A Road Safety Audit

conducted for the

New Mexico Department of Transportation (NMDOT)

in conjunction with
City of Santa Fe

for

Guadalupe Street from Agua Fria to Paseo de Peralta

NMDOT District 5
December 2014

Conducted by the Road Safety Audit Team

OCCAM
CONSULTING ENGINEERS INC

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I. Introduction

A. Scope and Purpose of the Road Safety Audit (RSA)

The NMDOT received funding under the Federal Highway Safety Improvement Program (HSIP) to conduct a Road Safety Audit (RSA) for existing conditions on Guadalupe Street in the City of Santa Fe from Agua Fria to Paseo de Peralta. The objective of the study is to offer traffic safety recommendations for multi-modal traffic within the corridor. The request was submitted by the Santa Fe Metropolitan Planning Organization (MPO) on behalf of the City of Santa Fe. The City of Santa Fe has received numerous concerns from businesses along the corridor regarding pedestrian safety issues.

The scope of the project included pre-study preparation, data collection, analysis, stakeholder workshop and documentation. The RSA includes a workshop with study team professionals to brainstorm the issues and develop countermeasures to address any safety deficiencies identified by the study.

The purpose of the RSA was to evaluate the study area for potential safety improvements, which could lead to fewer crashes and a safer environment for pedestrians in the future. The purpose includes development of an implementation plan for use by the City of Santa Fe to schedule and budget future improvements/projects.

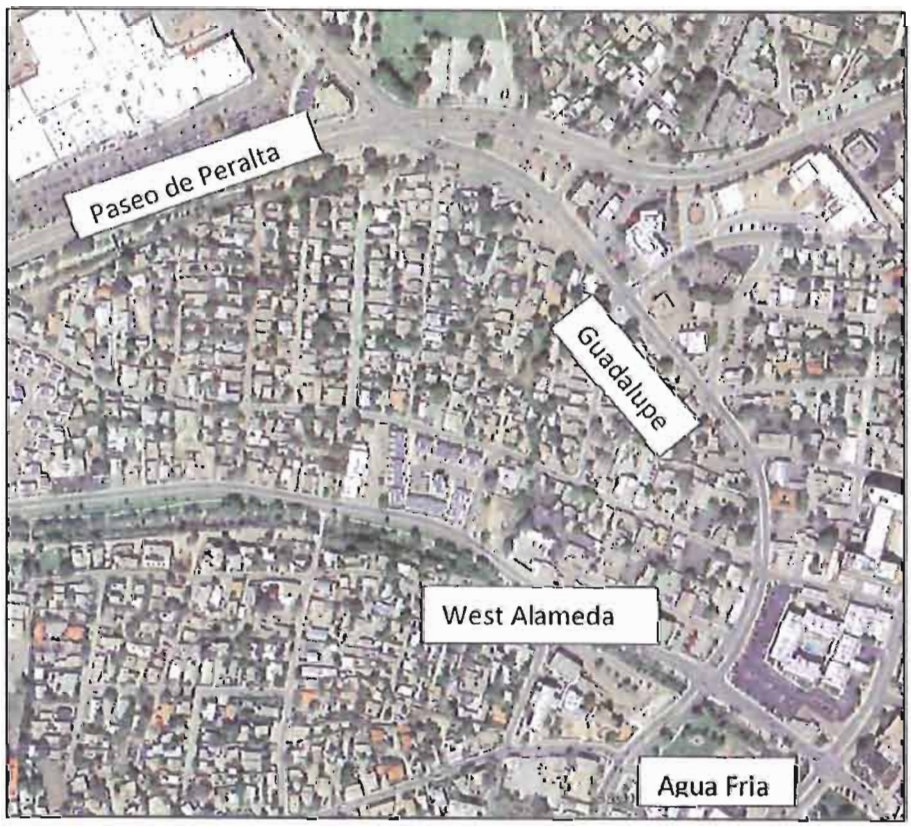


Figure 1 Vicinity Map

B. Project Limits

The project limits are Guadalupe Street from the intersection with Agua Fria north to the intersection with Paseo de Peralta, a distance of approximately 1/2 mile. A vicinity map is provided in Figure 1.

C. Identification of Project Stage, Existing Road, and Items Reviewed

The corridor was studied to evaluate the conditions for the multi-modal use of vehicular traffic, bicycle traffic, and pedestrians Data that was collected and reviewed included traffic counts, pedestrian counts, crash data, roadway typical section elements, stakeholder input, site observations and the stakeholder workshop.

II. Background

A. Audit Team, Affiliation and Qualifications.

The RSA team organized for this study is identified in Table 1. The RSA workshop team included representatives from the City of Santa Fe, NMDOT General Office, NMDOT District 5, the Santa Fe Metropolitan Planning Organization and Occam Consulting Engineers.

A kick-off meeting was held on August 19, 2014 to discuss the general overview of the RSA and to identify specific safety issues/locations throughout the corridor. From this meeting, it was

Table 1. Road Safety Audit Team

NMDOT General Office	Steve Eagan, PE (Safety Engineer)
NMDOT General Office	Afshin Jian, PE (State Traffic Engineer)
NMDOT District 5	Will Montoya, PE D5 Engineering Support Section
Santa FE MPO	Keith Wilson (MPO Senior Planner)
Santa Fe MPO	Mark Tibbetts (MPO Officer)
City of Santa Fe	John Romero, PE Traffic Engineering Division Director
Occam Consulting Engineers (OCE)	Carlos Ruiz, PE
Occam Consulting Engineers (OCE)	Robert Kurtz, PE
Occam Consulting Engineers (OCE)	Doug Stewart

determined that traffic and pedestrian counts would be needed. OCE hired Mike Henderson Consulting, LLC to conduct nine (9) hour traffic and pedestrian counts at ten (10) intersections within the corridor. These counts were conducted on Wednesday, August 27, 2014.

A second meeting was held on September 8, 2014 to review the preliminary crash and traffic data that had been received. OCE staff members conducted a field review of the study area after the meeting.

A workshop and site visit was conducted on Wednesday, October 8, 2014 with project stakeholders. The site visit was conducted in the morning and the workshop was held after lunch. The workshop was held at the City of Santa Fe Public Works Offices near the project area. The study background was presented followed by a briefing on known issues, data collected and preliminary analysis of the data. A discussion of the morning site visit occurred. The team subsequently entered into a brainstorming session, discussing known operational conditions and observations from the site visit and walk-through. Upon brainstorming of the issues, team members discussed several possible countermeasures for consideration and evaluation or vetting.

The team developed a list of issues and countermeasures. OCE then consolidated the issues/countermeasures and e-mailed these out for comment. These issues and countermeasures were then finalized and are discussed in greater detail in this report.

B. Data Collection

Existing Roadway Geometry Conditions

Guadalupe Street within the study area is predominantly a four lane street with a very narrow median. There is sidewalk along both sides of the roadway, although some sections have narrow sidewalks. The roadway is constructed with curb and gutter throughout. The speed limit on Guadalupe Street is 25 mph.

From approximately the Park/Catron intersection north, the right of way widens providing a buffer area between the sidewalk and curb and gutter of approximately five (5) feet.

The corridor has four signalized intersections. These are at West Alameda, San Francisco, Park/Catron and Paseo de Peralta. Dedicated left turn lanes for traffic on Guadalupe Street exist only at the West Alameda and the Paseo de Peralta intersections.

Turning radii for vehicles at most of the intersections are very tight and dictate vehicles must reduce speed to make the desired turning movement.

All throughout the corridor there is a high density of access openings, with many of them being wider than what would typically be built using current design standards.

Bicycles and Pedestrians

As can be seen from walking the corridor and from the pedestrian counts conducted, there is a high volume of pedestrians with some bicycle traffic along the corridor. Guadalupe Street, at it's closest point, is only 1/4 mile from the downtown Santa Fe Plaza.

Table 2 show the pedestrians crossing Guadalupe during the AM, Mid-Day and PM Peak Hours. The pedestrian counts indicated a higher volume of pedestrians in the southern 1/2 of the corridor, from Agua Fria to Park-Catron.

The pedestrian peak hour counts are indicated in Table 3 and all of the pedestrian counts are located with the traffic data in the appendix.

Crash Data Collection and Analyses

The objective of the study is to offer traffic safety recommendations for improved multi-modal traffic within the corridor. The City requested the study to address options that provide for overall safer connectivity throughout the Guadalupe Street corridor.

Crash history for the last five years available (2008-2012) was obtained from the New Mexico Department of Transportation (NMDOT) and was analyzed for the study. An overall view of the crash data is provided in Figures 2 and 3, with additional information and analysis in the Appendix.

There were a total of 115 crashes recorded during the analysis period (2008-2012). Zero (0) fatalities were reported in the crash records. There were a total of 30 crashes involving injuries and 85 crashes involving property damage only. Four (4) accidents were alcohol related.

Two (2) crashes involved bicycle users during the reporting period. There were also two (2) crashes that involved pedestrians.

Twenty-six (26) out of 115 crashes were reported during the Dusk/Night time/Dawn period over the five year analysis period.

Approximately 40 percent of the crashes were of a type involving side swipes of one type or another.

The intersections with the highest raw number of accidents over the five year period were Paseo de Peralta (42 accidents), Catron/Park (23), West Alameda (13) and West San Francisco (9). This correlates to these same intersections having the highest intersection crash rates.

The intersections with the highest intersection crash rates, in order of highest rate, were Catron/Park, Paseo de Peralta, West Alameda and West San Francisco.

Table 2—Pedestrians Crossing Guadalupe during Peak Hours

Intersection	AM Peak Hour	Mid-Day Peak Hour	PM Peak Hour	Total
Guadalupe and Agua Fria	9:00 - 10:00	12:45 - 13:45	16:30 - 17:30	
Crossings of Guadalupe	28	23	16	67
Crossings of Agua Fria	17	24	62	103
				170
Guadalupe and West Alameda	7:45 - 8:45	12:45 - 13:45	16:30 - 17:30	
Crossings of Guadalupe	21	22	51	94
Crossings of West Alameda	30	33	73	136
				230
Guadalupe and Water	7:45 - 8:45	12:45 - 13:45	16:30 - 17:30	
Crossings of Guadalupe	2	2	4	8
Crossings of Water	17	15	23	55
				63
Guadalupe and San Francisco	7:45 - 8:45	12:45 - 13:45	16:30 - 17:30	
Crossings of Guadalupe	45	65	77	187
Crossings of San Francisco	13	52	48	113
				300
Guadalupe and Johnson	7:30 - 8:30	12:45 - 1:45	16:30 - 17:30	
Crossings of Guadalupe	6	6	9	21
Crossings of Johnson	7	17	14	38
				59
Guadalupe and Jefferson-Mckenzie	7:30 - 8:30	12:15 - 1:15	16:30 - 17:30	
Crossings of Guadalupe	18	22	29	69
Crossings of Jefferson-Mckenzie	17	24	24	65
				134
Guadalupe and Park-Catron	7:30 - 8:30	12:00 - 1:00	16:30 - 17:30	
Crossings of Guadalupe	13	18	11	42
Crossings of Park-Catron	11	19	7	37
				79
Guadalupe and Jose	7:45 - 8:45	12:00 - 1:00	17:00 - 18:00	
Crossings of Guadalupe	1	0	2	3
Crossings of Jose	12	18	7	37
				40
Guadalupe and Solona	7:30 - 8:30	12:00 - 1:00	17:00 - 18:00	
Crossings of Guadalupe	2	6	3	11
Crossings of Solona	3	6	5	14
				25
Guadalupe and Paseo de Peralta	7:45 - 8:45	11:45 - 12:45	16:45 - 17:45	
Crossings of Guadalupe	6	11	6	23
Crossings of Paseo de Peralta	6	20	8	34
				57

Intersections in red are signalized

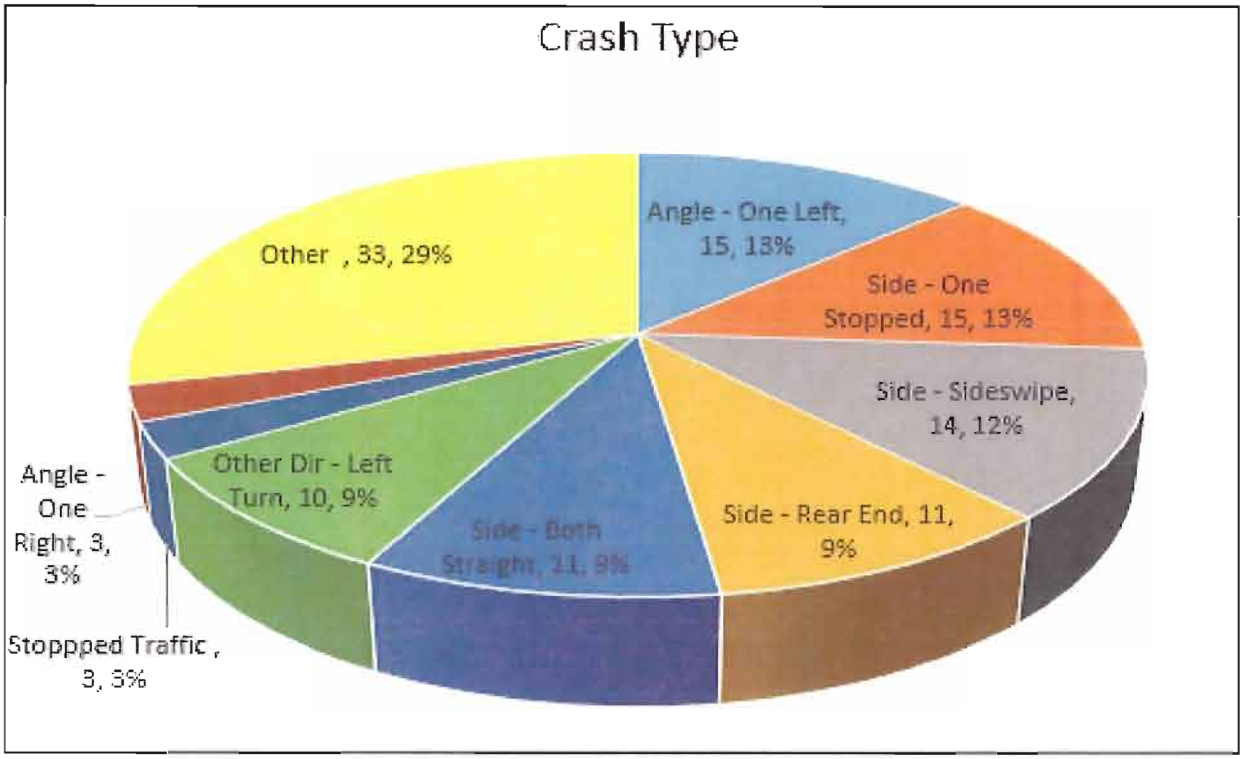


Figure 2. Crashes by Type

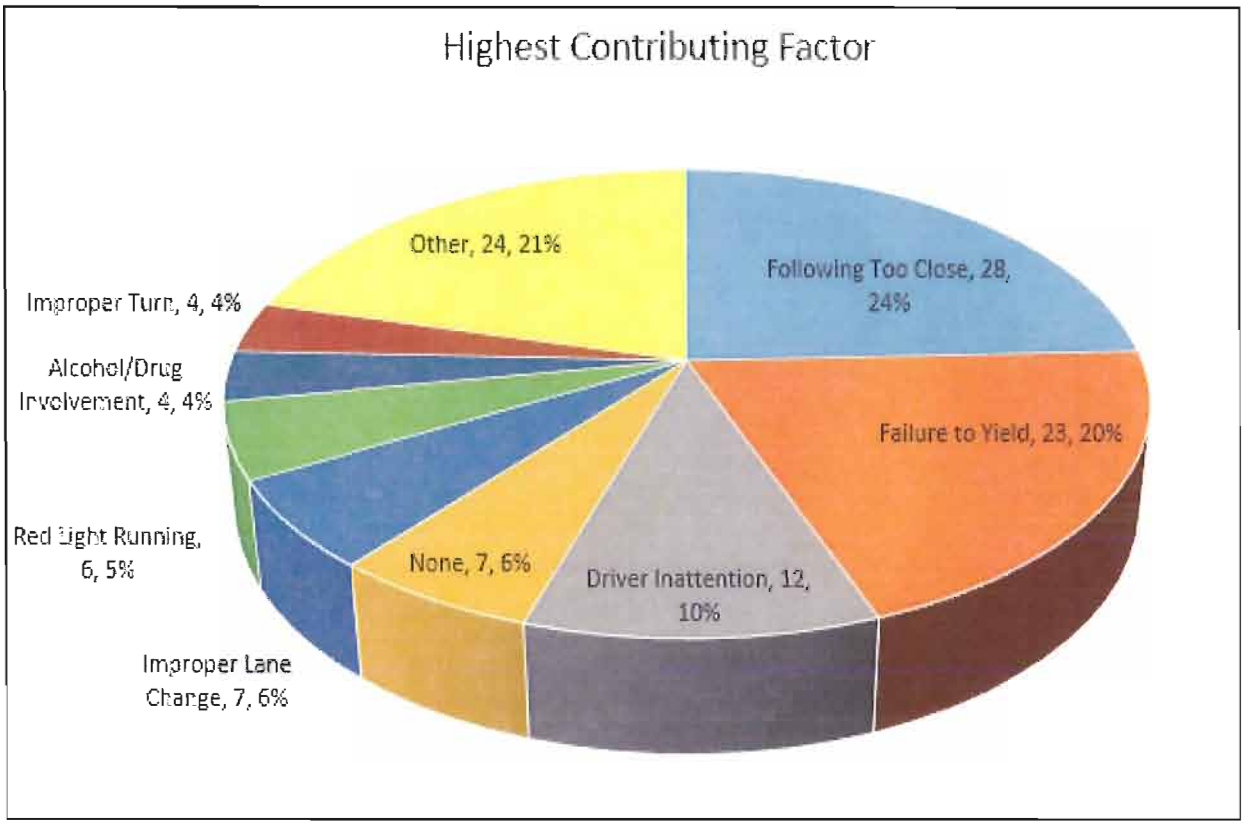


Figure 3. Crashes by Highest Contributing Factor

Peak hour Traffic Counts

Peak hour traffic counts were conducted at ten (10) locations within the study area. Traffic counts were taken from 7:00—10:00 a.m., 11:00—2:00 p.m. and 4:00—7:00 p.m. These counts were conducted on Wednesday, August 27, 2014.

Traffic flow data was collected in fifteen minute intervals for each location to determine the peak hours. Classifications were conducted to determine the flow of vehicles, bicycles, and pedestrians. The AM, Mid-Day and PM Peak Hours were then determined for each intersection.

Table 3 gives the AM, Mid-Day and PM Peak Hour Traffic Data. Detailed traffic counts are provided in the Appendix and summarized below.

The AM Peak Hour occurred for nine (9) of the ten (10) intersections from 7:30 AM to 8:30 AM or from 7:45 AM to 8:45 AM. The highest traffic volume intersection during the AM Peak Hour was at Paseo de Peralta, with West Alameda second.

The Mid-Day Peak Hour occurred for the southern five (5) intersections (Agua Fria to Johnson) at 12:45 to 13:45 PM, while the Mid-Day Peak Hour for the northern five (5) intersections (Jefferson-Mckenzie to Paseo de Peralta) was predominantly 12:00 to 1:00 PM. Again, Paseo de Peralta and West Alameda were the two intersections with the highest traffic volumes.

The PM peak hour predominantly occurred from 4:30 to 5:30 PM. Paseo de Peralta and Alameda had the highest peak hours during the PM Peak Hour compared to their AM and Mid-Day Peaks.

The highest peak hour of the entire day for every intersection in the corridor were during the PM Peak Hour.

Intersection AM, Mid-Day and PM Peak Hour Traffic with corresponding Bicycle and Pedestrian Counts are also shown in Table 3.

The pedestrian counts show that the West Alameda and West San Francisco intersection have some of the highest pedestrian counts of all the intersections. As stated previously, the pedestrian counts are much higher in the southern 1/2 of the corridor than the northern 1/2.

The existing Level of Service (LOS) for the unsignalized intersections are shown in Table 4 and in Table 5 for the signalized intersections.

The LOS's for the six unsignalized intersections were an LOS of "A" for the AM, Mid-Day and PM Peak Hours except for two peak hours at the McKenzie/Jefferson Intersection, which were an LOS of "B".

Table 3—Traffic, Pedestrian and Bicycle Peak Hour Data

Intersection	AM Peak Hour	Mid-Day Peak Hour	PM Peak Hour
Guadalupe and Agua Fria	9:00 - 10:00	12:45 - 13:45	16:30 - 17:30
Vehicles	707 vph	1135 vph	1230 vph
Pedestrians	45 pph	52 pph	79 pph
Bicycles	9 bph	7 bph	20 bph
Guadalupe and West Alameda	7:45 - 8:45	12:45 - 13:45	16:30 - 17:30
Vehicles	1436 vph	1881 vph	2064 vph
Pedestrians	53 pph	65 pph	124 pph
Bicycles	5 bph	7 bph	9 bph
Guadalupe and Water	7:45 - 8:45	12:45 - 13:45	16:30 - 17:30
Vehicles	935 vph	1269 vph	1336 vph
Pedestrians	11 pph	17 pph	23 pph
Bicycles	2 bph	4 bph	4 bph
Guadalupe and San Francisco	7:45 - 8:45	12:45 - 13:45	16:30 - 17:30
Vehicles	1041 vph	1405 vph	1490 vph
Pedestrians	58 pph	127 pph	125 pph
Bicycles	2 bph	9 bph	5 bph
Guadalupe and Johnson	7:30 - 8:30	12:45 - 1:45	16:30 - 17:30
Vehicles	984 vph	1291 vph	1381 vph
Pedestrians	13 pph	23 pph	23 pph
Bicycles	0 bph	5 bph	1 bph
Guadalupe and Jefferson-Mckenzie	7:30 - 8:30	12:15 - 1:15	16:30 - 17:30
Vehicles	962 vph	1239 vph	1300 vph
Pedestrians	35 pph	46 pph	53 pph
Bicycles	0 bph	4 bph	3 bph
Guadalupe and Park-Catron	7:30 - 8:30	12:00 - 1:00	16:30 - 17:30
Vehicles	1106 vph	1304 vph	1380 vph
Pedestrians	24 pph	37 pph	18 pph
Bicycles	1 bph	3 bph	4 bph
Guadalupe and Jose	7:45 - 8:45	12:00 - 1:00	17:00 - 18:00
Vehicles	966 vph	1203 vph	1228 vph
Pedestrians	13 pph	18 pph	9 pph
Bicycles	1 bph	3 bph	0 bph
Guadalupe and Solona	7:30 - 8:30	12:00 - 1:00	17:00 - 18:00
Vehicles	1040 vph	1200 vph	1245 vph
Pedestrians	8 pph	12 bph	8 pph
Bicycles	0 bph	2 bph	0 bph
Guadalupe and Paseo de Peralta	7:45 - 8:45	11:45 - 12:45	16:45 - 17:45
Vehicles	2252 vph	2399 vph	2677 vph
Pedestrians	11 pph	33 pph	24 pph
Bicycles	3 bph	2 bph	2 bph

NOTE: Pedestrian/Bicycle volumes shown are for the peak traffic hour and not necessarily the peak pedestrian hour.

Table 4—Existing LOS, Unsignalized Intersections

Unsignalized Intersections	AM LOS	Mid-Day LOS	PM LOS
Guadalupe Street and Agua Fria	A	A	A
Guadalupe Street and Water	A	A	A
Guadalupe Street and Johnson Street	A	A	A
Guadalupe Street and McKenzie/Jefferson	B	B	A
Guadalupe Street and Jose Street	A	A	A
Guadalupe Street and Solano	A	A	A

Table 5—Existing LOS, Signalized Intersections

Signalized Intersections	AM Peak LOS						Mid-Day Peak LOS						PM Peak LOS					
	SE	NW	NE	SW	Overall		SE	NW	NE	SW	Overall		SE	NW	NE	SW	Overall	
Guadalupe Street and West Alameda	B	B	B	B	B		A	B	B	B	B		B	B	C	C	B	
	EB	WB	NB	SB	Overall		EB	WB	NB	SB	Overall		EB	WB	NB	SB	Overall	
Guadalupe Street and West San Francisco	A	A	A	A	A		A	A	A	A	A		A	B	A	A	A	
	SE	NW	NE	SW	Overall		SE	NW	NE	SW	Overall		SE	NW	NE	SW	Overall	
Guadalupe Street and Catron/Park Ave	B	A	B	C	B		B	B	A	B	B		B	B	B	B	B	
	EB	WB	SE	NW	Overall		EB	WB	SE	NW	Overall		EB	WB	SE	NW	Overall	
Guadalupe Street and Paseo de Peralta	D	C	F ***	F ***	F ***		D	C	F ***	F ***	F ***		C	C	F ***	C	E	

*** - Left Turn Movements Fail

The intersection with the worst LOS was at Paseo de Peralta. This was due to an LOS of "F" for several of the left turn movements on the SE and NW approaches, which are the left turn movements off of Guadalupe Street to Paseo de Peralta.

Speed Studies

The City of Santa Fe conducted two (2) speed studies in the corridor. One was between West San Francisco and Catron/Park (both signalized intersections) and a second one between Catron/Park and Paseo de Peralta (also, both signalized intersections). The combined 85th Percentile Speed for the first study was 29 MPH and 30 MPH for the second study. The posted speed limit at both locations is 25 MPH.

Copies of both studies are located in the Appendix.

C. Commentary on Data Received from Project Owner and Design Team.

The subconsultant collected traffic and pedestrian data on Wednesday, August 27, 2014 to capture weekday commuter information. The counts were also conducted before Labor Day Weekend to capture the high volume of tourist traffic generated during the summer in the City of Santa Fe. This was felt to be crucial for Guadalupe Street, since it is so close to the tourist attractions in and around the downtown Plaza.

The City of Santa Fe provided e-mail correspondence that they had received from property owners in the study area. One comment focused on the access difficulties for business; the other related to motorist's speeds and overall concerns for safety. Both e-mails are located in the Appendix.

D. Site Visit General Observations

The study team conducted a site visit on the morning of the RSA workshop. The team began at the intersection of Agua Fria at the southern end of the corridor and proceed north to Paseo de Peralta. The team began the site visit at 10:30 AM at the southern end of the corridor at the Agua Fria Intersection. The team walked on the east side of Guadalupe north to the EOP at Paseo de Peralta, crossed the street and walked south on the west side of Guadalupe.

Observation notes from workshop attendees are found in the Appendix under the Meeting Minutes.

Also, members of OCE previously walked the corridor to observe and take notes of site conditions on several occasions before the workshop site visit on October 8, 2014.

Aerial plan sheets and pictures of the corridor are provided in the Appendix.

III. Findings and Suggestions

Table 4 lists the Issues and the Countermeasures that were identified during the workshop held on October 8th. The Issues identified were:

1. High occurrence of sideswipe crashes
2. Lack of Access Control
3. Insufficient geometrics/poor intersection sight distance
4. Insufficient lighting
5. Substandard/Antiquate Traffic Signal Hardware/Design
6. Upgrades needed at Guadalupe St./Paseo de Peralta
7. Lack of sign/striping/marking maintenance
8. Pedestrian issues—ADA non-compliance, narrow sidewalks, obstructions in sidewalks, insufficient slopes, width of pedestrian crossings, lack of buffer space
9. Noncompliance with posted speed limits
10. Corridor not multi-modal/poor/lack of transit, transit stops, poor pedestrian facilities with neighborhood demographics

The following countermeasures are recommended for consideration. An initial programming level cost estimate of the recommendations and conceptual figures are provided in the conclusion section of the report.

1. Traffic Control Devices Upgrades/Maintenance

Suggestion: Review and replace all signage throughout the corridor. Ensure all street signs are up and visible. Consider advance warning signs for each signalized intersection. Consider additional speed limit signs, especially after each signalized intersection. Install "Share the Road" signage for bicyclists. Replace all pavement markings. Stripe the longitudinal markings on the existing corridor.

2. Crosswalks/Median Refuge

Suggestion: Construct two crosswalks with median islands, overhead flashers, signing, pavement markings etc. where there is not a nearby traffic signal and there is a history of pedestrian activity. Possible locations include at Agua Fria or just north of it, and just south of the Johnson Intersection. The median island would need to be of a width of at least 4 feet.

Crosswalks would include a median island, signing, pavement marking, striping, and pedestrian activated warning lights.

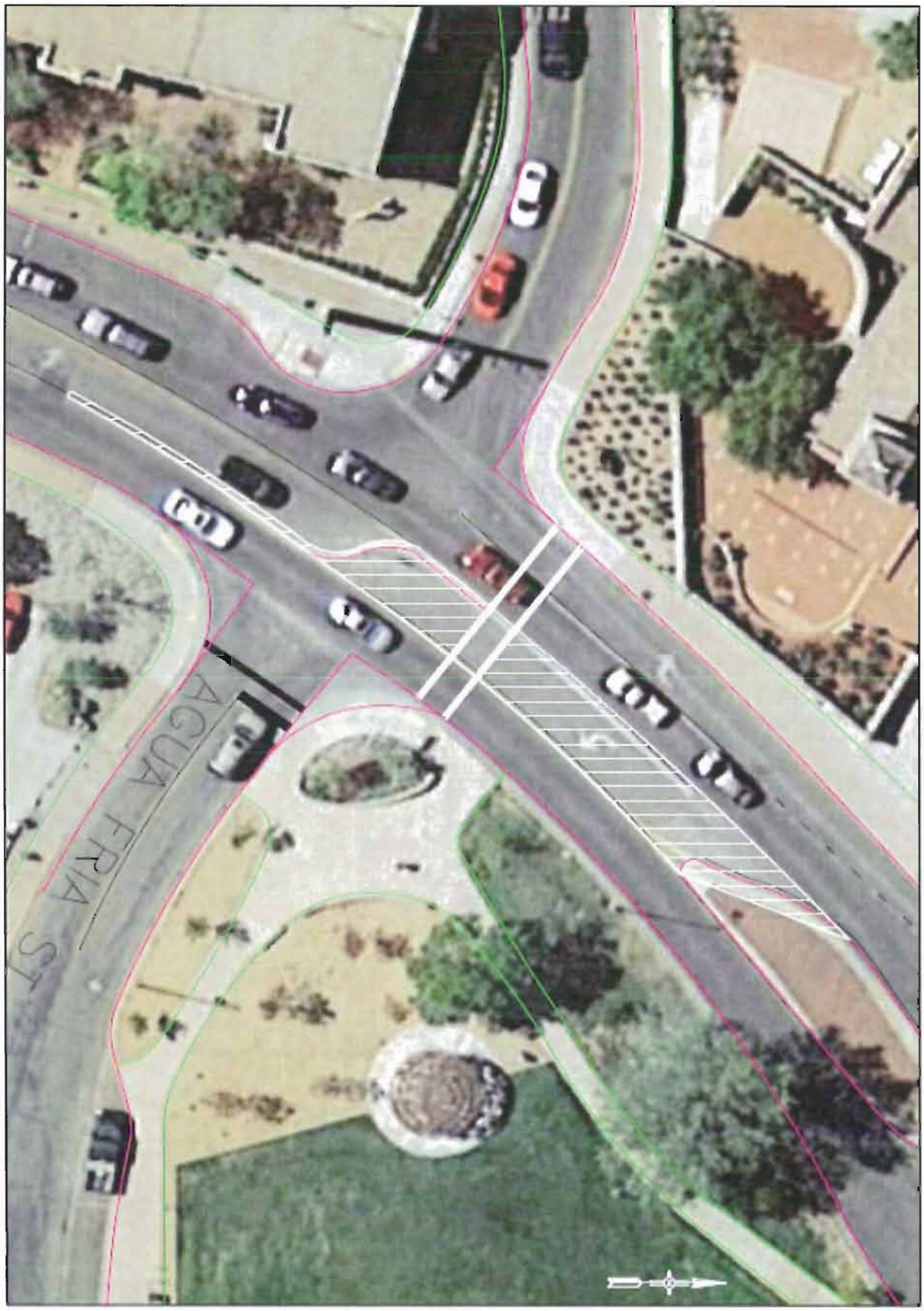
Extending the full width median that is located on the north side of Agua Fria to the south would eliminate the southbound left turn lane onto Agua Fria. However, the traffic volumes for this movement are light and account for only 1.3 percent of the total approach volumes

Table 6—Issues and Countermeasures

Countermeasures	Traffic Control Devices Up-grades/ Maintenance	Cross-walks/ Median Refuge	Improve Overhead Lighting	Clean up/ Consolidate Accesses	Intersection Geometric Revisions	Improve ADA-Ramps, Widths Remove Obstructions	Traffic Calming/ Reduce Lane Width	Traffic Signal Redesign/ Coordination	4 to 3 Lane - "Road Diet"
Issues									
High occurrence of sideswipe crashes	*		*		*		*		***
Lack of Access Control				***					*
Insufficient geometrics/poor intersection sight distance					***	*	*	*	***
Insufficient Lighting			***					*	*
Substandard/Antiquated Traffic Signal Hardware/Design					*			***	***
Upgrades needed at Guadalupe St/Paseo de Peralta					*			***	*
Lack of sign/striping/marking maintenance	***								***
Pedestrian Issues - narrow sidewalks, obstructions in sidewalks, insufficient slopes, width of pedestrian crossings, lack of buffer space	*	*		*	*	***	*	*	***
Noncompliance with Posted Speed Limits	*				*		***	*	***
Corridor not multi-modal/poor/lack of transit, transit stops, poor pedestrian facilities with demographics		*		*		***	*		***

"*" - Indicates countermeasure partially addresses issue
"***" - Indicates countermeasures more completely addresses issue

Countermeasure—Pedestrian Refuge, Extend Median to south to Agua Fria



Countermeasure—Pedestrian Refuge/Geometric Improvements, Johnson Street

for this intersection.

The second proposed median refuge island would have to be much narrower to accommodate two thru lanes in each direction. Ideally, this crosswalk should be located south of the Johnson Street intersection due to the large volume of pedestrians in this area.

3. Improve Overhead Lighting

Suggestion: Remove and replace overhead lighting along the entire corridor. Lights would be staggered from one side of the street to the other. Approximately 30 - 30 foot tall luminaries with a 400 watt sodium light in addition to overhead lighting mounted at each of the signalized intersections. The luminaries would be spaced at approximately 200 feet apart on each side of the roadway.

The city could consider the continuance of the ornamental lighting south of Agua Fria north thru the southern portion of the corridor for enhanced lighting/security for pedestrians.

4. Clean Up/Consolidate Accesses

Suggestion: Shorten, reduce or remove access points along the entire corridor. This could be conducted in conjunction with ADA improvements along the corridor. Reduced access points/ widths would assist in reducing the number of conflict points in the corridor, while also allowing better pedestrian movements on each side of Guadalupe Street.

This work could be done in phases, either put out to bid or with a city-wide annual price agreement. Or the access consolidation could be done as part of a roadway reconstruction project.

5. Intersection Geometric Revisions

Suggestion: Make geometric improvements at selected locations throughout the corridor. This would include improving turning radii at select intersections, adjusting connecting street openings and closing of medians to create right –in/right-out side streets.

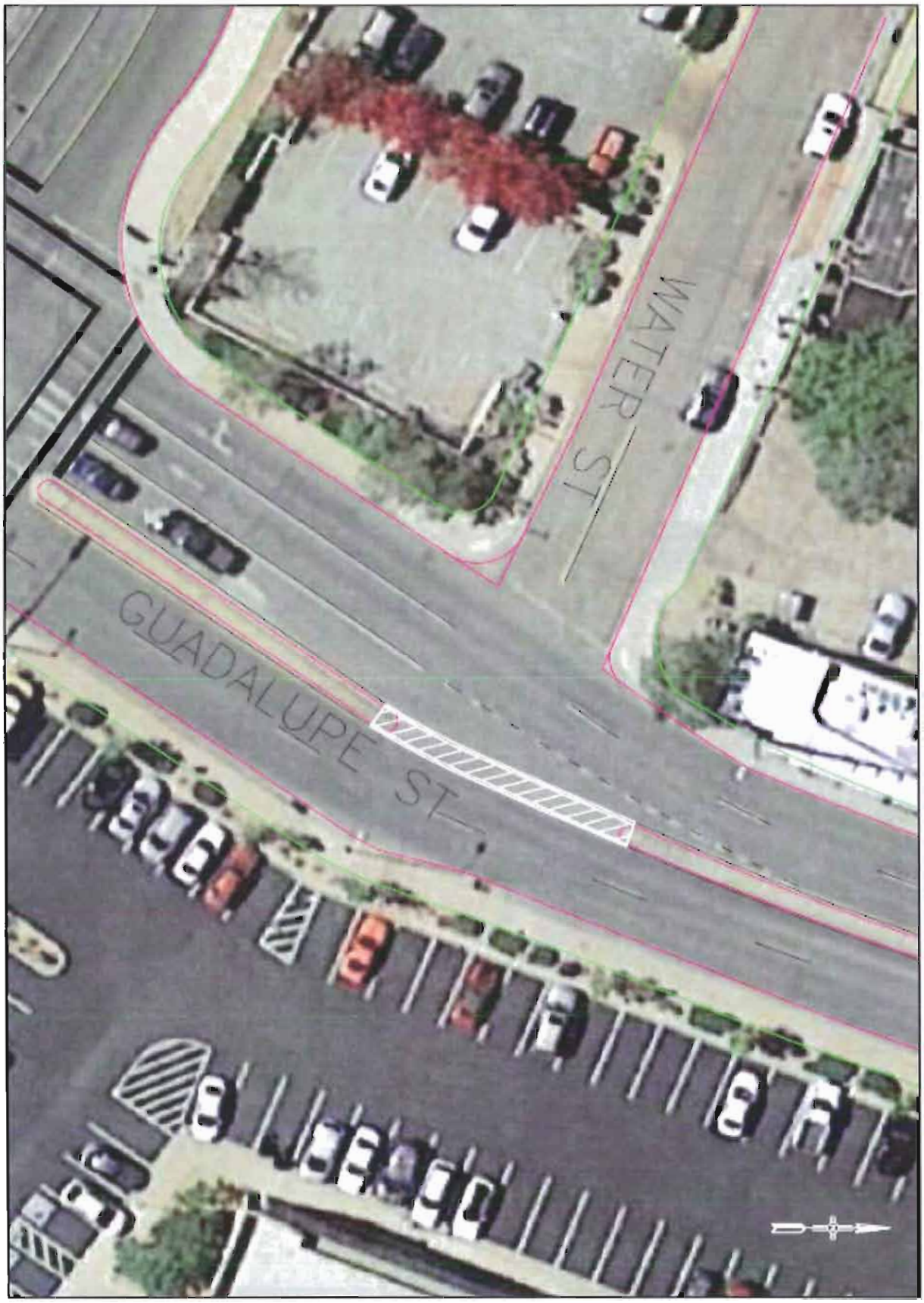
Specific suggested improvements include:

- Improvement of intersection radii at San Francisco, Johnson, Catron/Park (west side) and Solano.

- Close median at Water Street, making Water a right-in/right-out only. This would allow for the extension of the southbound left turn lane at Alameda. The traffic volume making a left into Water or a left out was extremely low.

- Reconfiguration of McKenzie/Jefferson Intersection to include a pedestrian refuge for pedestrians walking north along the east side of Guadalupe Street. Southbound left turns off

Countermeasure—Geometric Improvements, Closed Median at Water Street



Countermeasure—Geometric Improvements/Pedestrian Refuge at Jefferson

of Guadalupe would be prohibited, however, these account for less than two (2) percent of total intersection volumes.

- An additional lane at Catron/Park Traffic Signal for motorists approaching Guadalupe from the east side. There is a high volume of traffic at the Johnson/Guadalupe Intersection making a right turn to the north. This would seem to indicate vehicles avoiding the traffic signal at Catron/Park.

- Install a median island on Johnson Street at the intersection to provide a pedestrian refuge for pedestrians traveling along Guadalupe Street.

- Consider removing the eastbound to northbound left turn lane at Paseo de Peralta. There is little left turn movements at this intersection. Doing this, in conjunction with reconfiguring the crosswalks crossing Guadalupe as the city has planned, would allow for the medians on Guadalupe to be extended. This would allow for pedestrian refuge, as well as providing storage for the left turn movements, which are currently failing during peak hours.

6. Improve ADA—Ramps, Widths, Remove Obstructions

Suggestion: Complete a corridor wide or phased project to reconstruct non-compliant ADA ramps, replace unusable driveways with sidewalks, remove/relocate obstructions and reconstruct failing segments of sidewalk. Much of this work could possibly be done with the consolidation/removal of accesses.

This project could be let out to bid as a project and/or completed using an annual city wide price agreement for construction work, if the City of Santa Fe has such an annual agreement.

7. Employ Traffic Calming Techniques/Reduce Lane Width

Suggestion: Employ traffic calming techniques throughout the corridor. Such techniques could include:

- Speed humps
- Speed table, with or without a crosswalk
- Restriping to reduce the roadway/lane width
- Narrowing of the roadway in select locations with the use of curb and gutter

Speeds humps and/or speed tables have shown to decrease the 85th Percentile Speed approximately 22 percent, while narrowing of the roadway decreases the 85th Percentile Speed by only about 7 percent.

The last two techniques are meant to give the motorist a feeling of "constraint," thereby decreasing speeds.

Countermeasure—Geometric Improvements, Remove Left Turn Lane, Paseo de Peralta

The particular traffic calming techniques should be installed in phases, from the least severe to motorists to the most severe. This will allow for their impacts and reductions in crashes/ speeds to be gauged before proceeding to the next level.

8. Traffic Signal Redesign/Coordination

Suggestion: Upgrade traffic signals throughout the corridor to meet current traffic signal design standards. Issues include: signal indication over each lane, pedestrian indicators too far for visibility, current pedestrian hardware, LED signal heads, current controller cabinets.

The City of Santa Fe does have plans to conduct a city wide installation of LED "Countdown" Pedestrian indicators.

9. Reduce Typical from 4 Lane to 3 Lane "Road Diet"

Suggestion: Convert the existing four lane roadway typical into a three lane roadway typical. The typical section would be two through lanes and a center two-way left turn lane and/or raised medians with center left turn lanes. Bicycle lanes and pedestrian crossing islands could then be added to the corridor. Additionally, wider sidewalks could then be installed.

FHWA literature indicates that such as "road diet" can improve safety for bicyclists, reduce rear-end and side-swipe crashes, improve speed limit compliance and decrease crash severity when crashes do occur.

Some studies also indicate that in addition to the number of crashes being reduced, traffic volumes can also be slightly reduced as well.

The assumption is made that since the sidewalks/ramps would be widened and/or reconstructed throughout the entire corridor, this "road diet" would be accomplished by a total reconstruction of the corridor.

Schematic drawings of what the new typical would look like appears on the next page.

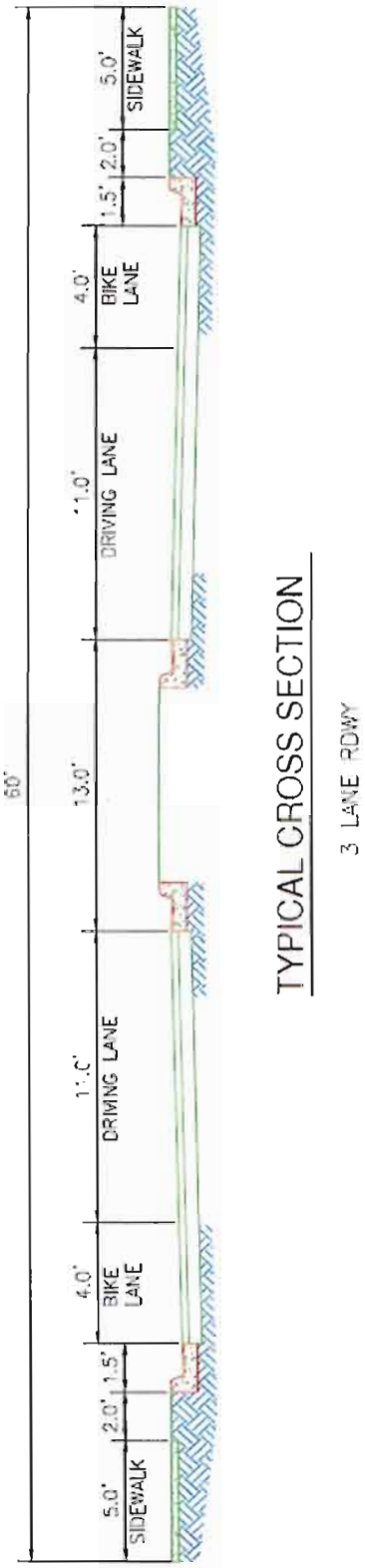
The City of Santa Fe has basically constructed this typical on Guadalupe Street south of Agua Fria with good success.

The southern 2/3 of Guadalupe Street under review currently had a very narrow raised median. Therefore, introducing a three lane typical with a raised median in this area would possibly be met with less resistance from businesses/property owners in the area.

The three lane typical would end on the south side of the Paseo de Peralta intersection.

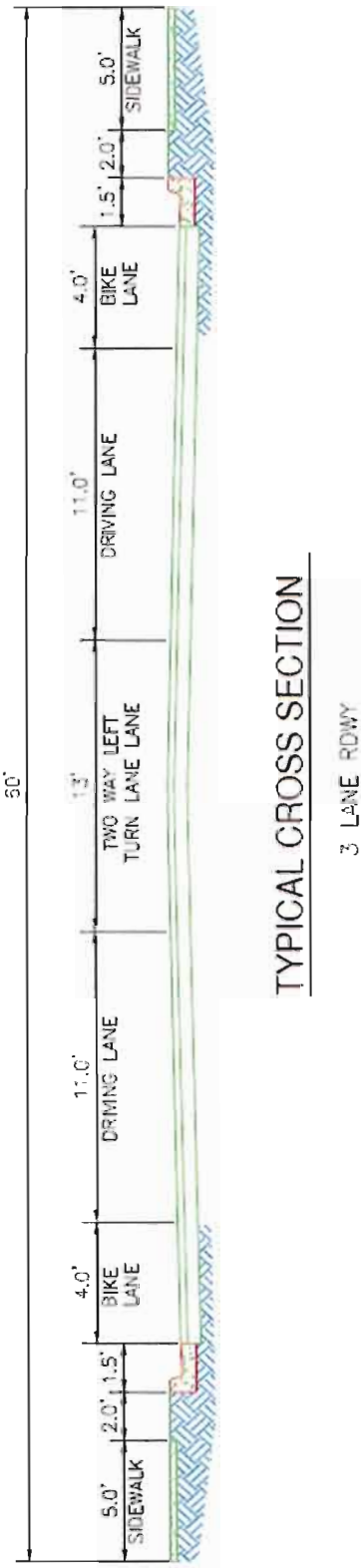
This typical does decrease the LOS for the northbound and southbound movements on Guadalupe Street.

Countermeasure— Four Lanes to Three Lanes, "Road Diet"



TYPICAL CROSS SECTION

3 LANE RDWY



TYPICAL CROSS SECTION

3 LANE RDWY

This countermeasure would be by far the most expensive, but would address many of the issues that exist within the corridor.

Conclusions

In conclusion, the following table of considerations are recommended for programming into the process for implementation. Estimated costs are provided for each countermeasure for budget level planning.

Some countermeasures can be done in conjunction with each other, i.e., consolidation of access points with improvements to ADA. Other countermeasures are specific to certain locations, i.e., specific intersection geometric improvements, while others are more corridor wide.

Table 7. Conclusions	
Improvement/Countermeasure	**Planning Level Cost Estimate**
1. Traffic Control Devices Upgrades/Maintenance Review and replace all signage throughout the corridor. Ensure all street signs are up and visible. Consider advance warning signs for each signalized intersection. Consider additional speed limit signs, especially after each signalized intersection. Install "Share the Road" signage for bicyclists. Replace all pavement markings. Stripe the existing longitudinal lines in the corridor.	$125,000 to $150,000
2. Crosswalk/Median Refuge Construct two to three crosswalks with median islands, overhead flashers, signing, pavement markings etc. where there is not a nearby traffic signal and there is a history of pedestrian activity. Possible locations include at Agua Fria or just north of it, and just north of the Jefferson/McKenzie Intersection. The median island would need to be of a width of at least 4 feet.	$200,000 to $250,000
3.Improve Overhead Lighting Remove and replace overhead lighting along the entire corridor. Lights would be staggered from one side of the street to the other. An approximate quantity of lights is 30 foot tall luminaries with a 400 watt sodium light in addition to overhead lighting mounted at each of the signalized intersections. The city would possibly want to continue the ornamental lighting south of Agua Fria north thru the corridor.	$150,000 to $175,000
4. Clean Up/Consolidate Accesses Shorten, reduce or remove access points along the entire corridor. This could be conducted in conjunction with ADA improvements along the corridor. Reduced access points/widths would assist in reducing the number of conflict points in the corridor, while also allowing better pedestrian movements on each side of Guadalupe Street.	$175,000 to $225,000

Table 7. Conclusions (continued)	
Improvement/Countermeasure	**Planning Level Cost Estimate**
5. Intersection Geometric Revisions Make geometric improvements at selected locations throughout the corridor. This would include improving turning radii at select intersections, adjusting connecting street openings and closing of medians to create right –in/right-out side streets.	$275,000 to $325,000
6. Improve ADA—Ramps, Widths, Remove Obstructions Complete a corridor wide or phased project to reconstruct non-compliant ADA ramps, replace unusable driveways with sidewalk, remove/relocate obstructions and reconstruct failing segments of sidewalk.	$250,000 to $300,000
7. Employ Traffic Calming Techniques/Reduce Lane Widths Employ traffic calming techniques throughout the corridor. Such techniques could include speed humps, speed tables with or without crosswalks, restriping to reduce the roadway lane width and/or narrowing of sections of the roadway with the use of curb and gutter.	$150,000 to $200,000
8. Traffic Signal Redesign/Coordination Upgrade traffic signals throughout the corridor to meet current traffic signal design standards. Issues include: signal indication over each lane, pedestrian indicators too far for visibility, current pedestrian hardware, LED signal heads, current controller cabinets.	$700,000 to $750,000
9. Reduce Typical from 4 Lane to 3 Lane, "Road Diet" Convert the existing four lane roadway typical into a three lane roadway typical. Typical section would be two through lanes and a center two-way left turn lane and/or raised medians with center left turn lanes. Bicycle lanes and pedestrian crossing islands could then be added to the corridor. Additionally, wider sidewalks could then be installed.	$2,300,000 to $2,500,000

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