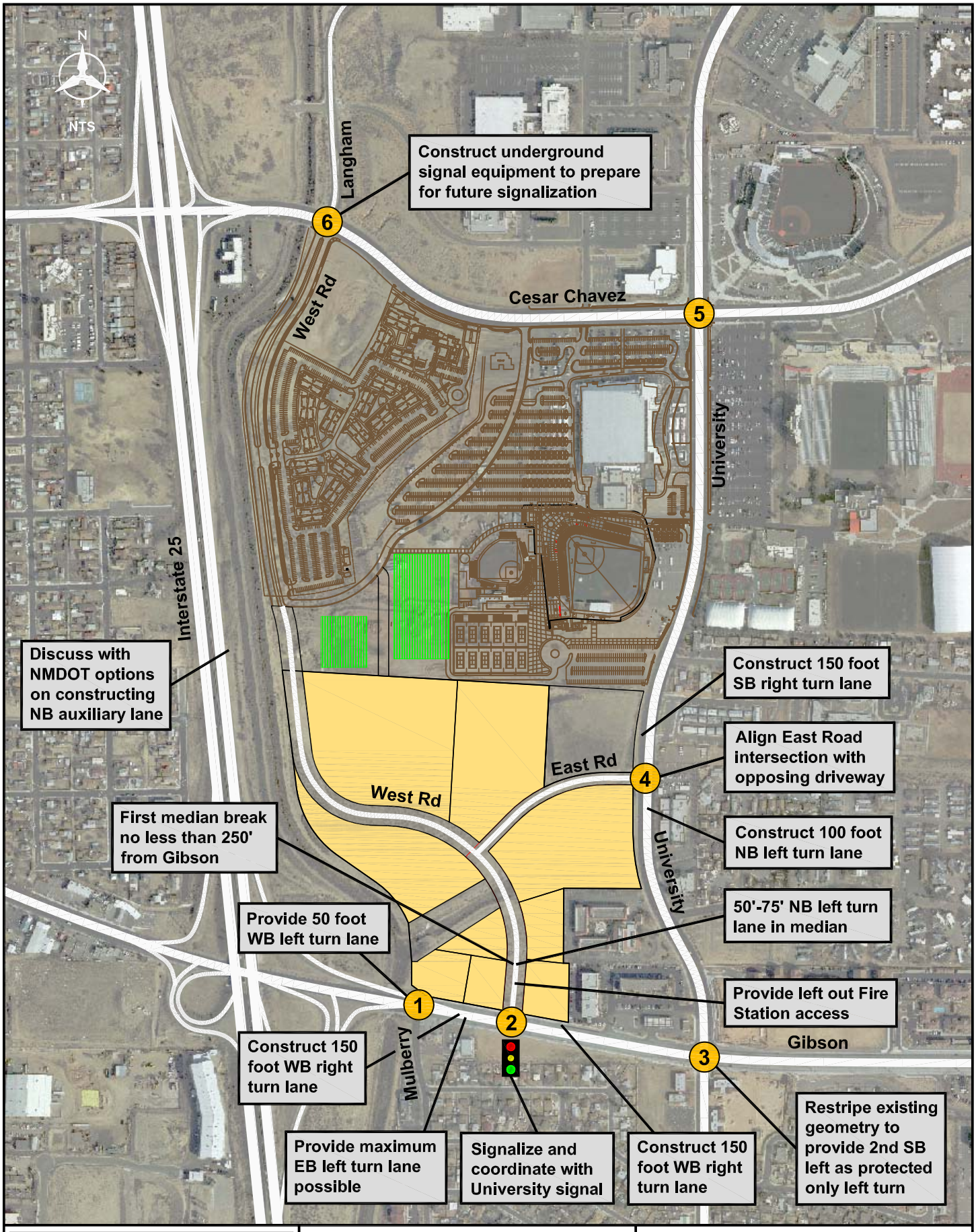
Construct a 100-foot northbound left turn lane at the East Road entrance on University per DPM guidelines.

Align the East Road intersection with the driveway to the City of Albuquerque Housing Services driveway.

Make necessary striping modifications to provide a second southbound left turn lane at Gibson and University. Modify traffic signal heads and timing plan as required to operate as a protected-only left turn movement.

The underground conduit and structures for a traffic signal at the West Road/Langham intersection with Avenida Cesar Chavez should be constructed to plan for the eventual signalization of this intersection. This traffic signal should be coordinated with the traffic signals at the I-25 Northbound Ramp and University Boulevard to ensure that queues do not back up into the I-25 ramp intersection.

UNM should begin discussions with the NMDOT to determine the appropriate course of action on improvements to northbound I-25 between Gibson and Avenida Cesar Chavez, however typically interstate improvements are the purview of the NMDOT and FHWA.



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Bohannan Huston
Courtyard I 7500 Jefferson St. NE Albuquerque, NM 87109-4335
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FIGURE 12
Recommended Improvements