TRAFFIC IMPACT ANALYSIS

APN 3128-481-010
ADELANTO, CALIFORNIA

PREPARED FOR:
Lilac Development, LLC

PREPARED BY:
HALL & FOREMAN, INC.
14297 CAJON STREET, #101
VICTORVILLE, CA 92392

FINAL REPORT

October 1, 2012

Hall & Foreman, Inc.
Engineering ▪ Planning ▪ Surveying

October 1, 2012 Job No. VV.100273.0000

Ms. Agnes Yen
Lilac Development, LLC
878 Towne Center Dr.
Pomona, CA 91767

RE: FINAL TRAFFIC IMPACT ANALYSIS – APN 3128-481-010 – ADELANTO, CALIFORNIA

Dear Ms. Yen;

Hall & Foreman Inc. is pleased to submit the Final Traffic Impact Analysis report for a proposed project in the unincorporated area of the City of Adelanto, in the County of San Bernardino. The project consists of a proposed Office/Retail center located along Mojave Drive, east of Coleridge Street and west of Bellflower Street.

The report examines the traffic impacts specifically for the project and presents recommended traffic improvements. The report also addresses the impacts of overall growth within the area to assure that cumulative traffic mitigations can be addressed. This report should satisfy the approval requirements for Lilac Development, LLC.

We are pleased to have been of assistance to you in processing and obtaining approval for the project. If you have any questions or comments, please feel free to contact me at 760-524-9115.

Respectfully submitted,

Hall & Foreman Inc.

Robert A. Kilpatrick, P.E., T.E.
Project Director/Associate

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1. INTRODUCTION

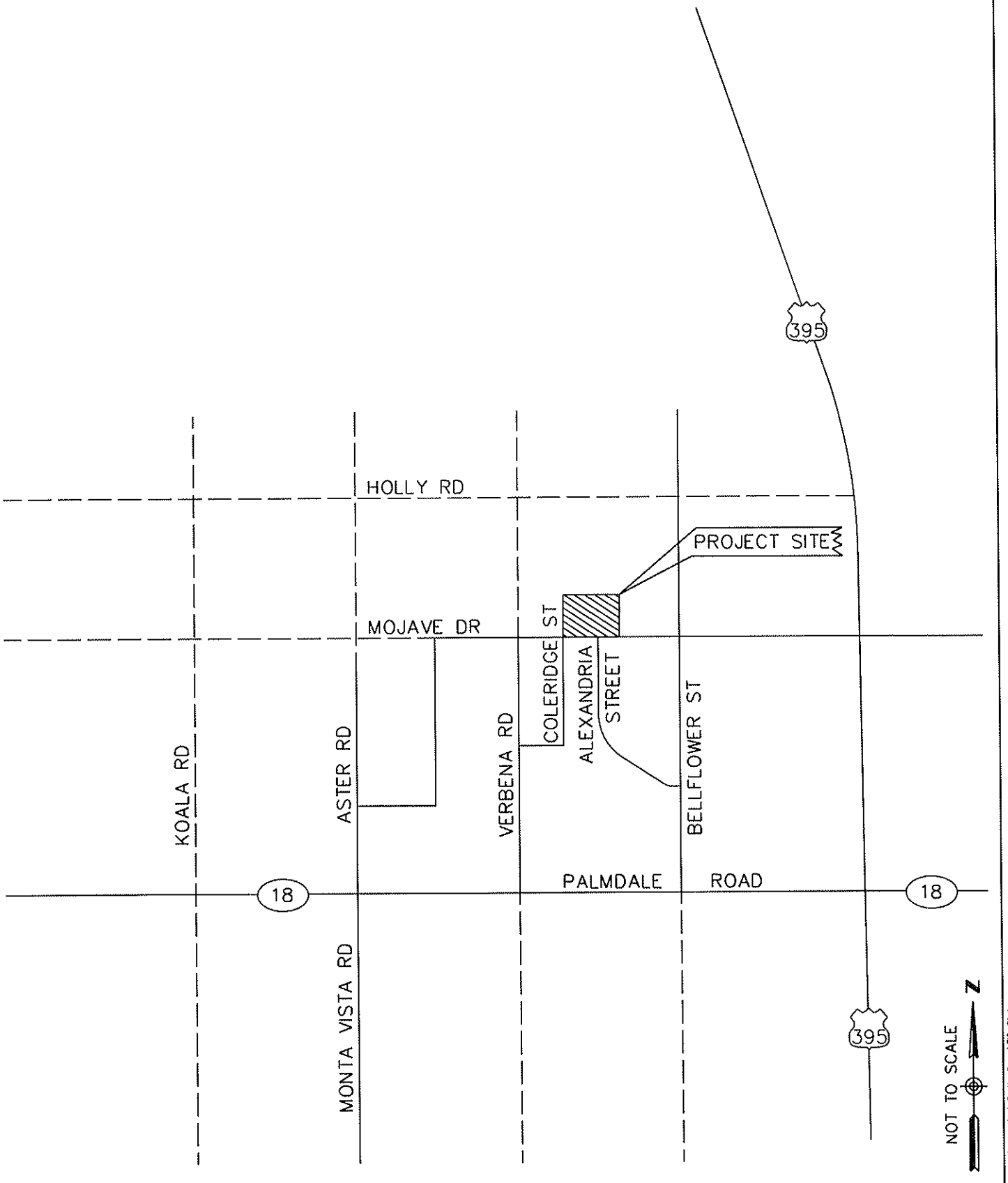
This report identifies the traffic impacts and presents recommendations for access and traffic mitigation for the proposed project located on Mojave Drive at APN 3128-481-010 in the unincorporated area of the City of Adelanto, in the County of San Bernardino. The project identified as Lilac Development, LLC's property consists of a total of 8.8 acres containing two (2) Restaurants with Drive-thru's, six (6) Office/Retail buildings, one (1) Restaurant and two (2) Retail buildings. The project is generally located along Mojave Drive, east of Coleridge Street and west of Bellflower Street. The facility will be accessible from four newly constructed driveways. The driveways are located along Mojave Drive, fronting the east and westerly development. *Figure 1* illustrates the vicinity map and project location and *Figure 2* illustrates the proposed project site plan.

The project is located in the unincorporated area in the City of Adelanto in San Bernardino County. The project is bound by Mojave Drive to the south and open dirt lots to the north, east, and west of the property. Access to the project is proposed off of Mojave Drive.

To address traffic impacts due to the proposed project, a study area encompassing the streets in the area was developed. The study area is bound by the intersections of Mojave Drive, Aster Road, Palmdale Road, and Highway 395. Mojave Drive provides regional access to the study area due to its full access to Highway 395 to the east.

In addition to addressing traffic impacts due specifically to development of the project, this study addresses impacts due to development correlating with the development of the project and cumulative projects up to the year 2012 within the study area. The examination of potential development correlating with the development of the project is known as background traffic. Traffic due to other projects is estimated using straight-line growth in the area to create a base for analyzing project traffic impacts.

To assure that recommended improvements for the project fits in with the ultimate needs of the roadway and driveway entry/exit system, traffic estimates for development up to the year 2035 are examined. Identified as future traffic, the traffic generation of the adjoining projects, which is incorporated into the area growth, is included. A Victor Valley Area Traffic Study (VVATS) was supplied by the Southern California Association of Governments in the project vicinity for a base model of Year 2003 and future growth values of Year 2035. Using a County of San Bernardino implemented software (Bturns), the link volumes where adjusted and converted from VVATS link volumes to directional turn volumes for the year 2035.



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VINCINITY MAP

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ADELANTO
TRAFFIC IMPACT ANALYSIS

FIGURE 1

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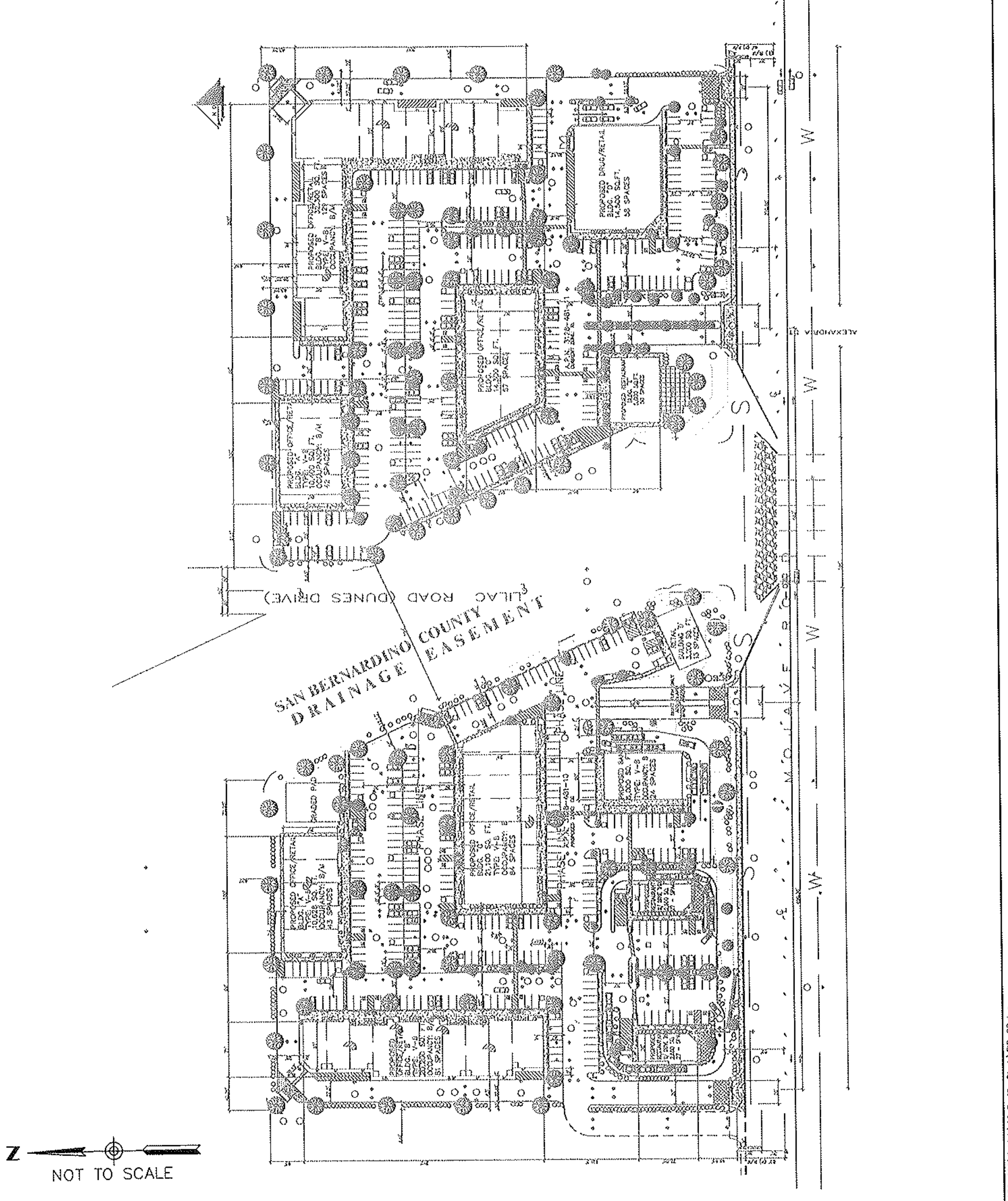

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SITE PLAN

LILAC DEVELOPMENT, LLC
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TRAFFIC IMPACT ANALYSIS

FIGURE 2

Drawing Name: V:\100273\Eng\100273-000\Exhibit\02 Traffic Study\FIG-02.dwg
Last Opened: Oct 26, 2011 - 4:08pm by: DJuarez

3. EXISTING CONDITIONS

Existing Street System

The project site currently is comprised of an open dirt lot. Land uses around the site consist of single-family dwellings, and two elementary schools south of the project site. Streets fronting the project property are developed paved roads. The roads currently are in range of pavement widths of 20 to 60 feet and are in good to fair condition. The following roadways provide regional access to the project within the study area:

Mojave Drive will provide the primary access to the project site. Mojave Drive is currently a two lane road (one lane in each direction) and it contains curb and gutter on the southerly side fronting the project. The paved road begins just east of Aster Road and continues as a paved road east. Mojave Drive runs east west from the project site.

Bellflower Street is currently a five-lane street (two lanes in each direction and a central lane for left turn pockets) between Palmdale Road and Mojave Drive. Bellflower Street runs north-south and is east of the project vicinity. Currently, Bellflower consists of a curb and gutter along the east and westerly side of the road.

Palmdale Road will provide regional access to the project site. Palmdale Road (SR 18) is currently a two-lane road (one in each direction). The roadway flares out to accommodate a right and left turn and merging lane at several intersections. Palmdale Road runs east-west from the Palmdale area to Victorville.

Highway 395 provides regional access in the project area. Highway 395 (US 395) traverses north to south and provides access between Bishop to the north and the Interstate I-15 Freeway to the south. This roadway is primarily a two-lane highway (one lane in each direction) with left turn pockets at key intersections.

Verbena Road provides local access within the project area. Verbena is a north-south road from Mojave Dr to Palmdale Blvd. The roadway is currently a four lane road (two and one lanes in each direction) with left turn pockets at several intersections. The Verbena Rd width diminishes to a strictly two lane road (one lane in each direction) northerly of Palmdale Road, for several hundred feet.

Coleridge/ Alexandria Streets provide local access to the residential areas nearby the project area.

The project proposes to construct four entry/exit driveways on Mojave Drive. The property is separated into two areas referred as the west project site and the east project site since the San Bernardino County Drainage Easement splits the project property into two. Each project site has two driveways. The first driveway, Driveway "A", is located on the west end of west project site and is aligned to Coleridge Street, as shown on the Site Plan, *Figure 2*. The second driveway, Driveway "B", is located on the east end of the west project site. The third driveway, Driveway "C", is located on the west end of the east project site and is aligned to Alexandria Street, as shown on the Site Plan, *Figure 2*. The fourth driveway, Driveway "D", is located on the east end of the east project site.

The corner sight distance for all the proposed driveways was verified based on the proposed conditions, and the posted speed of 45 mph on Mojave Drive. Based on the analysis the corner sight distance was determined to be adequate. The corner sight distance (*intersection sight distance*) calculations and exhibits showing the intersection sight distance triangles are included in the appendix of the report.

The project proposes to obtain its primary access from Mojave Drive. Eight intersections have been identified within the study area that may potentially be impacted by the projects development. These intersections are:

- Mojave Drive and Verbena Road
- Mojave Drive and Coleridge Street
- Mojave Drive and Alexandria Street
- Mojave Drive and Bellflower Road
- Mojave Drive and Highway 395
- Palmdale Road and Verbena Road
- Palmdale Road and Bellflower Street
- Palmdale Road and Highway 395

Currently the intersections of Mojave Drive at Highway 395, Palmdale Road at Verbena Road, and Palmdale Road at Highway 395 are signalized intersections.

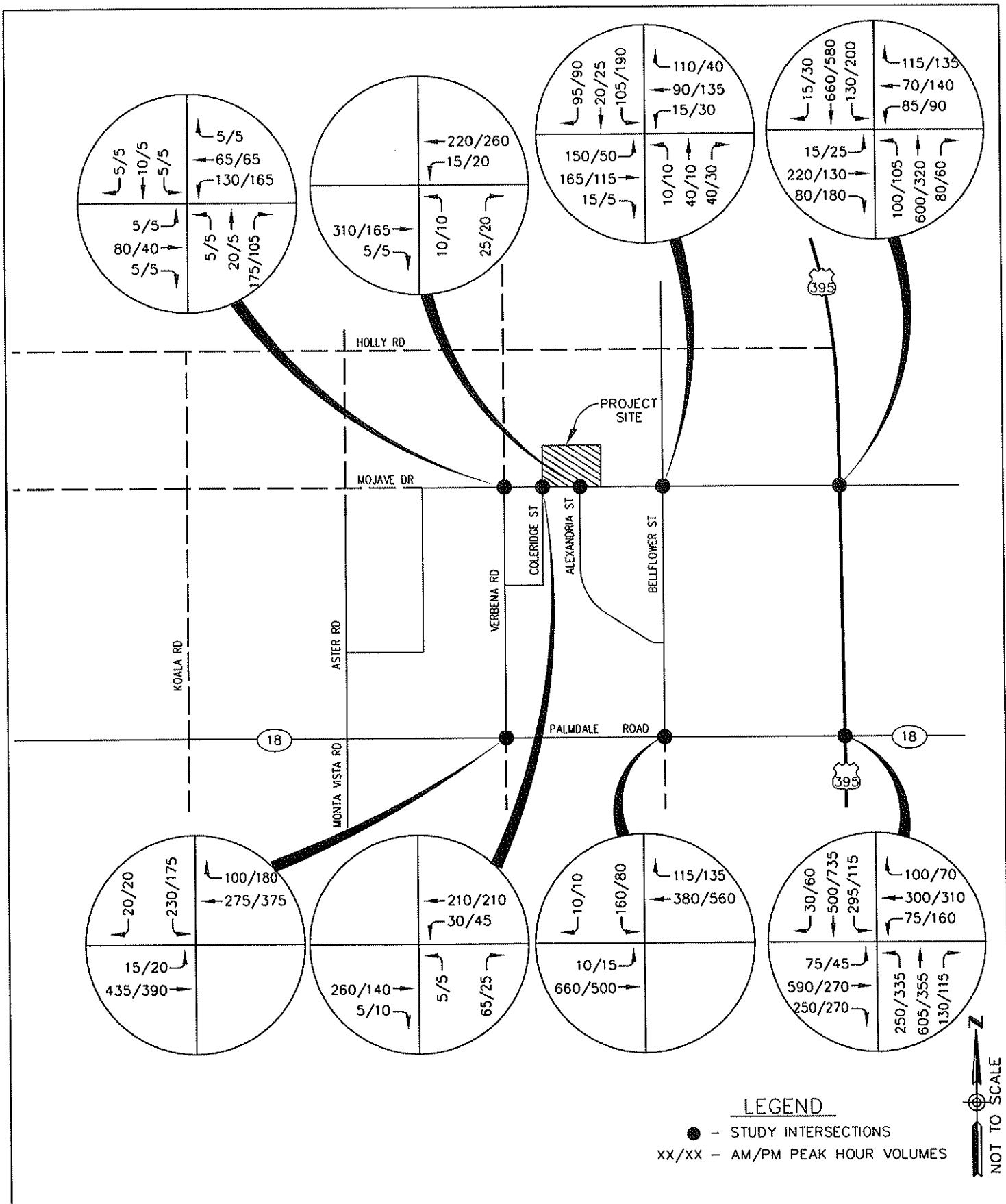
Existing Traffic Volumes

Figure 3 illustrates the existing peak hour traffic volumes in the study area. Newport Traffic Studies' staff conducted AM and PM peak hour (7:00-8:00 AM and 4:00-5:00 PM) turning movement counts at the above-mentioned existing intersections identified for detailed analysis. These counts were conducted in December of 2010. The resulting turning movement volumes are presented in the appendix of this report.

Capacity Analysis Methodologies

Signalized Intersections:
Intersection capacity analyses were conducted for the signalized study intersections to determine a present level-of-service (LOS). Based on the existing intersection geometrics as illustrated in *Figure 4* and traffic volumes during the AM peak hour and PM peak hour, the capacity analyses for the signalized intersections were conducted using the WEBSTER (Webster Based Signal Timing Evaluation Routine) methodology (Al Grover and Associates, version 2.0.9). The computerized analysis uses the delay methodology in accordance with the 2000 Highway Capacity Manual. The analysis determines a level-of-service (LOS), which quantitatively describes the operating characteristics of signalized intersections. The LOS ranges from "A" (the best) through "F" (system breakdown).

Un-signalized Intersections:
Intersection capacity analyses were conducted for the seven existing study intersections to determine present conditions and levels-of-service utilizing the existing intersection geometrics as presented in Figure 4. Based on the existing intersection geometrics and traffic volumes during the AM and PM peak hour, intersection capacity analyses were conducted utilizing HCS 2000, which is an un-signalized intersection capacity analysis program, developed by McTrans. This program was developed in accordance with the 2000 Highway Capacity Manual. The analysis determines a level-of-service (LOS), which quantitatively describes the operating characteristics of un-signalized intersections. The LOS ranges from "A" (the best) through "F" (system breakdown). The LOS for the intersection represents the LOS for the critical movement. This is typically the stop controlled left turn from the minor street.



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EXISTING TRAFFIC VOLUMES
YEAR 2010
LILAC DEVELOPMENT, LLC
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TRAFFIC IMPACT ANALYSIS

FIGURE 3

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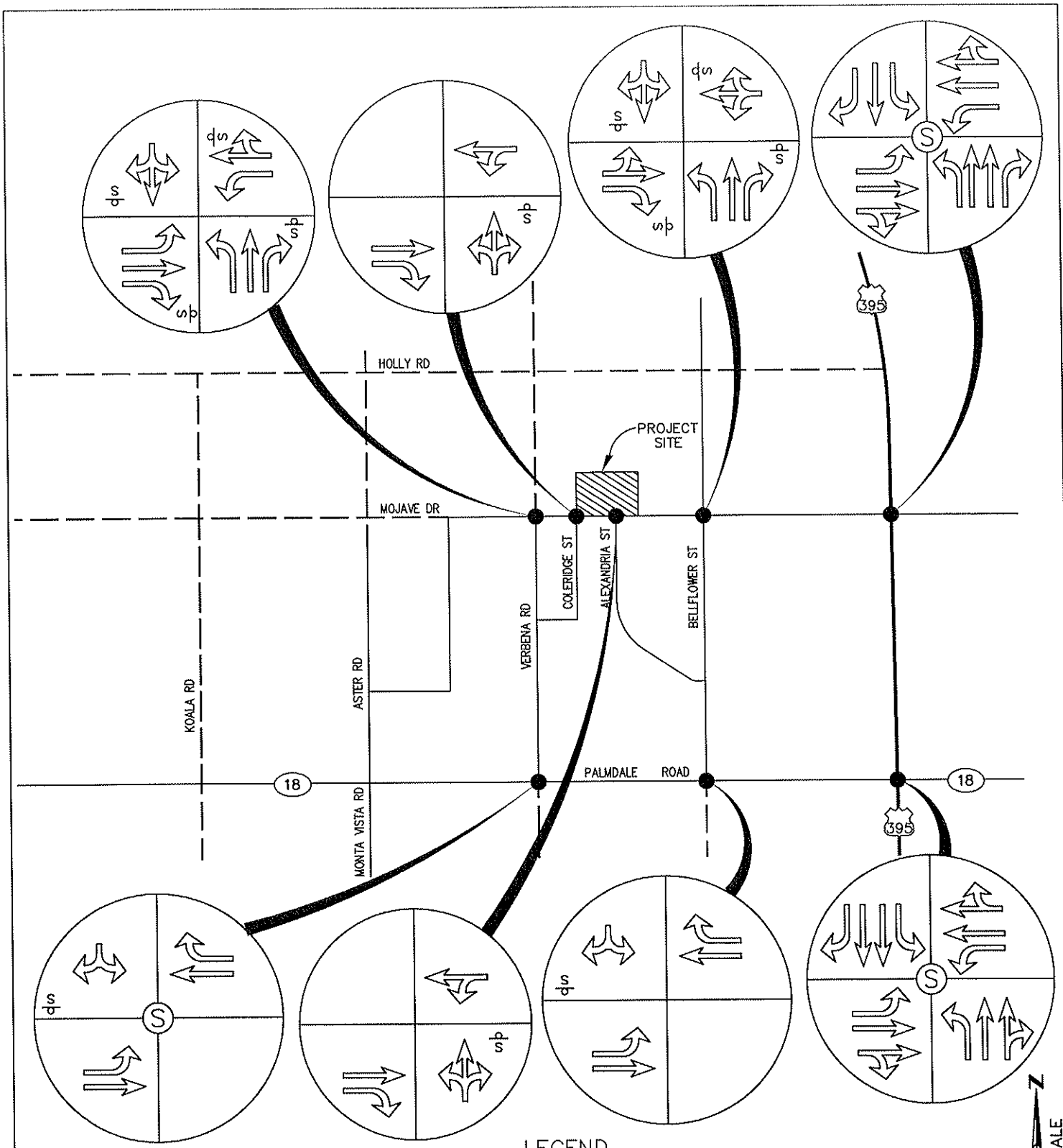

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EXISTING INTERSECTION GEOMETRICS

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FIGURE 4

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TABLE 1
INTERSECTION CAPACITY ANALYSIS – EXISTING CONDITIONS
Traffic Impact Analysis – Lilac Development, LLC

Intersection	A.M. Peak		P.M. Peak	
	Delay (1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Dr and Verbena Road (3)	10.2	B	9.0	A
-Mojave Dr and Coleridge Street (3)	11.3	B	9.7	A
-Mojave Dr and Alexandria Street (3)	8.3	A	10.4	B
-Mojave Dr and Bellflower Street (3)	26.0	D	13.1	B
-Mojave Dr and Highway 395	0.72	D	0.70	D
-Palmdale Road and Verbena Road	0.47	B	0.40	B
-Palmdale Road and Bellflower Street (3)	61.2	F	28.9	D
-Palmdale Road and Highway 395	0.88	D	0.85	D

(1) ICU – Intersection Capacity Utilization
(2) LOS – Level of Service
(3) Un Signalized Intersection
(4) ICU – Intersection Capacity Utilization
Source: **Hall & Foreman Inc.**

As illustrated in Table 1 under existing traffic conditions, all but four of the intersections are operating at LOS "B" or better. Mojave Drive and Bellflower Street is operating at LOS "D" during the morning Peak Hour and the intersection of Palmdale Road and Bellflower Street is operating at LOS "D" or lower for both the AM and PM Peak Hour. This is representive of the intersection currently being unsignalized. The intersection of Mojave Drive and Highway 395 and Palmdale Road and Highway 395 is currently operating at a LOS "D" during the AM and PM Peak Hours.

4. BACKGROUND TRAFFIC

Area Growth

To analyze the project impacts, the inclusion of traffic generated by other projects within the study area is necessary. Other area projects at the study intersections were taken into consideration. The estimated traffic volumes are presented on Exhibit A-F in the appendix to this report. This growth with other area project traffic volumes is known as background traffic. The analysis of background traffic allows a comparison of traffic impacts with and without the project applying other area projects to the existing turn movement volumes. *Figure 5A* illustrates year 2012 background traffic volumes.

Background Traffic Analysis

To determine the impacts of the project to the study intersection, existing plus the anticipated background traffic project peak hour volumes were calculated. The analysis was conducted with the existing year 2012 intersection geometrics.

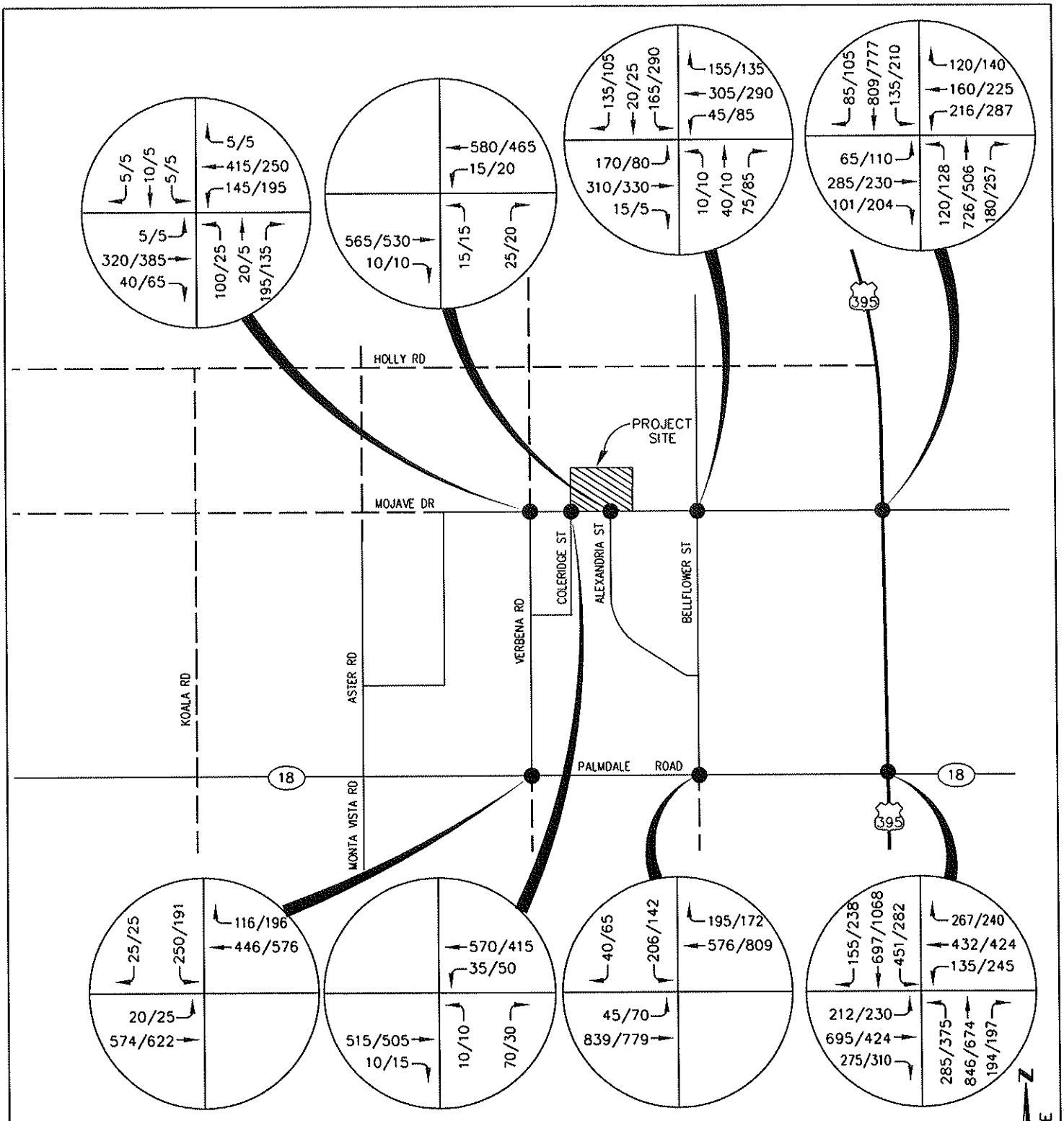
TABLE 2
INTERSECTION CAPACITY ANALYSIS – BACKGROUND CONDITIONS
Traffic Impact Analysis – Lilac Development, LLC

	A.M. Peak		P.M. Peak	
Intersection	Delay (1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Drive and Verbena Road (3)	24.94	C	19.11	C
-Mojave Drive and Coleridge Street (3)	16.1	C	15.7	C
-Mojave Drive and Alexandria Street (3)	20.2	C	17.7	C
-Mojave Drive and Bellflower Street (3) w/ Mitigation (High School project)	117.38 0.53	F C	125.95 0.56	F C
-Mojave Drive and Highway 395 w/ Mitigation (Target project)	0.93 0.67	E C	0.99 0.76	E D
-Palmdale Road and Verbena Road	0.61	B	0.59	B
-Palmdale Road and Bellflower Street (3) w/ Mitigation (Caltrans project)	801.6 0.83	F C	945.9 0.74	F C
-Palmdale Road and Highway 395 w/ Mitigation (Wal-Mart Project) w/ Additional Mitigation	1.17 1.01 0.87	F F D	1.13 1.09 0.90	F F D

(1) ICU – Intersection Capacity Utilization
(2) LOS – Level of Service
(3) Un Signalized Intersection
(4) ICU – Intersection Capacity Utilization
Source: **Hall & Foreman Inc.**

As illustrated in Table 2 under background traffic conditions, the intersections of Mojave Drive and Verbena Road, Mojave Drive and Coleridge Street, Mojave Drive and Alexandria Street, and Palmdale Road and Verbena Road will continue to operate at an acceptable LOS "C" or better, and all other intersections will operate at LOS "D" or lower.

As shown on Table 2, mitigation is required for all but four intersections to accommodate the anticipated traffic due to other area projects. The proposed mitigation measures addressed for the background traffic conditions are shown on *Figure 5B*. As presented, there are four projects that are proposed in the area that have identified improvements to the area streets. Since it is assumed that these projects are to be developed by the Year 2012, and are included in the Background traffic projections, the proposed improvements are assumed to be constructed under Background conditions. These improvements include the installation of a traffic signal and intersection widening at the intersection of Mojave Drive and Bellflower Street as a part of the new High School project, intersection widening at the intersection of Mojave Drive and Highway 395 as a part of the Target project, and intersection widening at the intersection of Palmdale Drive and Highway 395 as part of the Wal-Mart project. In addition, the City of Adelanto and Caltrans have identified a safety improvement project for the intersection of Palmdale Road and Bellflower Street. To mitigate Background traffic, additional mitigation is needed at the intersection of Palmdale Road at Highway 395. The additional mitigation is needed in addition to the mitigation identified by the Wal-Mart project. The recommended mitigation from the Wal-Mart project consists of adding an exclusive right turn lane in the westbound, eastbound, and northbound directions. The additional mitigation required is the addition of an exclusive left turn lane in the northbound, southbound, westbound, and eastbound directions. The exclusive right turn lane proposed by the Wal-Mart project should be upgraded to a free right turn lane to improve the level of service at the intersection. All recommended mitigations are shown on *Figure 5B*.



LEGEND

● – STUDY INTERSECTIONS

XX/XX – AM/PM PEAK HOUR VOLUMES

N

NOT TO SCALE

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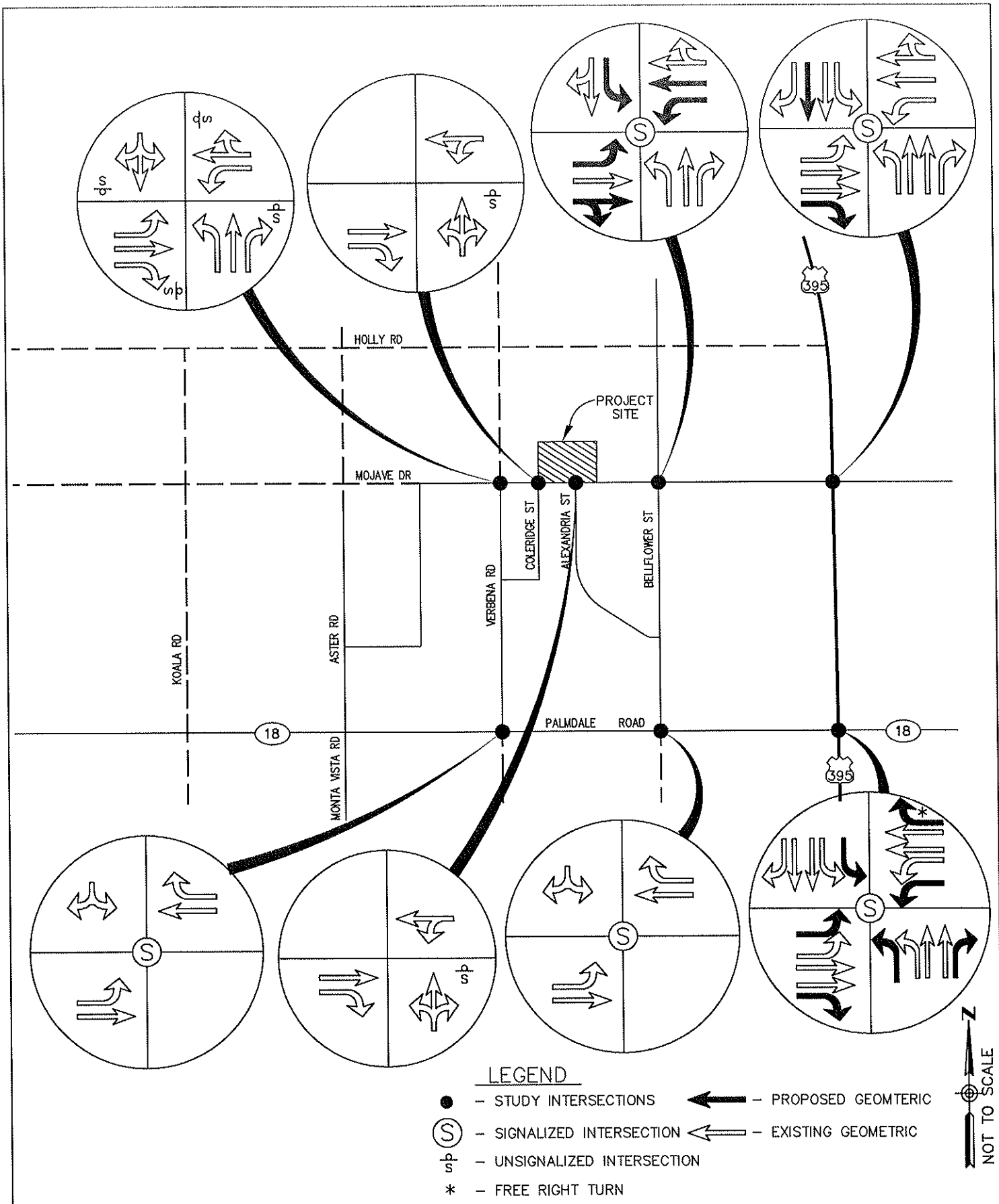
BACKGROUND TRAFFIC
YEAR 2012
LILAC DEVELOPMENT, LLC
ADELANTO
TRAFFIC IMPACT ANALYSIS

FIGURE 5A



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BACKGROUND YEAR 2012 RECOMMENDED GEOMETRICS
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TRAFFIC IMPACT ANALYSIS

FIGURE 5B

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5. PROJECT CONDITIONS

Project Trip Generation

The project was analyzed to determine the amount of traffic that would be generated from the proposed development. To identify potential traffic impacts from the project, trip generation factors were applied to the type of use to generate project traffic estimates. The trip generation rates were obtained from the Institute of Transportation Engineers' trip generation report as presented in Table 3.

TABLE 3
PROJECT TRIP GENERATION
Traffic Impact Analysis – Lilac Development, LLC

	Use		A.M. Peak Hour			P.M. Peak Hour		
		Daily	In	Out	Total	In	Out	Total
	Westerly Development							
1	**Restaurant w/ Drive-Thru**							
	(ITE 934) Per 1000 SF	496.12	25.17	24.18	49.35	17.6	16.24	33.84
	5,300	**2,629**	**133**	**128**	**262**	**93**	**86**	**179**
2	**Office/ Retail (Business Park)**							
	(ITE 770) Per 1000 SF	12.76	1.2	0.23	1.43	0.3	0.99	1.29
	30,828	**393**	**37**	**7**	**44**	**9**	**31**	**40**
3	**Specialty Retail Store**							
	(ITE 814) Per 1000 SF	44.32	3.28	3.56	6.84	2.81	2.21	5.02
	24,300	**1077**	**80**	**87**	**166**	**68**	**54**	**122**
4	**Bank**							
	(ITE 932) Per 1000 SF	148.15	6.92	5.43	12.35	12.91	12.91	25.82
	6,000	**889**	**41**	**33**	**74**	**77**	**77**	**155**
	Westerly Development Sub-Total	4,989	292	254	546	248	248	496
	Internal Trips (10% Reduction)	-499	-29	-25	-55	-25	-25	-50
	Pass-By Trips (10%)	-499	-29	-25	-55	-25	-25	-50
	Sub-Total	**3,991**	**233**	**203**	**437**	**199**	**198**	**397**

	Use		A.M. Peak Hour			P.M. Peak Hour		
		Daily	In	Out	Total	In	Out	Total
	Easterly Development							
4	**Restaurant**							
	(ITE 932) Per 1000 SF	127.15	5.99	5.53	11.52	6.58	4.57	11.15
	5,000	**636**	**30**	**28**	**58**	**33**	**23**	**56**
5	**Office/ Retail (Business Park)**							
	(ITE 770) Per 1000 SF	12.76	1.2	0.23	1.43	0.3	0.99	1.29
	42,700	**545**	**51**	**10**	**61**	**13**	**42**	**55**
6	**Specialty Retail Store**							
	(ITE 814) Per 1000 SF	44.32	3.28	3.56	6.84	2.81	2.21	5.02
	14,300	**634**	**47**	**51**	**98**	**40**	**32**	**72**
7	**Drug Store**							
	(ITE 881) Per 1000 SF	88.16	1.52	1.14	2.66	5.18	5.18	10.35
	14,500	**1278**	**22**	**17**	**39**	**75**	**75**	**150**
	Easterly Development Sub-Total	3,093	150	105	255	161	172	333
	Internal Trips (10% Reduction)	-309	-15	-10	-26	-16	-17	-33
	Pass-By Trips (10%)	-309	-15	-10	-26	-16	-17	-33
	Sub-Total	**2,474**	**120**	**84**	**204**	**129**	**137**	**266**
	West Development	**3,991**	**233**	**203**	**437**	**199**	**198**	**397**
	East Development	**2,474**	**120**	**84**	**204**	**129**	**137**	**266**
	Project Totals	**6,465**	**353**	**287**	**641**	**327**	**336**	**663**
	West Trip Percentage	**62%**	**66%**	**71%**	**68%**	**61%**	**59%**	**60%**
	East Trip Percentage	**38%**	**34%**	**29%**	**32%**	**39%**	**41%**	**40%**

As presented, the project consists of the developments shown on the previous table on a total of 3.8 acres. It is estimated that the project will generate 6,465 daily trips, 641 trips during the AM Peak Hour, and 663 trips during the PM Peak Hour.

Project Trip Distribution

To address the impacts of the estimated project traffic, the trips were distributed and assigned to the surrounding streets and study intersections. The project traffic was distributed based on the anticipated project utilization. Once the distribution pattern was established, project trips were assigned to the area streets that serve the project.

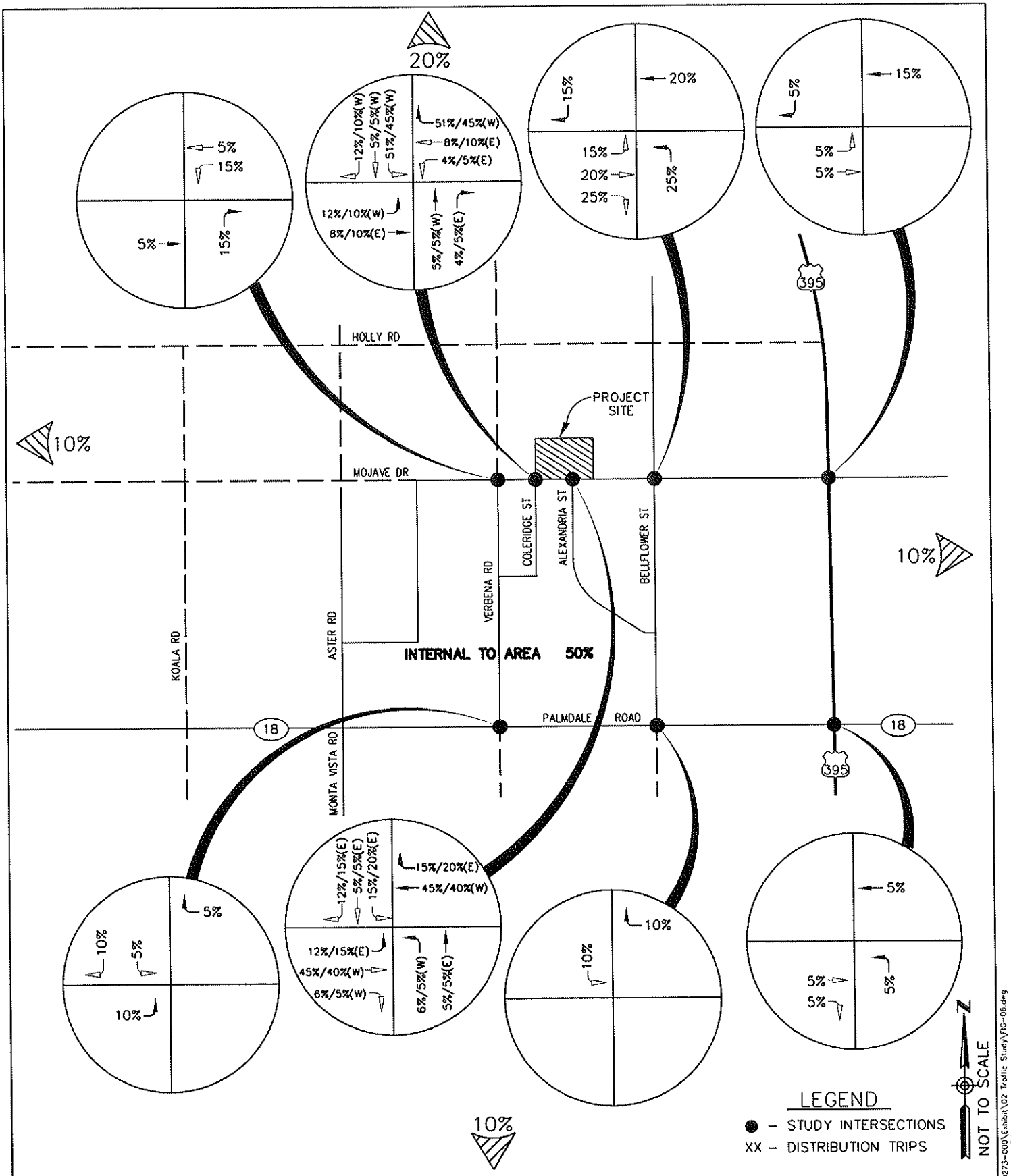
To address the impacts of the estimated entry/exit trips at the project driveways, the trips were distributed and assigned to each driveway. The project was distributed based on the anticipated project traffic flows and surrounding area utilization.

Figure 6 illustrates the general and specific estimated distribution pattern for project traffic. The project traffic was added to the existing traffic volume to assess the impacts generated. *Figure 7* illustrates the estimated AM and PM peak hours for the project traffic volumes.

Project Traffic Analysis

Based on the proposed traffic distribution, assignment patterns and project trip generation, intersection capacity analyses were conducted to assess the estimated project impacts. To determine the project impacts at the study intersection and driveways, the Background Year 2012 volumes and project trips, known as Project Conditions and as shown on *Figure 8*, were calculated.

Intersection capacity analysis for the proposed un-signalized driveway intersections were conducted utilizing the methodologies described in the Capacity Analysis Methodologies. The recommended intersection geometrics are shown in *Figure 9*. The LOS for the intersection presented in Table 4 represents the LOS for the critical movement. This is typically the stop controlled left turn from the minor street.



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TRIP DISTRIBUTION

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FIGURE 6

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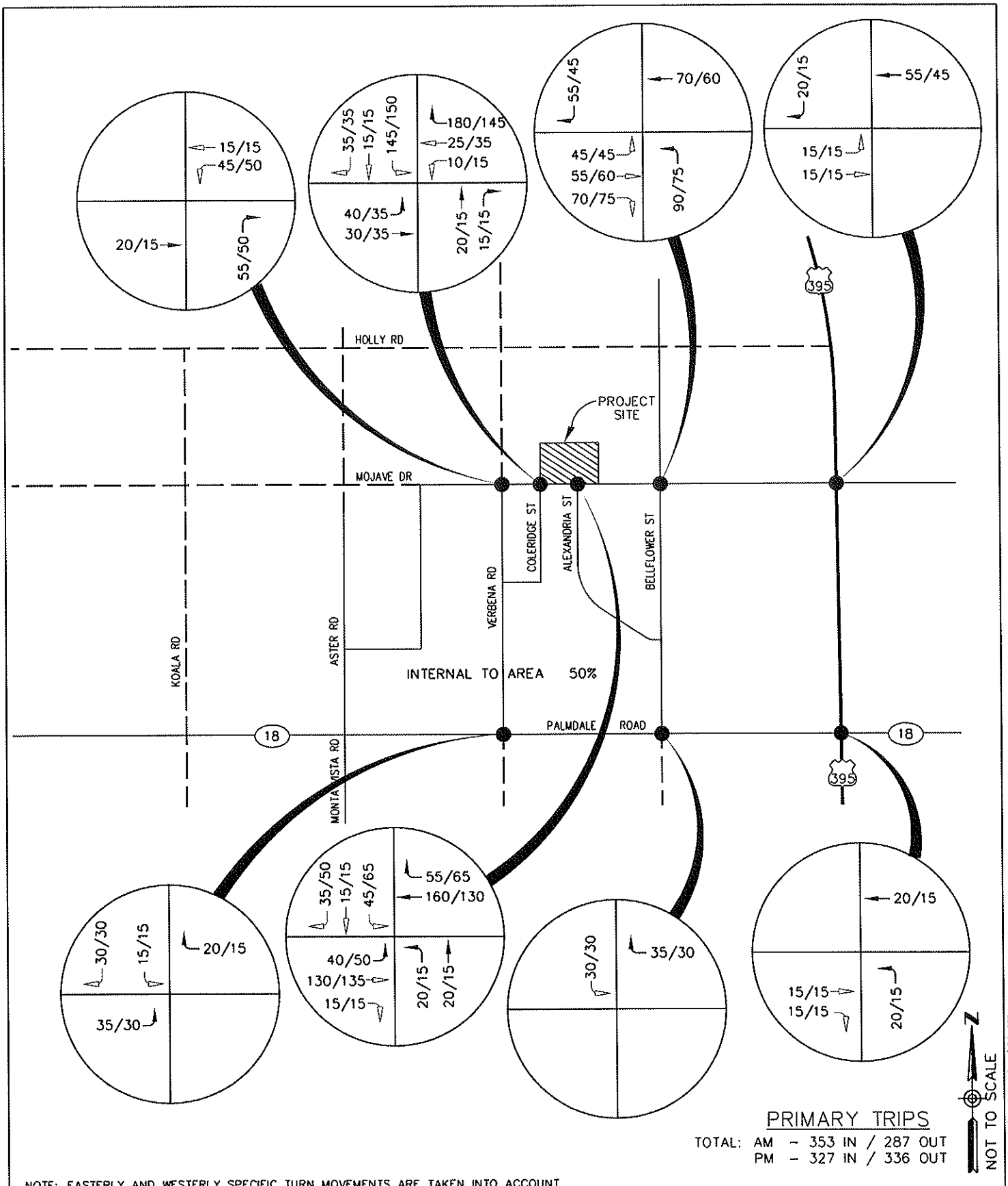

PRIMARY TRIPS

TOTAL: AM - 353 IN / 287 OUT
PM - 327 IN / 336 OUT

NOTE: EASTERLY AND WESTERLY SPECIFIC TURN MOVEMENTS ARE TAKEN INTO ACCOUNT FROM PERCENTAGE BREAK FROM FIGURE 6.

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PROJECT TRIPS

LILAC DEVELOPMENT, LLC
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FIGURE 7

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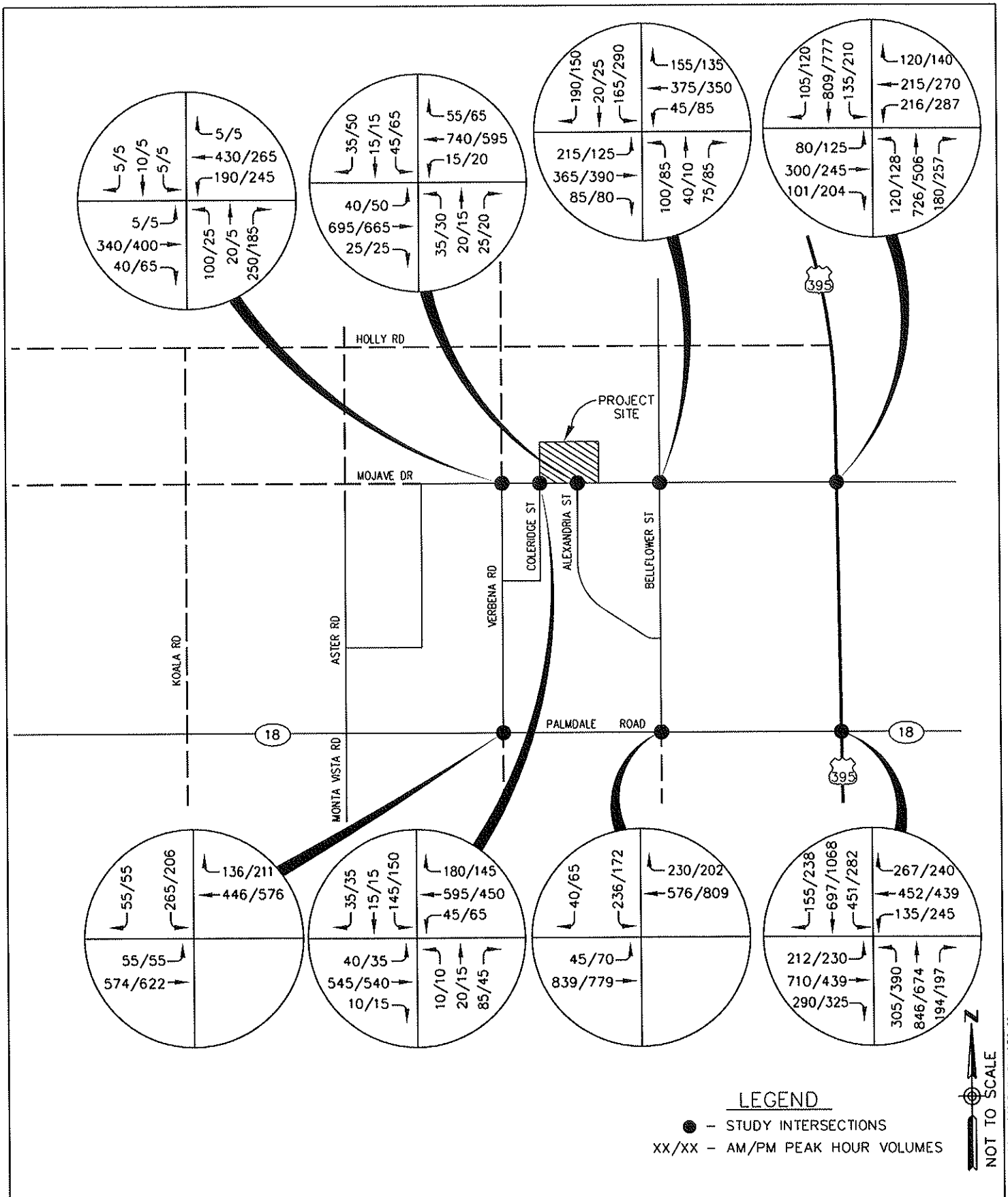

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YEAR 2012 BACKGROUND PLUS PROJECT TRIPS
LILAC DEVELOPMENT, LLC
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FIGURE 8

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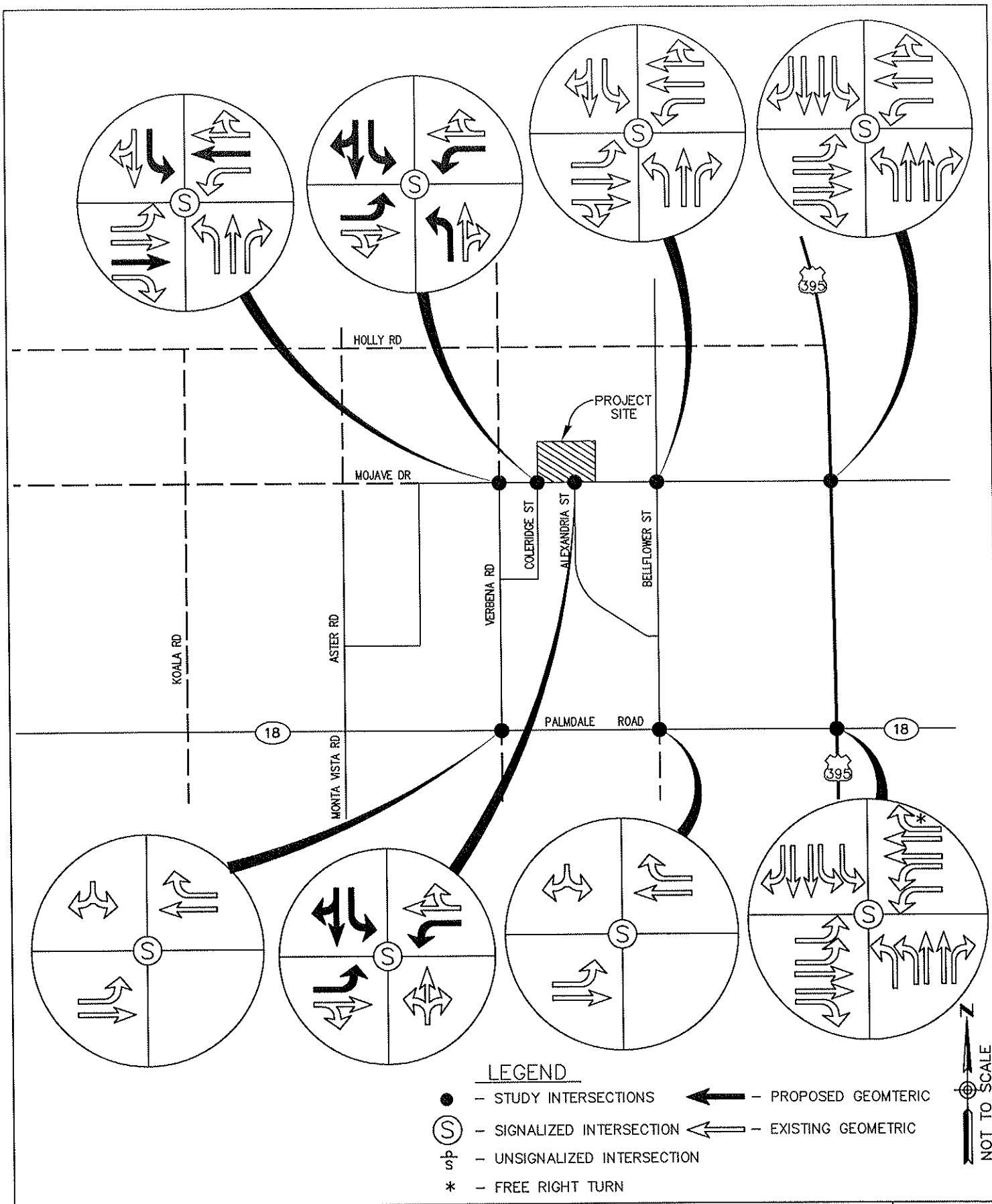

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RECOMMENDED PROJECT INTERSECTION GEOMETRICS

LILAC DEVELOPMENT, LLC
ADELANTO
TRAFFIC IMPACT ANALYSIS

FIGURE 9

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TABLE 4
INTERSECTION CAPACITY ANALYSIS – PROJECT CONDITIONS
Traffic Impact Analysis – Lilac Development, LLC

Intersection	A.M. Peak Delay (1)/ ICU (4)	A.M. Peak LOS (2)	P.M. Peak Delay (1)/ ICU (4)	P.M. Peak LOS (2)
-Mojave Drive and Verbena Road	32.92	D	24.63	C
w/ Mitigation (Traffic Signal)	0.47	C	0.50	C
-Mojave Drive and Coleridge Street (3)	1403.0	F	760.0	F
w/ Mitigation (Traffic Signal)	0.74	D	0.60	C
-Mojave Drive and Alexandria Street (3)	455.1	F	365.7	F
w/ Mitigation (Traffic Signal)	0.66	C	0.60	C
-Mojave Drive and Bellflower Street	0.61	C	0.58	C
-Mojave Drive and Highway 395	0.64	C	0.71	D
-Palmdale Road and Verbena Road	0.65	B	0.62	B
-Palmdale Road and Bellflower Street	0.81	C	0.79	C
-Palmdale Road and Highway 395	0.86	D	0.90	D

(1) ICU – Intersection Capacity Utilization
(2) LOS – Level of Service
(3) Un Signalized Intersection
(4) ICU – Intersection Capacity Utilization
Source: **Hall & Foreman Inc.**

As presented in Table 4, the required mitigations under Background conditions would remain in place. As a result, the only intersections requiring specific project mitigation are the Intersections of Mojave Drive and Coleridge Street, and Mojave Drive and Alexandria Street. These intersections represent the main project driveways.

To improve those intersections falling at LOS "D" or lower, mitigation measures have been provided for the recommended intersection. Currently, Mojave Drive and Coleridge Street and Mojave Drive and Alexandria Street are two-way stop intersections that will need to be improved to provide for a signalized intersection. Mojave Drive and Verbena Rd is currently a four-way stop controlled intersection which also requires a traffic signal installation in order to improve the critical movement LOS to an acceptable LOS "D" or better. The recommended project geometrics for the intersections requiring specific project mitigation are presented in *Figure 9.*

A traffic signal warrant study was done for the intersections of Mojave Drive and Alexandria Street, Mojave Drive and Coleridge Street, and Mojave Drive and Verbena Road. All 3 intersections satisfied Warrant 3 due to the high peak hour volumes expected at these intersections for the project conditions.

6. FUTURE TRAFFIC CONDITIONS

Area Growth

This report is primarily concerned with traffic impacts created by the proposed project. However, growth within the study area due to development will occur. To analyze the future conditions the VVATS traffic model Year 2035 was used, which includes the High School, Target, and Wal-Mart background projects. The VVATS traffic model Year 2035 data was adjusted based on the existing turn volume movements and the anticipated growth in the near vicinity. This allows the project to be analyzed to its relation of the cumulative traffic.

The results of the year 2035 forecast calculations are illustrated in *Figures 10* and *11,* and presented in the Turn Movement summary worksheets in the appendix to this report.

Future Traffic Analysis

The intersections were analyzed using the capacity analysis methodology described earlier. The analysis was conducted with the anticipated project and Future Year 2035 traffic volumes and the existing intersection geometrics. The results of the analysis are shown in Tables 5 and 6.

TABLE 5
INTERSECTION CAPACITY ANALYSIS – FUTURE YEAR 2035 CONDITIONS – W/O PROJECT
Traffic Impact Analysis – Lilac Development, LLC

	A.M. Peak		P.M. Peak	
Intersection	Delay (1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Drive and Verbena Road (3)	11.2	B	277.2	F
-Mojave Drive and Coleridge Street (3)	15.0	B	12.1	B
-Mojave Drive and Alexandria Street (3)	16.7	C	14.0	B
-Mojave Drive and Bellflower Street	0.68	C	0.59	C
-Mojave Drive and Highway 395	0.77	C	0.84	D
-Palmdale Road and Verbena Road	0.53	B	0.54	B
-Palmdale Road and Bellflower Street (5)	0.82	C	0.78	C
-Palmdale Road and Highway 395	0.97	E	0.99	E

(1) ICU – Intersection Capacity Utilization
(2) LOS – Level of Service
(3) Un Signalized Intersection
(4) ICU – Intersection Capacity Utilization
(5) Previously Mitigated Intersection by other project
Source: **Hall & Foreman Inc.**

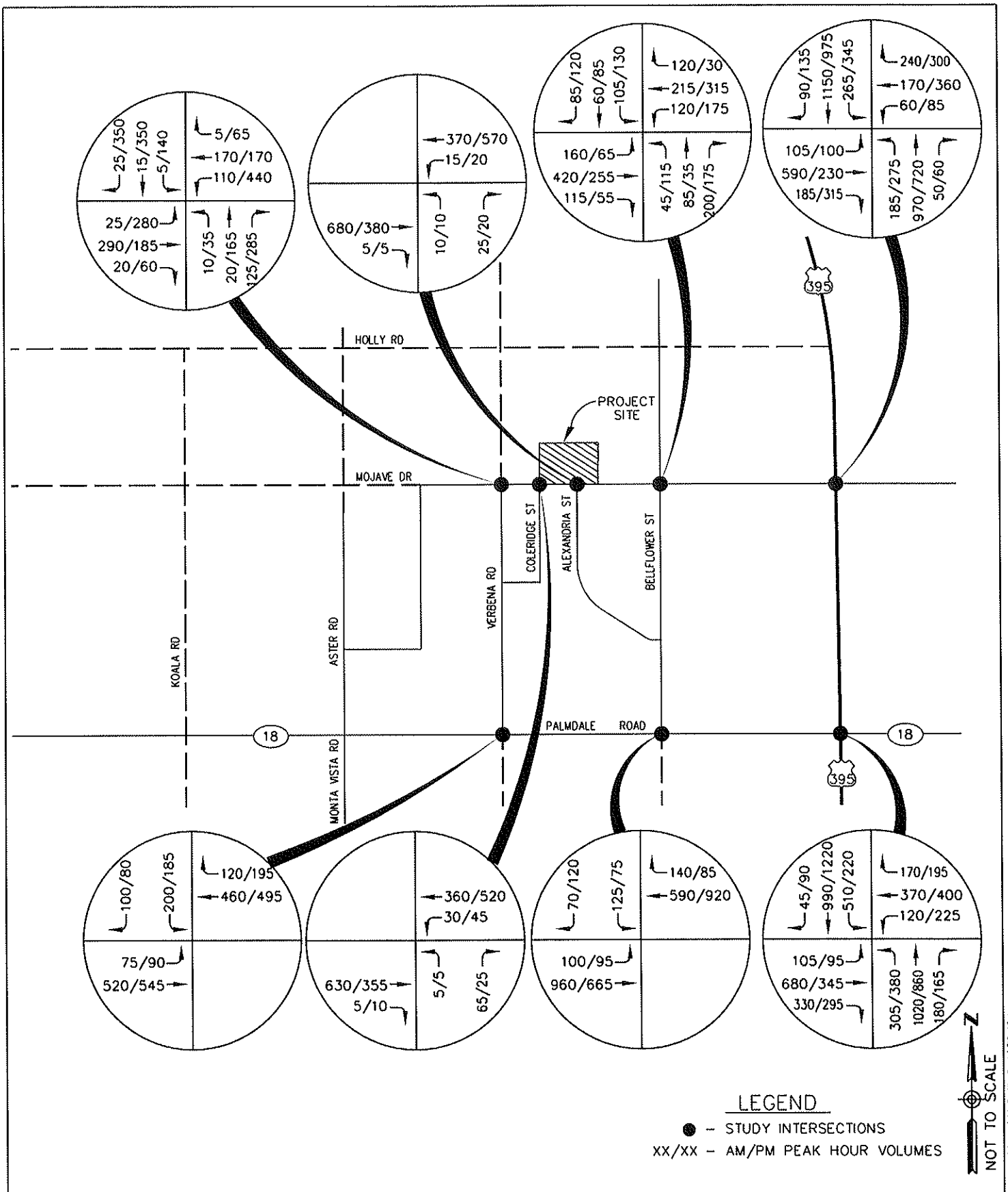
As illustrated in Table 5 under Year 2035 w/o project conditions, it is anticipated that the intersection of Mojave Dr and Verbena Road will drop to an unacceptable Levels-of-Service. To address the issue mitigations measures are recommended and are illustrated in *Figure 11.*

TABLE 6
INTERSECTION CAPACITY ANALYSIS – FUTURE YEAR 2035 CONDITIONS – WITH PROJECT
Traffic Impact Analysis – Lilac Development, LLC

	A.M. Peak		P.M. Peak	
Intersection	Delay (1)/ ICU (4)	LOS (2)	Delay (1)/ ICU (4)	LOS (2)
-Mojave Drive and Verbena Road	0.29	C	0.63	D
-Mojave Drive and Coleridge Street	0.63	C	0.61	C
-Mojave Drive and Alexandria Street	0.61	C	0.61	C
-Mojave Drive and Bellflower Street	0.57	C	0.62	C
-Mojave Drive and Highway 395	0.77	D	0.83	D
-Palmdale Road and Verbena Road	0.59	B	0.58	B
-Palmdale Road and Bellflower Street	0.81	B	0.82	C
-Palmdale Road and Highway 395	0.84	D	0.87	D

(1) ICU – Intersection Capacity Utilization
(2) LOS – Level of Service
(3) Un Signalized Intersection
(4) ICU – Intersection Capacity Utilization
Source: **Hall & Foreman Inc.**

As illustrated in Table 6 under Year 2035 with project traffic conditions, the additional traffic to the street system lowers the LOS at several intersections, however the intersections will continue to operate at acceptable levels-of-service. The proposed recommended mitigations are shown on *Figure 12* of this report. The proposed additional mitigations for Year 2035 are shown and further discussed in the Summary of this report.



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YEAR 2035 TRAFFIC VOLUMES WITHOUT PROJECT
LILAC DEVELOPMENT, LLC
ADELANTO
TRAFFIC IMPACT ANALYSIS

FIGURE
10

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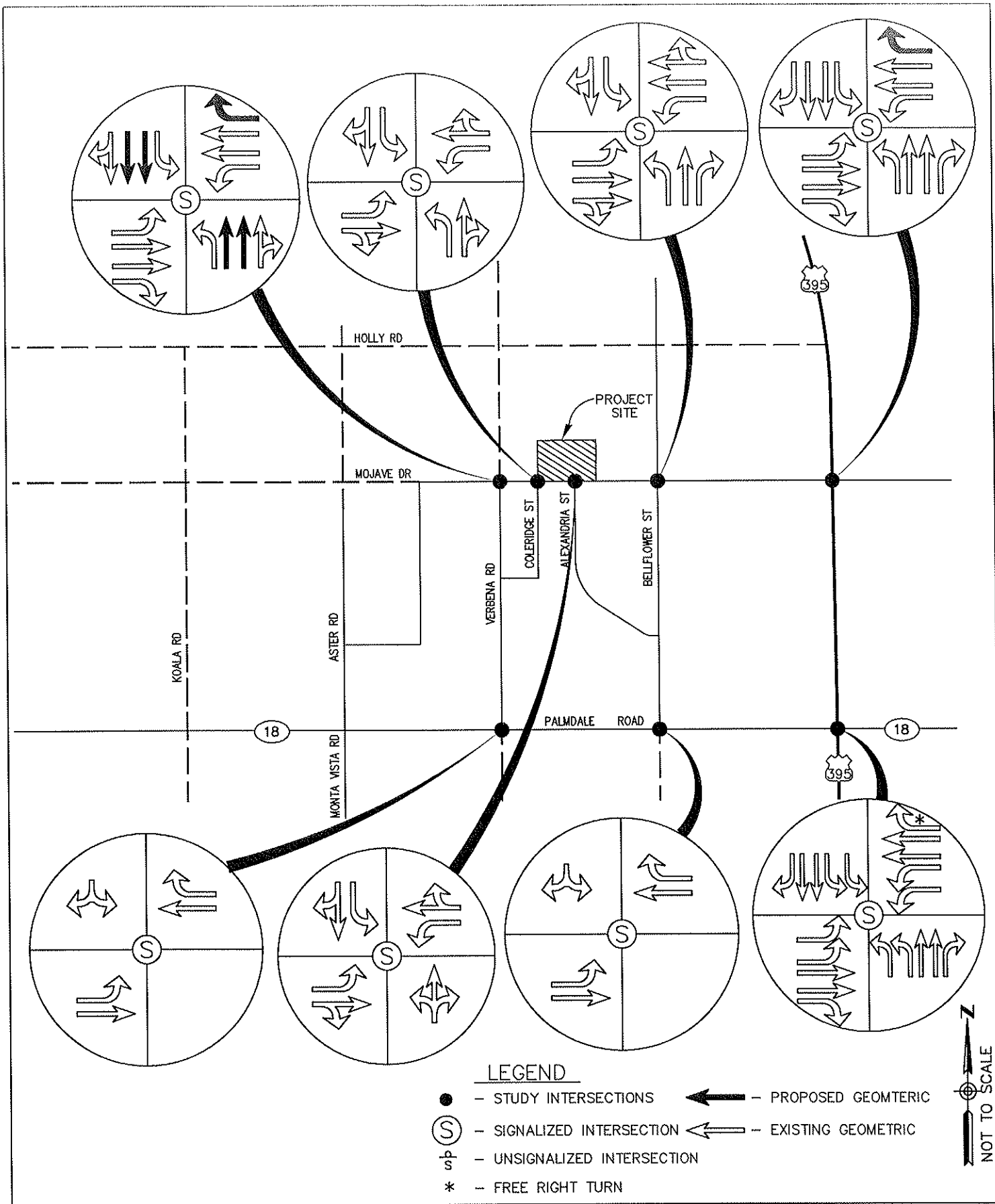

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PROPOSED GEOMETRICS
YEAR 2035
LILAC DEVELOPMENT, LLC
ADELANTO
TRAFFIC IMPACT ANALYSIS

FIGURE 11

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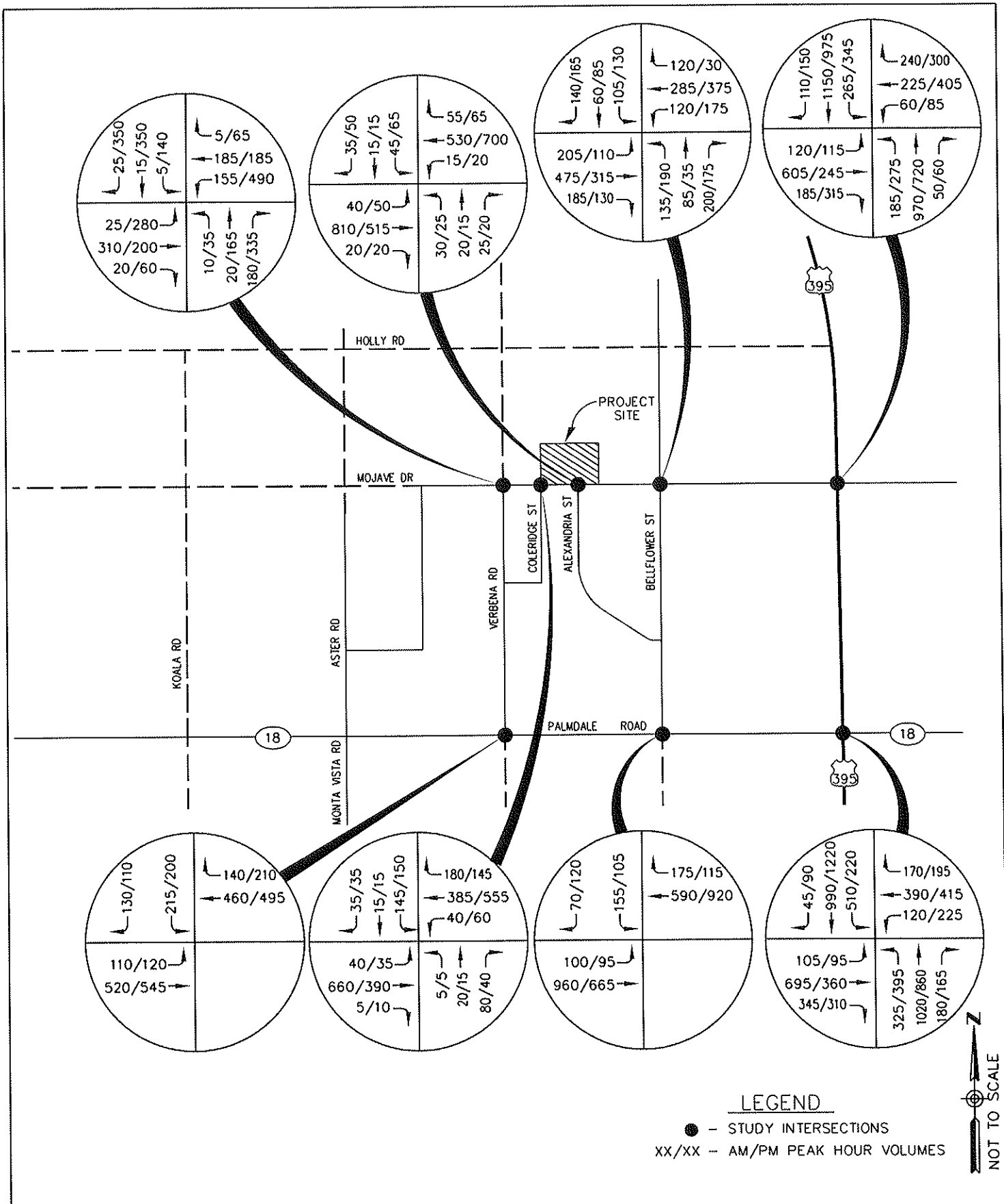

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YEAR 2035 TRAFFIC VOLUMES WITH PROJECT
LILAC DEVELOPMENT, LLC
ADELANTO
TRAFFIC IMPACT ANALYSIS

FIGURE 12

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7. PROJECT MITIGATION AND SUMMARY

In summary, the project as presented will cause impacts to the surrounding street system. The street system will require the installation of new traffic signals and lane improvements at several intersections.

Background Mitigation – Year 2012

As discussed, several intersections are recommended to be mitigated to address other project volume generation. The following intersections are improvements required in addition to those improvements to be constructed by others;

1. Palmdale Road and Highway 395; The Wal-Mart project recommends that an exclusive right turn lane in the westbound, eastbound, and northbound direction be added to the intersection. The additional mitigation identified by this study is the addition of an exclusive left turn lane in the northbound, southbound, westbound, and eastbound directions. The exclusive right turn lane in the westbound direction proposed by the Wal-Mart project should be upgraded to a free right turn lane to improve the level of service at the intersection.

Year 2035 Mitigation

The following are the additional recommended mitigation measures to address the Year 2035 traffic growth:

1. Mojave Drive and Verbena Road; Due to the high volumes, the intersection requires that the following lane modifications be made. In the westbound direction add an exclusive right turn lane. In the northbound and southbound directions add two through lanes.

2. Mojave Drive and Highway 395; Provide an exclusive right turn lane in the westbound direction.

Project Specific Mitigation

The following is an outline of the specific mitigation measures recommended for the project;

1. Mojave Drive and Coleridge Street (Main project entrance, west project site / Driveway A); Install a traffic signal at the main project entrance. Make lane modifications to provide one left turn lane and a shared through and right turn lane in all directions.

2. Mojave Drive and Alexandria Street (Main project entrance, east project site / Driveway C); Install a traffic signal at the main project entrance. Make lane modifications to provide one left turn lane and a shared through and right turn lane in the eastbound, westbound, and southbound directions. A single all direction lane is required in the northbound direction at the intersection.

3. Mojave Drive and Verbena Road; Install a traffic signal and provide an exclusive left turn lane, one through lane, and an exclusive right turn lane in the northbound direction. In the southbound direction provide an exclusive left turn lane and a shared through and right turn lane. In the eastbound direction provide an exclusive left turn lane, two through lanes, and an exclusive right turn lane. In the westbound direction provide an exclusive left turn lane, a through lane, and a shared through and right turn lane.

4. Construct half width street improvements along project frontages.

   Based on the analysis of the vertical Sight Distance constraints, that portion of Mojave Drive east of the existing Drainage Easement will be required to be reconstructed to meet the vertical Stopping Sight Distance for a 45 mph design speed.

   The secondary driveways (Driveway's B and D), shall be restricted to Right Turn In and Out movements. This can be accomplished by constructing a "pork chop" diverter island in the driveway approach with signage, or the construction of a raised median in Mojave Drive.

TABLE 7
TRAFFIC MITIGATION FAIR SHARE - BACKGROUND YEAR 2012
Traffic Impact Analysis – Lilac Development, LLC

Location	Improvements	Fair Share	Total Cost ($)	Project Cost ($)
Palmdale Road and Highway 395	As discussed in Project Mitigation and Summary	4.1%	$350,000	$14,350

Total Background Year 2012 = $246,065

TRAFFIC MITIGATION FAIR SHARE - FUTURE YEAR 2035

Location	Improvements	Fair Share	Total Cost ($)	Project Cost ($)
Mojave Drive and Verbena Road	As discussed in Project Mitigation and Summary	30.3%	$1,208,880	$366,290
Mojave Road and Highway 395	As discussed in Project Mitigation and Summary	5.3%	$50,000	$2,630

Total Project Year 2035 = $368,290

Grand Total = $382,640

APPENDIX

- Other Area Projects
    - Exhibit A – School Development
    - Exhibit B – Target Development
    - Exhibit C – Wal-Mart Development
    - Exhibit D - Residential Projects
    - Exhibit E - Hwy 395 and SR 18 Background Traffic
    - Exhibit F– Total Projects

- VVATS Model, Year 2003 AM/PM Peak Period
- VVATS Model, Year 2035 AM/PM Peak Period
- Calculation of Future Directional Turn Volumes from Future Directional Link Volumes (NCHRP 255)
- Post Process Worksheets
- Project Mitigation Cost Calculations
- Intersection Capacity Analysis Calculations