Roadway Geometric Modification Analysis

Central Avenue (Washington to Zuni)
Zuni Road (Washington to Central)

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Foreword

The following text highlights the major findings of the Roadway Geometric Modification (RGM) Analysis for Zuni Road and Central Avenue.

- Focus of this study is Microscopic Traffic Operations and Signalization Analysis.
  - 2012 collected traffic volumes and 2035 projected traffic volumes
  - Previous Analysis was macroscopic and focused on roadway geometry
  - This study is microscopic, studying the intersection signal timing and geometry
  - Safety benefits of Roadway Geometric Modifications, as well as, modal choice assumed to be summarized by others
  - BUS and BRT impacts are not assessed

- Study area included the following roadways from Washington St. to General Chennault St.
  - Central Avenue
  - Zuni Road
  - Copper Avenue (discontinuous minor parallel arterial north of Central Ave.)
  - Lomas (Nearest major parallel arterial)

- Change in Delay Summary

Scenario	2012		2035	
	AM	PM	AM	PM
No Geometric Modification	Baseline[1]	Baseline[1]	Baseline[1]	Baseline[1]
Zuni Road Geometric Modification	0% [1, 2]	0%	↑7%	↑22%
Zuni Road / Central Avenue Geometric Modification	0% [1, 2]	↑4%	↑10%	↑16%

1 – .All scenarios utilized optimized timing plans

- 2012 Analysis
  - Traffic Signals should remain on the grid
  - AM 110 second cycles, PM 120 seconds Cycles
  - RGMs warrant right-turn lanes at 4 intersections

Overall, it appears that either RGM scenario could be introduced without significant detrimental impact to the study area traffic operations when compared to the existing traffic operations, as long as recommended timing plans or auxiliary lane mitigations are implemented. It should be stressed that no RGM should be recommended on Central Avenue until a comprehensive study and planning have been done addressing BRT. The study should

include but not be limited to the following:

1. Address BRT impacts to signal timing and phasing (Transit Pre-emption, Center Running BRT and left-turn phasing)
2. Locations of Stations and their impacts on pedestrian phasing.
3. Impacts on mid-block access.
4. BRT impacts on auxiliary vehicle left and right turn-lanes.

- 2035 Analysis
    - Traffic Signals should remain on the grid
    - Grid should consider AM 130 second cycles, PM 150 seconds Cycles
    - RGMs warrant right-turn lanes at 4 intersections

In general, when comparing the baseline No RGM scenario, with either RGM scenarios, there are some projected increases in delay and reductions in capacity, but these are of relatively low significance as many of the increases in delay and reductions in capacity are the result of increased demands associated with 2035 projections regardless of the RGM scenario.

In Summary, there will be an increase in delays in the study area with the implementation of the analyzed roadway RGMs. That being said, there is not a fatal flaw foreseen in the traffic operations under these operations. If the sustainable initiatives, safety improvements, and neighborhood desires are aligned to implement the modifications, there is no reason to wait to implement the Zuni Road RGM. Central Avenue recommendations should wait for a full and comprehensive study and analysis of BRT impacts on operations.

Executive Summary

Introduction

Lee Engineering has been tasked by the City of Albuquerque to study the potential capacity, signal timing, and intersection impacts of proposed roadway geometric modifications on both Zuni Road and Central Avenue. The purpose of this study is to further expand the previously macroscopic models created by Mid-Region Council of Governments (MRCOG) which projected existing and 2035 corridor demands for the following three scenarios:

- No Roadway Geometric Modification
- Roadway Geometric Modification on Zuni Road only
- Roadway Geometric Modifications on both Zuni Road and Central Avenue

The RGM on Zuni Road proposes to modify the existing four-lane section (two through lanes in each direction) between San Mateo Boulevard and Central Avenue to a three lane section, which will incorporate one through and bike lane in each direction and a left-turn lane down the middle. Between Washington Street and San Mateo Boulevard, the modification will take the existing six-lane section and modify it to a four-lane roadway with a center left-turn lane/median and a bike lane in each direction.

The roadway geometric modification along Central Avenue proposes to eliminate one through lane in each direction in order to accommodate one exclusive Bus Rapid Transit (BRT) lane in each direction, likely running down the middle of Central Avenue. This proposal would modify Central Avenue's current six-lane with center raised median cross-section to a four vehicle lane with two BRT lanes, and bike lanes. It should be noted that this study will analyze only the geometric modifications on Central Avenue and does not study BRT alternatives and operations.

The following study will review both modification scenarios on a microscopic scale utilizing Synchro 8.0 software to analyze impacts, such as intersection capacity, auxiliary lane queue storage capacity, signal timing, and corridor coordination, at the signalized intersection level of detail. This draft report documents the assessment and comparison of signal operations for all current and 2035 traffic demand scenarios, provides optimized signal and coordination plans for all future options, recommends lane geometry and signal operations mitigation for existing demands, and determines the viability of either modification for existing and 2035 demands.

Conclusions and Recommendations

Based on the analyses, the conclusions and recommendations are summarized as follows:

Existing 2012 Conclusions

- Signal timing and progression optimization on Lomas Blvd, Zuni Road, and Central Ave will improve existing Level-of-Service and is recommended regardless whether Zuni Rd or Central Ave is modified.
- Based on signal timing optimization using Synchro software, it appears that for existing 2012 traffic demands under either scenario all study intersections can remain on the existing Grid signal timing scheme. Meaning that existing AM and PM cycle lengths of 110 seconds and 120 second, respectively, can be retained.
- Intersection capacity analyses results indicates that all intersections will operate under capacity and at a satisfactory Level of Service (LOS) of D or better under optimized existing conditions except at the following locations:
    - Lomas Blvd/San Mateo Blvd (Over capacity Movement/LOS E PM)
    - Lomas Blvd/Wyoming Blvd (Overcapacity AM/PM)
- The following intersections were identified to operate at LOS D under existing optimized (No RGM) conditions. Accompanying mitigation to achieve LOS C is also identified:
    - Central Ave/San Mateo – The addition of a northbound right-turn lane
    - Central Ave/Wyoming Blvd – The addition of either a westbound right-turn lane or a dual southbound left-turn lane.
    - Zuni Rd/Louisiana Blvd - The addition of a northbound right-turn lane
- For the 2012 Zuni Road RGM scenario, all movements are under capacity and expected to operate at an acceptable LOS except for Lomas Boulevard intersections with San Mateo Boulevard and Wyoming Boulevard which are both over capacity and LOS E. Generally, comparisons between the optimized existing (No RGM) conditions and Zuni Rd RGM conditions yield no significant impacts positive or negative to operation levels and capacity.
- For the 2012 Central Ave/Zuni Rd RGM, all movements are under capacity and expected to operate at an acceptable LOS except for Lomas Boulevard intersections with San Mateo Boulevard and Wyoming Boulevard which are both over capacity and LOS E. Also, at least one movement at the Central Avenue/Wyoming Boulevard intersection is a bit over capacity but still operates at a LOS D. The Central Ave/Zuni Rd RGM displays relatively minimal impacts positive or negative to operation levels and capacity when compared to the existing optimized (No RGM) conditions. There are two intersections indicating a significant increase in delay and reduction in LOS and include the Central Ave/Wyoming and Zuni/San Pedro intersections during the PM peak period. The Lomas/Pennsylvania intersection was significantly improved during the AM. All other intersections operated at essentially the same level.

- With the implementation of either scenario under optimized signal splits and offsets under 2012 demands, individual signalized corridors will operate with anywhere from no change in average delay per vehicle (Lomas, Central and Zuni AM-Zuni RGM) to a 2 second increase in average delay per vehicle (Central PM-Central Ave/Zuni Rd RGM). For the overall network, delay is remains the same, except for the PM peak under Central Ave/Zuni Rd RGM where there was an increase of 1 second in average delay per vehicle.
- Generally, 2012 arterial speeds and Arterial LOS are not significantly changed with either scenario.
- Existing traffic queue demands will exceed existing available storage at the following locations:
    - Eastbound left-turn at Central Avenue/San Mateo Blvd
    - Eastbound, northbound, and southbound left-turns at Central Ave/San Pedro Dr
    - Eastbound and northbound left-turns at Central Ave/Wyoming Blvd
    - Eastbound, westbound, and southbound left-turns at Zuni Rd/Louisiana
    - Eastbound and westbound left-turns at Zuni Rd/Wyoming Blvd
- Zuni Rd RGM traffic queue demands will exceed existing storage at the following intersections:
    - Eastbound and westbound left-turns at Central Avenue/San Mateo Blvd.
    - Eastbound and southbound left-turns at Central Ave/San Pedro Dr.
    - Southbound left-turn at Central Ave/Louisiana Blvd.
    - Eastbound and northbound left-turns at Central Ave/Wyoming Blvd.
    - Southbound left-turn at Zuni Rd/San Pedro Dr.
    - Westbound and southbound left-turns at Zuni Rd/Louisiana Blvd.
    - Eastbound left-turn at Zuni Rd/Wyoming Blvd.

  These auxiliary lanes should be re-sized to accommodate anticipated demands with the implementation of the Zuni Rd RGM.
- Central Ave/Zuni Rd RGM traffic queue demands will exceed existing storage at the following intersections:
    - Eastbound and westbound left-turns at Central Avenue/San Mateo Blvd.
    - Westbound left-turn at Central Ave/Alvarado Dr.
    - Eastbound and southbound left-turns at Central Ave/San Pedro Dr.
    - Eastbound and northbound left-turns at Central Ave/Wyoming Blvd.
    - Southbound left-turn at Zuni Rd/San Mateo Blvd.
    - Southbound left-turn at Zuni Rd/San Pedro Dr.
    - Westbound and southbound left-turns at Zuni Rd/Louisiana Blvd.
    - Eastbound left-turn at Zuni Rd/Wyoming Blvd.

  These auxiliary lanes should be re-sized to accommodate anticipated demands with the implementation of the Central Ave/Zuni Rd RGM.
- As shown in ***Table 9,*** all newly proposed lanes are colored green and should be constructed accommodating at least minimum storage length shown if possible.

- Overall, it appears that either modification scenario could be introduced without significant detrimental impact to the study area traffic operations when compared to existing operations, as long as recommended timing plans or auxiliary lane mitigations are implemented. This conclusion should be tempered with the fact that there are some identified movements that are either over capacity and/or have insufficient queue storage length, both of which can create unpredictable performance and many times reduce corridor performance. The only noticeable degradation of operation was seen in the increase in corridor delay on Central Avenue with either modification scenario.
- It should be stressed that this study only investigates potential operations with lane geometry modifications on Central Avenue and does not review operational issues directly related to the construction of BRT. When and if BRT is implemented, traffic should be evaluated specifically to address impacts of transit preemption at signalized intersections, potential reduction in minor street access to Central Avenue, the potential increase in u-turns at intersections, and where median breaks should be planned. These are just a few of the issues that should be studied when planning/design for the Central Avenue BRT begins.

2012 Recommendations

- Right-turn lanes mitigation was required and recommended on Zuni Road at the following intersections under both scenarios in order to maintain acceptable levels of service:
  - San Mateo Boulevard
  - San Pedro Drive
  - Louisiana Boulevard
  - Wyoming Boulevard
- It should be noted that right-turn lanes recommended for Zuni Road can be accommodated without procuring additional ROW.
- Right-turn lanes are also recommended at major intersections along Central Avenue under the Central Ave/Zuni Rd modification scenario and include the following:
  - San Mateo Boulevard
  - San Pedro Drive
  - Louisiana Boulevard
  - Wyoming Boulevard
- When and if any modifications are implemented on Zuni Road and/or Central Avenue, a comprehensive new timing plan should be created, implemented and field tested.
- RGM on Zuni Road has minimal impact on LOS and delay, and therefore could be implemented.
- RGN on Central Avenue is not recommended until BRT impacts have been fully analyzed and studied.

2035 Conclusions

- Based on signal timing optimization using Synchro Software, it appears that for existing 2035 traffic demands under all scenarios, all study intersections will require increases in the grid cycle lengths. Analysis indicates that the AM peak will require a 130 second cycle length and the PM will require a 150 second cycle length for all scenarios except the No RGM PM scenario will also require a 130 second cycle length.
- It should be noted that auxiliary left and right turn-lanes were added at several intersections to accommodate the projected 2035 turning movements. It was assumed that if the projected 2035 traffic demands were to be accurate, appropriate geometric improvements would be have been made within the 23 years between now and 2035. The added auxiliary lanes were kept consistent between scenarios except for those intersections on Zuni Road and Central Avenue where the roadway modifications occur. Lane geometry at Lomas Boulevard and Copper Avenue intersections remained consistent across all 2035 scenarios.
- Intersection capacity analyses results indicates that all intersections will operate under capacity and at a satisfactory Level of Service (LOS) of D or better under existing conditions except at the following locations:
    - Lomas Boulevard/San Mateo Boulevard (Over capacity/LOS E PM)
    - Lomas Boulevard/San Pedro Drive (Over capacity PM)
    - Lomas Boulevard/Louisiana Boulevard (Over capacity/LOS F PM)
    - Lomas Boulevard/Pennsylvania Street (At capacity PM)
    - Lomas Boulevard/Wyoming Boulevard (Overcapacity AM/PM)
    - Zuni Road/Louisiana Boulevard (Over Capacity/LOS E PM)
    - Zuni Road/Wyoming Boulevard (Over capacity/LOS E AM/PM)
- For the 2035 Zuni Rd RGM scenario, all movements are under capacity and expected operate at an acceptable LOS except for Lomas Boulevard intersections with San Mateo Boulevard, San Pedro Drive and Wyoming Boulevard which are all over capacity and LOS E except San Pedro, which is LOS D. Also the Copper Avenue/Wyoming Boulevard, Zuni Road/Louisiana Boulevard, and Zuni/Wyoming intersections are still over capacity, but in some cases operating at LOS F rather than E. Finally, when compared to the No RGM scenario, two new intersections are now over capacity including Copper Avenue/Louisiana Boulevard and Central Avenue/Zuni Road. It should be noted that the movements that appear to be over capacity on Zuni Road are typically turn movements from the north/south street. It is our opinion that these projected turn movements are not realistic (too large) with a proposed roadway modification on Zuni Road and the capacity analysis results are conservative.
- For the 2035 Central Ave/Zuni Rd RGM, all movements are under capacity and expected to operate at an acceptable LOS except for the same intersections that were identified for the Zuni RGM scenario in the previous bullet and the Central Avenue/Wyoming Boulevard which is over capacity and LOS E in the AM. Similar to the Zuni RGM scenario, many of the movements that are over capacity on Central Avenue and Zuni are turning movements from the north/south corridor,

and it is our opinion that with the introduction of roadway geometric modifications on Central Avenue and Zuni Road, these turning demands are too large and therefore the results are conservative.

- With the implementation of either roadway modification scenario under optimized signal splits and offsets under 2035 demands, all signalized corridors will operate progressively increasing delay when going from No RGM to a Zuni Rd RGM to a Central Ave/Zuni Rd RGM. Overall delay is increased, under the Zuni Rd RGM, 7% (2 seconds/vehicle) AM and 22% (7 seconds/vehicle) PM, and under the Central Ave/Zuni Rd RGM increased 10% (seconds/vehicle) AM and 16% (seconds/vehicle) PM. It should be noted that the increase for the Zuni Rd RGM PM, is likely inflated due to unrealistic left-turn movements from Wyoming Boulevard onto Zuni Road.
- Generally, 2035 arterial speeds and Arterial LOS have not significantly changed between the No RGM scenario and either of the two modification scenarios.
- Auxiliary lane queue capacity was not summarized for the 2035 demands, as these demands are far enough into the future that recommended storage lengths are not practical at this time. However, 95th percentile queue lengths for 2035 scenarios can be found with the capacity analysis calculation sheet in Appendix E.
- In general, when comparing the baseline, No RGM, scenario with either roadway modification scenarios, there are some projected increases in delay and reductions in capacity, but these are relatively less significant as corridors, like Lomas Boulevard, and other major arterial intersections will already be significantly stressed even without modifications due to projected traffic growth. Consideration should also be given to the fact that with the addition of BRT on Central Avenue, 2035 demands could be further reduced without diverting to adjacent corridors. Additionally, if the City of Albuquerque's plan to redevelop the properties along Central Avenue within the study area to contain high density urban style housing and Knob Hill style store fronts, Central Avenue and Zuni Road will become less and less a desired east-west connection and more of a destination/origin and more conform to the proposed modified roadway geometry.

2035 Recommendations

- When implementing either roadway modification under 2035 demands, it may be necessary for long term demands to conduct a warrant study to see if signal control would be needed at the Copper Avenue/Louisiana Boulevard intersection.
- If the projected 2035 demands become reality, attention should be given to mitigation or alternate routes that will ease congestion on Lomas Boulevard east/west and Wyoming Boulevard, Louisiana Boulevard and San Mateo Boulevard north/south regardless of whether a roadway modification is implemented on these corridors or not.

1.0 Introduction

Lee Engineering has been tasked by the City of Albuquerque to study the potential capacity, signal timing, and intersection impacts of proposed Roadway Geometric Modifications (RGM) on both Zuni Road and Central Avenue. The purpose of this study is to further expand the previously macroscopic models created by Mid-Region Council of Governments (MRCOG) which projected existing and 2035 corridor demands for the following three scenarios:

- No Roadway Geometric Modification
- Roadway Geometric Modification on Zuni Road only
- Roadway Geometric Modifications on both Zuni Road and Central Avenue

The RGM on Zuni Road proposes to modify the existing four-lane cross-section (two through lanes in each direction) between San Mateo Boulevard and Central Avenue to a three lane cross-section, which will incorporate one through and bike lane in each direction and a left-turn lane down the middle. Between Washington Street and San Mateo Boulevard, the modification will take the existing six-lane section and to a four-lane roadway cross-section with a center left-turn lane/median and a bike lane in each direction. At various locations along the corridor, raised medians will be constructed to provide pedestrian refuges for crossing. There may also be opportunities to provide pedestrian bulb-outs at minor street intersections to reduce crossing length and time.

The RGM along Central Avenue proposes to eliminate one through lane in each direction in order to accommodate one exclusive Bus Rapid Transit (BRT) lane in each direction, likely running down the middle of Central Avenue. This proposal would convert Central Avenue's current six-lane with center raised median cross-section to a four vehicle lane with two-BRT lanes, and bike lanes. It should be noted that this study will analyze only the lane modification on Central Avenue and does not study BRT alternatives and operations.

The described RGM will effectively reduce capacity along both Zuni Road and Central Avenue, thus requiring a portion of the traffic demand diverting to adjacent east-west corridors, including Lomas Boulevard and to a lesser extent Copper Avenue. Gibson Boulevard is not likely to experience an appreciable amount of diverted demands as it is located approximately a mile south of Zuni Road and a mile and a half south of Central Avenue.

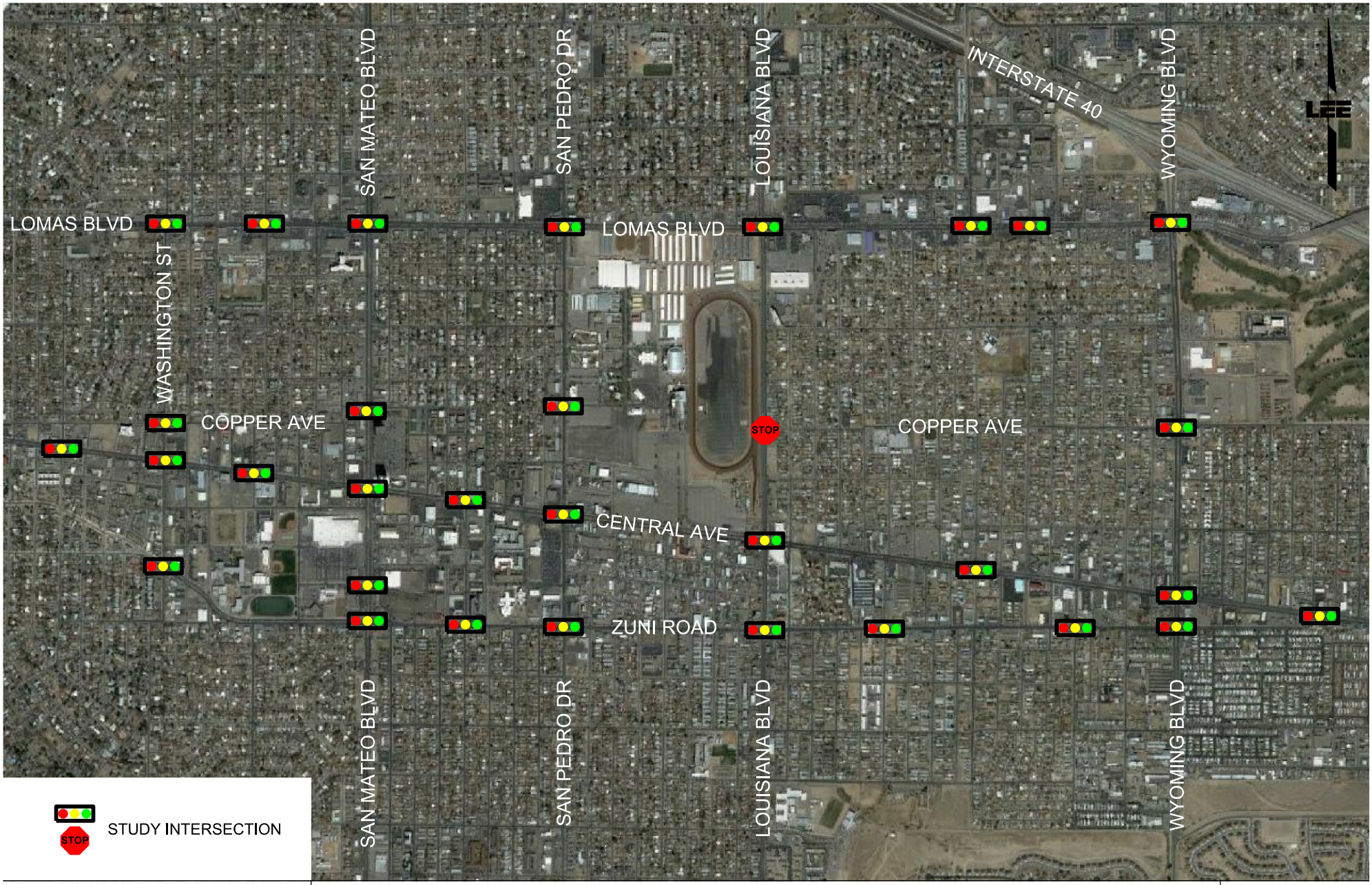
It should be noted that the study corridors are intersected by several major north/south arterials including six-lane arterials with raised median (San Mateo Boulevard, Louisiana Boulevard, and Wyoming Boulevard) and the more minor four-lane arterial of San Pedro Drive.

The following study will review both Roadway Geometric Modification scenarios on a microscopic scale utilizing Synchro 8.0 software to analyze impacts, such as intersection capacity, auxiliary lane queue storage capacity, signal timing, and corridor coordination at the signalized intersection level of detail.

This report documents the assessment and comparison of signal operations for all existing year 2012 and year 2035 traffic demand scenarios, provides optimized signal and coordination plans for all future options, recommends lane geometry and signal operations mitigation for existing demands, and determines the viability of either RGM for existing 2012 and 2035 demands. The network system and study intersections included are identified in ***Table 1***. ***Figure 1*** on the following page shows a map of the study intersections located in this system.

Table 1. Project Intersections

Lomas Blvd	Copper Ave	Central Ave	Zuni Rd
Washington St	Washington St	Morningside Dr	Washington St
Monroe St	San Mateo Blvd	Washington St	San Mateo Blvd
San Mateo Blvd	San Pedro Dr	Monroe St	Alvarado Dr
San Pedro Dr	Louisiana Blvd	San Mateo Blvd	San Pedro Dr
Louisiana Blvd	Wyoming Blvd	Alvarado Dr	Louisiana Blvd
Pennsylvania St		San Pedro Dr	San Pablo St
Tennessee St		Louisiana Blvd	Utah St
Wyoming Blvd		Pennsylvania St	Wyoming Blvd
		Wyoming Blvd	
San Mateo Blvd / Highland Ave		Zuni Rd	



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MAP OF STUDY AREA INTERSECTIONS

FIGURE
1

2.0 Traffic Volumes

The data collection effort for the project included various 24-hour bi-directional machine counts, peak period turning movement counts at each study intersection, and MRCOG supplied 2035 AM and PM peak hour demands for each Geometric Modification scenario. Additionally, existing geometric conditions and signal operations were observed.

Four bi-directional automatic traffic recorder (ATR) counts were conducted over a 24-hour period at the following locations. A full report of the collected ATR count data is supplied in Appendix A.

- Central Avenue, East of Washington Street – September 27, 2012
- Central Avenue, West of Wyoming Street – September 27, 2012
- Zuni Road, West of San Mateo Boulevard – September 25, 2012
- Zuni Road, West of Central Avenue – September 25, 2012

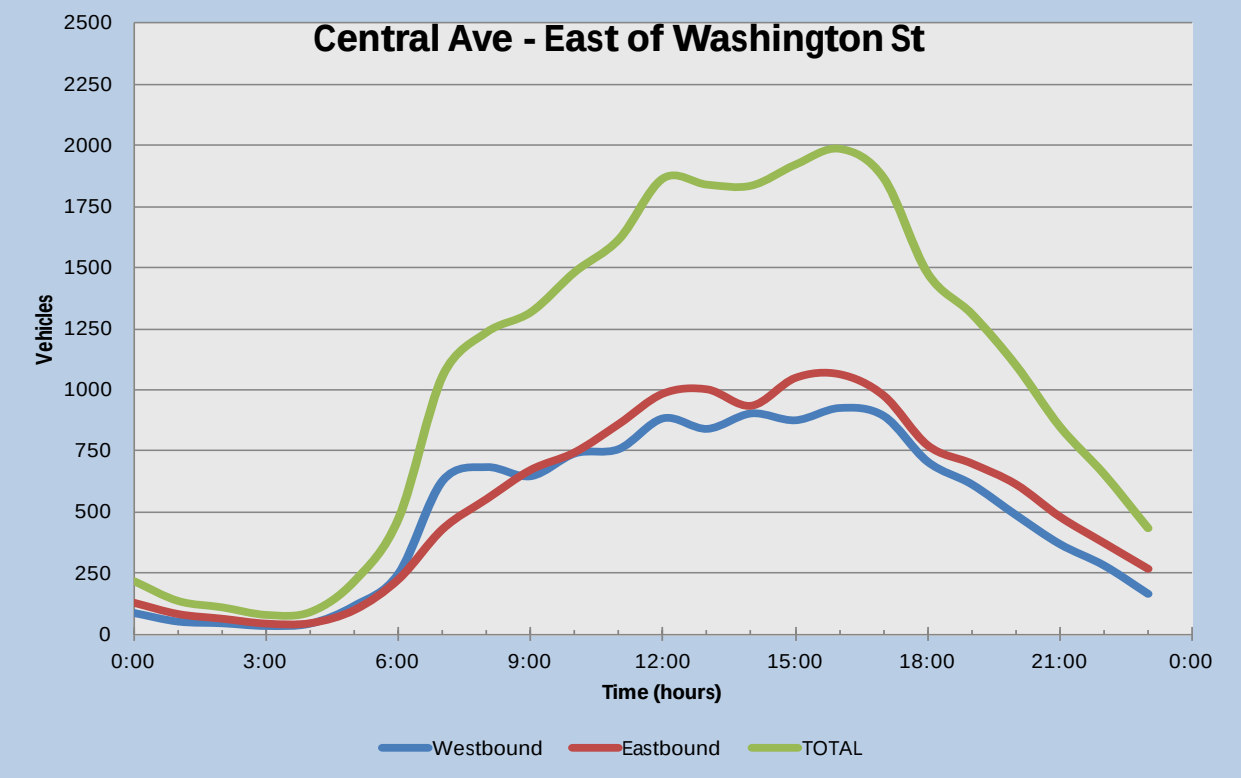
Figures 2 and ***3*** graphically illustrate the weekday hourly traffic volume data at each count location for a 24-hour period. Shown in the graphs are the westbound, eastbound, and total hourly volume at each count location. From the counts on Central Avenue, there is a trend of greater westbound directional traffic during the AM peak hour and greater eastbound traffic during the PM peak hour. On Zuni Road, eastbound traffic is heavier for a majority of the day, with westbound traffic only slightly heavier during a few morning hours.

Historical traffic counts were researched and correlated with the count locations chosen for this project. As indicated in ***Table 2*** below, a declining trend in traffic volume is observed each year over the past four years with the exception of Central Avenue west of Wyoming Boulevard which shows an increase.

Table 2. Historical ADT Volume

Count Location	MRCOG Data				LEE
	2008	2009	2010	2011	2012
Central Ave East of Washington St	28,600	28,100	27,700	26,400	25,200
Central Ave West of Wyoming Blvd	35,200	34,500	27,500	27,400	29,500
Zuni Rd West of San Mateo Blvd	19,400	19,000	18,800	18,800	14,000
Zuni Rd West of Central Ave	9,400	9,200	9,100	9,100	7,400

Figure 2. ATR Count Data – Central Avenue



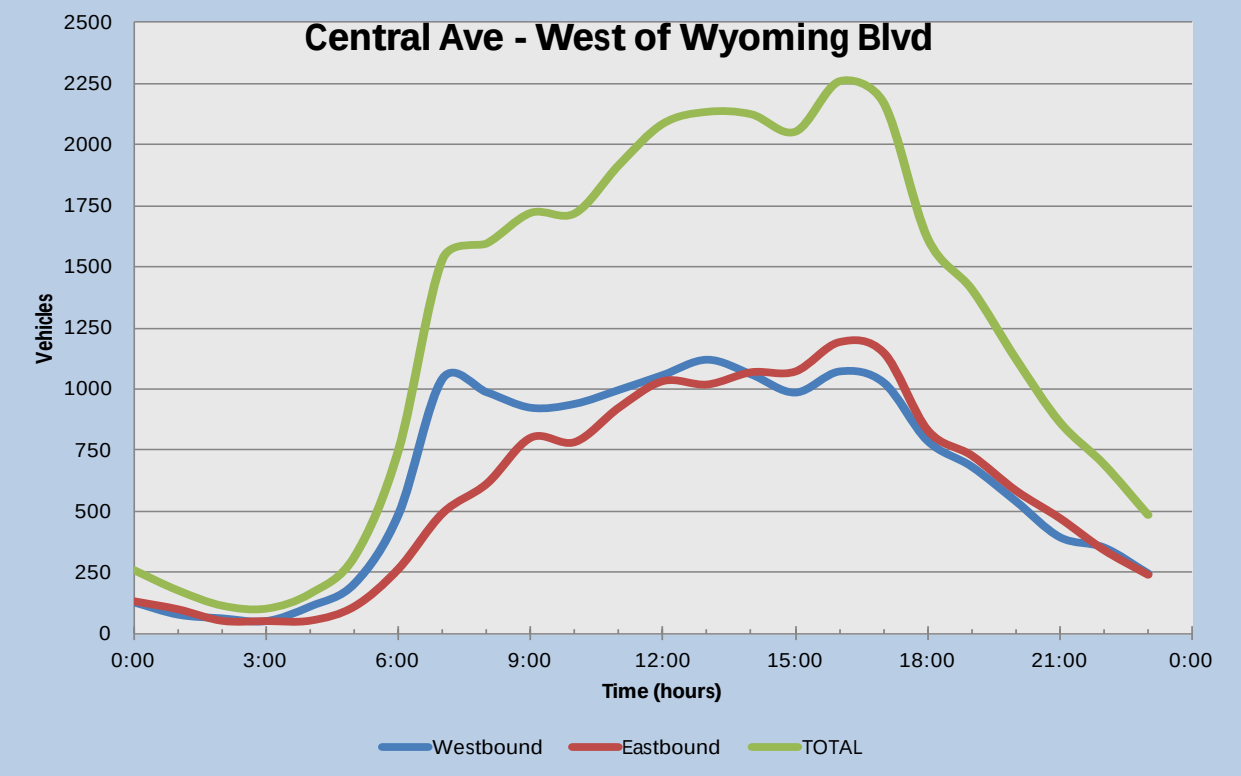
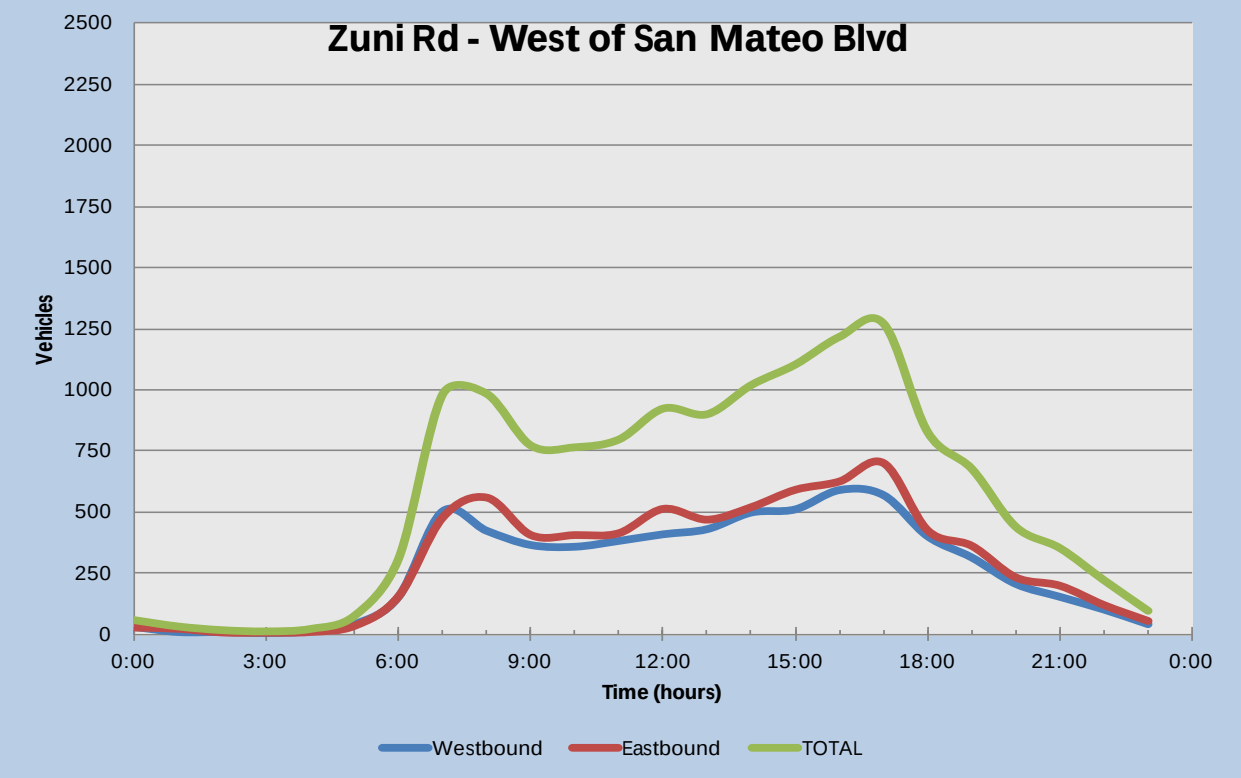
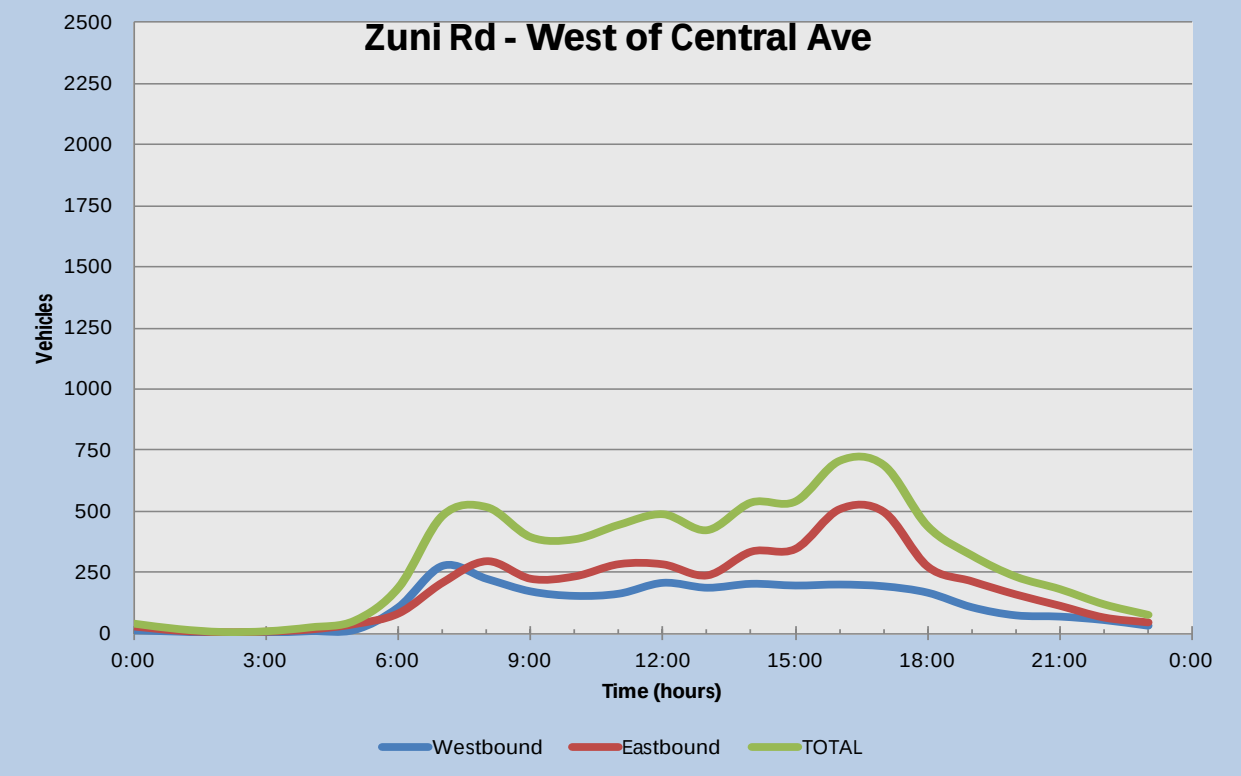


Figure 3. ATR Count Data – Zuni Road



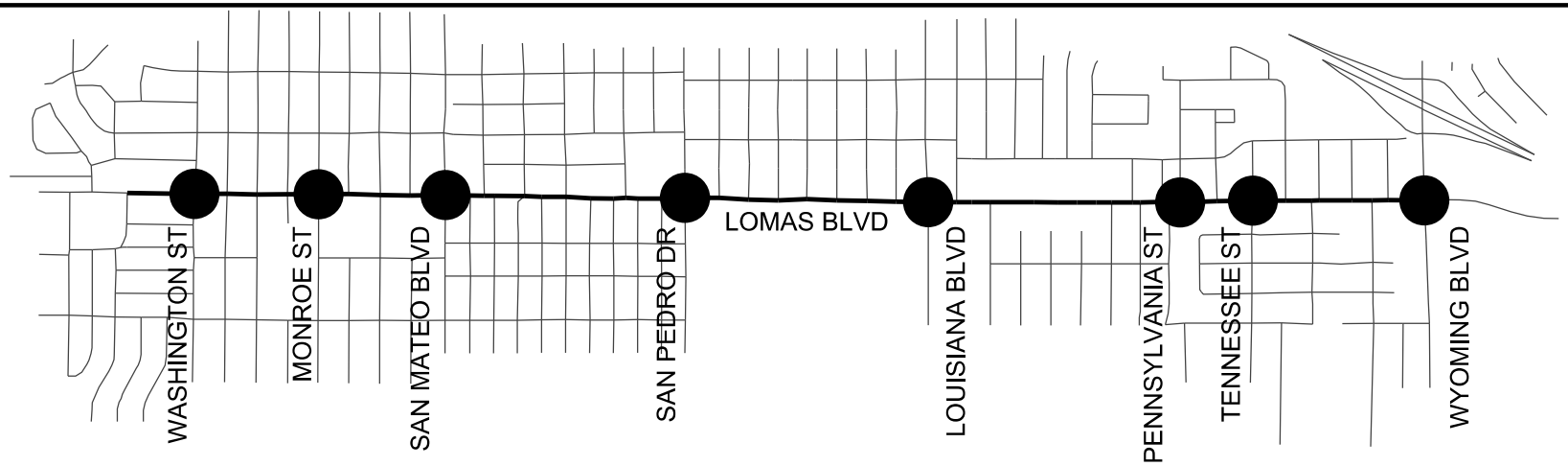


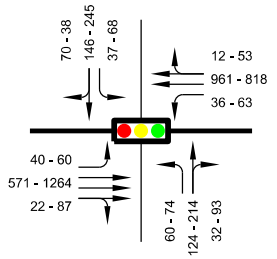
Weekday turning movement counts (TMCs) were conducted Tuesdays through Thursdays from September 11, 2012 to September 25, 2012 for 3, three-hour periods beginning at 6:45AM, 11:00AM, and 3:00PM. All turning movement count data is supplied in Appendix A. ***Table 3*** below shows the peak hour for each intersection based on the collected intersection TMC data.

Table 3. Intersection Peak Hours

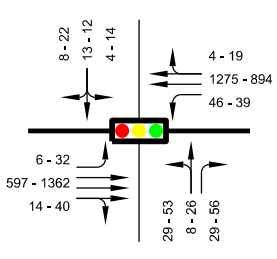
Intersection	AM Peak Hour	PM Peak Hour
Lomas Blvd – Washington St	7:30 – 8:30 AM	4:45 – 5:45 PM
Lomas Blvd – Monroe St	7:45 – 8:45 AM	4:45 – 5:45 PM
Lomas Blvd – San Mateo Blvd	7:30 – 8:30 AM	4:45 – 5:45 PM
Lomas Blvd – San Pedro Dr	7:30 – 8:30 AM	4:30 – 5:30 PM
Lomas Blvd – Louisiana Blvd	7:30 – 8:30 AM	4:45 – 5:45 PM
Lomas Blvd – Pennsylvania St	7:30 – 8:30 AM	4:45 – 5:45 PM
Lomas Blvd – Tennessee St	7:30 – 8:30 AM	4:45 – 5:45 PM
Lomas Blvd – Wyoming Blvd	7:15 – 8:15 AM	4:45 – 5:45 PM
Copper Ave – Washington St	7:30 – 8:30 AM	5:00 – 6:00 PM
Copper Ave – San Mateo Blvd	7:30 – 8:30 AM	4:30 – 5:30 PM
Copper Ave – San Pedro Dr	7:15 – 8:15 AM	3:45 – 4:45 PM
Copper Ave – Louisiana Blvd	7:15 – 8:15 AM	4:30 – 5:30 PM
Copper Ave – Wyoming Blvd	7:15 – 8:15 AM	4:00 – 5:00 PM
Central Ave – Morningside Dr	7:45 – 8:45 AM	5:00 – 6:00 PM
Central Ave – Washington St	7:30 – 8:30 AM	4:45 – 5:45 PM
Central Ave – Monroe St	7:30 – 8:30 AM	5:00 – 6:00 PM
Central Ave – San Mateo Blvd	7:15 – 8:15 AM	4:30 – 5:30 PM
Central Ave – Alvarado Dr	8:45 – 9:45 PM	4:15 – 5:15 PM
Central Ave – San Pedro Dr	7:15 – 8:15 AM	4:15 – 5:15 PM
Central Ave – Louisiana Blvd	7:15 – 8:15 AM	4:15 – 5:15 PM
Central Ave – Pennsylvania St	7:45 – 8:45 AM	4:30 – 5:30 PM
Central Ave – Wyoming Blvd	7:15 – 8:15 AM	3:45 – 4:45 PM
Central Ave – Zuni Rd	7:30 – 8:30 AM	4:30 – 5:30 PM
Zuni Rd – Washington St	7:15 – 8:15 AM	4:30 – 5:30 PM
Zuni Rd – San Mateo Blvd	7:15 – 8:15 AM	4:30 – 5:30 PM
Zuni Rd – Alvarado Dr	7:00 – 8:00 AM	4:45 – 5:45 PM
Zuni Rd – San Pedro Dr	7:15 – 8:15 AM	4:00 – 5:00 PM
Zuni Rd – Louisiana Blvd	7:15 – 8:15 AM	4:15 – 5:15 PM
Zuni Rd – San Pablo St	7:30 – 8:30 AM	4:30 – 5:30 PM
Zuni Rd – Utah St	7:15 – 8:15 AM	4:45 – 5:45 PM
Zuni Rd – Wyoming Blvd	7:15 – 8:15 AM	4:30 – 5:30 PM
Highland Ave – San Mateo Blvd	7:15 – 8:15 AM	4:30 – 5:30 PM

On the following pages, ***Figures 4, 5, 6,*** and **7** show the weekday AM and PM peak hour turning movement volumes for the each of the corridors analyzed, (Lomas Boulevard, Copper Avenue, Central Avenue, and Zuni Road).

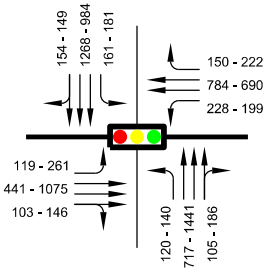




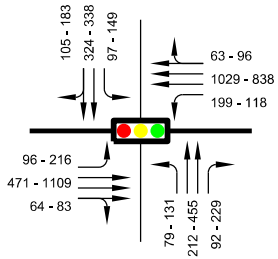
LOMAS BLVD /
WASHINGTON ST
7:30 - 8:30 AM
4:45 - 5:45 PM



LOMAS BLVD /
MONROE ST
7:45 - 8:45 AM
4:45 - 5:45 PM



LOMAS BLVD /
SAN MATEO BLVD
7:30 - 8:30 AM
4:45 - 5:45 PM



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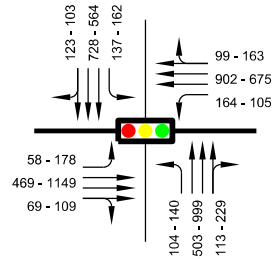

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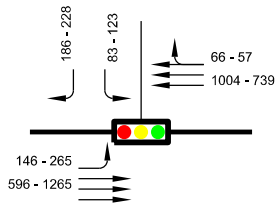

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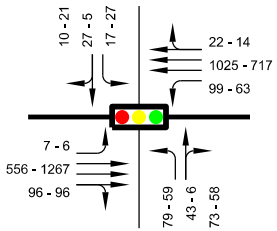

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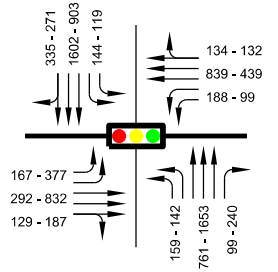


LOMAS BLVD /
WYOMING BLVD
7:15 - 8:15 AM
4:45 - 5:45 PM

LEGEND

LANE GEOMETRY

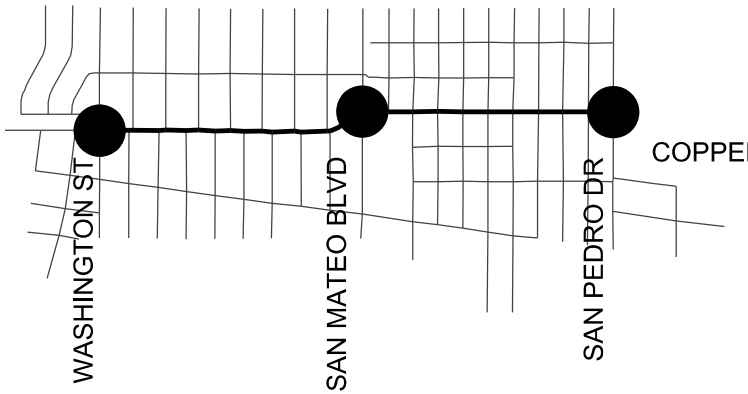
785 - 568 *AM - PM* PEAK HOUR VOLUMES

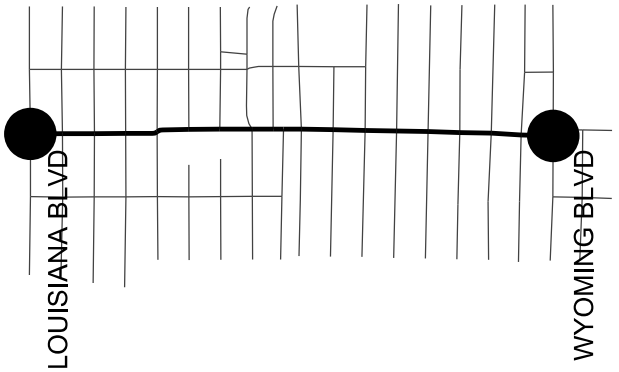
8220 SAN PEDRO DRIVE NE
SUITE 150
ALBUQUERQUE, NM 87113
505/338-0988 FAX 505/338-0989
LEE ENGINEERING

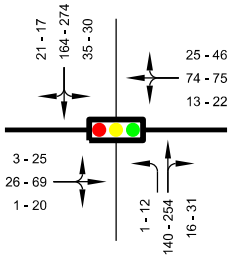
2012 Existing Peak Hour Turning Movement Counts & Lane Geometry

LOMAS BOULEAVARD

FIGURE
4







COPPER AVE /
WASHINGTON ST
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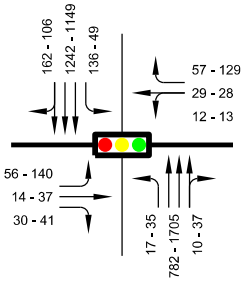

COPPER AVE /
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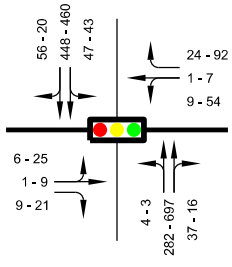

COPPER AVE /
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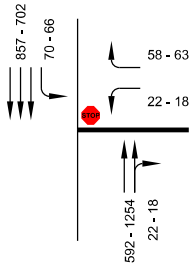

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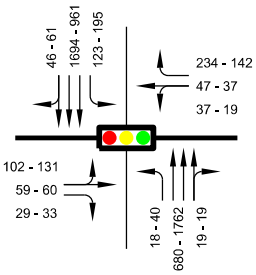

COPPER AVE /
WYOMING BLVD
7:15 - 8:15 AM
4:00 - 5:00 PM

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

8220 SAN PEDRO DRIVE NE
SUITE 150
ALBUQUERQUE, NM 87113
505/338-0988 FAX 505/338-0989

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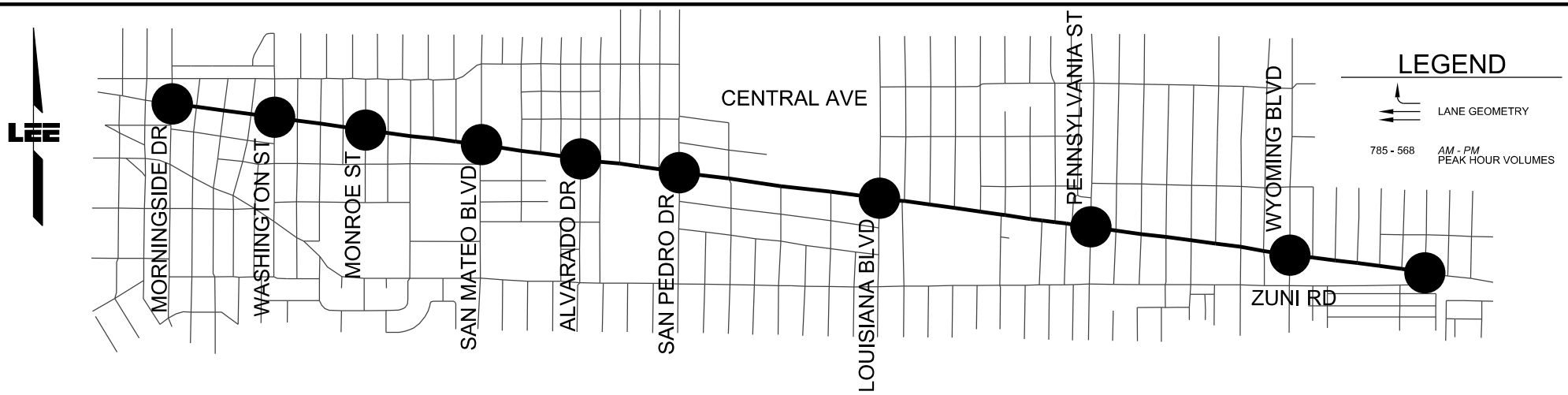
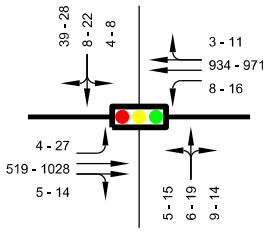
2012 Existing Peak Hour Turning Movement Counts & Lane Geometry

COPPER AVENUE

FIGURE
5





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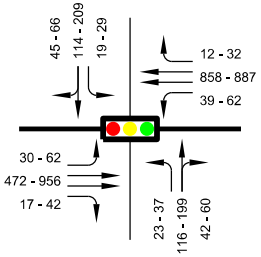

CENTRAL AVE /
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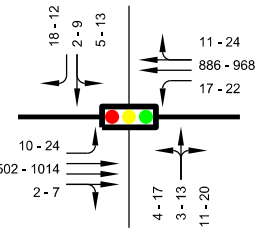

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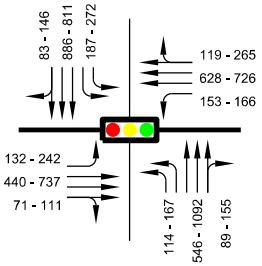

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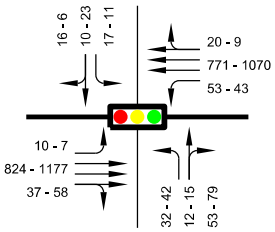

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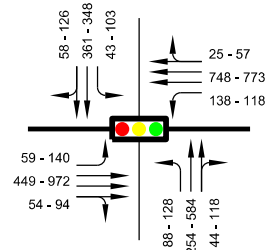

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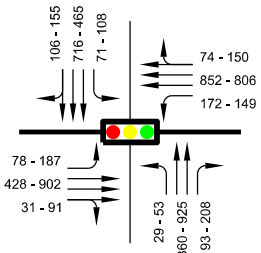

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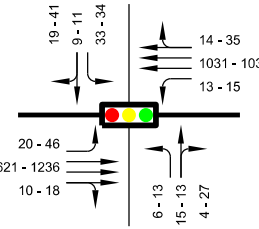

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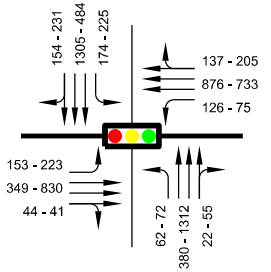

CENTRAL AVE /
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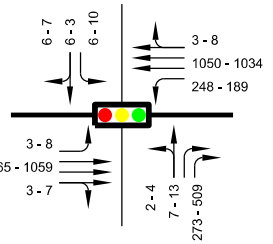

CENTRAL AVE /
ZUNI RD
7:30 - 8:30 AM
4:30 - 5:30 PM

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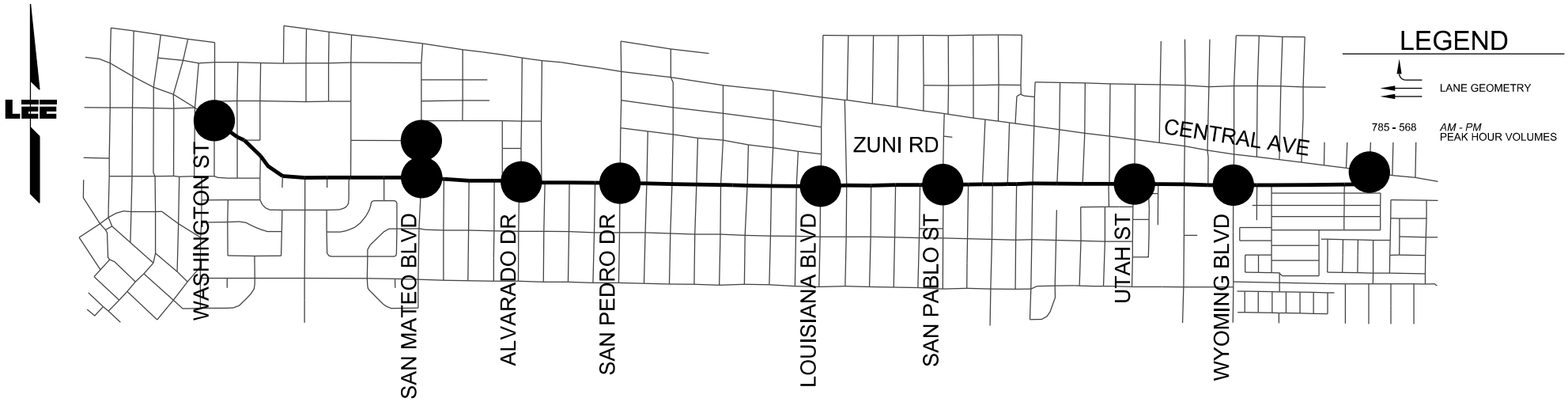
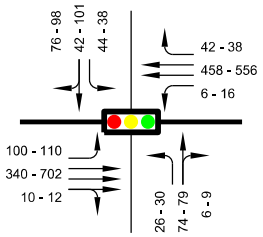
2012 Existing Peak Hour Turning Movement Counts & Lane Geometry

CENTRAL AVENUE

FIGURE
6





ZUNI RD /
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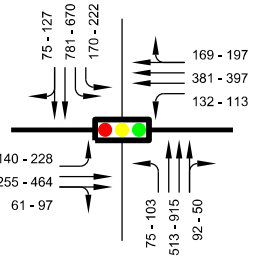
4:30 - 5:30 PM



ZUNI RD /
SAN MATEO BLVD
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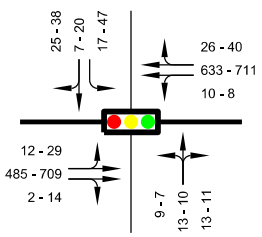

ZUNI RD /
ALAVARDO DR
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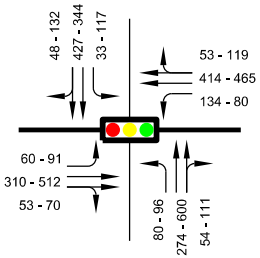

ZUNI RD /
SAN PEDRO DR
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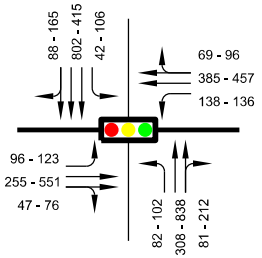
4:00 - 5:00 PM



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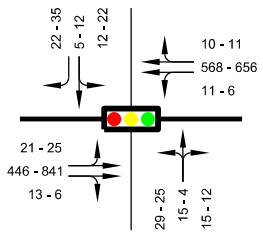

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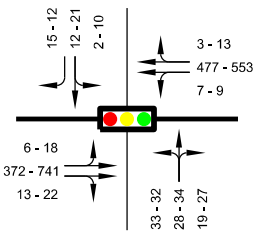

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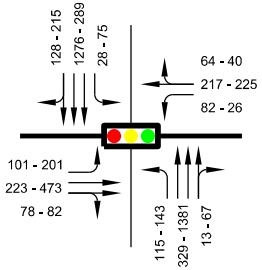

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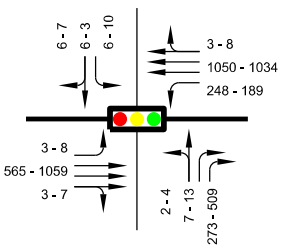

ZUNI RD /
CENTRAL AVE
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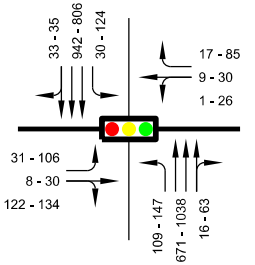
4:30 - 5:30 PM



SAN MATEO BLVD /
HIGHLAND AVE
7:15 - 8:15 AM
4:15 - 5:15 PM

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2012 Existing Peak Hour Turning Movement Counts & Lane Geometry

ZUNI ROAD

FIGURE
7

3.0 Projected Roadway Geometric Modification and 2035 Traffic Demands

Lee Engineering contacted MRCOG to provide not only the projected demands from the 2035 regional traffic model, but also to run the model under both RGM scenarios. The resultant raw data is provided in **Appendix B** for the No RGM, Zuni RGM, and Central/Zuni RGM scenarios. As provided, the raw data contains bi-directional daily, AM, and PM peak hour demands only, and does not provide turning movement demands. Anticipated average growth rates over the study corridor length between year 2012 and year 2035 traffic demands for the study corridors are tabulated in ***Table 4***.

Table 4. Anticipated 2035 Average Traffic Demand Growth Rates for Study Corridors.

Corridor	Percent Growth Between 2012 &2035 Demands			
	AM		PM	
	EB	WB	EB	WB
Lomas Boulevard	3.24%	2.42%	1.82%	3.59%
Copper Avenue	0.62%	4.41%	2.91%	7.81%
Central Avenue	1.20%	-0.002%	0.004%	0.004%
Zuni Road	1.40%	0.54%	0.96%	1.10%

As shown, heavier growth is projected for Lomas Boulevard and Copper Avenue, whereas Central Avenue and Zuni Road are anticipated to grow much less and the westbound AM demand on Central Avenue is expected to actually contracts slightly over the next 23 years.

It should be noted that, although the overall 2035 regional model does take modal choice into account, the 2035 RGM projections do not adjust the local modal choice proportions. This means that the RGM scenario demands are likely on the conservative side, especially for the Central/Zuni RGM option. Central Avenue currently is one of the heaviest transit corridors in the city. Therefore, it is very likely that with the addition of a BRT route through the study area, a significant amount of local trips to and from the area will utilize the BRT service thus reducing projected vehicular demands. This shift in modal choice could be significant, especially when considering the latest City of Albuquerque Metropolitan Transportation Plan is apportioning funding to attempt to achieve transit usage targets of 10% to 15%.

By knowing the entering and exiting traffic demands for all approaches at an intersection and utilizing existing traffic data turning movement proportions, 2035 directional demands were converted to intersection turning movements using an algorithm known as the "Fratar" or "Furness" method. This algorithm maintains 2035 entering and exiting demands and finds a unique algebraic solution for left, through, and right-turn movements on each approach that match existing turning proportions as closely as possible. For this study, the "TurnsW32" program was used to develop 2035 turning demands at major study intersections. Calculation sheets indicating input and output at each intersection are provided in **Appendix B**.

It should be mentioned, that while the MRCOG models do have full directional data for major intersections, many of the more minor cross streets are not provided for, such as San Pablo

Street, Utah Street, and Monroe Street to name a few. For these minor signals, it was assumed that the side street traffic would not experience growth due to the fact that these turning movements are more than likely local trips within a mature urban area of the city. Therefore 2012 data was used for the side street movements and the through demands on the major corridor were taken from the MRCOG models. The resulting 2035 turning demands are shown in ***Figure 8*** through ***Figure 19***. It should be noted that due to the lack of data for Copper Avenue west of San Pedro, growth rates indicated on Copper Avenue between Louisiana Boulevard and Wyoming Boulevard were applied to get 2035 demands for Copper Avenue West. Additionally, north/south demands on Washington, San Mateo and San Pedro along Copper Avenue were balanced to match adjoining 2035 demands approaching Central Avenue.

Percent changes in traffic demands between the scenarios are indicated on ***Figures 20 and 21***.

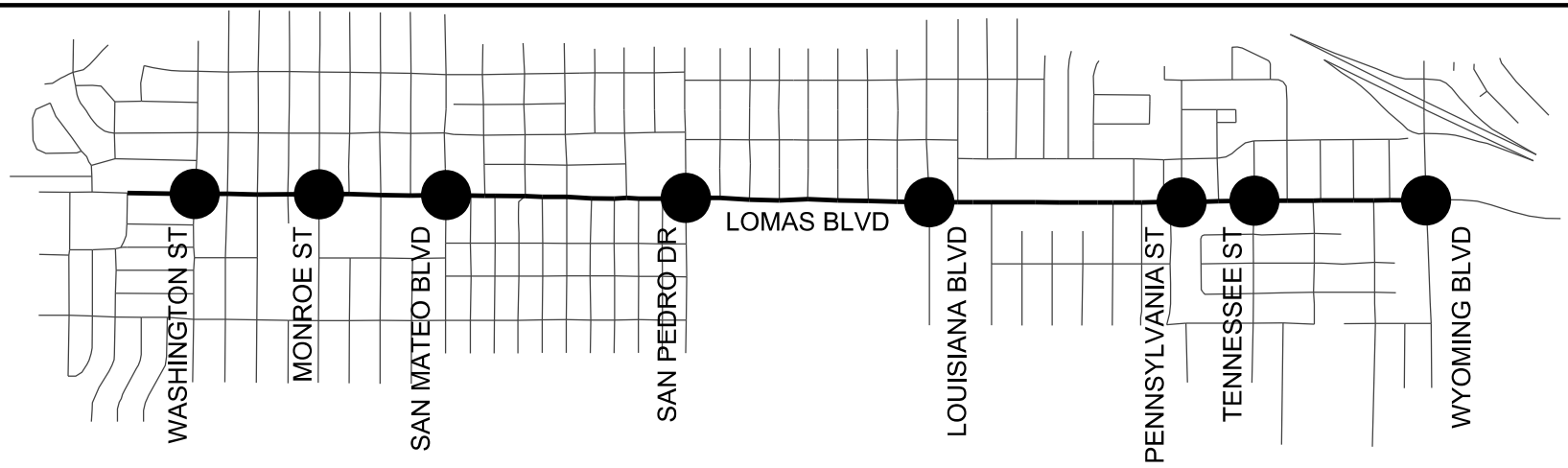
Observed Traffic Demand Differences (No RGM vs. Zuni Rd RGM)

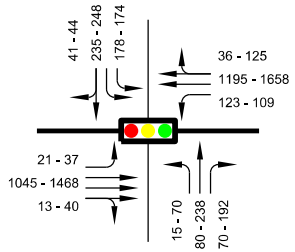
In summary, Zuni Road can expect an average traffic demand reduction of approximately 3% eastbound and 12% westbound in the AM peak and a reduction of 22% eastbound and 16% westbound in the PM peak for a Zuni Rd RGM scenario. In general, the reduced demands on Zuni are essentially reapportioned with Central Avenue receiving the greatest amount of added demands ranging anywhere from approximately 60% to 80% of the diverted demand depending on peak hour, direction of travel, and which side of Louisiana Boulevard you are on. Copper Avenue receives a smaller proportion of the remaining diverted trips, while Lomas Boulevard receives an even smaller amount of diverted Zuni trips. It is not surprising that Central Avenue would receive the majority of diverted trips since it is the nearest east-west connection and never more than a quarter of a mile away from Zuni Road within the study area. Copper is only a two-lane collector street with 30 mph speed limits and is interrupted by Expo New Mexico and thus does not offer an attractive continuous alternative. Lomas is approximately one mile away and presents much too distant of a detour to absorb much of the diverted Zuni demands.

Observed Traffic Demand Differences (No RGM vs. Central Ave/Zuni Rd RGM)

As indicated in **Figure 21**, when both Central Avenue and Zuni Road experience roadway geometry modifications, Central Avenue still receives much of the diverted Zuni traffic, but also sheds some of its own traffic as well. Therefore traffic demand increases on Central Avenue are much more modest than the Zuni Rd RGM scenario. As expected Copper Avenue receives more traffic than observed for the Zuni Rd RGM scenario, but is limited by its two-lane collector cross section and its lack of east west connectivity. Demands on Lomas Boulevard are increase modestly as a result of diverted Central Avenue trips. Any remaining Central Avenue trips are likely diverted to alternate east-west connections outside of the study area. These diverted demands would have to be longer commuter trips versus local trips where utilizing the interstate in combination with a more northern east west arterial makes sense.

The percent changes in demands observed in the 2035 models were then used to adjust existing 2012 traffic counts to create 2012 versions of the Zuni and Central Ave/Zuni Rd RGM scenarios. The new vehicle turning movements for the modified scenarios are summarized in **Figures 22 to 29.**





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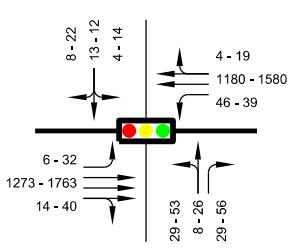

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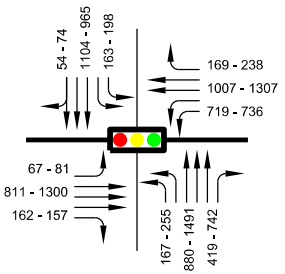
MONROE ST



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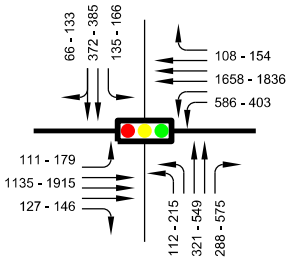

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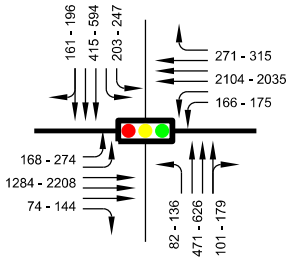
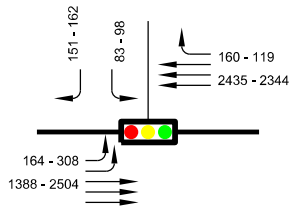
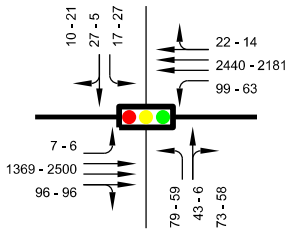


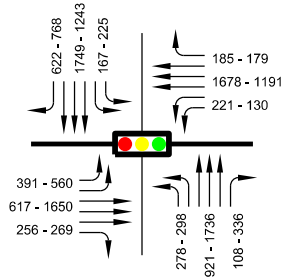
LOMAS BLVD /
LOUISIANA BLVD



LOMAS BLVD /
PENNSYLVANIA ST



LOMAS BLVD /
TENNESSEE ST



LOMAS BLVD /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

8220 SAN PEDRO DRIVE NE
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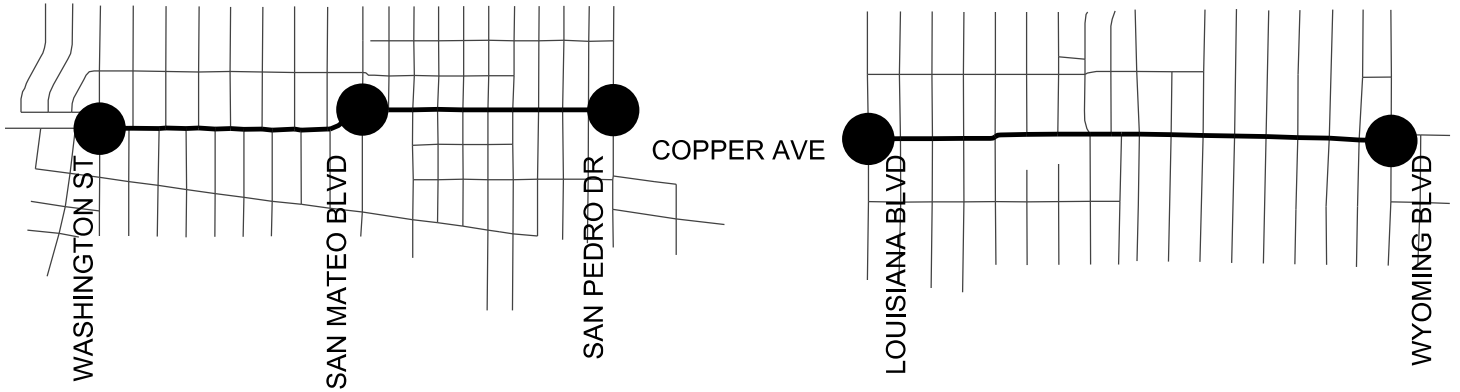
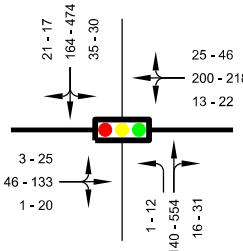
LEE ENGINEERING

2035 Baseline Peak Hour Turning Movement Counts & Lane Geometry

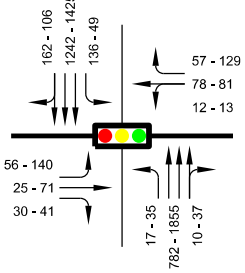
LOMAS BOULEAVARD

FIGURE
8

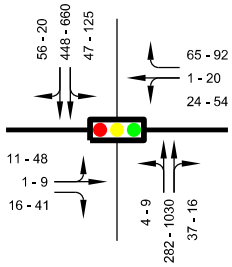




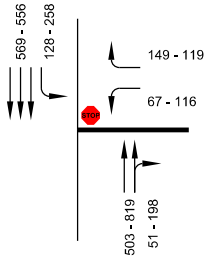
COPPER AVE /
WASHINGTON ST



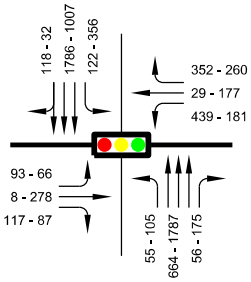
COPPER AVE /
SAN MATEO BLVD



COPPER AVE /
SAN PEDRO DR



COPPER AVE /
LOUISIANA BLVD



COPPER AVE /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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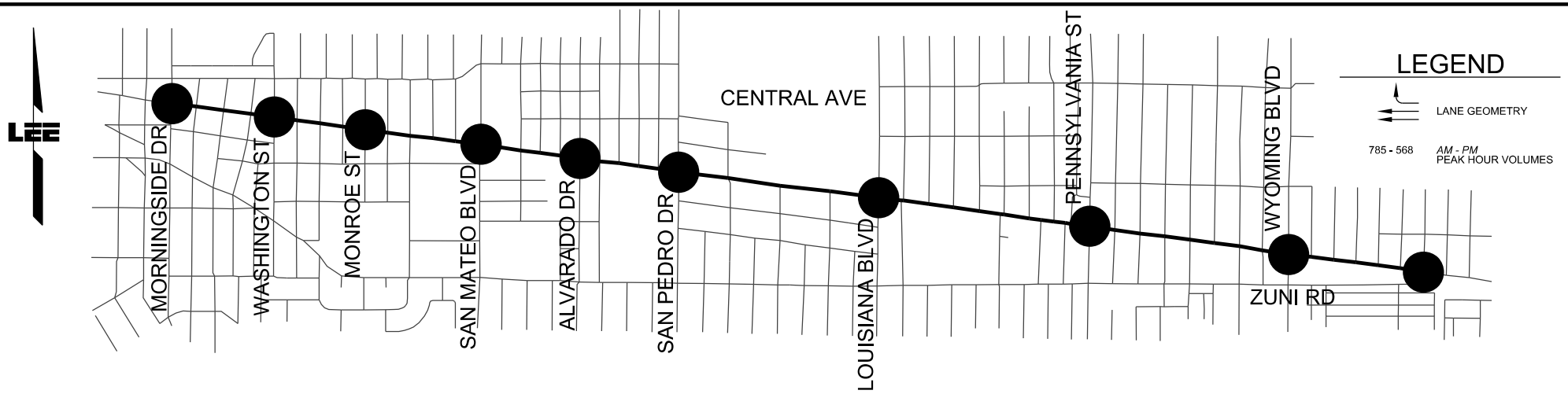
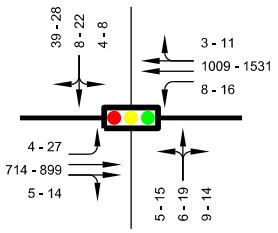
2035 Baseline Peak Hour Turning Movement Counts & Lane Geometry

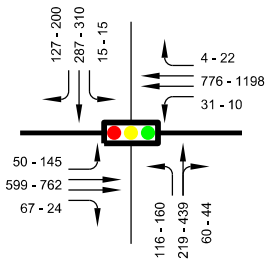
COPPER AVENUE

FIGURE
9

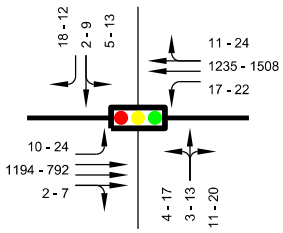




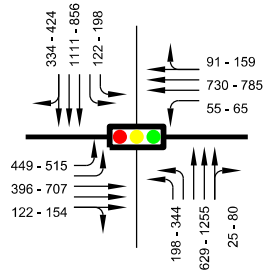
CENTRAL AVE /
MORNINGSIDE DR



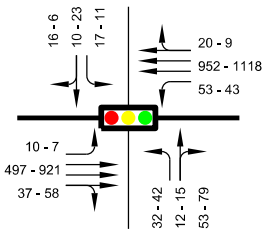
CENTRAL AVE /
WASHINGTON ST



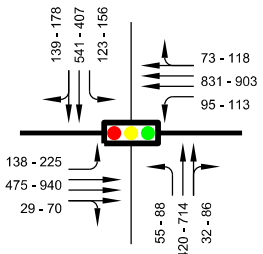
CENTRAL AVE /
MONROE ST



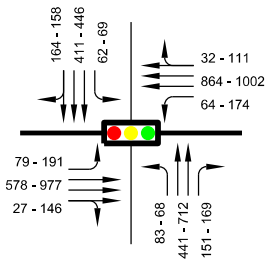
CENTRAL AVE /
SAN MATEO BLVD



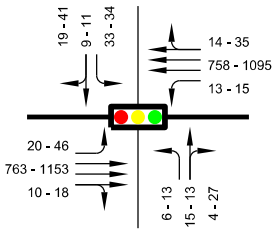
CENTRAL AVE /
ALVARADO DR



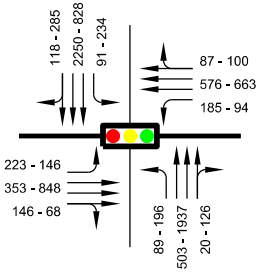
CENTRAL AVE /
SAN PEDRO DR



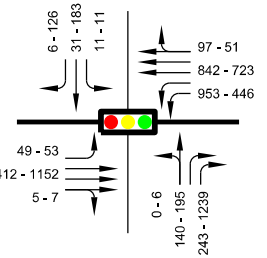
CENTRAL AVE /
LOUISIANA BLVD



CENTRAL AVE /
PENNSYLVANIA ST



CENTRAL AVE /
WYOMING BLVD



CENTRAL AVE /
ZUNI RD

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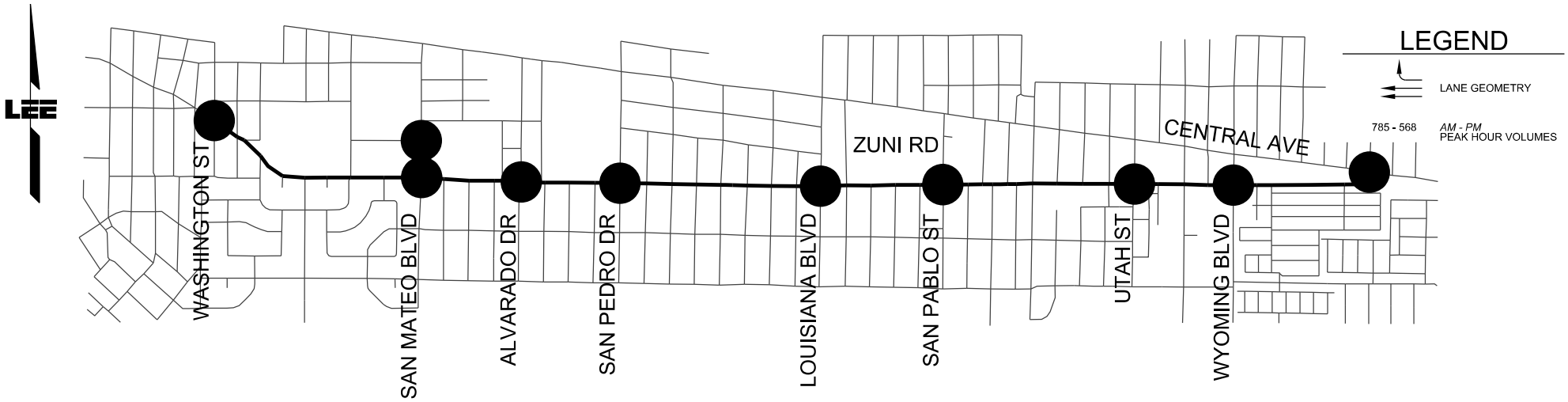
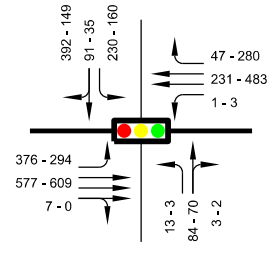
2035 Baseline Peak Hour Turning Movement Counts & Lane Geometry

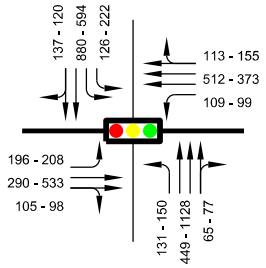
CENTRAL AVENUE

FIGURE
10

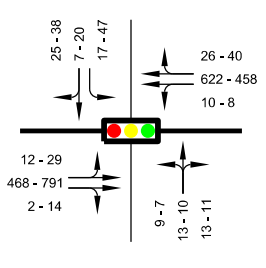




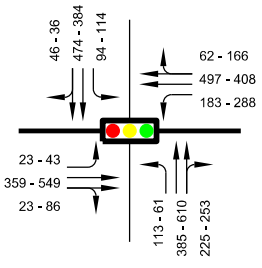
ZUNI RD /
WASHINGTON ST



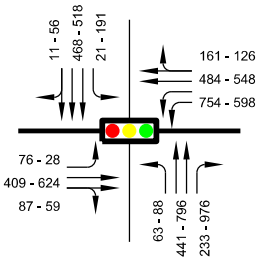
ZUNI RD /
SAN MATEO BLVD



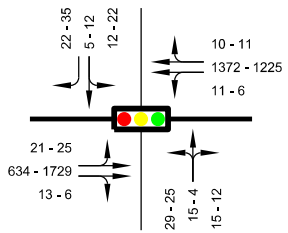
ZUNI RD /
ALAVARDO DR



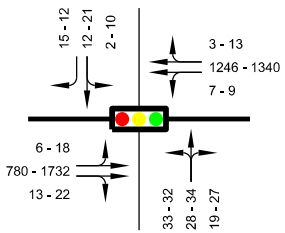
ZUNI RD /
SAN PEDRO DR



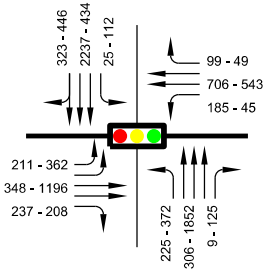
ZUNI RD /
LOUISIANA BLVD



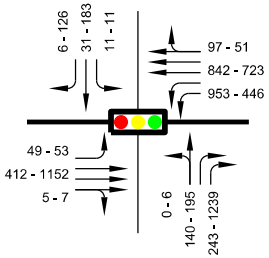
ZUNI RD /
SAN PABLO ST



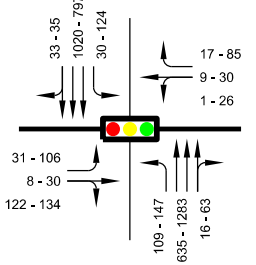
ZUNI RD /
UTAH ST



ZUNI RD /
WYOMING BLVD



ZUNI RD /
CENTRAL AVE



SAN MATEO BLVD /
HIGHLAND AVE

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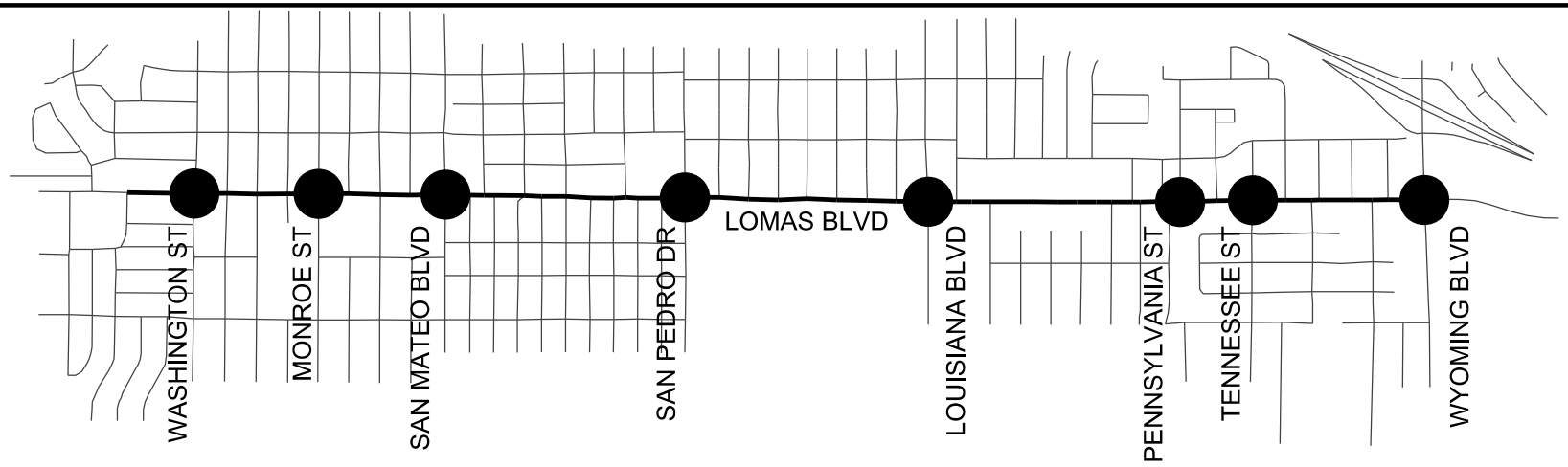
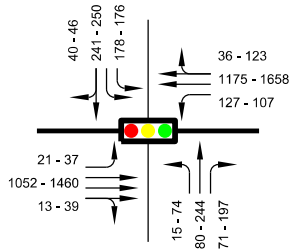
2035 Baseline Peak Hour Turning Movement Counts & Lane Geometry

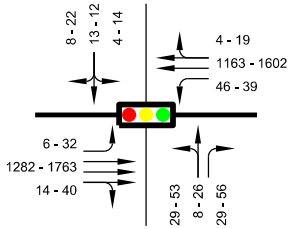
ZUNI ROAD

FIGURE
11

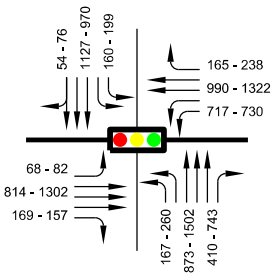




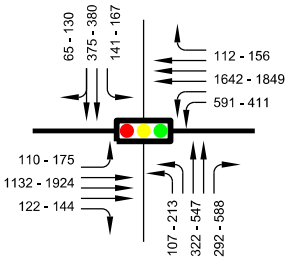
LOMAS BLVD /
WASHINGTON ST



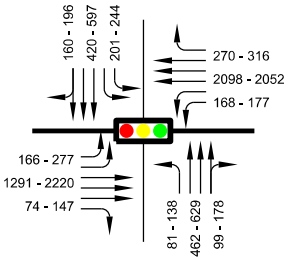
LOMAS BLVD /
MONROE ST



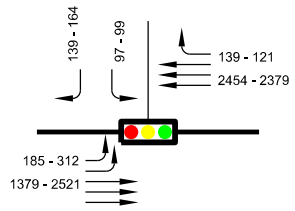
LOMAS BLVD /
SAN MATEO BLVD



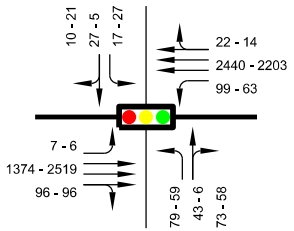
LOMAS BLVD /
SAN PEDRO DR



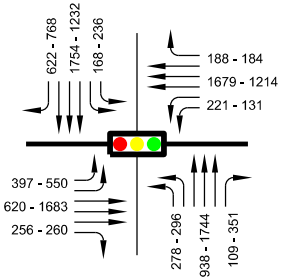
LOMAS BLVD /
LOUISIANA BLVD



LOMAS BLVD /
PENNSYLVANIA ST



LOMAS BLVD /
TENNESSEE ST



LOMAS BLVD /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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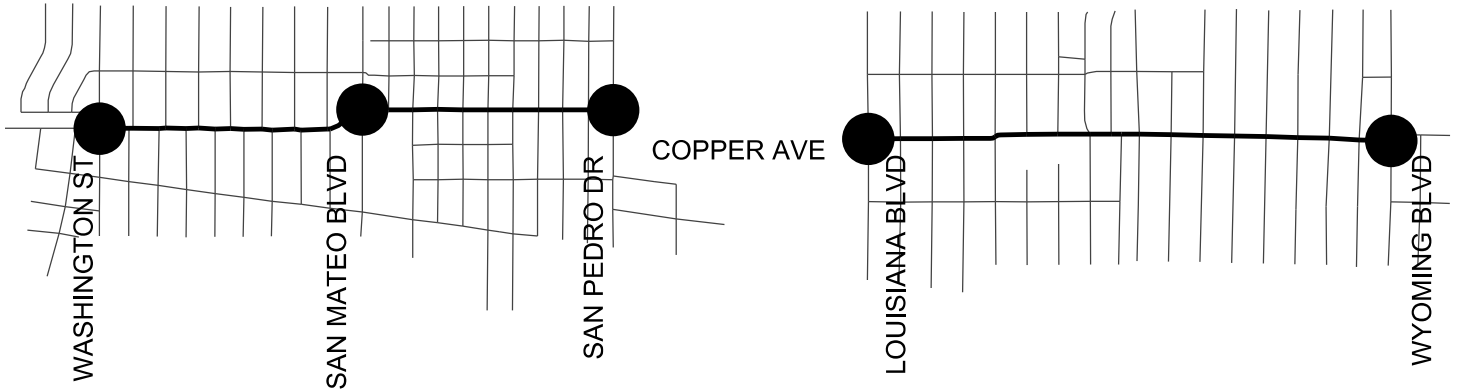
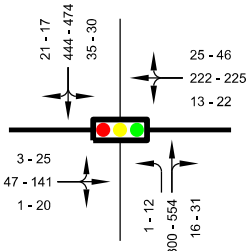
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

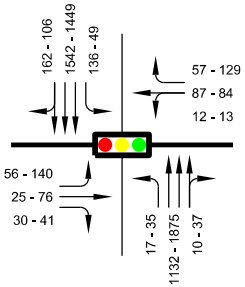
LOMAS BOULEAVARD

FIGURE
12

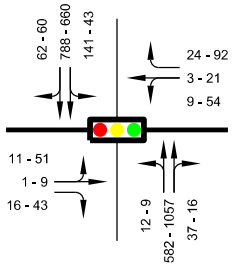




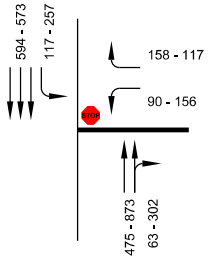
COPPER AVE /
WASHINGTON ST



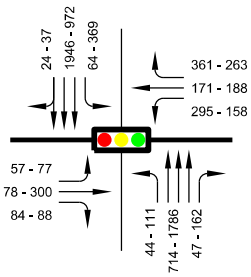
COPPER AVE /
SAN MATEO BLVD



COPPER AVE /
SAN PEDRO DR



COPPER AVE /
LOUISIANA BLVD



COPPER AVE /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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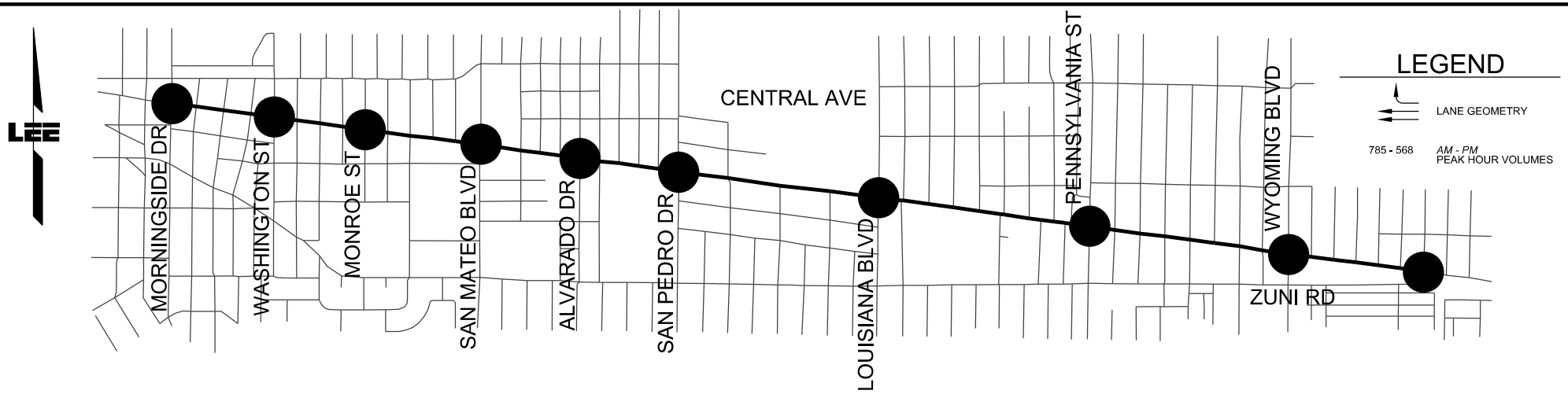
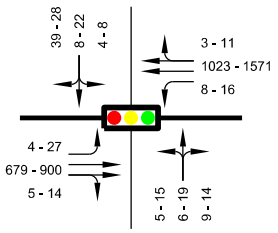
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

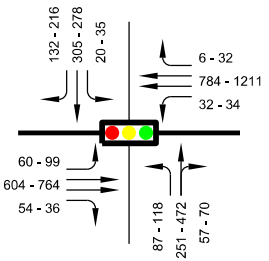
COPPER AVENUE

FIGURE
13

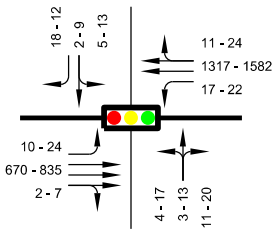




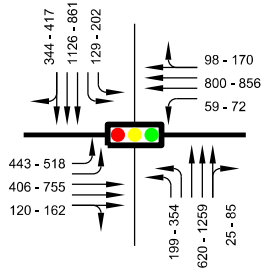
CENTRAL AVE /
MORNINGSIDE DR



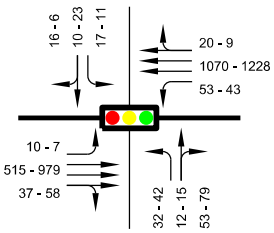
CENTRAL AVE /
WASHINGTON ST



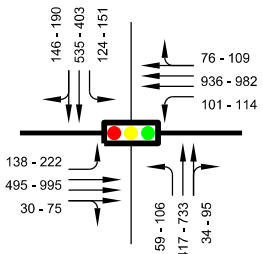
CENTRAL AVE /
MONROE ST



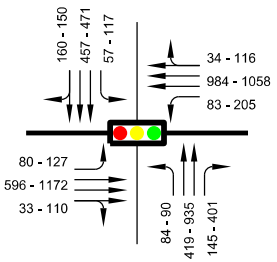
CENTRAL AVE /
SAN MATEO BLVD



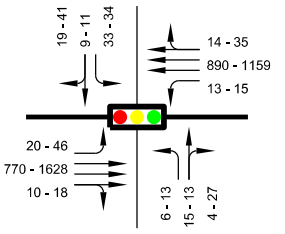
CENTRAL AVE /
ALVARADO DR



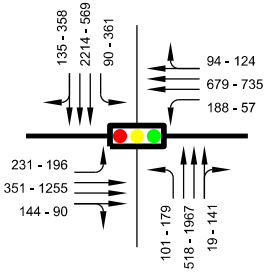
CENTRAL AVE /
SAN PEDRO DR



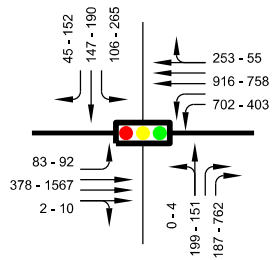
CENTRAL AVE /
LOUISIANA BLVD



CENTRAL AVE /
PENNSYLVANIA ST



CENTRAL AVE /
WYOMING BLVD



CENTRAL AVE /
ZUNI RD

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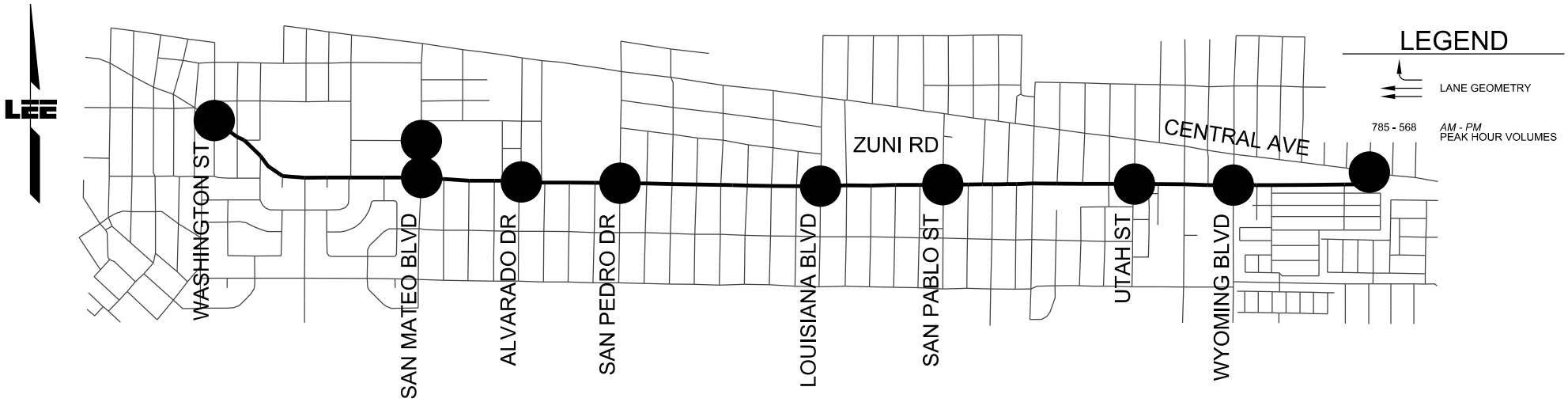
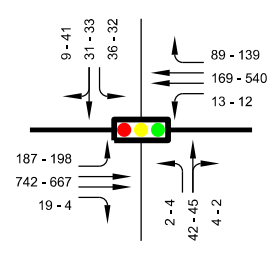
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

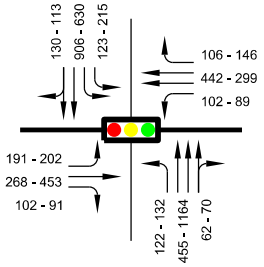
CENTRAL AVENUE

FIGURE
14

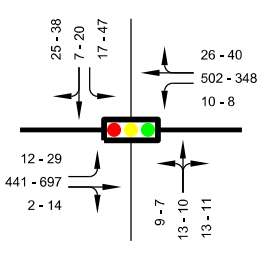




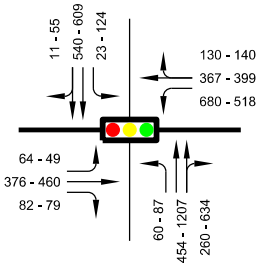
ZUNI RD /
WASHINGTON ST



ZUNI RD /
SAN MATEO BLVD



ZUNI RD /
ALAVARDO DR



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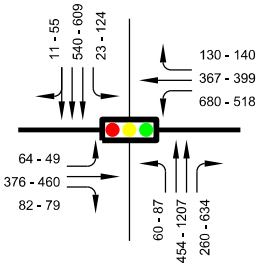
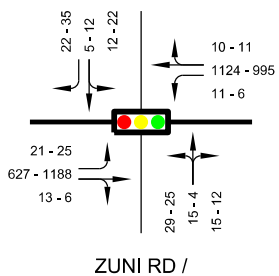
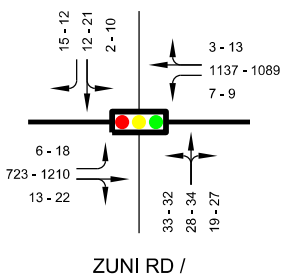
SAN PEDRO DR



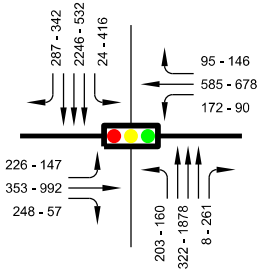
ZUNI RD /
LOUISIANA BLVD



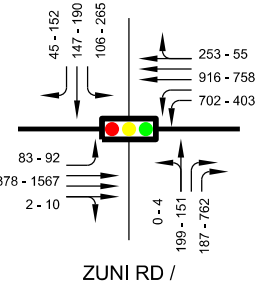
ZUNI RD /
SAN PABLO ST



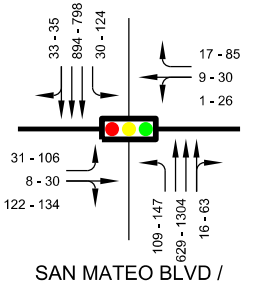
ZUNI RD /
UTAH ST



ZUNI RD /
WYOMING BLVD



ZUNI RD /
CENTRAL AVE



SAN MATEO BLVD /
HIGHLAND AVE

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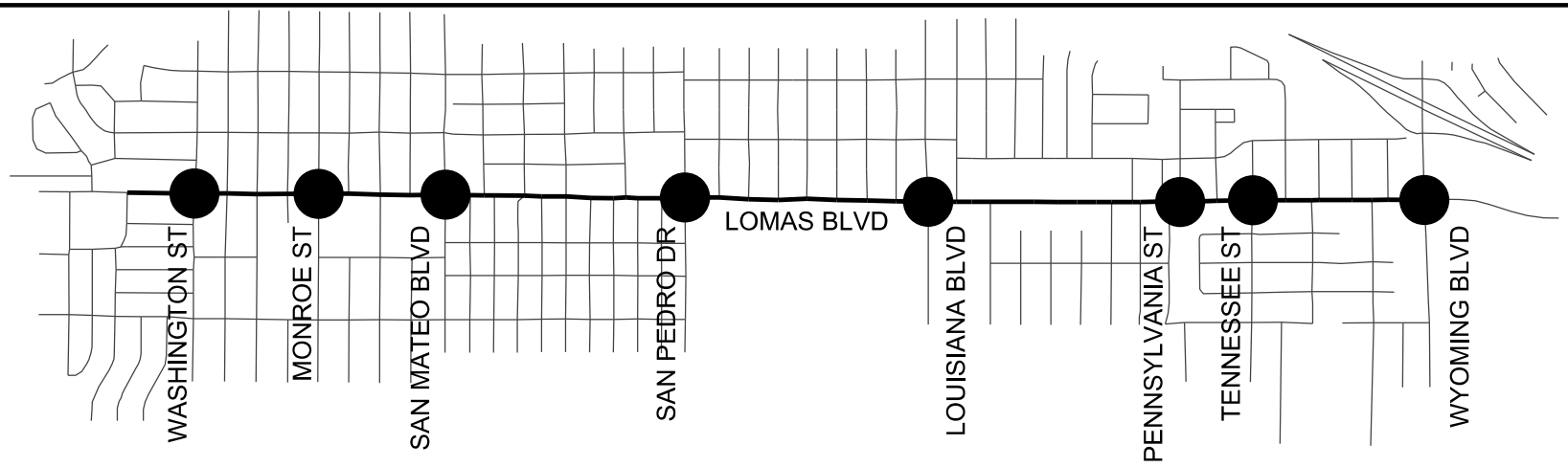
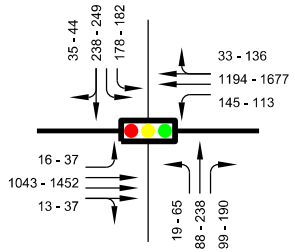
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

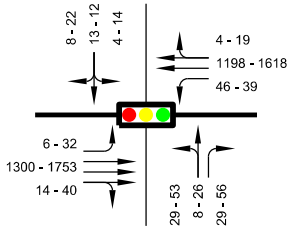
ZUNI ROAD

FIGURE
15

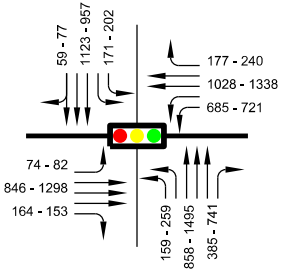




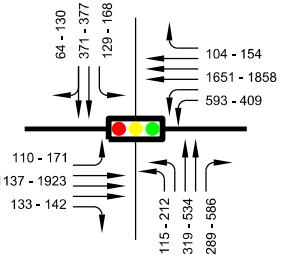
LOMAS BLVD /
WASHINGTON ST



LOMAS BLVD /
MONROE ST



LOMAS BLVD /
SAN MATEO BLVD



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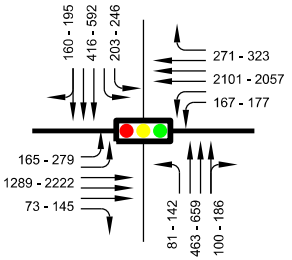
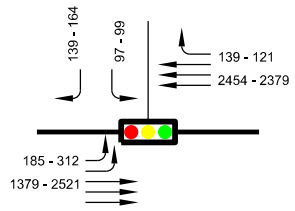
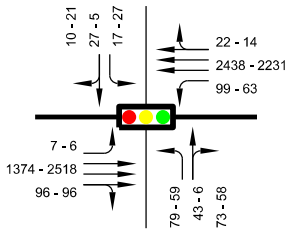
SAN PEDRO DR



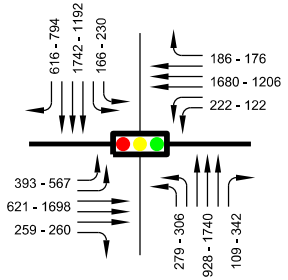
LOMAS BLVD /
LOUISIANA BLVD



LOMAS BLVD /
PENNSYLVANIA ST



LOMAS BLVD /
TENNESSEE ST



LOMAS BLVD /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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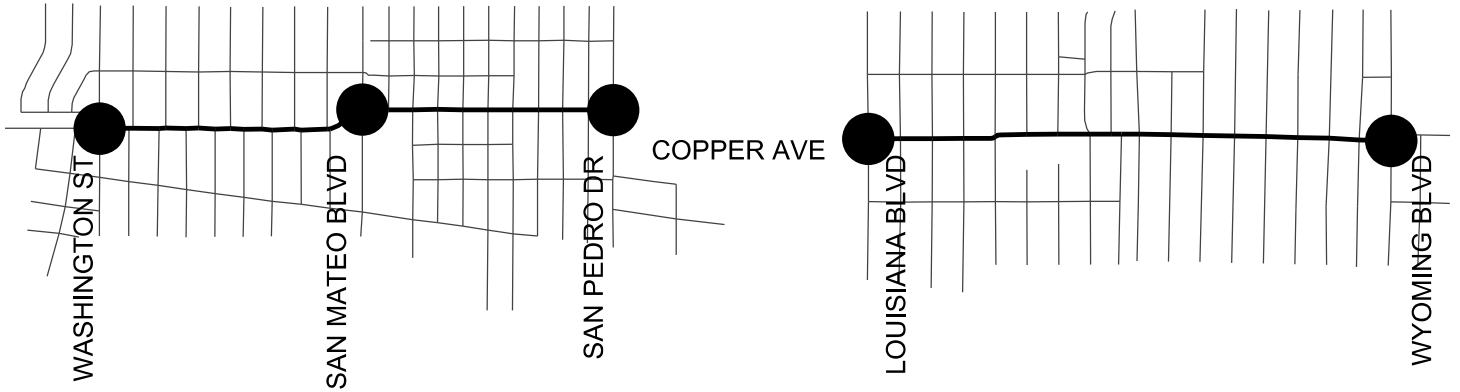
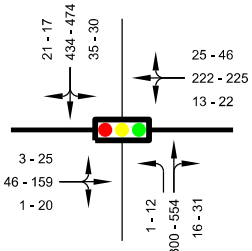
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

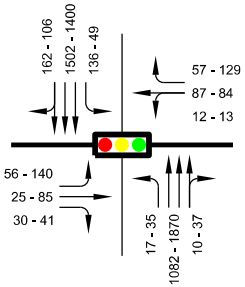
LOMAS BOULEAVARD

FIGURE
16

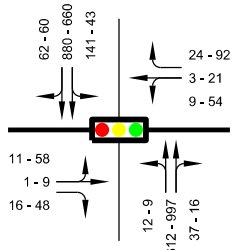




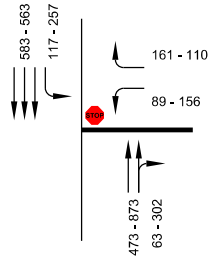
COPPER AVE /
WASHINGTON ST



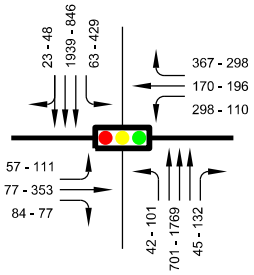
COPPER AVE /
SAN MATEO BLVD



COPPER AVE /
SAN PEDRO DR



COPPER AVE /
LOUISIANA BLVD



COPPER AVE /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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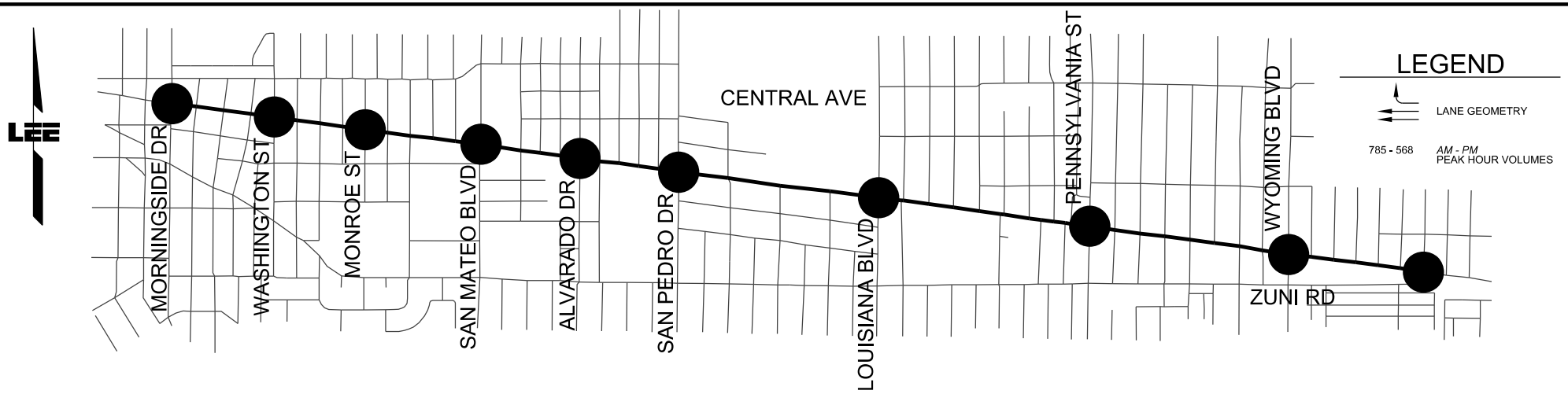
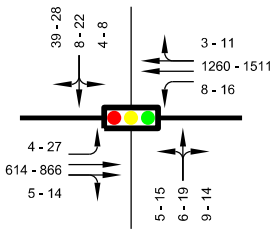
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

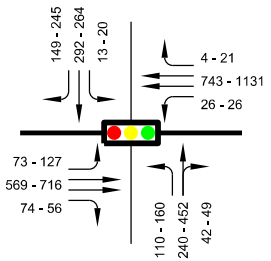
COPPER AVENUE

FIGURE
17

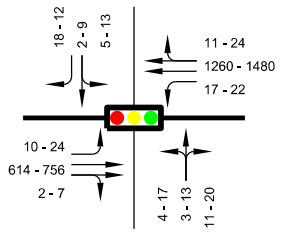




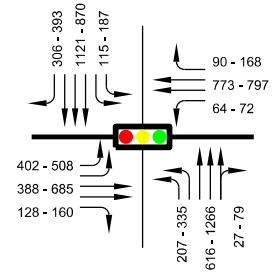
CENTRAL AVE /
MORNINGSIDE DR



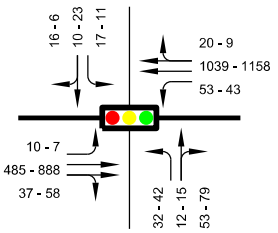
CENTRAL AVE /
WASHINGTON ST



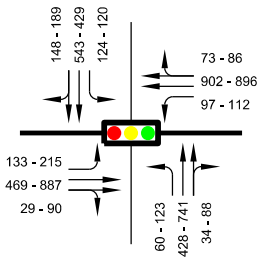
CENTRAL AVE /
MONROE ST



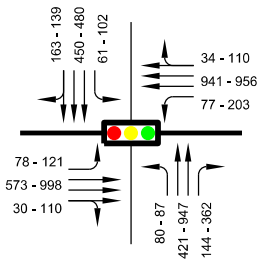
CENTRAL AVE /
SAN MATEO BLVD



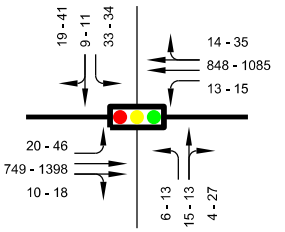
CENTRAL AVE /
ALVARADO DR



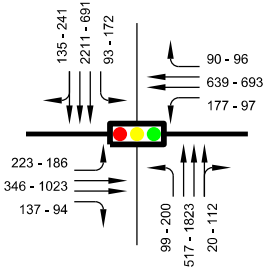
CENTRAL AVE /
SAN PEDRO DR



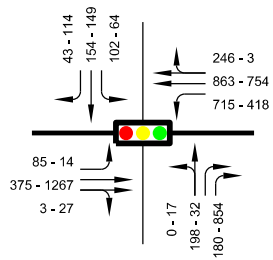
CENTRAL AVE /
LOUISIANA BLVD



CENTRAL AVE /
PENNSYLVANIA ST



CENTRAL AVE /
WYOMING BLVD



CENTRAL AVE /
ZUNI RD

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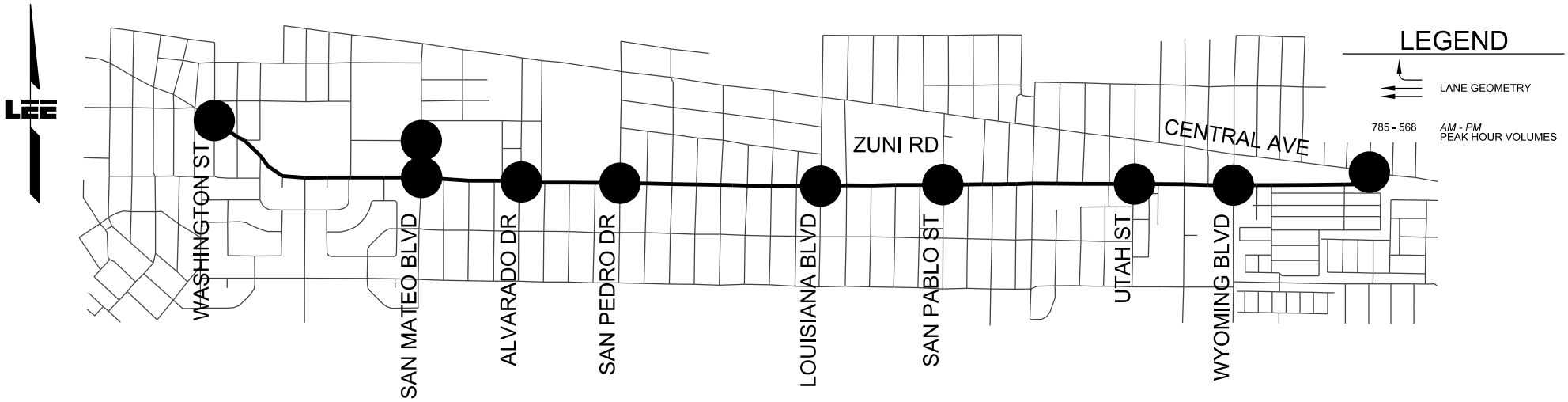
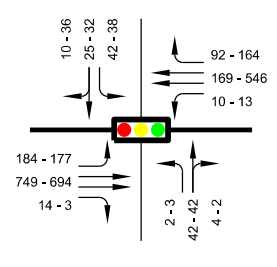
Zuni Road & Central Avenue Geometric Modification

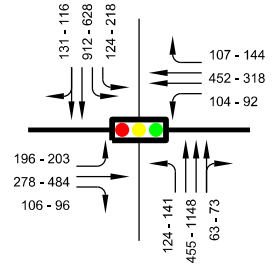
CENTRAL AVENUE

FIGURE
18

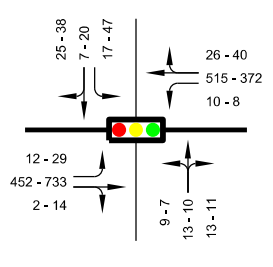




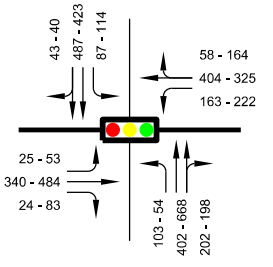
ZUNI RD /
WASHINGTON ST



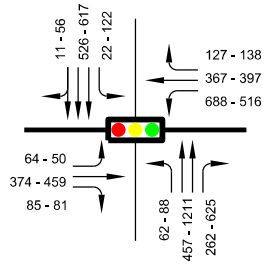
ZUNI RD /
SAN MATEO BLVD



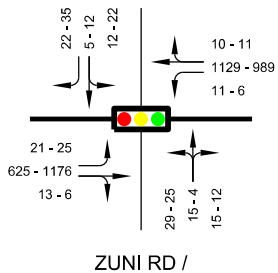
ZUNI RD /
ALAVARDO DR



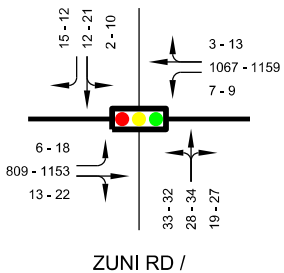
ZUNI RD /
SAN PEDRO DR



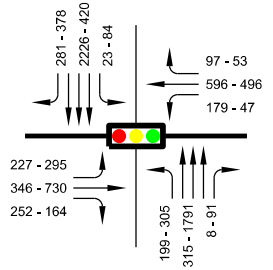
ZUNI RD /
LOUISIANA BLVD



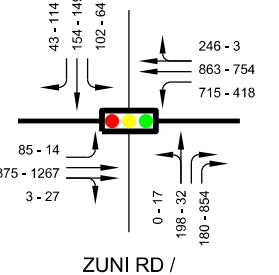
ZUNI RD /
SAN PABLO ST



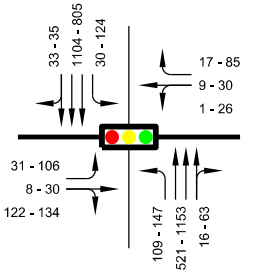
ZUNI RD /
UTAH ST



ZUNI RD /
WYOMING BLVD



ZUNI RD /
CENTRAL AVE



SAN MATEO BLVD /
HIGHLAND AVE

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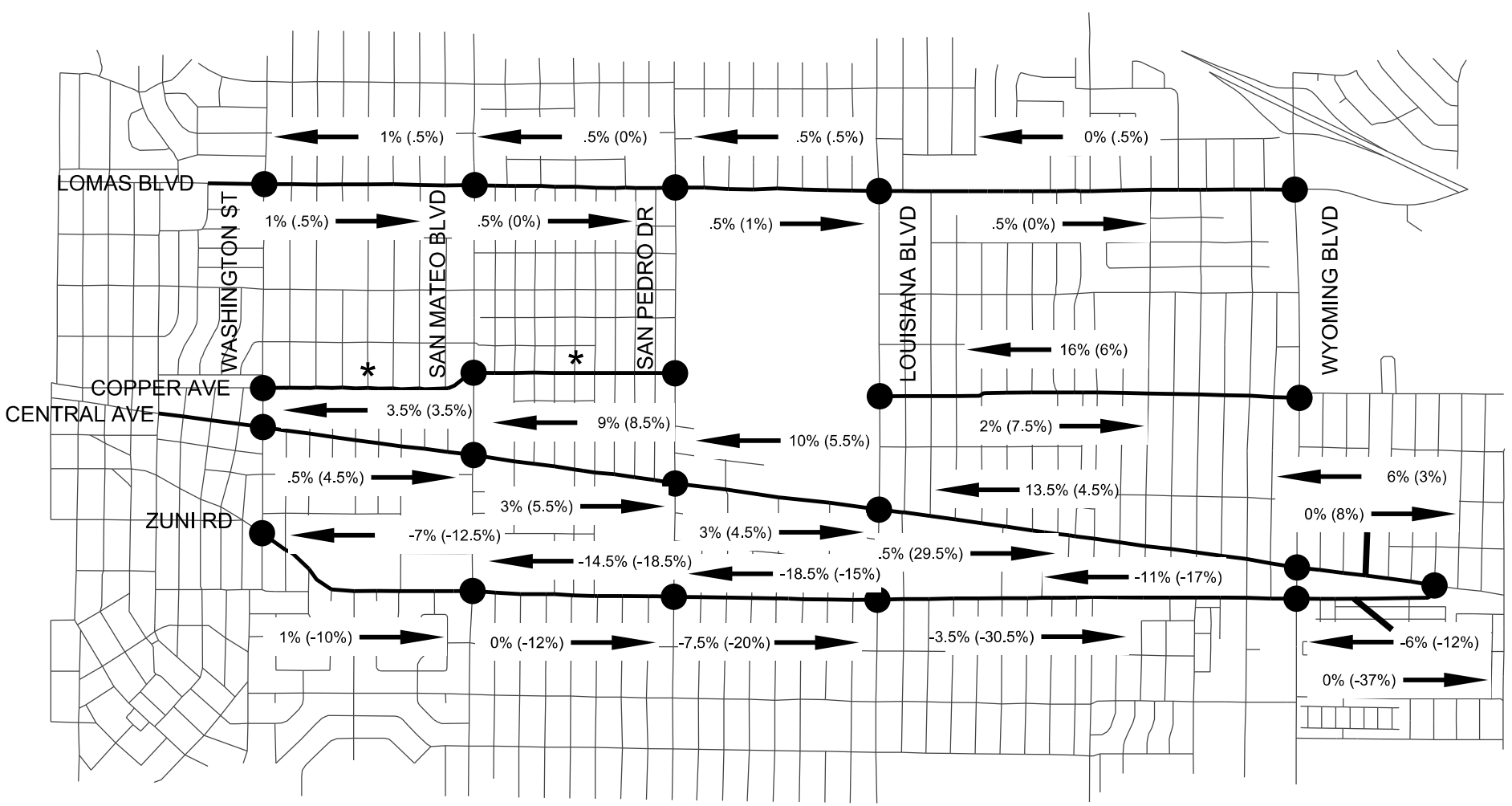
2035 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

ZUNI ROAD

FIGURE
19



LEGEND

AM PEAK(PM PEAK)

*NO DATA PROVIDED FOR COPPER AVENUE WEST

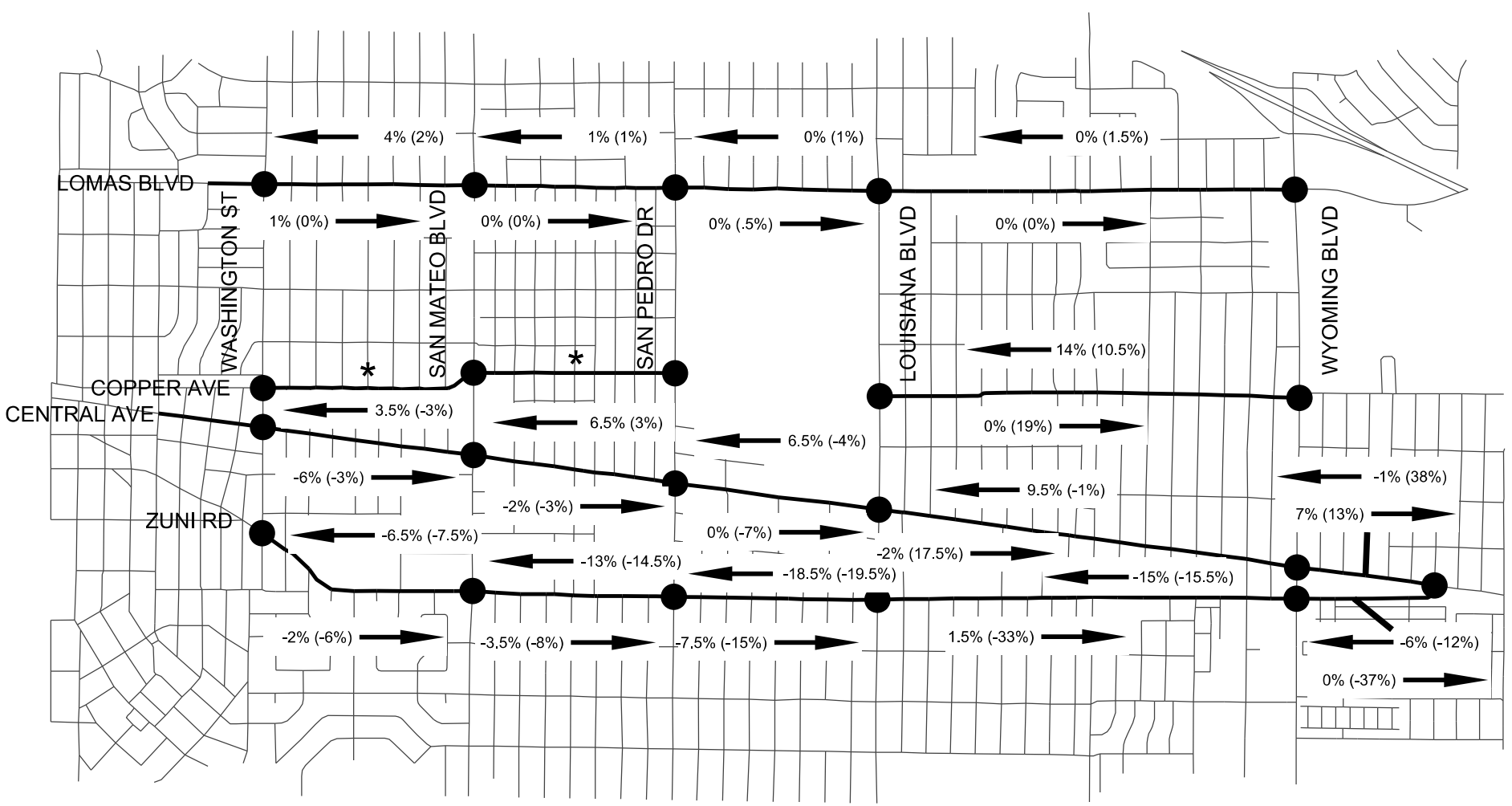
8220 SAN PEDRO DRIVE NE
SUITE 150
ALBUQUERQUE, NM 87113
505/338-0988 FAX 505/338-0989

LEE ENGINEERING

2035 Traffic Reduction/Increase

Zuni Road Geometric Modification vs. No Geometric Modification

FIGURE
20



LEGEND

AM PEAK(PM PEAK)

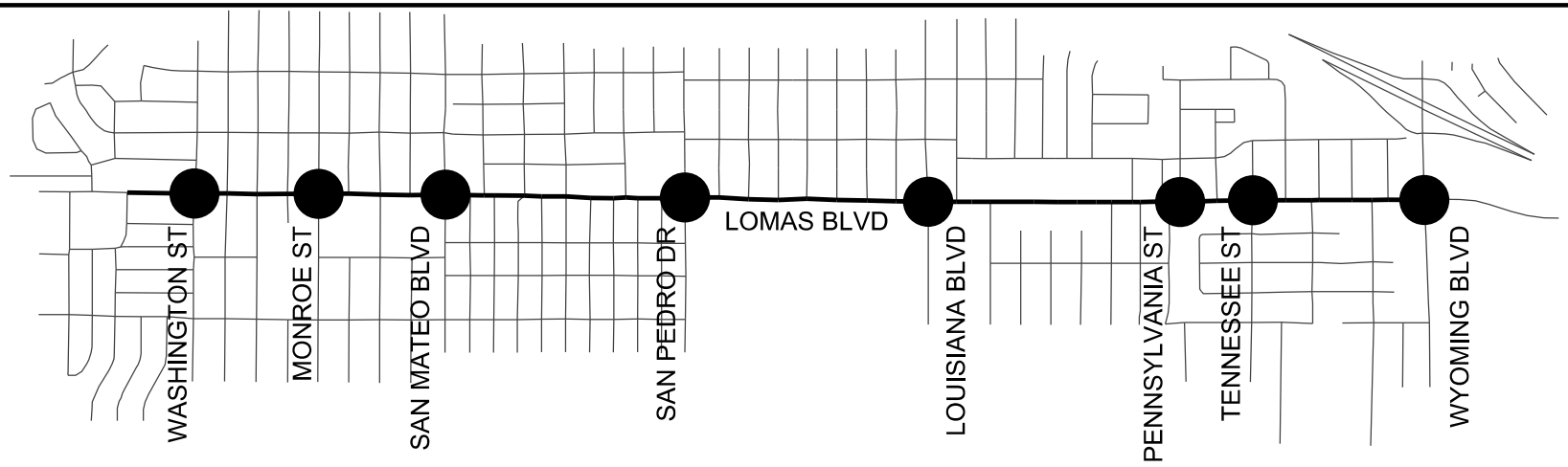
* NO DATA PROVIDED FOR COPPER AVENUE WEST

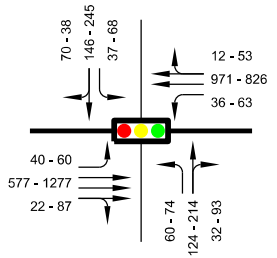
8220 SAN PEDRO DRIVE NE
SUITE 150
ALBUQUERQUE, NM 87113
505/338-0988 FAX 505/338-0989
LEE ENGINEERING

2035 Traffic Reduction/Increase

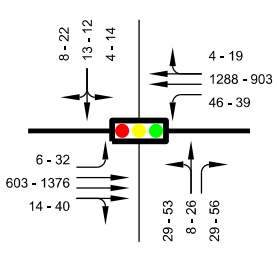
Zuni Road & Central Avenue Geometric Modification vs. No Geometric Modification

FIGURE
21

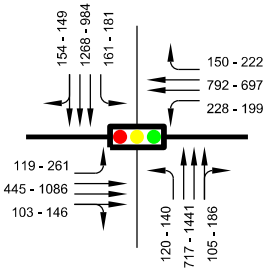




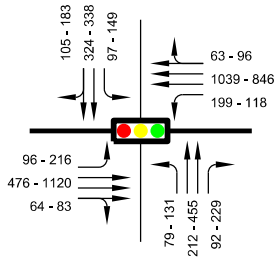
LOMAS BLVD /
WASHINGTON ST



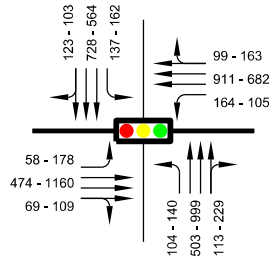
LOMAS BLVD /
MONROE ST



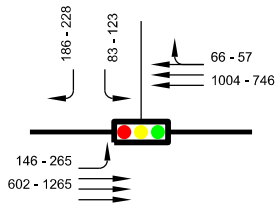
LOMAS BLVD /
SAN MATEO BLVD



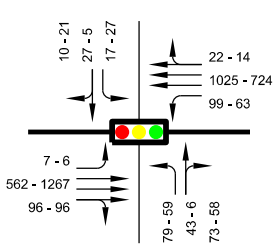
LOMAS BLVD /
SAN PEDRO DR



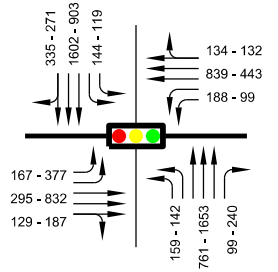
LOMAS BLVD /
LOUISIANA BLVD



LOMAS BLVD /
PENNSYLVANIA ST



LOMAS BLVD /
TENNESSEE ST



LOMAS BLVD /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

8220 SAN PEDRO DRIVE NE
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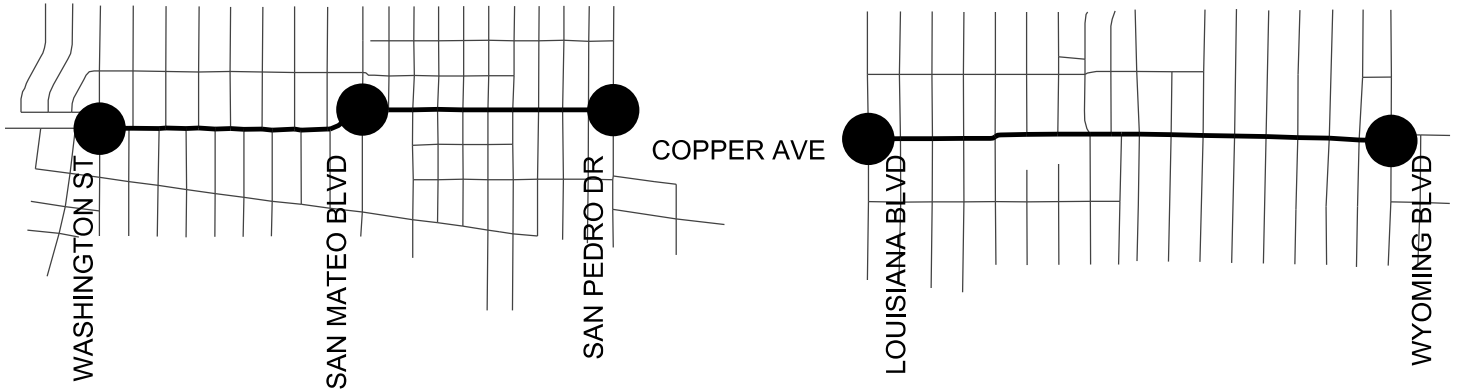
505/338-0988 FAX 505/338-0989

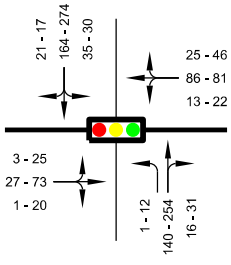
LEE ENGINEERING

2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

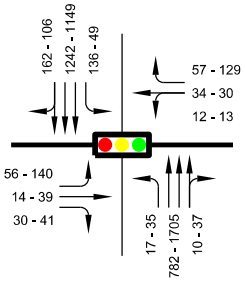
LOMAS BOULEAVARD

FIGURE
22

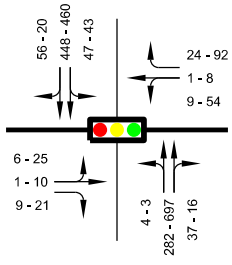




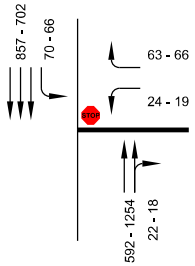
COPPER AVE /
WASHINGTON ST



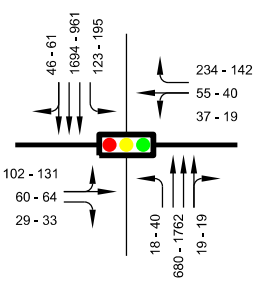
COPPER AVE /
SAN MATEO BLVD



COPPER AVE /
SAN PEDRO DR



COPPER AVE /
LOUISIANA BLVD



COPPER AVE /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

8220 SAN PEDRO DRIVE NE
SUITE 150
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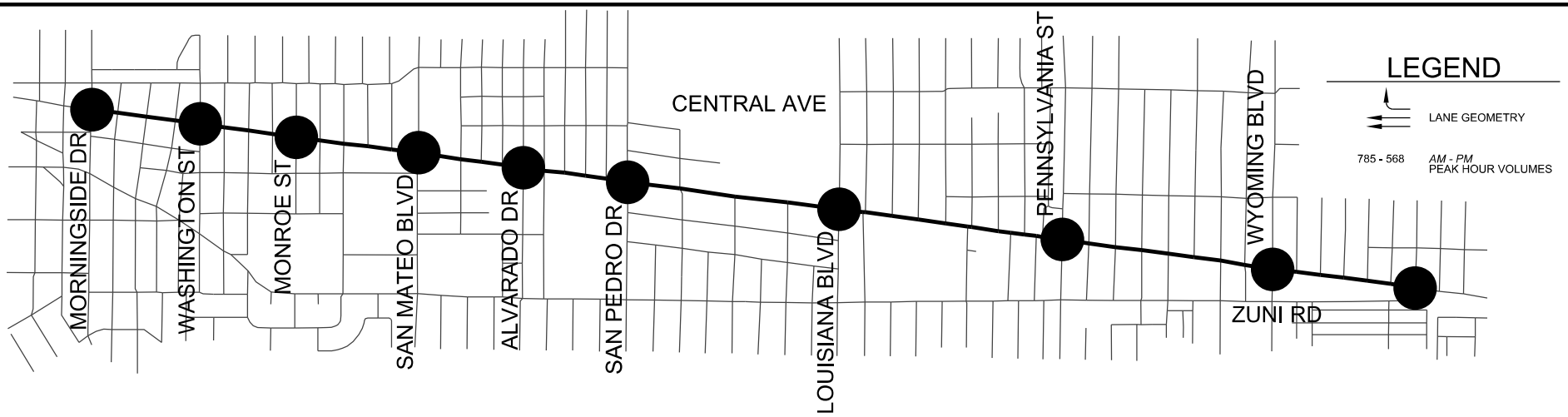
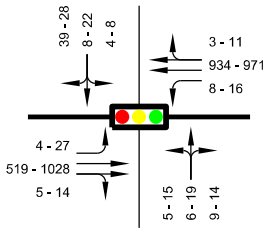
LEE ENGINEERING

2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

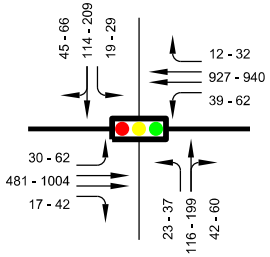
COPPER AVENUE

FIGURE
23

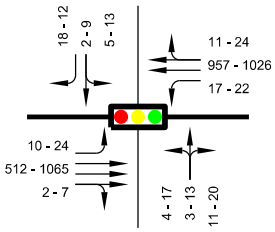




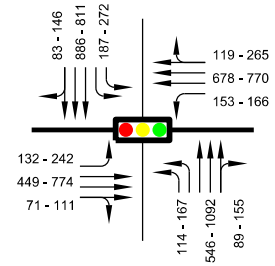
CENTRAL AVE /
MORNINGSIDE DR



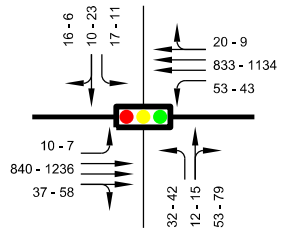
CENTRAL AVE /
WASHINGTON ST



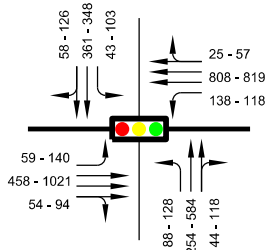
CENTRAL AVE /
MONROE ST



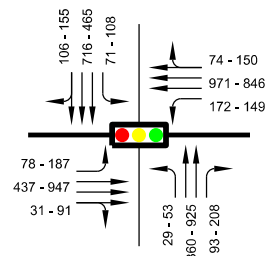
CENTRAL AVE /
SAN MATEO BLVD



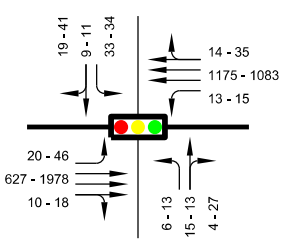
CENTRAL AVE /
ALVARADO DR



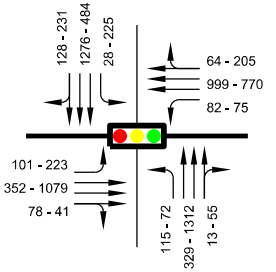
CENTRAL AVE /
SAN PEDRO DR



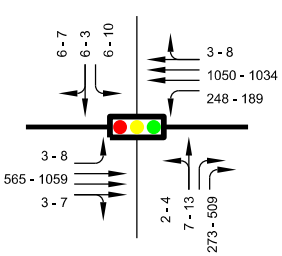
CENTRAL AVE /
LOUISIANA BLVD



CENTRAL AVE /
PENNSYLVANIA ST



CENTRAL AVE /
WYOMING BLVD



CENTRAL AVE /
ZUNI RD

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SUITE 150
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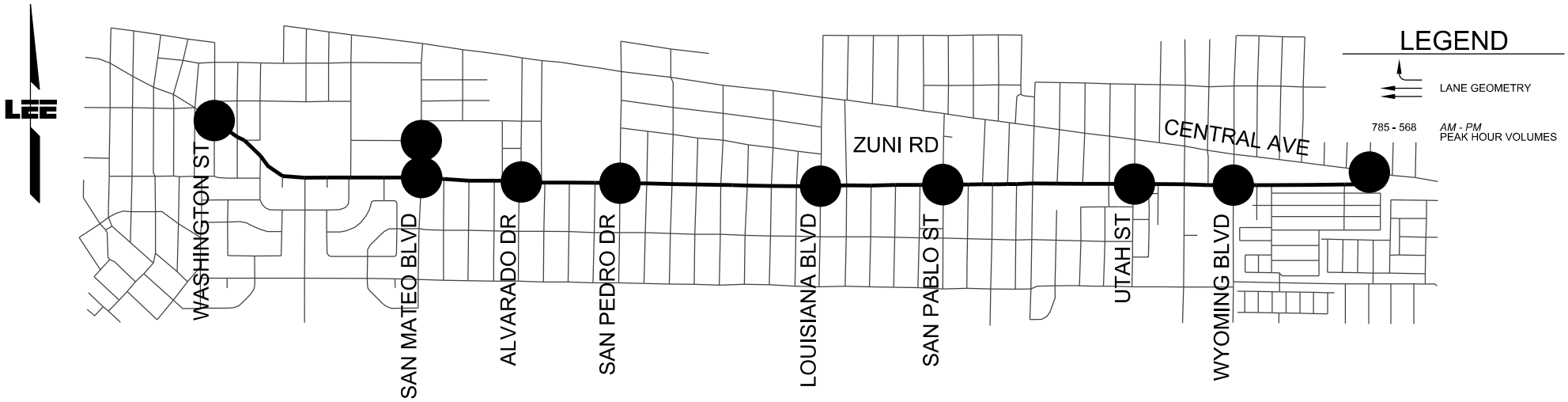
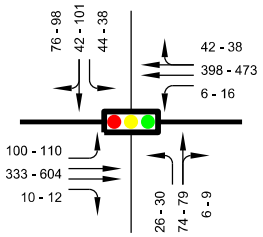
2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

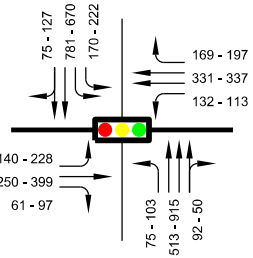
CENTRAL AVENUE

FIGURE
24

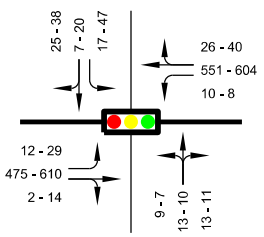




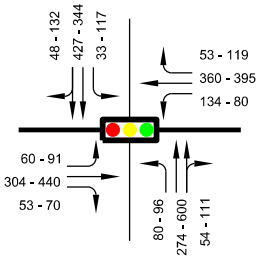
ZUNI RD /
WASHINGTON ST



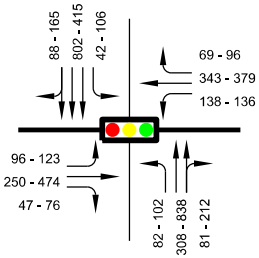
ZUNI RD /
SAN MATEO BLVD



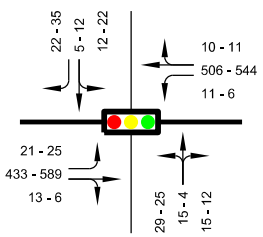
ZUNI RD /
ALAVARDO DR



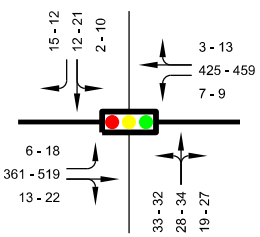
ZUNI RD /
SAN PEDRO DR



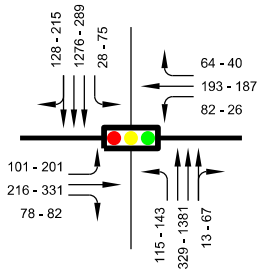
ZUNI RD /
LOUISIANA BLVD



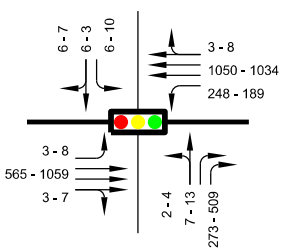
ZUNI RD /
SAN PABLO ST



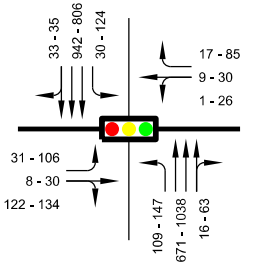
ZUNI RD /
UTAH ST



ZUNI RD /
WYOMING BLVD



ZUNI RD /
CENTRAL AVE



SAN MATEO BLVD /
HIGHLAND AVE

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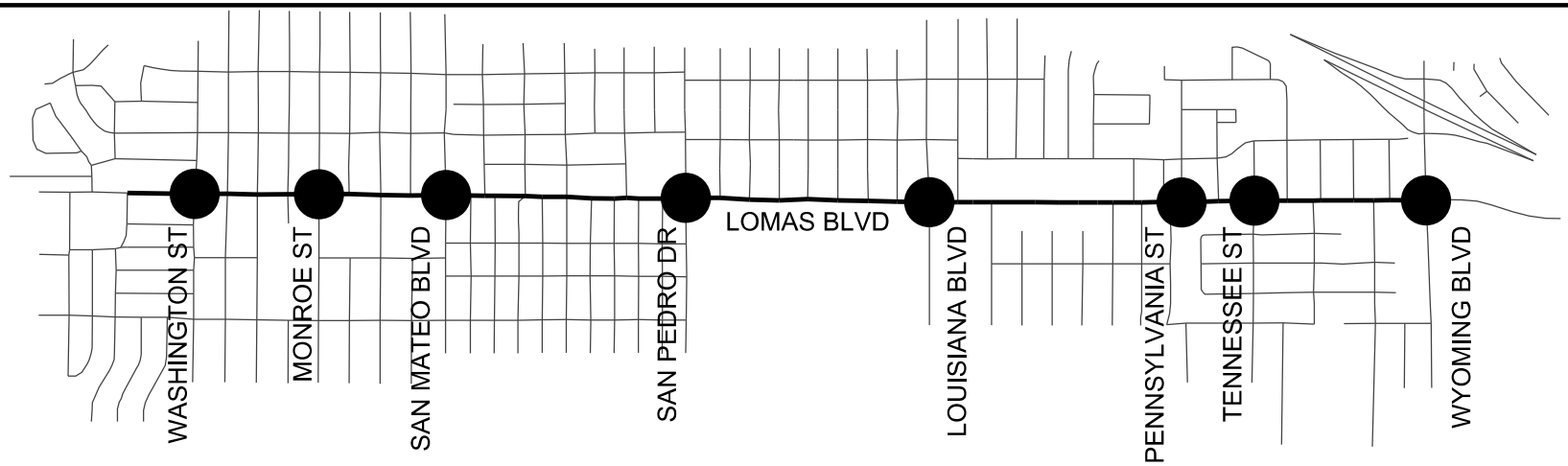
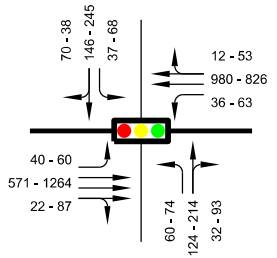
2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road Geometric Modification

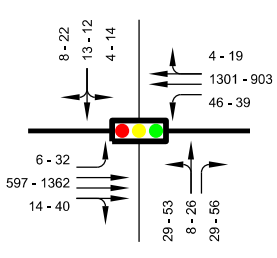
ZUNI ROAD

FIGURE
25

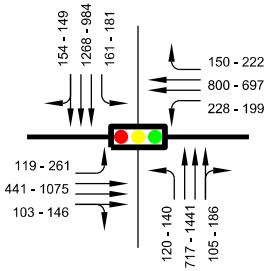




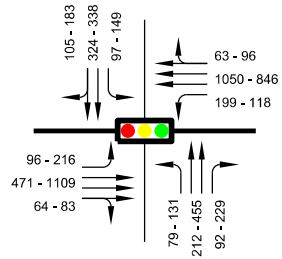
LOMAS BLVD /
WASHINGTON ST



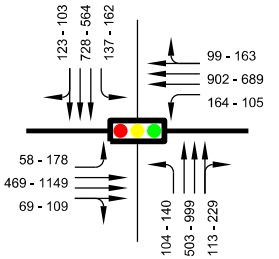
LOMAS BLVD /
MONROE ST



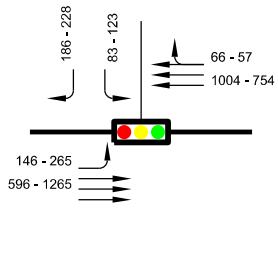
LOMAS BLVD /
SAN MATEO BLVD



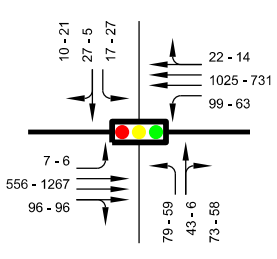
LOMAS BLVD /
SAN PEDRO DR



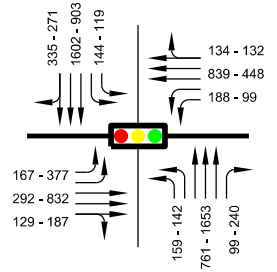
LOMAS BLVD /
LOUISIANA BLVD



LOMAS BLVD /
PENNSYLVANIA ST



LOMAS BLVD /
TENNESSEE ST



LOMAS BLVD /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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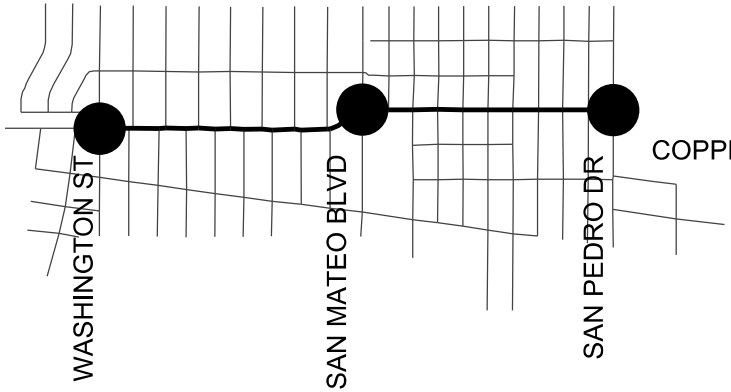
505/338-0988 FAX 505/338-0989

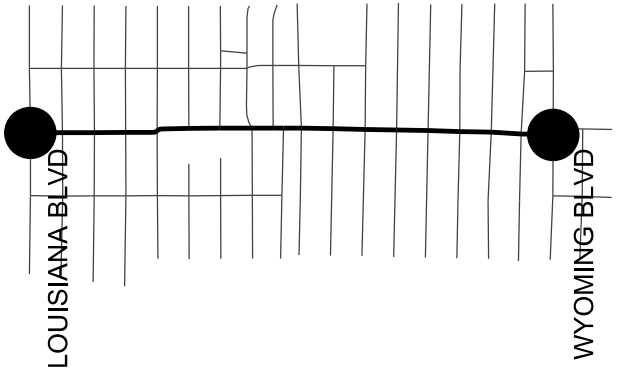
LEE ENGINEERING

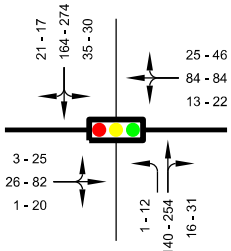
2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

LOMAS BOULEAVARD

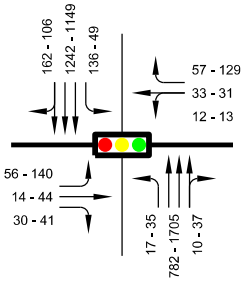
FIGURE
26



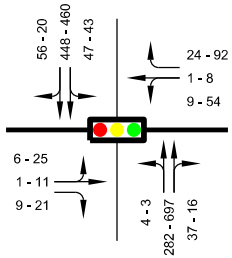




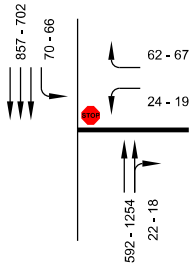
COPPER AVE /
WASHINGTON ST



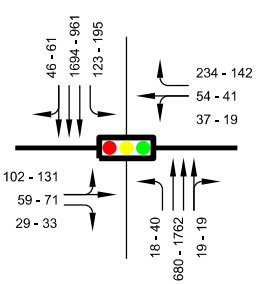
COPPER AVE /
SAN MATEO BLVD



COPPER AVE /
SAN PEDRO DR



COPPER AVE /
LOUISIANA BLVD



COPPER AVE /
WYOMING BLVD

LEGEND

LANE GEOMETRY

785 - 568 *AM - PM* PEAK HOUR VOLUMES

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2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

COPPER AVENUE

FIGURE
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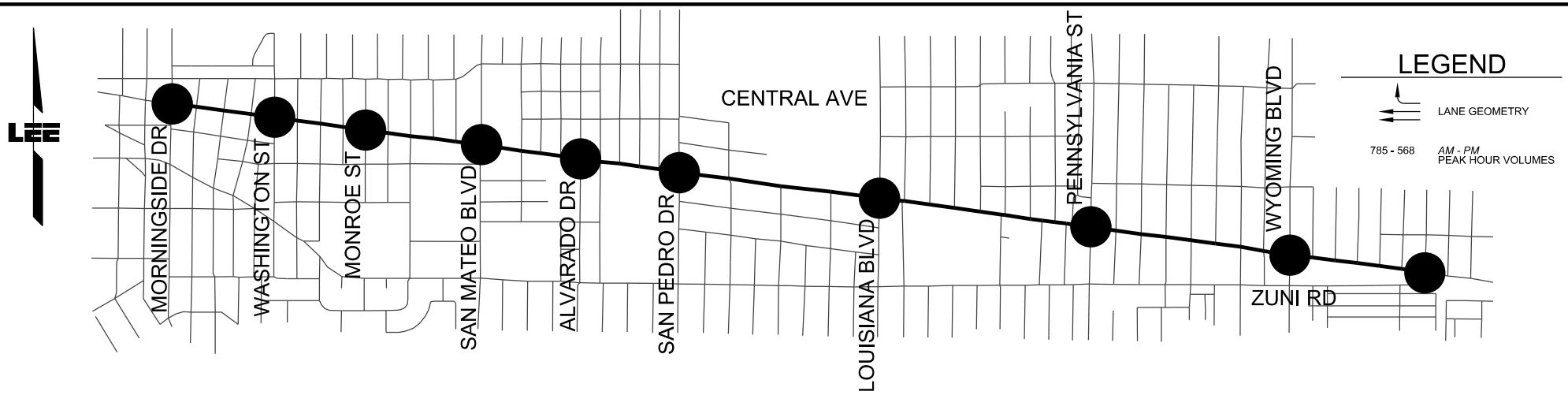

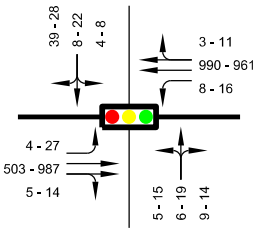

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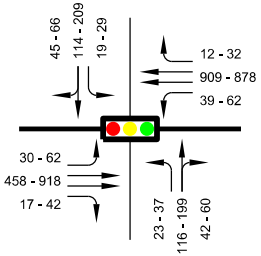

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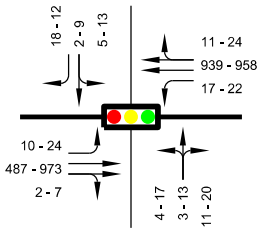

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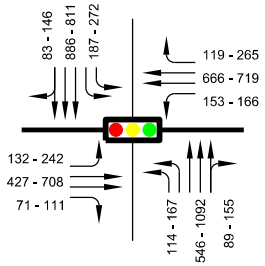

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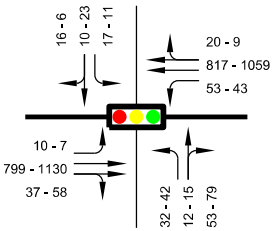

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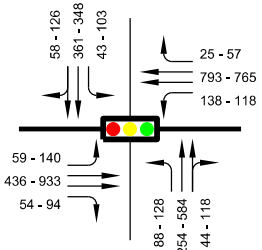

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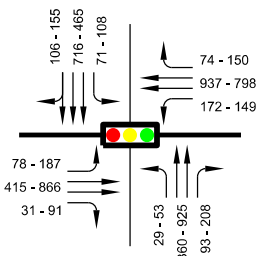

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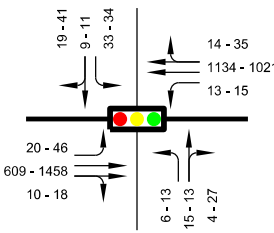
LOUISIANA BLVD



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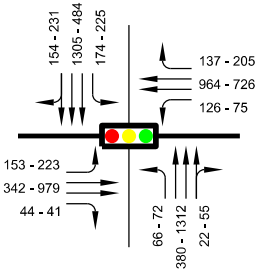

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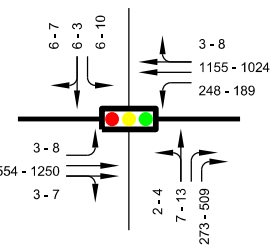

CENTRAL AVE /
ZUNI RD

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2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

CENTRAL AVENUE

FIGURE
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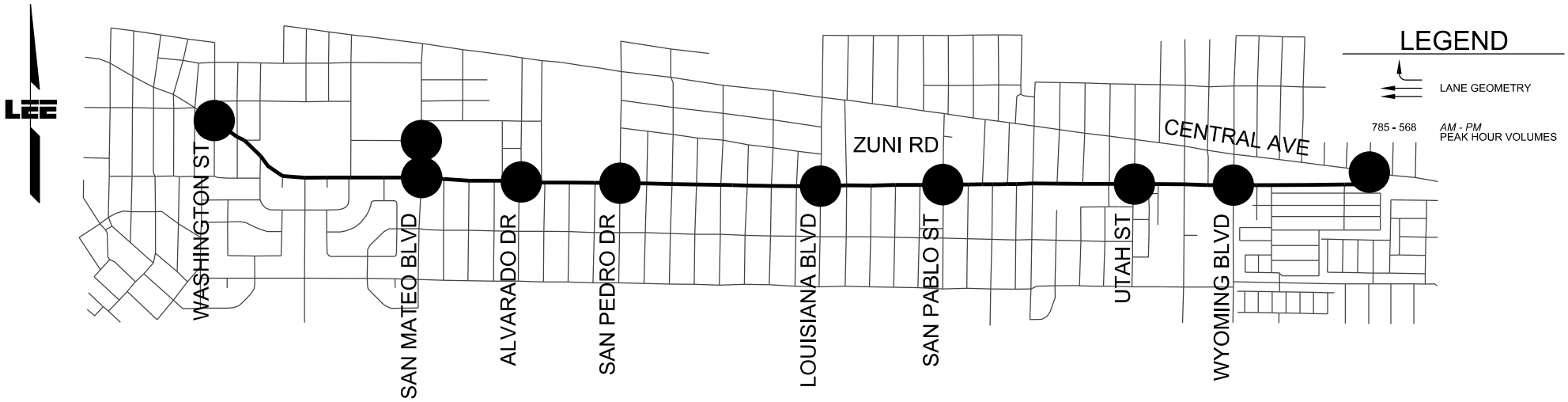
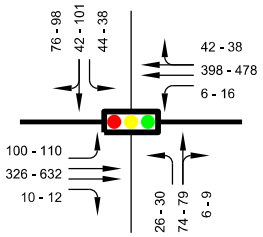
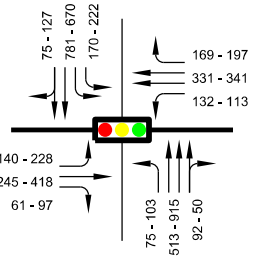
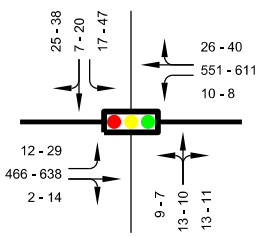




ZUNI RD /
WASHINGTON ST



ZUNI RD /
SAN MATEO BLVD



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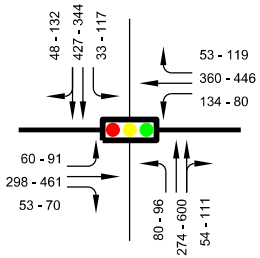

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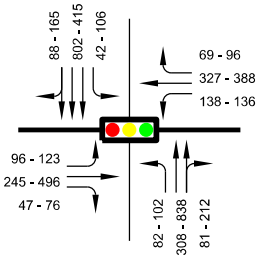

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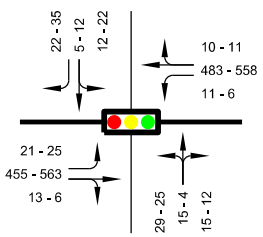
LOUISIANA BLVD



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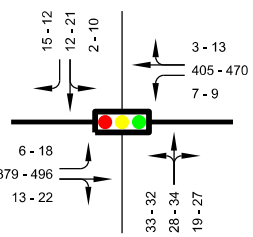

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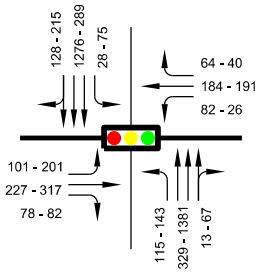

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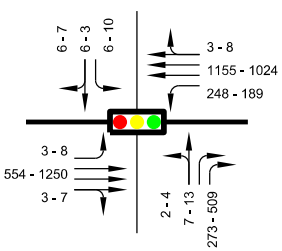
WYOMING BLVD



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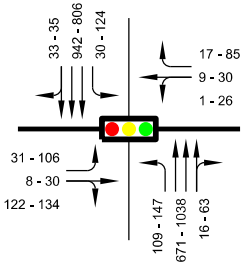
CENTRAL AVE



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HIGHLAND AVE

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2012 Peak Hour Turning Movement Counts & Lane Geometry
Zuni Road & Central Avenue Geometric Modification

ZUNI ROAD

FIGURE
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4.0 Existing 2012 Traffic Signal Timing

Presently, the City of Albuquerque Traffic Engineering Division has signal timing and coordination plans in place for the study corridors and intersections. The existing timings and patterns have been incorporated in the Synchro Model as a base-line scenario for existing traffic demands. This base-line scenario will be used to compare optimized signal timing and coordination patterns created for the roadway modifications on Zuni Road scenario, and the roadway modifications on both Zuni Road and Central Avenue scenario.

The traffic data collected as part of this study was used to evaluate the existing and modified signal timing plans and patterns for the AM and PM peak hours for all roadway geometric modification scenarios. The following procedures were incorporated in modifying the existing timing plans, and consequently compare and contrast capacity, arterial level of service, and review auxiliary lane queuing:

- **Pedestrian Crossing Times** – New pedestrian crossing times were calculated based on the latest MUTCD pedestrian walking speed of 3.5 feet per second and a walking distance as the greatest of measured lengths in both directions from the pedestrian ramp to the edge of the traveled way. Calculated pedestrian times are provided in **Appendix C**. As shown, most calculated pedestrian times are significantly greater than those currently in use. The exception to this is Zuni Road, where many of existing pedestrian times are actually a bit higher than required. As a result of this, there is the possibility of increased cycle lengths and the increased probability of early releases for the coordinated phases; however, the signal timing along the corridor will remain in coordination whenever a pedestrian call is made, limiting signal transition and out-of-coordination periods. It should be noted that at locations where pedestrian bulb-outs are constructed these pedestrian crossing times could be reduced, thereby allowing additional green time to those phases that require it most. The newly calculated pedestrian times have been applied to the roadway geometric modification scenarios.
- **Yellow and Red Clearance Intervals** – Utilizing the latest ITE equations found in *2009 ITE Traffic Signal Timing Manual*, calculated yellow change and all red clearance intervals were compared with existing values. Please see **Appendix C** for comparison between existing yellow change/red clearances and the calculated ones. The new clearance interval times have been applied to the roadway geometric modification scenarios**.**
- **Operations at Copper Avenue/Washington Street, Zuni Road/San Pablo Street, & Zuni Road/Utah Street** – It should be noted that these intersections do not currently have vehicle detection and therefore are currently running free uncoordinated signal patterns.
- **Cycle Length -** Cycle length scenarios ranging from 100 seconds to 140 seconds were evaluated using Synchro to determine which cycle length would offer the most benefit (fewest stops and lowest delay) to the corridor as a whole. The

resulting optimized cycle lengths are shown in ***Table 5*** for the AM and PM peak hours for all roadway geometric modification scenarios.

Table 5. Study Area Recommended Network Cycle Lengths

Year	Analysis Scenario	Timing Plan	Cycle Length (sec)
2012	Existing	AM Peak	110
		PM Peak	120
	No Modification (Optimized)	AM Peak	110
		PM Peak	120
	Zuni Modification (Optimized)	AM Peak	110
		PM Peak	120
	Central/Zuni Modification (Optimized)	AM Peak	110
		PM Peak	120

As indicated in ***Table 5***, it appears that the existing cycle lengths are applicable to all scenarios providing the best overall arterial performance and least delays.

- **Intersection Split Times –** All intersection green split times were optimized for AM and PM peak period plans using Synchro. We then reviewed all resulting splits and adjusted them to get each movement as much below capacity as possible. As mentioned, many side street green times were adjusted upward to accommodate the calculated required pedestrian crossing times. It should be noted that in order to keep movements under capacity and retain existing cycle lengths, the bus preemption phase for the northbound movement at the Lomas Boulevard/Wyoming Boulevard intersection was removed. This should not impact current operations due to the fact that bus routing has since changed and the preemption phase is no longer utilized. If this preemption phase were to be left in, pedestrian crossing movements would not be accommodated and the signal would go out of coordination when a pedestrian call occurred or a longer cycle length would need to be investigated for the entire network. Greater cycle length could have a detrimental effect on the corridors has they tend to increase queuing and delay.
- **Coordination –** Network offsets were optimized for both the Zuni and Central/Zuni modification scenarios to provide the best two-way progression possible. Optimization parameters allowed for half-cycling at minor intersections if applicable.
- **Geometric Mitigation –** It should be noted that at locations along Central Avenue and Zuni Road where split optimization was not sufficient to keep movements below capacity, right-turn auxiliary lanes were proposed at the intersection to provide additional capacity. Auxiliary right-turn lanes were added and are recommended on Zuni Road at the following intersections under both roadway modification scenarios:

- San Mateo Boulevard
- San Pedro Drive
- Louisiana Boulevard
- Wyoming Boulevard

Auxiliary right-turn lanes were also added and are recommended at major intersections along Central Avenue under the Central/Zuni roadway modification scenario and include the following:

- San Mateo Boulevard
- San Pedro Drive
- Louisiana Boulevard
- Wyoming Boulevard

5.0 Existing 2012 Capacity and Corridor Analyses

Capacity analyses were performed for the thirty-two (32) study area intersections for both the AM and PM peak hours under existing (No RGM), Zuni RGM, and Central/Zuni RGM timing conditions (the RGM and the No RGM Optimized scenarios include modified vehicle clearance intervals and pedestrian walk/clearance intervals). A summary of the delay and level of service (LOS) at each study intersection is provided on the next page in ***Table 6***. Characters color coded in red show a significant reduction in delay and LOS and characters in green show a significant reduction in delay and LOS between the NO RGM optimized and the RGM scenarios. Characters that show no color distinction indicate no significant change.

From ***Table 6***, the following information can be identified:

- Existing condition analysis shows all intersections operate at a LOS D or better for all peak hours, except for the Lomas Boulevard/San Mateo Boulevard, Lomas Boulevard/Louisiana Boulevard, Lomas Boulevard/Wyoming Boulevard, and Central Avenue/San Mateo Boulevard intersections which are LOS E or worse. All of these intersections contain movements which are over capacity. Central Avenue at Wyoming Boulevard also has at least one movement which is above capacity during the PM peak demands, but it is still operating at a LOS of D.
- Cycle lengths, green splits, and offsets were then offset for existing conditions. As indicated nearly all intersection operations showed reduced delay and better LOS. The locations that did not improve, essentially maintained existing operations levels. The following intersections on Central Ave and Zuni Rd were identified as still exhibiting LOS D accompanied by needed mitigation to get this intersection to LOS C:
    - Central Ave/San Mateo – The addition of a northbound right-turn lane
    - Central Ave/Wyoming Blvd – The addition of either a westbound right-turn lane or a dual southbound left-turn lane.
    - Zuni Rd/Louisiana Blvd - The addition of a northbound right-turn lane

  The needed ROW to construct the above mitigation, likely does not justify bringing an LOS D to an LOS C.
- With the Zuni Rd RGM in place, operation levels on both Zuni Road and Central Avenue remain in acceptable LOS (mostly at C with a few at D) and are all under capacity. As indicated, there are no intersections identified that show a significant increase or decrease over the existing optimized scenario.
- With the Central Ave/Zuni Rd RGM in place, all intersections on Central Avenue and Zuni road remain under capacity and mostly at a minimum LOS of C (a handful at D), except for the Central/Wyoming intersection, which has a movement which operates just over capacity, but still at a LOS D. As indicated, two intersections show a significant increase in delay and decrease in LOS in the PM peak (Central/Wyoming and Zuni/San Pedro) On e intersection showed significant

improvement over the existing optimized condition (Lomas/Pennsylvania)

- Operations on Lomas Boulevard tend to degrade slightly with the implementation of the RGM, but not much worse than existing conditions. The intersections of Lomas Boulevard at San Mateo Boulevard and Wyoming Boulevard remain with at least one movement operating above capacity.

Complete Synchro level-of-service and delay reports are provided in Appendix D.

Table 6. 2012 Study Intersection Capacity Analysis Results

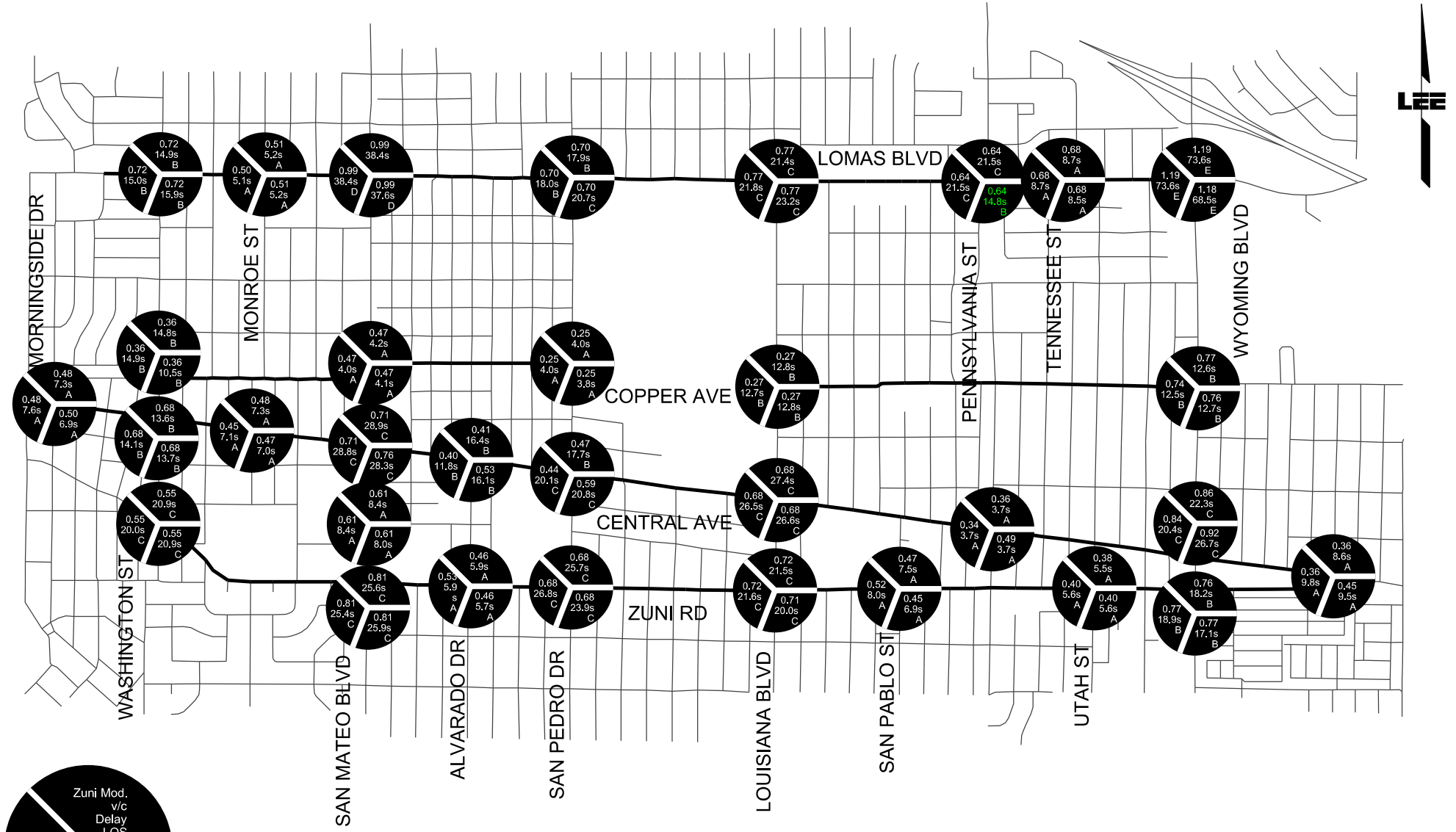
	2012 - No RGM (Existing Timings)						2012 - No RGM (Optimized Timings)						2012 - Zuni Rd RGM						2012 - Zuni Rd and Central Ave RGM					
	AM			PM			AM			PM			AM			PM			AM			PM		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
Lomas Blvd & Washington St	0.76	16.1	B	0.81	21.2	C	0.72	15.0	B	0.79	21.4	C	0.72	14.9	B	0.79	21.4	C	0.72	15.9	B	0.79	20.1	C
Lomas Blvd & Monroe St	0.50	4.9	A	0.58	7.7	A	0.50	5.1	A	0.57	7.5	A	0.51	5.2	A	0.57	7.5	A	0.51	5.2	A	0.57	7.0	A
Lomas Blvd & San Mateo Blvd	0.85	30.0	C	1.08	55.5	E	0.99	38.4	D	1.12	57.2	E	0.99	38.4	D	1.12	57.4	E	0.99	37.6	D	1.12	57.1	E
Lomas Blvd & San Pedro Dr	0.70	19.5	B	0.79	27.5	C	0.70	18.0	B	0.81	28.7	C	0.70	17.9	B	0.81	28.7	C	0.70	20.7	C	0.81	26.2	C
Lomas Blvd & Louisiana Blvd	0.73	28.6	C	1.34	81.2	F	0.77	21.8	C	0.92	28.4	C	0.77	21.4	C	0.92	28.5	C	0.77	23.2	C	0.92	28.6	C
Lomas Blvd & Pennsylvania St	0.52	19.6	B	0.54	14.6	B	0.64	21.5	C	0.55	12.2	B	0.64	21.5	C	0.55	12.2	B	**0.64**	**14.8**	**B**	0.56	12.2	B
Lomas Blvd & Tennessee St	0.68	10.4	B	0.73	11.1	B	0.68	8.7	A	0.56	7.0	A	0.68	8.7	A	0.56	7.0	A	0.68	8.5	A	0.56	7.9	A
Lomas Blvd & Wyoming Blvd	1.12	53.9	D	1.22	47.9	D	1.19	73.6	E	1.28	42.3	D	1.19	73.6	E	1.28	42.3	D	1.18	68.5	E	1.28	42.8	D
Copper Ave & Washington St	0.39	9.8	A	0.64	12.6	B	0.36	14.9	B	0.49	9.7	A	0.36	14.8	B	0.49	9.9	A	0.36	10.5	B	0.49	11.0	B
Copper Ave & San Mateo Blvd	0.47	4.4	A	0.69	9.7	A	0.47	4.0	A	0.70	10.1	B	0.47	4.2	A	0.70	10.2	B	0.47	4.1	A	0.70	10.5	B
Copper Ave & San Pedro Dr	0.25	4.6	A	0.61	7.5	A	0.25	4.0	A	0.41	5.2	A	0.25	4.0	A	0.42	5.3	A	0.25	3.8	A	0.42	9.0	A
Copper Ave & Louisiana Blvd (1)	*0.27*	*12.7*	*B*	*0.51*	*18.3*	*C*	*0.27*	*12.7*	*B*	*0.51*	*18.3*	*C*	*0.27*	*12.8*	*B*	*0.51*	*18.4*	*C*	*0.27*	*12.8*	*B*	*0.51*	*18.4*	*C*
Copper Ave & Wyoming Blvd	0.76	16.7	B	0.83	16.3	B	0.74	12.5	B	0.87	17.9	B	0.77	12.6	B	0.88	18.1	B	0.76	12.7	B	0.87	18.8	B
Central Ave & Morningside Dr	0.43	8.8	A	0.44	11.6	B	0.48	7.6	A	0.88	24.1	C	0.48	7.3	A	0.88	24.2	C	0.50	6.9	A	0.85	23.6	C
Central Ave & Washington St	0.68	17.6	B	0.78	21.3	C	0.68	14.1	B	0.79	20.0	C	0.68	13.6	B	0.79	19.7	B	0.68	13.7	B	0.76	18.3	B
Central Ave & Monroe St	0.46	8.9	A	0.50	7.9	A	0.45	7.1	A	0.90	18.9	B	0.48	7.3	A	0.95	22.8	C	0.47	7.0	A	0.90	23.4	C
Central Ave & San Mateo Blvd	0.70	35.3	D	1.11	57.1	E	0.71	28.8	C	0.96	38.5	D	0.71	28.9	C	0.96	38.4	D	0.76	28.3	C	0.99	44.7	D
Central Ave & Alvarado Dr	0.31	6.0	A	0.40	9.2	A	0.40	11.8	B	0.48	17.7	B	0.41	16.4	B	0.50	18.0	B	0.53	16.1	B	0.62	18.5	B
Central Ave & San Pedro Dr	0.44	22.3	C	0.83	30.0	C	0.44	20.1	C	0.77	22.5	C	0.47	17.7	B	0.77	22.9	C	0.59	20.8	C	0.86	27.1	C
Central Ave & Louisiana Blvd	0.70	19.6	B	0.83	30.4	C	0.68	26.5	C	0.84	27.1	C	0.68	27.4	C	0.84	27.3	C	0.68	26.6	C	0.88	28.3	C
Central Ave & Pennsylvania St	0.34	3.4	A	0.42	3.2	A	0.34	3.7	A	0.42	3.1	A	0.36	3.7	A	0.52	3.5	A	0.49	3.7	A	0.56	4.1	A
Central Ave & Wyoming Blvd	0.85	44.3	D	1.08	53.8	D	0.84	20.4	C	0.92	35.9	D	0.86	22.3	C	0.92	39.5	D	0.92	26.7	C	**1.01**	**47.3**	**D**
Central Ave & Zuni Rd	0.36	9.4	A	0.62	12.1	B	0.36	9.8	A	0.88	13.6	B	0.36	8.6	A	0.88	12.5	B	0.45	9.5	A	0.70	11.0	B
Zuni Rd & Washington St	0.47	13.9	B	0.67	18.1	B	0.55	20.0	C	0.76	24.7	C	0.55	20.9	C	0.76	24.9	C	0.55	20.9	C	0.76	30.4	C
Zuni Rd & San Mateo Blvd	0.95	33.6	C	0.89	35.1	D	0.81	25.4	C	0.84	33.0	C	0.81	25.6	C	0.84	33.0	C	0.81	25.9	C	0.84	35.8	D
Zuni Rd & Alvarado Dr	0.57	9.1	A	0.64	16.7	B	0.53	5.9	A	0.57	8.6	A	0.46	5.9	A	0.51	7.9	A	0.46	5.7	A	0.51	7.3	A
Zuni Rd & San Pedro Dr	0.50	23.9	C	0.64	32.2	C	0.68	26.8	C	0.86	29.5	C	0.68	25.7	C	0.86	29.5	C	0.68	23.9	C	**0.89**	**36.7**	**D**
Zuni Rd & Louisiana Blvd	0.56	30.3	C	0.92	35.2	D	0.72	21.6	C	0.97	40.9	D	0.72	21.5	C	0.94	36.5	D	0.71	20.0	C	0.99	40.8	D
Zuni Rd & San Pablo St	0.35	5.6	A	0.39	5.5	A	0.52	8.0	A	0.65	5.8	A	0.47	7.5	A	0.46	5.0	A	0.45	6.9	A	0.45	8.0	A
Zuni Rd & Utah St	0.38	5.7	A	0.43	6.5	A	0.40	5.6	A	0.59	9.3	A	0.38	5.5	A	0.47	7.6	A	0.40	5.6	A	0.47	8.9	A
Zuni Rd & Wyoming Blvd	0.82	30.2	C	0.78	36.4	D	0.77	18.9	B	0.90	29.4	C	0.76	18.2	B	0.78	26.0	C	0.77	17.1	B	0.74	26.0	C
Highland Ave & San Mateo Blvd	0.61	6.8	A	0.86	12.8	B	0.61	8.4	A	0.83	14.1	B	0.61	8.4	A	0.83	14.3	B	0.61	8.0	A	0.72	13.4	B

Indicates an increase in delay (2) **Indicates a decrease in delay (2)**

(1) - Minor Street, Stop Controlled Intersection.

(2) - Indicates intersections that have a change in LOS **and** a change in delay greater than 5 seconds.

V/C = Maximum volume to capacity; Delay is in seconds



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2012 AM Peak Hour Capacity Analysis

All Geometric Modification Scenarios

FIGURE
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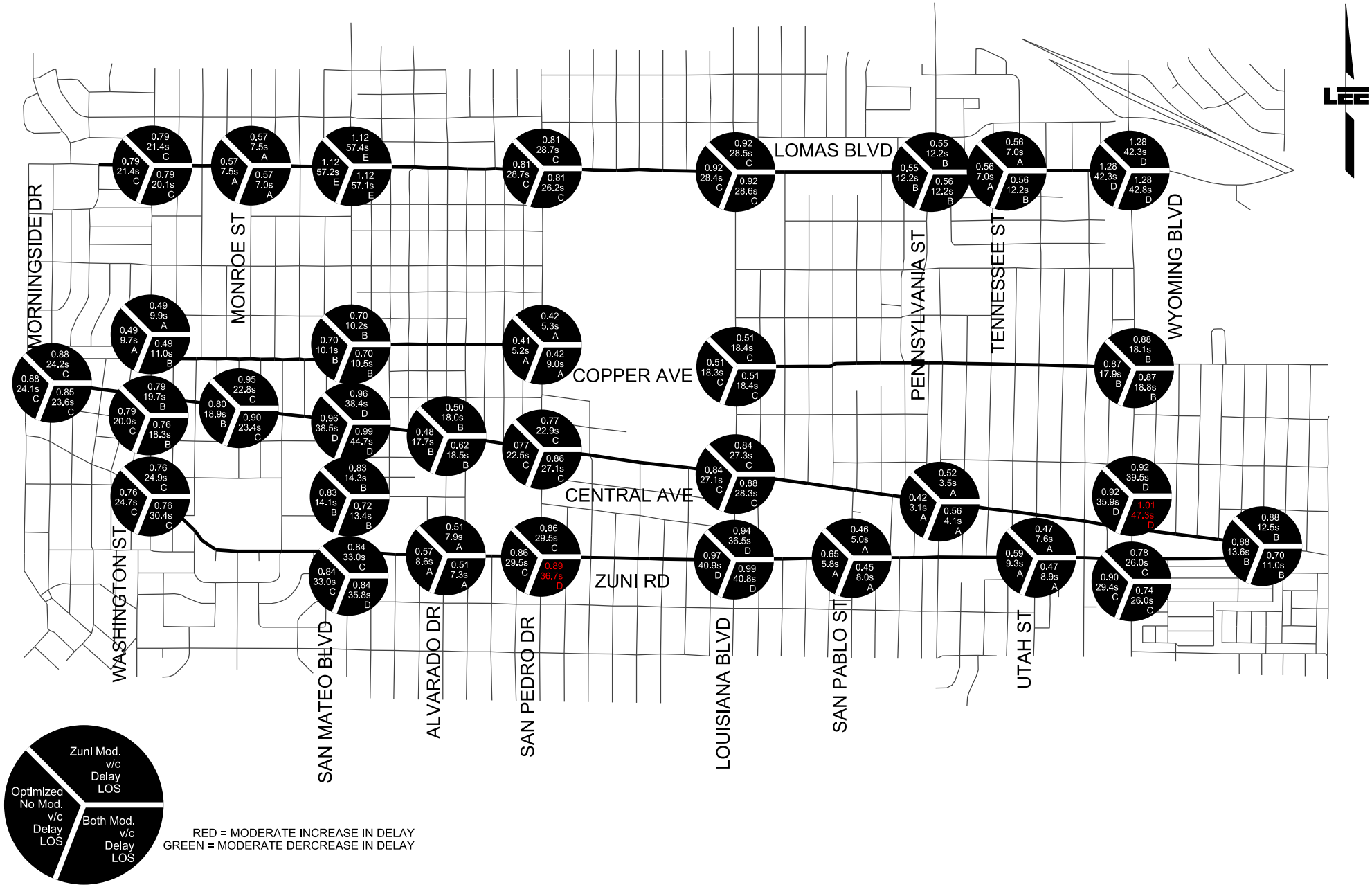

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2012 PM Peak Hour Capacity Analysis

All Geometric Modification Scenarios

FIGURE
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Another measure of effectiveness comparison between No RGM and the two RGM scenarios can be computed directly through the reporting feature of the Synchro software which summarizes the corridor specific and overall network delay. The total network and individual directional corridor delays have been output for each scenario and are shown in ***Table 7***.

Table 7. 2012 Measures of Effectiveness Comparison

		Total Delay, sec/veh	
Scenario	**Corridor/Network**	**AM Peak**	**PM Peak**
Existing (No RGM)	Lomas Blvd E/W Approaches	20	34
	Central Ave E/W Approaches	13	16
	Zuni Rd E/W Approaches	18	22
	Entire Network, All Approaches	21	29
Existing with Optimized Timing (No RGM)	Lomas Blvd E/W Approaches	16	19
	Central Ave E/W Approaches	12	19
	Zuni Rd E/W Approaches	16	20
	Entire Network, All Approaches	21	24
Zuni Rd RGM	Lomas Blvd E/W Approaches	16	19
	Central Ave E/W Approaches	12	20
	Zuni Rd E/W Approaches	15	18
	Entire Network, All Approaches	21	24
Central Ave/Zuni Rd RGM	Lomas Blvd E/W Approaches	15	19
	Central Ave E/W Approaches	12	21
	Zuni Rd E/W Approaches	15	18
	Entire Network, All Approaches	21	25

Copper Avenue was not reported as it as stop signs located along its length and is interrupted by the Expo New Mexico property and therefore is not considered a coordinated corridor. In general, the RGM scenarios either maintained existing levels of delay or slightly increased delay by no more than a few seconds per vehicle. It should be noted that the Existing Optimized No RGM and the two RGM timing plans have been optimized with auxiliary lane mitigation incorporated as mentioned in the capacity analysis. It should also be noted that the optimized plans include the new pedestrian crossing times.

The Synchro software also offers a report that provides arterial LOS and travel speeds. These results are summarized in ***Table 8***. Again, Copper Avenue was not reported as it as stop signs located along its length and is interrupted by the Expo New Mexico property and therefore is not considered a coordinated corridor.

Table 8. 2012 Arterial LOS Comparison

		AM Peak				PM Peak			
		EB		WB		EB		WB	
Scenario	Corridor/Network	Arterial Speed (MPH)	LOS	Arterial Speed (MPH)	LOS	Arterial Speed (MPH)	LOS	Arterial Speed (MPH)	LOS
Existing (No RGM)	Lomas Blvd E/W Approaches	23.9	C	21.4	D	16.1	E	22.4	C
	Central Ave E/W Approaches	23.2	C	23.2	C	22.5	C	21.4	C
	Zuni Rd E/W Approaches	19.5	C	19.9	C	17.2	D	19.1	C
Existing with Optimized Timing (No RGM)	Lomas Blvd E/W Approaches	25.1	C	22.7	C	24.5	C	22.8	C
	Central Ave E/W Approaches	22.5	C	24.5	B	21.4	C	20.7	C
	Zuni Rd E/W Approaches	21.0	C	20.7	C	16.7	D	20.2	C
Zuni Rd RGM	Lomas Blvd E/W Approaches	25.2	C	22.7	C	24.4	C	22.8	C
	Central Ave E/W Approaches	22.4	C	24.2	C	21.0	C	20.2	C
	Zuni Rd E/W Approaches	20.9	C	21.0	C	16.8	D	20.4	C
Central Ave/Zuni Rd RGM	Lomas Blvd E/W Approaches	25.1	C	23.7	C	24.4	C	22.0	D
	Central Ave E/W Approaches	22.3	C	23.6	C	19.9	C	19.7	C
	Zuni Rd E/W Approaches	21.5	C	21.0	C	18.9	C	20.4	C

As shown, there is very little significant change in arterial speed and arterial LOS between the various RGM and No RGM scenarios. There is a mixture of increased and decreased arterial speeds between scenarios, but mostly LOS C and a couple of LOS D is maintained through all the study corridors for both eastbound and westbound directions and AM and PM peak hours. It should be noted that the problem areas along each corridor tend to occur at heavy north/south corridors such as San Mateo, Louisiana, and Wyoming where turning movements are greater and heavy through movements are competing for a limited share of green times.

Queue Capacity Analysis

Auxiliary lane queues for the study intersections along Central Avenue and Zuni Road were analyzed comparing existing storage capacity with 95th percentile queue demands for all 2012 existing scenarios, as reported by Synchro. The 95th percentile queue is defined to be the maximum queue length (in feet) that has only a 5% probability of being exceeded during the analysis time period. The 95th percentile queue is a Measure of Effectiveness (MOE) provided

by the Synchro analysis software. ***Table 9*** summarizes this queue analysis.

Table 9. Auxiliary Lane Queue Capacity Analysis

Central Ave Intersections	Scenario	Storage Length/Demand (ft)								Zuni Rd Intersections	Scenario	Storage Length/Demand (ft)							
		EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR			EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Morningside Dr	Existing Storage	50	n/a	50	n/a	n/a	n/a	n/a	n/a	Washington St	Existing Storage	50	n/a	50	100	125	n/a	75	n/a
	No RGM	25	n/a	25	n/a	n/a	n/a	n/a	n/a		No RGM	50	n/a	^	25	25	n/a	50	n/a
	Zuni RGM	25	n/a	25	n/a	n/a	n/a	n/a	n/a		Zuni RGM	50	n/a	^	25	50	n/a	25	n/a
	Central/Zuni RGM	25	n/a	25	n/a	n/a	n/a	n/a	n/a		Central/Zuni RGM	50	n/a	^	25	50	n/a	50	n/a
Washington St	Existing Storage	75	250	75	300	75	n/a	125	n/a	San Mateo Blvd	Existing Storage	125	n/a	200	n/a	350	n/a	100	n/a
	No RGM	50	25	25	^	50	n/a	50	n/a		No RGM	175	n/a	50	n/a	150	n/a	100	n/a
	Zuni RGM	25	25	^	^	50	n/a	50	n/a		Zuni RGM	50	25	100	75	150	n/a	100	n/a
	Central/Zuni RGM	25	25	25	^	50	n/a	25	n/a		Central/Zuni RGM	75	^	100	50	150	n/a	125	n/a
Monroe St	Existing Storage	50	n/a	150	n/a	n/a	n/a	n/a	50	Alvarado Dr	Existing Storage	n/a	n/a	n/a	n/a	n/a	n/a	100	n/a
	No RGM	^	n/a	^	n/a	n/a	n/a	n/a	25		No RGM	^	n/a	^	n/a	n/a	n/a	75	n/a
	Zuni RGM	25	n/a	25	n/a	n/a	n/a	n/a	25		Zuni RGM	^	n/a	^	n/a	n/a	n/a	75	n/a
	Central/Zuni RGM	25	n/a	25	n/a	n/a	n/a	n/a	25		Central/Zuni RGM	25	n/a	^	n/a	n/a	n/a	75	n/a
San Mateo Blvd	Existing Storage	125	n/a	100	n/a	175	n/a	250	n/a	San Pedro Dr	Existing Storage	100	n/a	150	n/a	150	n/a	120	n/a
	No RGM	150	n/a	75	n/a	100	n/a	175	n/a		No RGM	100	n/a	125	n/a	75	n/a	75	n/a
	Zuni RGM	300	n/a	150	n/a	100	n/a	200	n/a		Zuni RGM	50	25	50	50	100	n/a	125	n/a
	Central/Zuni RGM	150	25	150	250	100	n/a	200	n/a		Central/Zuni RGM	50	50	50	25	100	n/a	125	n/a
Alvarado Dr	Existing Storage	25	n/a	25	n/a	50	n/a	50	n/a	Louisiana Blvd	Existing Storage	100	n/a	75	n/a	100	n/a	100	n/a
	No RGM	^	n/a	^	n/a	50	n/a	25	n/a		No RGM	125	n/a	100	n/a	75	n/a	125	n/a
	Zuni RGM	^	n/a	25	n/a	50	n/a	25	n/a		Zuni RGM	75	25	150	50	75	n/a	100	n/a
	Central/Zuni RGM	^	n/a	125	n/a	n/a	125	n/a	^		Central/Zuni RGM	100	50	125	50	100	n/a	125	n/a
San Pedro Dr	Existing Storage	50	n/a	100	n/a	125	n/a	50	n/a	San Pablo St	Existing Storage	n/a	n/a	n/a	n/a	n/a	n/a	n/a	75
	No RGM	125	n/a	100	n/a	150	n/a	125	n/a		No RGM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	25
	Zuni RGM	150	n/a	75	n/a	100	n/a	75	n/a		Zuni RGM	^	n/a	^	n/a	n/a	n/a	n/a	25
	Central/Zuni RGM	75	75	75	^	100	n/a	100	n/a		Central/Zuni RGM	^	n/a	^	n/a	n/a	n/a	n/a	25
Louisiana Blvd	Existing Storage	175	n/a	125	n/a	125	125	100	n/a	Utah St	Existing Storage	n/a	n/a	n/a	n/a	n/a	n/a	n/a	75
	No RGM	125	n/a	100	n/a	25	75	75	n/a		No RGM	n/a	n/a	n/a	n/a	n/a	n/a	n/a	^
	Zuni RGM	175	n/a	100	n/a	50	125	125	n/a		Zuni RGM	^	n/a	^	n/a	n/a	n/a	n/a	^
	Central/Zuni RGM	100	25	100	125	25	50	100	n/a		Central/Zuni RGM	^	n/a	^	n/a	n/a	n/a	n/a	^
Pennsylvania St	Existing Storage	75	n/a	25	n/a	50	n/a	50	n/a	Wyoming Blvd	Existing Storage	75	n/a	50	n/a	150	n/a	75	n/a
	No RGM	^	n/a	^	n/a	25	n/a	50	n/a		No RGM	175	n/a	75	n/a	100	n/a	75	n/a
	Zuni RGM	^	n/a	^	n/a	25	n/a	50	n/a		Zuni RGM	150	25	50	^	100	n/a	50	n/a
	Central/Zuni RGM	^	n/a	^	n/a	25	n/a	50	n/a		Central/Zuni RGM	150	25	50	^	100	n/a	75	n/a
Wyoming Blvd	Existing Storage	125	n/a	200	n/a	100	n/a	125	n/a										
	No RGM	175	n/a	150	n/a	50	n/a	275	n/a										
	Zuni RGM	275	n/a	100	n/a	50	n/a	275	n/a										
	Central/Zuni RGM	275	25	75	150	50	n/a	300	n/a										
Zuni Rd	Existing Storage	250	n/a	225	n/a	n/a	150	n/a	75										
	No RGM	25	n/a	100	n/a	n/a	^	n/a	^										
	Zuni RGM	^	n/a	100	n/a	n/a	125	n/a	^										
	Central/Zuni RGM	^	n/a	125	n/a	n/a	125	n/a	^										

Red = Queue demand exceeds existing storage
Green = Proposed turn-lane
"^" = less than one vehicle length
n/a = turn-lane does not exist

Based on ***Table 9***, the following observations can be made:

- In general, existing auxiliary turn-lane storage lengths will accommodate queue demands regardless of the scenario.
- Existing traffic queue demands will exceed existing available storage at the following locations:
  - Eastbound left-turn at Central Ave/San Mateo Blvd.
  - Eastbound, northbound, and southbound left-turns at Central Ave/San Pedro Dr.

  - Eastbound and northbound left-turns at Central Ave/Wyoming Blvd.
  - Eastbound, westbound, and southbound left-turns at Zuni Rd/Louisiana Blvd.
  - Eastbound and westbound left-turns at Zuni Rd/Wyoming Blvd.
- Zuni Rd RGM scenario traffic queue demands will exceed existing storage at the following intersections:
  - Eastbound and westbound left-turns at Central Ave/San Mateo Blvd.
  - Eastbound and southbound left-turns at Central Ave/San Pedro Dr.
  - Southbound left-turn at Central Ave/Louisiana Blvd.
  - Eastbound and northbound left-turns at Central Ave/Wyoming Blvd.
  - Southbound left-turn at Zuni Rd/San Pedro Dr.
  - Westbound and southbound left-turns at Zuni Rd/Louisiana Blvd.
  - Eastbound left-turn at Zuni Rd/Wyoming Blvd.

  These auxiliary lanes should be re-sized, if street geometry allows, accommodating anticipated demands with the implementation of the Zuni Rd RGM.
- Central Ave/Zuni Rd RGM scenario traffic queue demands will exceed existing storage at the following intersections:
  - Eastbound and westbound left-turns at Central Ave/San Mateo Blvd.
  - Westbound left-turn at Central Ave/Alvarado Dr.
  - Eastbound and southbound left-turns at Central Ave/San Pedro Dr.
  - Eastbound and northbound left-turns at Central Ave/Wyoming Blvd.
  - Southbound left-turn at Zuni Rd/San Mateo.
  - Southbound left-turn at Zuni Rd/San Pedro Dr.
  - Westbound and southbound left-turns at Zuni Rd/Louisiana Blvd.
  - Eastbound left-turn at Zuni Rd/Wyoming Blvd.

  These auxiliary lanes should be re-sized, if street geometry allows, accommodating anticipated demands with the implementation of the Central Ave/Zuni Rd RGM.
- As shown in ***Table 9,*** all newly proposed lanes are colored green and should be constructed to accommodate at least the minimum storage length shown if possible.

2012 Conclusion

Overall, it appears that the Zuni modification scenario could be introduced without significant detrimental impact to the study area traffic operations when compared to existing operations, as long as recommended timing plans or auxiliary lane mitigations are implemented. Although Central RGM results also indicate relatively insignificant detriment to the study area traffic operations, Central RGM conclusions should be tempered with the fact that there are some identified movements that are either over capacity and/or have insufficient queue storage length, both of which can create unpredictable performance and many times reduce corridor performance. Additionally, the Central modification scenario has not taken into account the potential for transit use in the area with the construction of Bus Rapid Transit on Central Avenue. Therefore, delay increases projected on Central Avenue, for the Central Ave/Zuni Rd RGM at a minimum, could be vary significantly depending on proposed BRT operations.

It should be stressed that this study only investigates potential operations associated with the geometry modifications Central Avenue and does not review operational issues directly related to the construction of BRT. No operational conclusions should be determined until traffic is evaluated to specifically address impacts of transit preemption at signalized intersections, potential reduction in minor street access to Central Avenue, the potential increase in u-turns at intersections, and where median breaks should be planned. These are just a few of the issues that should be studied when planning/design for the Central Avenue BRT begins.

6.0 Projected 2035 Signal Timing

Signal timing plans were also created for the projected 2035 traffic demands within the study area. An optimized baseline No RGM scenario will be compared to the optimized signal timing and coordination plans created for adjusted Zuni RGM 2035 demands with the Zuni Rd RGM, and adjusted Central Ave/Zuni Rd RGM 2035 demands.

Procedures similar to what was done with 2012 timing plans were also applied to 2035 turning movement demands and include the following:

- **Pedestrian Crossing Times** – The same pedestrian crossing times calculated for 2012 demands were applied to all 2035 scenarios including the No RGM scenario.
- **Yellow and Red Clearance Intervals** – Again, the same yellow and red intervals calculated and applied to 2012 traffic demands were applied to 2035 scenarios.
- **Operations at Copper Avenue/Washington Street, Zuni Road/San Pablo Street, & Zuni Road/Utah Street** – These were assumed to be coordinated for the 2035 scenarios.
- **Cycle Length –** As with 2012 demands, cycle length scenarios ranging from 80 seconds to 160 seconds were evaluated using Synchro to determine which cycle length would offer the most benefit (fewest stops and lowest delay) to the corridors and network as a whole. The resulting optimized cycle lengths are shown in ***Table 10*** for the AM and PM peak hours for all scenarios.

Table 10. Study Area Recommended Network Cycle Lengths

Year	Analysis Scenario	Timing Plan	Cycle Length (sec)
2035	No RGM (Optimized)	AM Peak	130
		PM Peak	130
	Zuni Rd RGM (Optimized)	AM Peak	130
		PM Peak	150
	Central Ave/Zuni Rd RGM (Optimized)	AM Peak	130
		PM Peak	150

As indicated in ***Table 10***, it appears that a 130 second cycle length is appropriate for all AM scenarios. In the PM a 130 second cycle is optimal for the No RGM scenario and a 150 second cycle length is optimal for both modification scenarios based on projected 2035 turning movement demands.

- **Intersection Split Times -** All intersection green split times were optimized for AM and PM peak period plans using Synchro. It should be noted that in order to keep movements closer to capacity, the bus preemption phase currently in place northbound at the Lomas Boulevard/Wyoming Boulevard intersection was removed as was discussed and applied for 2012 traffic scenarios.

- **Coordination –** Network offsets were optimized for both the Zuni Rd RGM and Central Ave/Zuni Rd RGM options to provide the best two-way progression possible. Optimization parameters allowed for half-cycling at minor intersections if applicable.
- **Geometric Mitigation –** It should be noted that auxiliary left and right turn-lanes were added at several intersections to accommodate the projected 2035 turning movements. It was assumed that if the projected 2035 traffic demands were to be accurate, appropriate geometric improvements would have been made within the 23 years between 2012 and 2035. The added auxiliary lanes were kept consistent between each scenario except for those intersections on Zuni Road and Central Avenue where the roadway geometric modifications were occurring. Lane geometry on the Lomas Boulevard and Copper Avenue intersections remained consistent across all modification scenarios.

7.0 Projected 2035 Capacity and Corridor Analyses

Capacity analyses were also performed for all thirty-two (32) study area intersections for both the AM and PM peak hours under projected 2035 demands and for No RGM, Zuni Rd RGM, and Central Ave/Zuni Rd RGM scenarios. A summary of the delay and level of service (LOS) at each study intersection is provided in ***Table 11***.

From ***Table 11***, the following observations are identified:

- The majority of the intersections under the No RGM condition operate under capacity and at a LOS D or better. The exceptions include the Lomas Boulevard intersections with San Mateo Boulevard, San Pedro Drive, Wyoming Boulevard, the Copper Avenue/Wyoming Boulevard intersection, the Central Avenue/Wyoming Boulevard intersection, and the Zuni Road intersections with Louisiana Boulevard and Wyoming Boulevard where most are operating at LOS E and/or at least one movement is operating above capacity. The Lomas Boulevard/Wyoming Boulevard intersection is especially over capacity with both AM and PM well over capacity and the AM operating at LOS F and PM at LOS E.
- The unsignalized intersection of Copper Avenue and Louisiana Boulevard has movements that are predicted to operate over capacity if either Zuni Road or both Zuni Road and Central Avenue are modified. With a significant portion of traffic being diverted to Copper Avenue, it may be necessary to review the need for a signal at this location eventually.
- Central Avenue will generally remain under capacity for either modification scenario except for the intersections at Wyoming Boulevard and at Zuni Road. Generally these intersections are above capacity do to large turning movements either to or from Central Avenue. It is likely that if the projected turning movements at these locations come to fruition, additional vehicles would be diverted to alternate routes or alternate modes of transportation to avoid an over capacity movement, and potential queue blockage that comes with over capacity turn phases.
- Significant reductions in delay (Greater than 5 seconds) and a reduction in LOS (One Letter) are observed on Central Avenue under both RGM scenarios and includes:
    - Central Ave and Morningside Drive
    - Central Ave and San Pedro Dr
    - Central Ave and Louisiana Blvd
    - Central Ave and Wyoming Blvd
    - Central Ave and Zuni Rd

  However, it should be noted that most of these intersections, except for the ones identified in the previous bullet, remain below capacity and maintain at least a LOS D.
- Zuni Road also generally stays below capacity and is projected to operate acceptably under either modification scenario except at the intersections of

Louisiana Boulevard and Wyoming Boulevard. Like Central Avenue, these two intersections are operating poorly mainly due to very large turning movements. It is unlikely some of these turn movements will become reality because dual left-turns at these locations cannot be constructed once Zuni Road is modified to a three-lane section. Additionally, projected east and westbound movements on Zuni Road are exceeding 1,000 through vehicles between Louisiana Boulevard and Wyoming Boulevard, which seems unrealistic. Usually one lane of traffic in an urban area with regularly space signalization would reach capacity around 700 to 800 vehicles. Therefore, it seems that additional diversion from Zuni Road to alternate routes and alternative transportation modes beyond the 2035 model would occur.

- Significant reductions in delay (Greater than 5 seconds) and a reduction in LOS (One Letter) are observed on Zuni Rd under both RGM scenarios and includes:
    - Zuni Rd and San Pedro Dr
    - Zuni Rd and Louisiana Blvd
    - Zuni Rd and Utah St
    - Central Ave and Wyoming Blvd

  However, it should be noted that most of these intersections, except for the ones identified in the previous bullet, remain below capacity and maintain at least a LOS D.
- Lomas Boulevard will be at or over capacity regardless of the modification scenario. Also, as mentioned in the previous two points, further diversion from Central Avenue and Zuni Road would be likely and therefore probably put Lomas Boulevard further over capacity.
- Significant reductions in delay (Greater than 5 seconds) and a reduction in LOS (One Letter) are observed on Lomas Blvd under both RGM scenarios at Tennessee St, but still maintains an LOS of B
- As mentioned previously, local impacts on modal choice have not been accounted for, therefore the projected 2035 operations may reflect a worse-case scenario. It is reasonable to assume that many trips to and from the study area would convert to transit trips if the planned BRT route is implemented on Central, and therefore many of the above capacity operations indicated in ***Table 11*** could possibly operate better than shown when the year 2035 arrives.

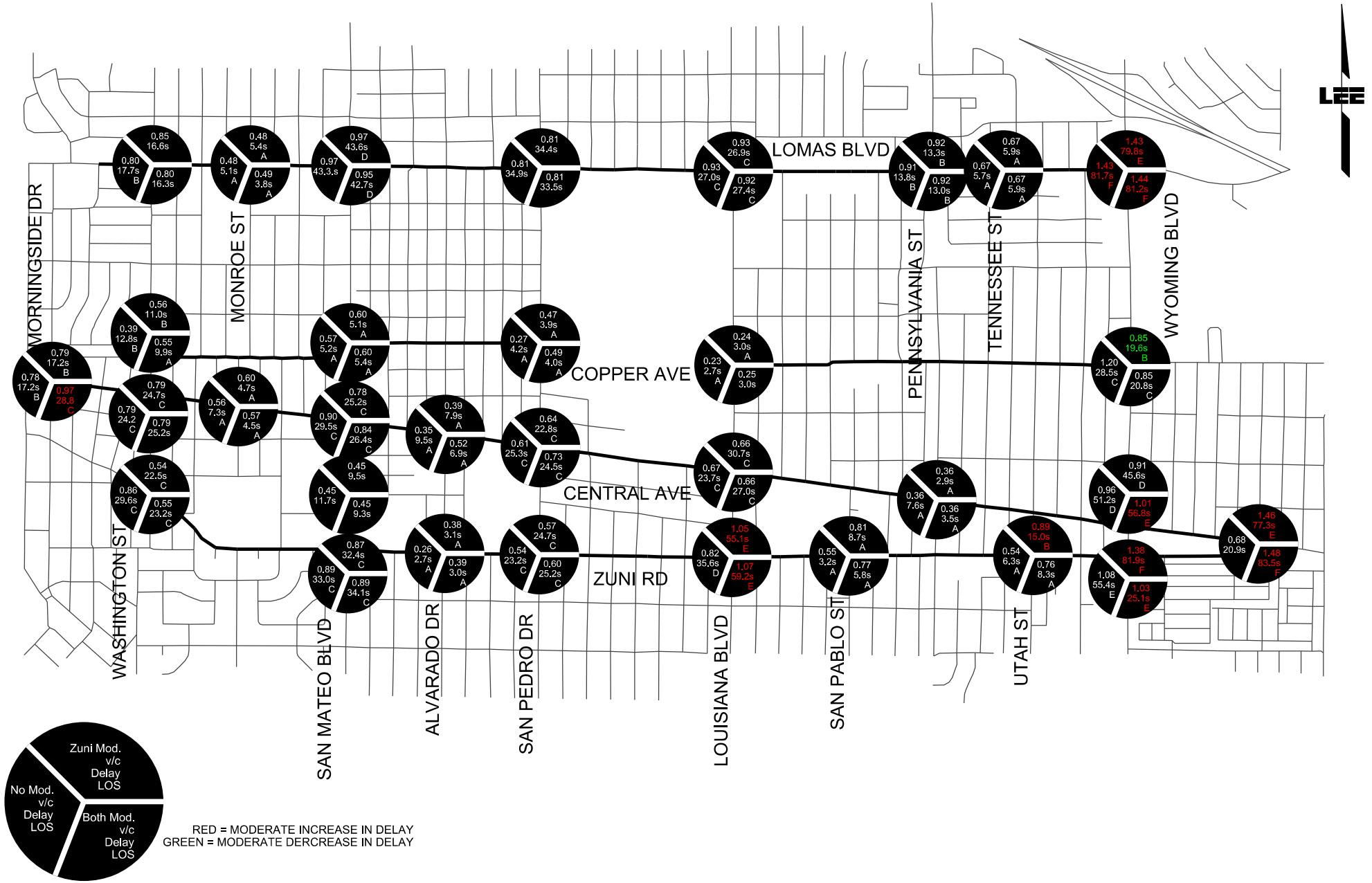
Table 11. 2035 Study Intersection Capacity Analysis Results

	2035 - No RGM						2035 - Zuni Rd RGM						2035 - Zuni Rd and Central Ave RGM					
	AM			PM			AM			PM			AM			PM		
	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
Lomas Blvd & Washington St	0.80	17.7	B	0.90	27.9	C	0.85	16.6	B	0.98	32.9	C	0.80	16.3	B	0.97	32.7	C
Lomas Blvd & Monroe St	0.48	5.1	A	0.62	7.7	A	0.48	5.4	A	0.61	5.1	A	0.49	3.8	A	0.62	5.0	A
Lomas Blvd & San Mateo Blvd	0.97	43.3	D	1.12	65.4	E	0.97	43.6	D	1.12	68.3	E	0.95	42.7	D	1.13	67.2	E
Lomas Blvd & San Pedro Dr	0.81	34.9	C	1.04	49.6	D	0.81	34.4	C	1.02	51.1	D	0.81	33.5	C	1.02	50.6	D
Lomas Blvd & Louisiana Blvd	0.93	27.0	C	0.99	35.2	D	0.93	26.9	C	0.94	39.6	D	0.92	27.4	C	0.93	38.5	D
Lomas Blvd & Pennsylvania St	0.91	13.8	B	1.00	24.5	C	0.92	13.3	B	0.95	20.3	C	0.92	13.0	B	0.95	19.5	B
Lomas Blvd & Tennessee St	0.67	5.7	A	0.75	5.1	A	0.67	5.9	A	**0.87**	**16.0**	**B**	0.67	5.9	A	**0.87**	**14.7**	**B**
Lomas Blvd & Wyoming Blvd	1.43	81.7	F	1.12	63.4	E	1.43	79.8	E	1.08	55.1	E	1.44	81.2	F	1.07	56.8	E
Copper Ave & Washington St	0.39	12.8	B	0.77	21.2	C	0.56	11.0	B	0.57	17.4	B	0.55	9.9	A	0.58	19.1	B
Copper Ave & San Mateo Blvd	0.57	5.2	A	0.72	12.5	B	0.60	5.1	A	0.80	9.1	A	0.60	5.4	A	0.80	9.1	A
Copper Ave & San Pedro Dr	0.27	4.2	A	0.53	7.7	A	0.47	3.9	A	0.46	5.2	A	0.49	4.0	A	0.44	7.6	A
Copper Ave & Louisiana Blvd [1]	*0.23*	*2.7*	*A*	*0.68*	*6.0*	*A*	*0.24*	*3.0*	*A*	**1.19**	**21.5**	**C**	*0.25*	*3.0*	*A*	**1.18**	**20.8**	**C**
Copper Ave & Wyoming Blvd	1.20	28.5	C	1.04	44.5	D	**0.85**	**19.6**	**B**	1.01	36.8	D	0.85	20.8	C	1.08	35.6	D
Central Ave & Morningside Dr	0.78	17.2	B	0.69	7.7	A	0.79	17.2	B	0.67	7.9	A	**0.97**	**28.8**	**C**	0.65	8.2	A
Central Ave & Washington St	0.79	24.2	C	0.87	30.9	C	0.79	24.7	C	0.89	26.1	C	0.79	25.2	C	0.86	24.6	C
Central Ave & Monroe St	0.56	7.3	A	0.69	7.3	A	0.60	4.7	A	0.56	3.9	A	0.57	4.5	A	0.52	3.2	A
Central Ave & San Mateo Blvd	0.90	29.5	C	0.93	39.6	D	0.78	25.2	C	0.94	50.0	D	0.84	26.4	C	0.94	49.0	D
Central Ave & Alvarado Dr	0.35	9.5	A	0.40	10.2	B	0.39	7.9	A	0.60	12.2	B	0.52	6.9	A	0.80	18.4	B
Central Ave & San Pedro Dr	0.61	25.3	C	0.83	30.9	C	0.64	22.8	C	**0.83**	**41.7**	**D**	0.73	24.5	C	**0.90**	**43.1**	**D**
Central Ave & Louisiana Blvd	0.67	23.7	C	0.81	24.3	C	0.66	30.7	C	**0.89**	**35.6**	**D**	0.66	27.0	C	**0.92**	**35.0**	**D**
Central Ave & Pennsylvania St	0.36	7.6	A	0.37	2.8	A	0.36	2.9	A	0.45	4.6	A	0.36	3.5	A	0.56	5.4	A
Central Ave & Wyoming Blvd	0.96	51.2	D	0.90	34.0	C	0.91	45.6	D	**0.98**	**49.0**	**D**	**1.01**	**56.8**	**E**	**0.95**	**42.9**	**D**
Central Ave & Zuni Rd	0.68	20.9	C	0.89	33.9	C	**1.46**	**77.3**	**E**	**1.00**	**42.3**	**D**	**1.48**	**83.5**	**F**	0.96	33.4	C
Zuni Rd & Washington St	0.86	29.6	C	0.75	18.3	B	0.54	22.5	C	0.53	17.9	B	0.55	23.2	C	0.49	17.9	B
Zuni Rd & San Mateo Blvd	0.89	33.0	C	0.78	35.9	D	0.87	32.4	C	0.79	39.4	D	0.89	34.1	C	0.82	39.6	D
Zuni Rd & Alvarado Dr	0.26	2.7	A	0.37	6.5	A	0.38	3.1	A	0.53	6.1	A	0.39	3.0	A	0.56	6.3	A
Zuni Rd & San Pedro Dr	0.54	23.2	C	0.85	31.9	C	0.57	24.7	C	**0.95**	**50.8**	**D**	0.60	25.2	C	**0.84**	**41.4**	**D**
Zuni Rd & Louisiana Blvd	0.82	35.6	D	1.09	64.5	E	**1.05**	**55.1**	**E**	**1.55**	**153.5**	**F**	**1.07**	**59.2**	**E**	**1.55**	**153.7**	**F**
Zuni Rd & San Pablo St	0.55	3.2	A	0.68	5.1	A	0.81	8.7	A	0.79	5.9	A	0.77	5.8	A	0.78	5.9	A
Zuni Rd & Utah St	0.54	6.3	A	0.73	8.1	A	**0.89**	**15.0**	**B**	**0.86**	**16.0**	**B**	0.76	8.3	A	**0.82**	**14.9**	**B**
Zuni Rd & Wyoming Blvd	1.08	55.4	E	1.01	59.2	E	**1.38**	**81.9**	**F**	1.05	69.0	E	**1.35**	**81.2**	**F**	1.02	56.8	E
Highland Ave & San Mateo Blvd	0.45	11.7	B	0.79	12.2	B	0.45	9.5	A	0.88	12.6	B	0.45	9.3	A	0.90	12.6	B

Indicates an increase in delay [2]

Indicates a decrease in delay [2]

(1) - Minor Street, Stop Controlled Intersection.
(2) - Indicates intersections that have a change in LOS **and** a change in delay greater than 5 seconds.



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2035 AM Peak Hour Capacity Analysis

All Geometric Modification Scenarios

FIGURE
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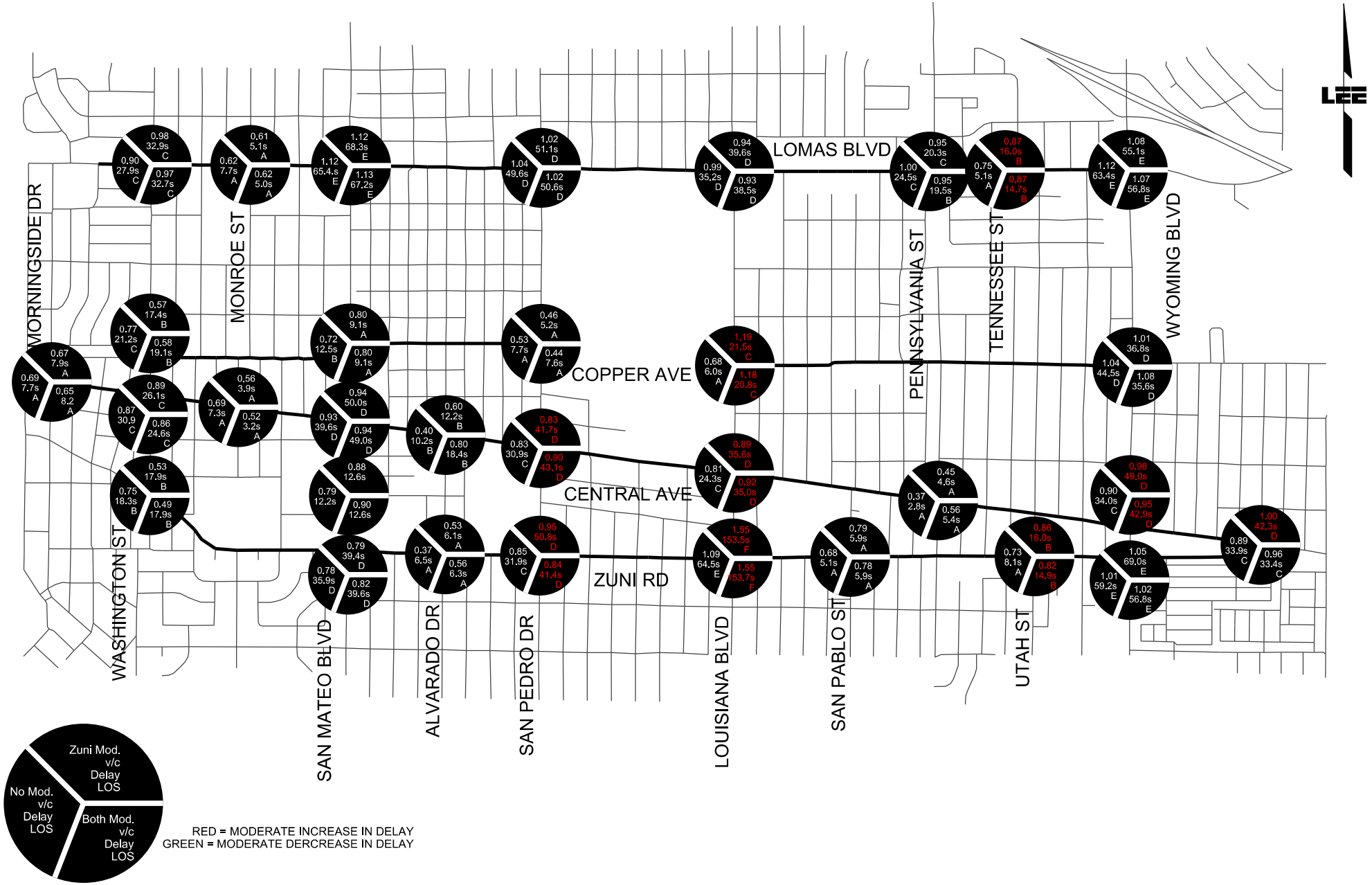

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2035 PM Peak Hour Capacity Analysis

All Geometric Modification Scenarios

FIGURE
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As was done for the 2012 traffic demands, the Synchro software was used to summarize the corridor specific and overall network delay between each RGM scenarios. The total network and individual directional corridor delays have been output for each scenario and are shown in ***Table 12***.

Table 12. 2035 Corridor Measures of Effectiveness Comparison

		Avg Delay, Sec./Veh	
Scenario	**Corridor/Network**	**AM Peak**	**PM Peak**
No RGM	Lomas Blvd E/W Approaches	22	28
	Central Ave E/W Approaches	17	21
	Zuni Rd E/W Approaches	20	23
	Entire Network, All Approaches	29	32
Zuni Rd RGM	Lomas Blvd E/W Approaches	22	32
	Central Ave E/W Approaches	25	27
	Zuni Rd E/W Approaches	30	41
	Entire Network, All Approaches	31	39
Central Ave/Zuni Rd RGM	Lomas Blvd E/W Approaches	21	32
	Central Ave E/W Approaches	29	25
	Zuni Rd E/W Approaches	28	37
	Entire Network, All Approaches	32	37

Generally we see a steady increase in delay for all corridors as the modifications are introduced. There does appear to be greater increase in delay for the PM peak hour when going from the Zuni Rd RGM to the Central Ave/Zuni Rd RGM. This is mainly due to the greater delays and heavier turn movements south to east observed at the Zuni/Wyoming intersection for the Zuni Rd RGM scenario. Realistically, delays at this intersection should be similar to each other between the two scenarios, and therefore I would expect that the PM peak should look similar to the AM with a steady increase in delay from No RGM to Zuni Rd RGM to Central Ave/Zuni Rd RGM scenarios.

The Synchro software also offers a report that provides arterial LOS and travel speeds. These results are summarized in ***Table 13***.

Table 13. 2035 Arterial LOS Comparison

		AM Peak				PM Peak			
		EB		WB		EB		WB	
Scenario	**Corridor/Network**	**Arterial Speed (MPH)**	**LOS**	**Arterial Speed (MPH)**	**LOS**	**Arterial Speed (MPH)**	**LOS**	**Arterial Speed (MPH)**	**LOS**
No RGM	Lomas Blvd E/W Approaches	22.8	C	22.9	C	19.3	D	20.5	D
	Central Ave E/W Approaches	21.3	C	22.1	C	20.7	C	20.2	C
	Zuni Rd E/W Approaches	21.3	C	21.6	C	17.5	D	21.8	C
Zuni Rd RGM	Lomas Blvd E/W Approaches	22.5	C	21.9	D	20.0	D	18.0	D
	Central Ave E/W Approaches	21.5	C	22.0	C	18.9	C	18.5	C
	Zuni Rd E/W Approaches	18.9	C	18.1	C	14.9	E	17.8	D
Central Ave/Zuni Rd RGM	Lomas Blvd E/W Approaches	22.6	C	22.5	C	20.3	D	18.0	D
	Central Ave E/W Approaches	21.0	C	20.3	C	19.3	C	18.6	C
	Zuni Rd E/W Approaches	19.2	C	18.7	D	15.7	D	19.4	C

In general, LOS C and D are maintained for both directions of travel between the scenarios. The only exception is for Zuni Road for the Zuni Rd RGM scenario. The reasoning for this is explained above due to questionable differences in 2035 turn demands at the southbound left-turn of the Zuni Rd/Wyoming Blvd intersection and is likely anomalous.

Auxiliary lane queue capacity was not summarized for the 2035 demands, as these demands are far enough into the future that recommended storage lengths are not practical at this time. However, 95th percentile queue lengths for 2035 scenarios can be found with the capacity analysis calculation sheets in **Appendix E**.

2035 Conclusion

In general, when comparing the baseline, No RGM, scenario with either of the modification scenarios, there are some projected increases in delay and reductions in capacity. These increases, however, are relatively less significant when compared to other corridors, like Lomas Boulevard, which will already be significantly stressed even without any roadway modifications due to the growth in traffic over the next 20+ years. Additionally, major intersections along Central Avenue and Zuni Rd at Louisiana Boulevard and Wyoming Boulevard are expected to be

near or above capacity regardless of the roadway modification scenario as a result in projected traffic growth. Consideration should also be given to the fact that with the addition of BRT on Central Avenue, projected 2035 demands could be further reduced without diverting to adjacent corridors. If the City of Albuquerque's plan to redevelop the properties along Central Avenue within the study area to contain high density urban style housing and Knob Hill style store fronts, Central Avenue and Zuni Road could become a less desired east-west connection and more of a destination/origin and further conform with the proposed modified geometry.

8.0 Conclusions and Recommendations

Conclusions and recommendations are summarized in the Executive Summary.

9.0 Appendix

Appendix A – Existing 2012 Traffic Volume Count Data
Appendix B – 2035 Traffic Volume Projections
Appendix C – Pedestrian Timing and Yellow Change/All Red Clearance Calculations
Appendix D – 2012 Capacity and Corridor Analysis Sheets
Appendix E – 2035 Capacity and Corridor Analysis Sheets