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AZ CORP COMMISSION
DOCKET CONTROL

Transcript Exhibit(s)

Docket #(s): 22-03639A-14-0157

Arizona Corporation Commission
DOCKETED
OCT 03 2014
DOCKETED BY

Exhibit #: S1, A1-A6

EXHIBIT
S-1
ADMITTED

STAFF MEMORANDUM

To: THE COMMISSION

From: Robert Marvin
Director
Safety Division

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AUG - 8 2014
LEGAL DIVISION
AZ CORP COMM

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2014 AUG -8 A 8: 34
AZ CORP COMMISSION
DOCKET CONTROL

Date: August 8, 2014

RE: IN THE MATTER OF THE APPLICATION OF THE TOWN OF GILBERT TO UPGRADE EXISTING CROSSINGS OF THE UNION PACIFIC RAILROAD COMPANY AT COOPER ROAD, DOT NO. 741-816-D, AND GUADALUPE ROAD, DOT NO. 741-815-W, IN THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA.

DOCKET NO. RR-03639A-14-0157

Background

On May 12, 2014, the Town of Gilbert ("Town") filed with the Arizona Corporation Commission ("Commission") an application for approval for the Union Pacific Railroad ("Railroad") to upgrade the existing crossings in Gilbert, Arizona located at Cooper Road, DOT No. 741-816-D, and Guadalupe Road, DOT No. 741-815-W.

On March 5, 2013, the Safety Division's Railroad Safety Section ("Staff") the Railroad, and the Town participated in diagnostic review of the proposed improvements at Cooper and Guadalupe Roads. All parties present were in agreement to the proposed improvements at the crossings. The following is a break down of the crossings in this application, including information about the crossings that was provided to Staff by the Town and its consultants.

Geographical Information

Incorporated on July 6, 1920, the Town is a relatively new community that has seen tremendous growth during the past two decades. The Town has experienced a rapid transition from a historically agriculture-based community to an urban center and suburb in the Phoenix Metropolitan Area. In the last two decades, the Town has grown at a pace unparalleled by most communities in the United States, increasing in population from 5,717 in 1980 to over 229,972 in 2014.

Cooper/Guadalupe Roads

The rail line in this area runs in a southeast to northwest direction. The Railroads tracks intersect two of the four legs of the intersection of Cooper and Guadalupe. This project will improve the operational characteristics and capacity of the Cooper/Guadalupe intersection. The proposed roadway work includes adding a through vehicular lane in each of the four directions, adding raised medians, and improving pedestrian crossings. Each crossing will be widened thirty-five feet asymmetrically from the centerline of each roadway. The majority of the added

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width will be to the north on Guadalupe, and to the east on Cooper. Railroad proposed upgrades will replace the existing flashing lights, gate mechanisms, bells and detection circuitry, with the latest in industry standards to include: 12-inch LED flashing lights, cantilevers with 12-inch LED flashing lights, median and curb-side automatic gates, bells, and constant warning time with advanced preemption circuitry. New concrete crossing surfaces will be added, along with replacing any impacted pavement markings. The proposed measures are consistent with safety measures employed at similar at-grade crossings in the State. The estimated cost of the proposed railroad crossings upgrades is $1,980,514. The Town is paying for the entire cost of the crossing improvements through Proposition 400, Maricopa Association of Governments ("MAG") monies. The Railroad will maintain the warning devices and the crossing surface.

Average Daily Traffic ("ADT") was provided by the Town. As of April 2014, the ADT for Cooper Road is 32,488 vehicles per day ("vpd"), and for Guadalupe Road, 18,846 vpd. The current Level of Service ("LOS") for the Cooper/Guadalupe intersection is LOS D during AM peak hours and LOS E during PM peak hours.

The American Association of State Highway and Transportation Officials ("AASHTO") Geometric Design of Highways and Streets, 2004, states that the Level of Service characterizes the operating conditions on a facility in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. This is a measure of roadway congestion ranging from LOS A--least congested--to LOS F--most congested. LOS is one of the most common terms used to describe how "good" or how "bad" traffic is projected to be.

The posted speed limit on both Cooper and Guadalupe Roads is 45 mph. Staff records, as well as Federal Railroad Administration ("FRA") accident/incident records, indicate on Guadalupe Road, 4 accidents, with one fatality and one injury. The first incident occurred on April 29, 1994, and resulted in one injury caused by the person driving around the downed gate. The second incident occurred on March 14, 1997 with no injuries and was caused by the driver, driving around the downed gate. The third incident occurred on April 6, 2005 with no injuries and was also caused by the driver, driving around the lowered gate. The fourth incident occurred on November 2, 2005 and resulted in a fatality. It was the result of the driver stopping on the tracks and being struck by the train. Records indicate no incidents at Cooper Road.

Alternative routes from these crossings are as follows; McQueen Road, 1.13 miles northwest of Guadalupe Road and Gilbert Road, 1.3 miles southeast of Copper Road. Both are at-grade crossings.

Train Data

Data provided by the Town regarding train movements through these crossings are as follows:

Train Count: 11 total average trains per day (all freight trains/no passenger trains)
Train Speed: 65 mph
Thru Freight/Switching Moves: All movements through these crossings are thru freight.

Schools and Bus Routes

The Town gave the following response about schools located near these crossings:

There are no schools in the immediate area of the crossings. Oak Tree Elementary is located at the corners of Neely Street and Houston Avenue approximately 0.7 miles from the intersection. Playa Del Ray Elementary is located at Horne Street and Cayman Drive approximately 0.65 miles from the intersection.

Hospitals

The Town gave the following response about hospitals in the area;

No hospitals are in the area of the Cooper Road and Guadalupe Road intersection and crossing. The Town of Gilbert has a fire station located on Guadalupe Road approximately 0.75 west of the intersection that has emergency vehicles that use the crossings. The Town of Gilbert has a fire station located on Cooper Road approximately 0.75 south of the intersection that has emergency vehicles using the crossing. The Cooper Road fire station will close and move locations in 2015.

Hazardous Materials

The Town gave the following response when asked about vehicles transporting hazardous materials through these crossings:

No known vehicles carrying hazardous materials use these crossings. The crossings are located in a light industrial section of the Town of Gilbert so there may be hazardous material delivery occasionally.

Zoning

Staff requested the Town provide information regarding the type of zoning in adjacent areas from these crossings. The following was the Town's response:

Near the Cooper Road and Guadalupe Road intersection and crossings the land is zoned commercial on the NW, NE and SW corners. It is zoned light industrial on the SE corner. Light industrial zoning follows the railroad to the north and south. A multi-family residential neighborhood is located on Guadalupe Road 200 feet west of the crossing. All of the land is adjacent to the intersection and the crossings and is currently developed. It is planned that the nursery on the NW corner of Cooper/Guadalupe will redevelop into a commercial property at some time in the future.

Spur Lines

The Town gave the following answer regarding spur lines in the area that were removed by the Railroad:

No spur removals within 10 miles of the Cooper Road and Guadalupe Road intersection are known.

Federal Highway Administration ("FHWA") Guidelines Regarding Grade Separation

The FHWA, Railroad-Highway Grade Crossing Handbook (Revised Second Edition August 2007) provides nine criteria for determining whether highway-rail crossings should be considered for grade separation or otherwise eliminated across the railroad right of way. The Crossing Handbook indicates that grade separation or crossing elimination should be considered whenever one or more of the nine conditions are met.

The nine criteria are applied to this crossing application as follows:

		Cooper/Guadalupe Road
The highway is a part of the designated Interstate Highway System	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
The highway is otherwise designed to have full controlled access	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
The posted highway speed equals or exceeds 70 mph	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
AADT exceeds 100,000 in urban areas or 50,000 in rural areas	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
Maximum authorized train speed exceeds 110 mph	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
An average of 150 or more trains per day or 300 million gross tons/year	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
Crossing exposure (trains/day x AADT) exceeds 1M in urban or 250k in rural; or passenger train crossing exposure exceeds 800k in urban or 200k in rural	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No
Expected accident frequency for active devices with gates, as calculated by the US DOT Accident Prediction Formula including five-year accident history, exceeds 0.5	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	N/A [1]
Vehicle delay exceeds 40 vehicle hours per day	Crossing Currently meets the criteria	No
	Crossing meets the criteria by 2030	No

[1] N/A = Not Applicable

Vehicular Delays at Crossings

Based on the current single track configuration, the Town gave the following response about delay times for vehicles at the crossings in this application. The delay time is measured from the point that the warning devices are activated at the crossing to the time the train has cleared the crossing and the warning devices are reset.

(1) Based on 1 mile of train at 35 mph (35 mph is used in lieu of 60 mph to be conservative and account for the proximity of the junction to the north), 25 seconds of preemption time, and 15 seconds for the warning devices to reset, the average delay time per train is 2.4 minutes. At eleven trains per day, the average delay time is 26.4 minutes per day.

(2) Based on a stopping time of 28 seconds and a time of 125 seconds to accelerate and to clear the track and 25 seconds of preemption time and 15 seconds for the warning devices to reset, the average delay time per train if a train stops on the track is 3.2 minutes. These times are based on one mile of train and charts from Railroad Engineering, Second Edition, John Wiley & Sons, Inc. 1982 (Figure 10.10 to estimate deceleration time and Figure 10.4 to estimate acceleration time to clear one mile of train).

Current delays fall well below the FHWA recommended threshold of 40 delay hours per day. Future delays also do not exceed 40 hours. It is very likely that the road authority would consider some kind of roadway project to address the traffic delays before the level of delay got to the 40 hour delay period.

Another commonly used measure outlined in the FHWA Guidelines; the so-called Crossing Exposure Index (which is simply the product of the number of trains per day multiplied by the number of vehicles crossing daily) is not currently met at either crossing. Based on future traffic projections submitted by the Town, the Crossing Exposure Index will not be met in the year 2030. It should be noted that the criteria identified in the FHWA material are not mandates, but guidelines established by the FHWA, which serve to alert those having jurisdiction that potential problems may arise.

Grade Separation

With regard to grade separating this crossing, the Town gave the following response:

With the proposed improvements to both Cooper and Guadalupe Roads, the locations of the at-grade crossings remain unchanged. A grade separation would have the following undesired consequences: 1) Access to existing businesses and to anticipated development would be severed for an estimated 2,000 feet along both Cooper and Guadalupe Roads; 2) There are several utilities in both Cooper and Guadalupe Roads that cannot support 30 feet of additional embankment needed for a grade separation; 3) There is insufficient right-of-way to accommodate a 30 foot high embankment slopes along both Cooper and Guadalupe Roads; and 4) The close proximity both crossings have to the intersection of Cooper and Guadalupe is inadequate to allow for the 620 feet of sight distance required by the Town with a grade-separated crossing.

Staff has utilized the FHWA Guidelines to determine the potential need for grade separation at this crossing. Based on existing conditions, the crossings in this application meet

none of the nine criteria for consideration of grade separation. Based on future projections by the Town, none of the nine criteria will be met by 2030.

Crossing Closure

The area surrounding these crossings is highly developed with both commercial businesses and residential dwellings. To close these crossings would have a negative effect on many of the local businesses and limit access to residences. Therefore, Staff would not recommend closure of these crossings.

Staff Conclusions

Having reviewed all applicable data, Staff supports the Town's application. Staff believes that the upgrades are in the public interest and are reasonable. Staff believes that the measures proposed by the Town are consistent with other similar at-grade crossings in the State and will provide for the public's safety. Therefore, Staff recommends approval of the Town's application.

Brian H. Lehman
Railroad Safety Supervisor
Safety Division

Originator: BHL

Original and thirteen (13) copies
of the foregoing were filed this
_8th_ day of August, 2014 with:

Docket Control
Arizona Corporation Commission
1200 West Washington Street
Phoenix, Arizona 85007

Copy of the foregoing mailed
this 8th day of August, 2014 to:

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Gilbert, AZ 85296

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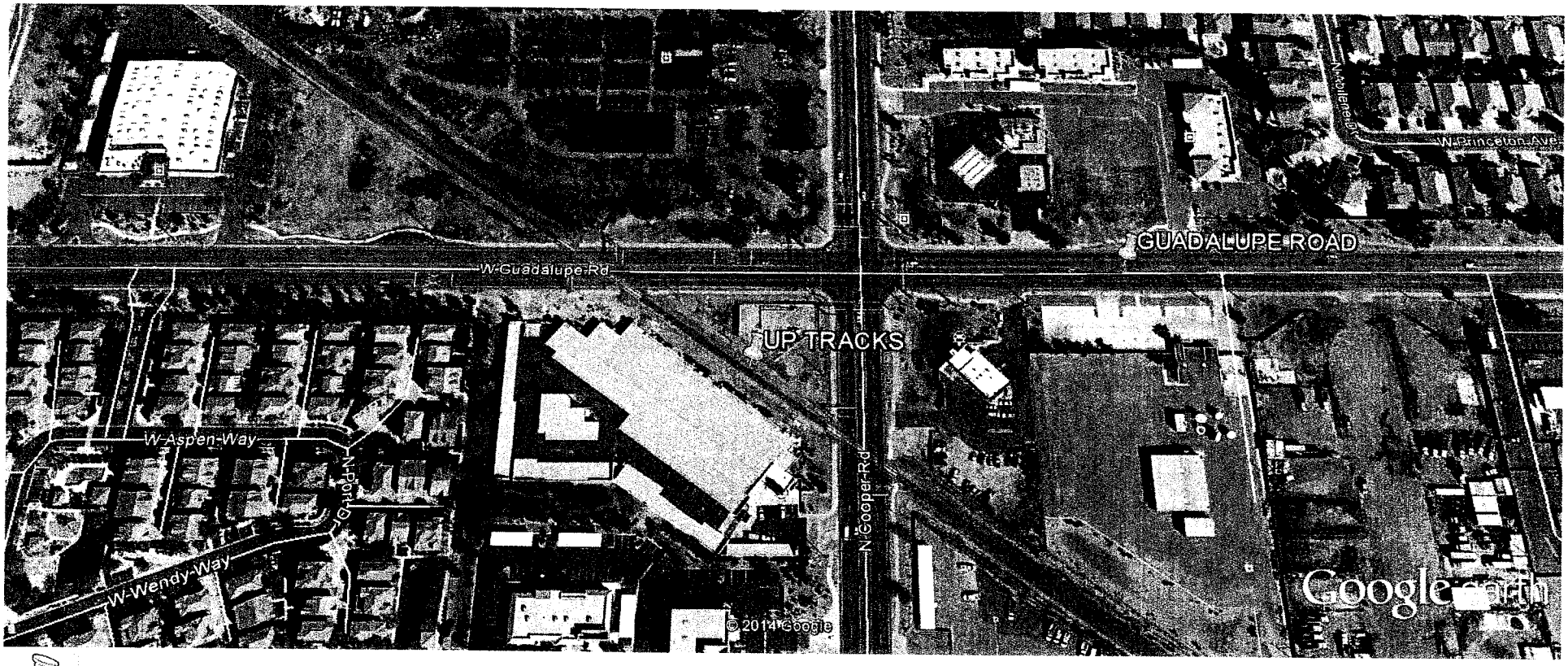
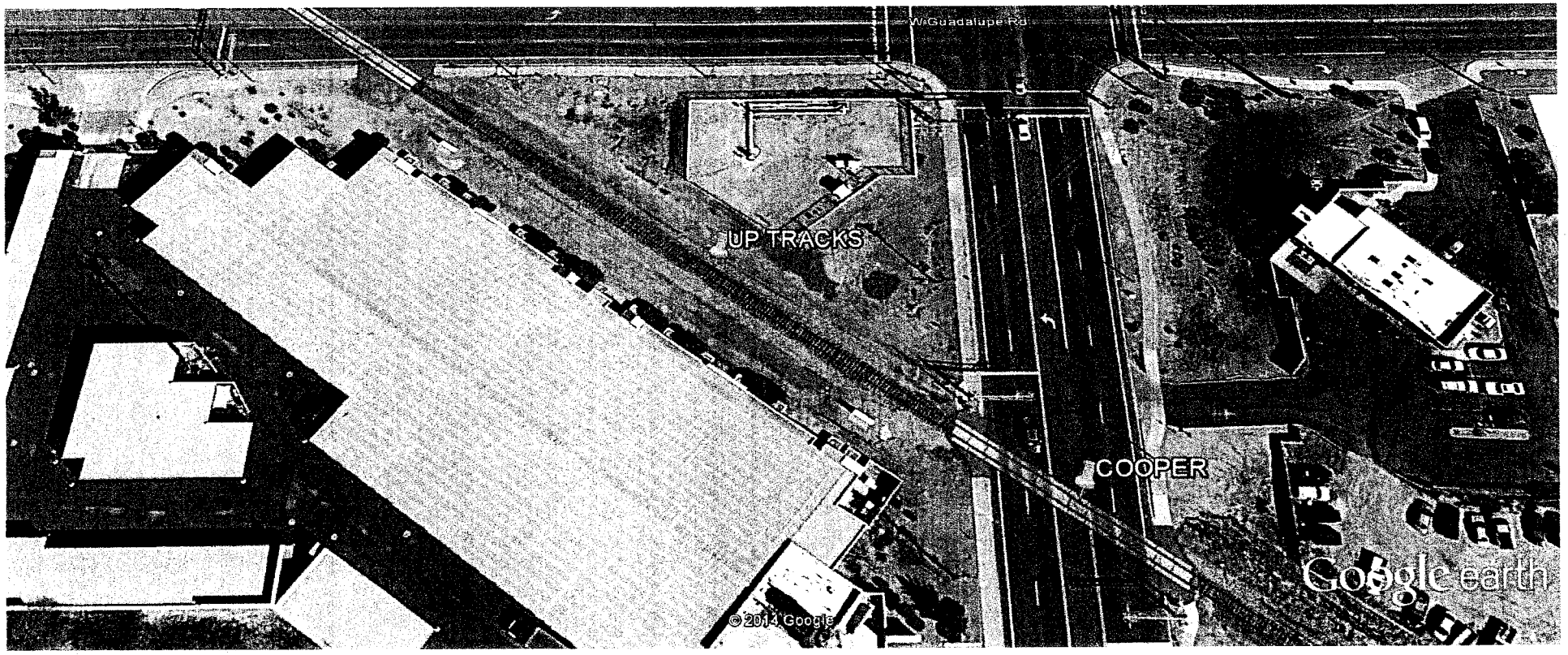
Gilbert, AZ 85296

Google earth



UP TRACKS

Google earth



GUADALUPE

PENGAD 800-631-6989
EXHIBIT
A-1
ADMITTED

GILBERT
ARIZONA

Date: May 12, 2014

Arizona Corporation Commission
Office of Railroad Safety
ATTN: Chris Watson
1200 W. Washington Street
Phoenix, AZ 85007

RE: **Arizona Corporation Commission Application to widen existing public at-grade railroad crossings**
Project: **Cooper and Guadalupe Intersection Improvements**
Town of Gilbert Project # – ST 094
Union Pacific Rail Road Crossing: Cooper Rd. - DOT #741816D - Rail mile 925.73
Union Pacific Rail Road Crossing: Guadalupe Rd. - DOT # 741815W - Rail mile 925.63

Mr. Watson,

This application is being submitted to the Arizona Corporation Commission (ACC) to allow the Union Pacific Railroad (UPRR) to modify the above identified crossings, on behalf of the Town of Gilbert. A field meeting was held on 3/5/2013 which identified Gilbert's intersection widening and improvement plans that affect the two railroad crossings. The existing roadway crossing condition currently has no traffic signal / train preemption interface, but does have cantilever flashing lights and a single cantilever gate for each direction at each crossing. Proposed roadway work includes adding a through vehicular lane in each direction, adding raised medians at the intersection and at the UPRR crossings, improving the pedestrian crossings and adding traffic signal / train preemption. Proposed UPRR improvements include installing additional concrete panels to each crossing, relocating gates and flashing lights for each crossing, and installing detection equipment to detect trains and interface with Gilbert's traffic signal for each crossing.

i) Location of Crossing
The Cooper and Guadalupe Intersection Improvements project will improve the operational characteristics and capacity of the intersection at Cooper and Guadalupe Roads in the Town of Gilbert (Town), Maricopa County, Arizona. The Union Pacific Railroad crosses two of the four legs of the intersection. Proposed roadway work includes adding a through vehicular lane in each direction, adding raised medians at the intersection and at the UPRR crossings, improving the pedestrian crossings as well as adding traffic signal / train detection and preemptive interface devices. These two railroad crossings are located as follows:

1. Cooper Crossing (DOT Crossing No. 741816D) is approximately 215' south of Guadalupe Road (Railroad Milepost 0925.73 and Railroad I.D. No. R 925.7).

2. Guadalupe Crossing (DOT Crossing No. 741815W) is approximately 305' west of Cooper Road (Railroad Milepost 0925.63 and Railroad I.D. No. R 925.6).

ii) Why the crossings are needed

The railroad crossings at Cooper Road and at Guadalupe Road are existing crossings that will need to be widened and improved in order to accommodate increased traffic and safety demand through the existing Cooper and Guadalupe intersection. This project was identified in the MAG Prop 400 program as a high need project. In 2012, the Town of Gilbert had a traffic engineering consultant perform a traffic study on the intersection. The study indicated a through lane in each direction was needed. In order to accommodate the through lane, each crossing will need to be widened thirty-five feet. The widening of both roadways, and hence each crossing is asymmetrical about the roadway centerlines. The majority of the added width will be to the North on Guadalupe, and to the East on Cooper. In addition, the new traffic signal will be preempted for both crossings. The existing system is not preempted by the Railroad signal equipment.

iii) Why the Existing Crossing Cannot be Grade Separated

With the proposed improvements to both Cooper and Guadalupe Roads, the location of the at-grade crossings remains unchanged. A grade separation would have the following undesired consequences: 1) Access to existing businesses and to anticipated development would be severed for an estimated 2,000 feet (1,000 feet on each side of tracks) along both Cooper and Guadalupe Roads; 2) There are several utilities in both Cooper and Guadalupe Roads that cannot support 30 feet of additional embankment needed for a grade-separated crossing; 3) There is insufficient right-of-way to accommodate a 30-foot high embankment slopes along both Cooper and Guadalupe Roads; and 4) The close proximity both crossings have to the intersection of Cooper and Guadalupe is inadequate to allow for the 620 feet of sight distance required by Town with a grade separated crossing.

iv) Type of Warning Devices to be Installed

The warning devices for eastbound and westbound Guadalupe traffic and for northbound and southbound Cooper traffic included in the design are as follows: gates with flashing lights will be installed in the medians and outside the roadways near the sidewalks. Cantilever flashing railroad signals will be installed outside the roadways near the sidewalks; and railroad safety signs and symbols will be installed per the MUTCD, part 8 standards.

v) Who will maintain the Crossing Warning Devices

UPRR will own and maintain the physical elements of the crossing (crossing surface, gates, flashing lights). The Town of Gilbert will own and maintain the approaching surface, signing and movement markings on both Cooper and Guadalupe Roads.

vi) Who is Funding the Project

The Town of Gilbert is funding this project using Proposition 400 Maricopa Association of Governments (MAG) Monies.

Should you have any questions on this information, please contact me by telephone at 480-503-6815, or by e-mail at tom.condit@gilbertaz.gov, or Mr. Henderson by telephone at 602-263-1177, or by e-mail at fhenderson@ritochpowell.com.

Sincerely,

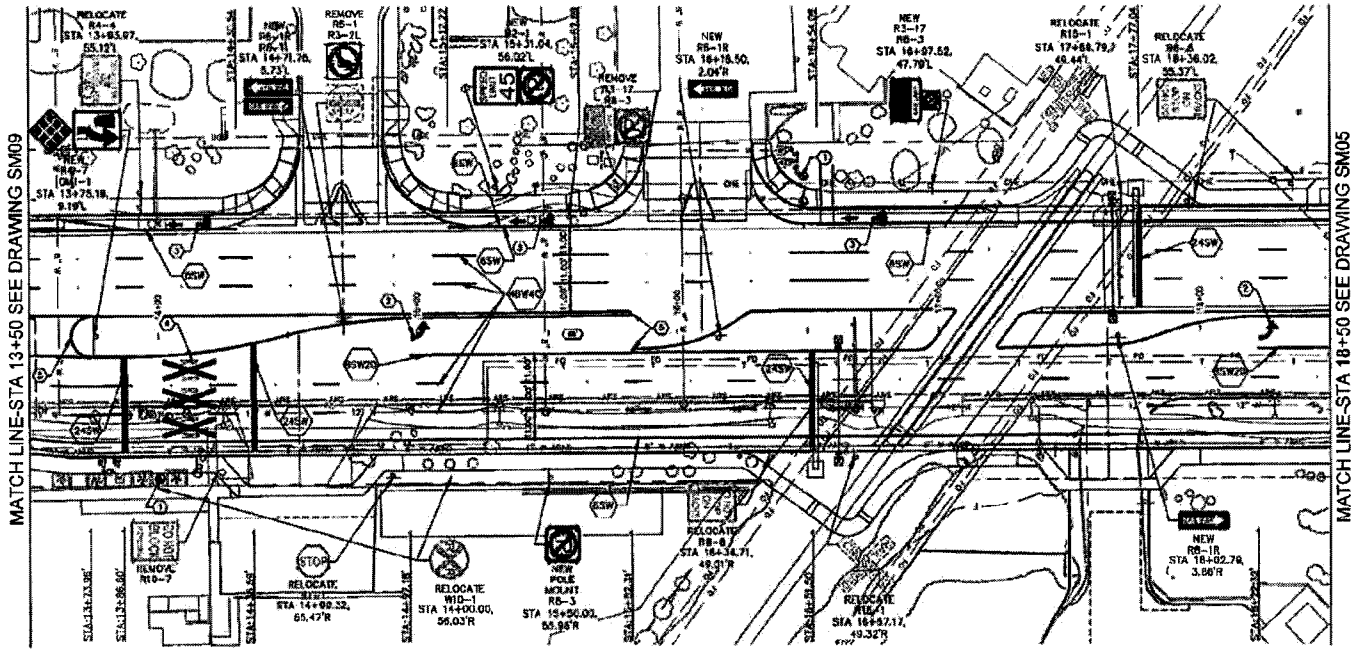
Tom Condit, P.E.
Acting Town Engineer

Frank Henderson, P.E.
Design PM/ Ritoch- Powell and Associates

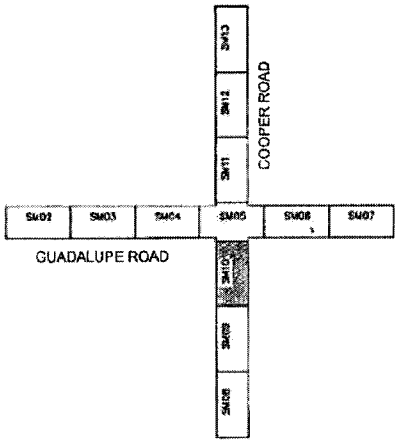
Enc:

1. Conceptual Cooper drawing
2. Conceptual Cooper and Guadalupe Intersection drawing
3. Conceptual Guadalupe drawing

Cc: Jack Gierak
Project File ST094



COOPER ROAD



KEY MAP

1. PAVEMENT MARKER FOR FIRE HYDRANT PER T.C.D. DET. 51
2. ARROW PER M.U.T.C.D. FIGURE 3D-24 AND T.O.G. DET. 301C
3. BIKE SYMBOL AND ARROW PER T.O.G. DET. 301A
4. HIGHWAY-RAIL GRADE CROSSING PAVEMENT MARKING PER M.U.T.C.D. SECT. 8B.27 AND T.O.G. DET. 301C
5. MEDIAN END TO BE PAINTED PER T.O.G. DET 304

TURN LANE STORAGE LENGTH (IN FEET)

GAP OR TAPER LENGTH (IN FEET)

SCALE: 1" = 20

GILBERT ARIZONA

RPA RITOCH-POWELL & Associates 602.263.1177 www.ritochpowell.com

95% PRELIMINARY NOT FOR CONSTRUCTION

NO.	BY	DATE	REVISION	APPR.	DATE

COOPER/GUADALUPE IMPROVEMENTS
PROJECT NO. ST094

SIGNING AND MARKING PLAN
STA 13+50 TO STA 18+50

DESIGNED	DRAWN	CHECKED	FILE NO.	SHEET NO.	TOTAL SHEETS
RJC	RPA	FEK			
DATE 11/13	DATE 11/13	DATE 11/13	SM10	84 OF 150	

C.I.P. PROJECT NO. ST094

MATCH LINE-STA 21+50 SEE DRAWING SM11

MATCH LINE-STA 17+50 SEE DRAWING SM04

MATCH LINE-STA 22+50 SEE DRAWING SM06

MATCH LINE-STA 18+50 SEE DRAWING SM10

GUADALUPE ROAD

COOPER ROAD

GUADALUPE ROAD

KEY MAP

SM02 SM03 SM04 SM05 SM06 SM07 SM08 SM09 SM10 SM11 SM12 SM13

N

SCALE: 1" = 20'

GILBERT ARIZONA

RPA RITOCH-POWELL & Associates 602.243.1177 www.ritochpowell.com

*NOTE: STATION INFORMATION FROM COOPER ROAD CENTERLINE.

1. PAVEMENT MARKER FOR FIRE HYDRANT PER T.O.G. DET. 85
2. ARROW PER M.U.T.C.D. FIGURE 3B-24 AND T.O.G., DET. 301C
3. FIRE SYMBOL AND ARROW PER T.O.G. DET. 301A
4. HIGHWAY-RAIL GRADE CROSSING PAVEMENT MARKING PER M.U.T.C.D. SECT. 8B.17 AND T.O.G. DET. 301C
5. MEDIAN END TO BE PAINTED PER T.O.G. DET 304

TURN LANE STORAGE LENGTH (IN FEET)

GAP OR TAPER LENGTH (IN FEET)

95% PRELIMINARY NOT FOR CONSTRUCTION

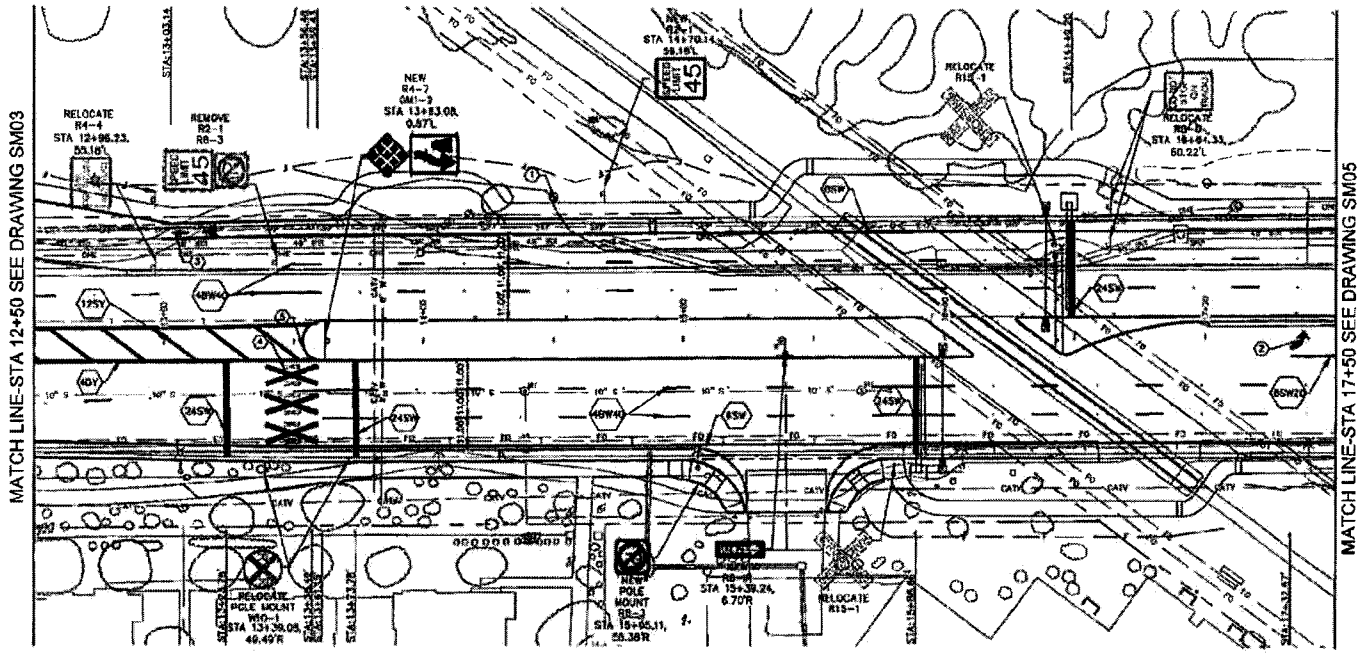
NO.	BY	DATE	REVISION	APPR.	DATE

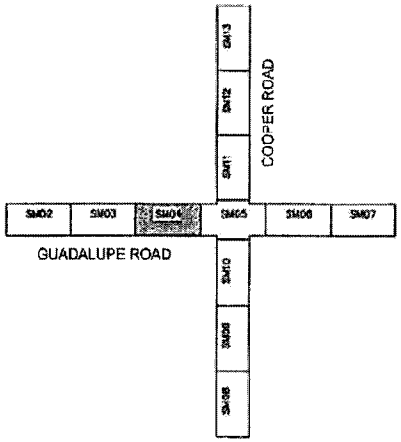
COOPER/GUADALUPE IMPROVEMENTS
PROJECT NO. ST094

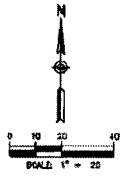
SIGNING AND MARKING PLAN
STA 17+50 TO STA 22+50

DESIGNED	DRAWN	REVIEWED	APPR. NO.	SHEET NO.	TOTAL SHEETS
B.J.C.	NPA	FTH	XS	SM05	70 OF 158
DATE: 11/03	DATE: 11/03	DATE: 11/03			

CIP PROJECT NO. ST094







GILBERT ARIZONA

RPA RITOCH-POWELL & Associates 602.263.1177 www.ritochpowell.com

1. PAVEMENT MARKER FOR FIRE HYDRANT PER T.O.G. DET. 6I
2. ARROW PER M.U.T.C.D. FIGURE 3B-24 AND T.O.G. DET. 301C
3. BIKE SYMBOL AND ARROW PER T.O.G. DET. 301A
4. HIGHWAY-RAIL GRADE CROSSING PAVEMENT MARKING PER M.U.T.C.D. SECT. 8B.27 AND T.O.G. DET. 301C
5. MEDIAN END TO BE PAINTED PER T.O.G. DET 304

TURN LANE STORAGE LENGTH (IN FEET)

GAP OR TAPER LENGTH (IN FEET)

REVIEW SET

95% PRELIMINARY NOT FOR CONSTRUCTION

NO.	BY	DATE	REVISION	APPR.	DATE

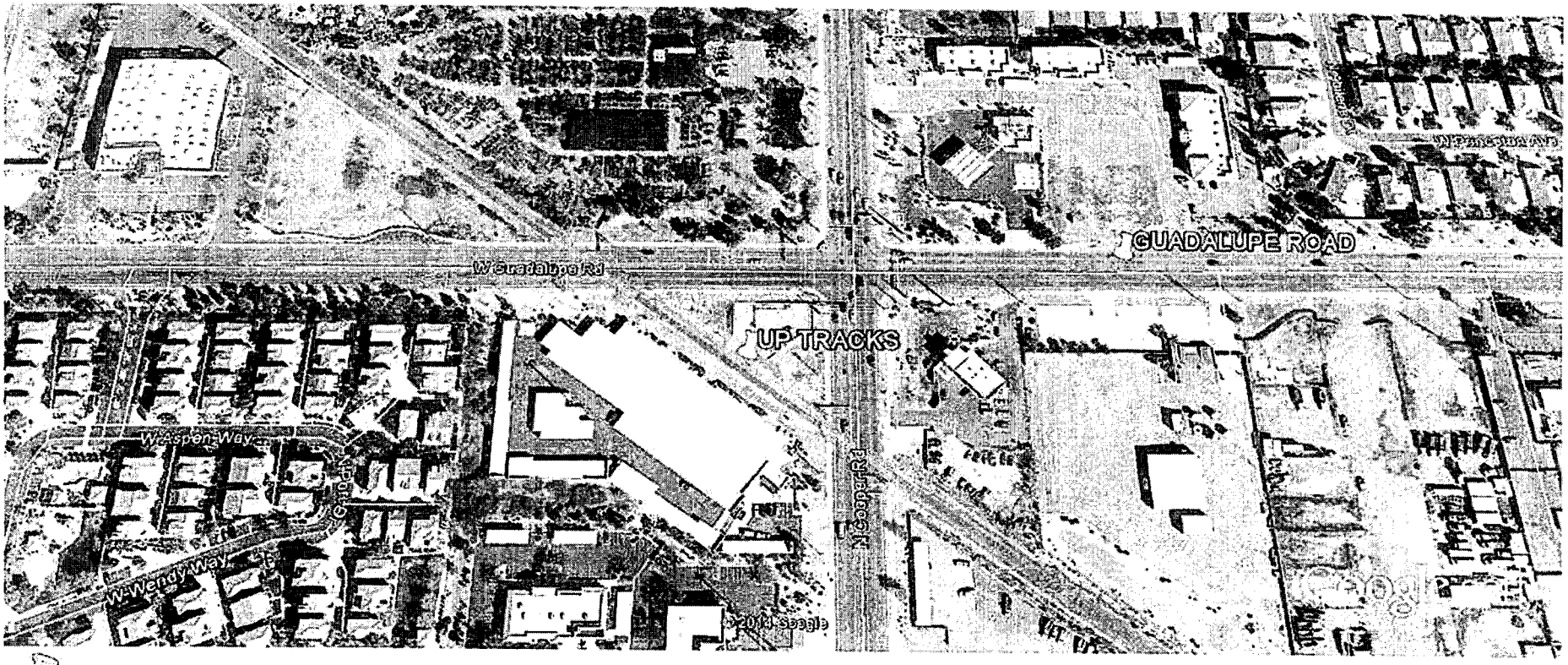
COOPER/GUADALUPE IMPROVEMENTS
PROJECT NO. ST094

SIGNING AND MARKING PLAN
STA 12+50 TO STA 17+50

DESIGNED	DRAWN	CHECKED	SHEET NO.	TOTAL SHEETS
DATE 11/13	DATE 11/13	DATE 11/13	SM04	78 OF 158

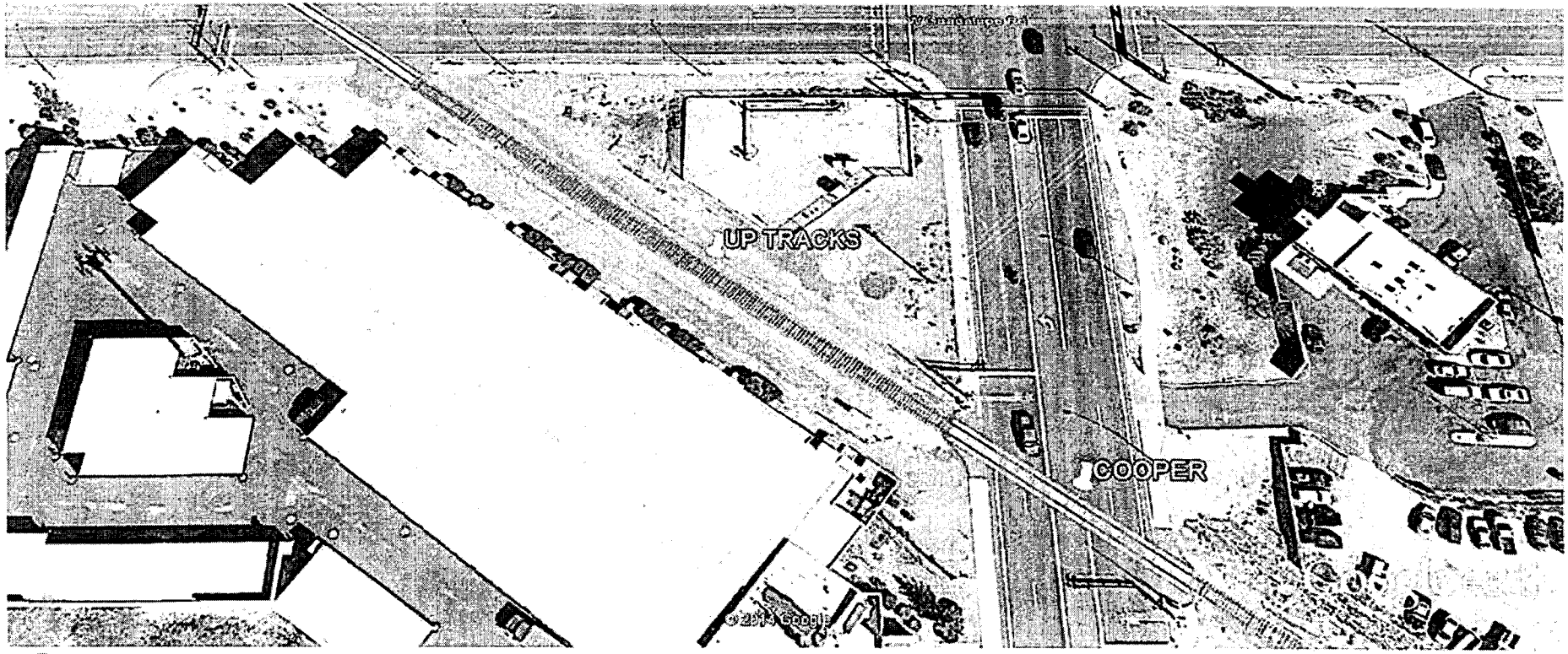
CITY PROJECT NO. ST094

Google earth



UP TRACKS

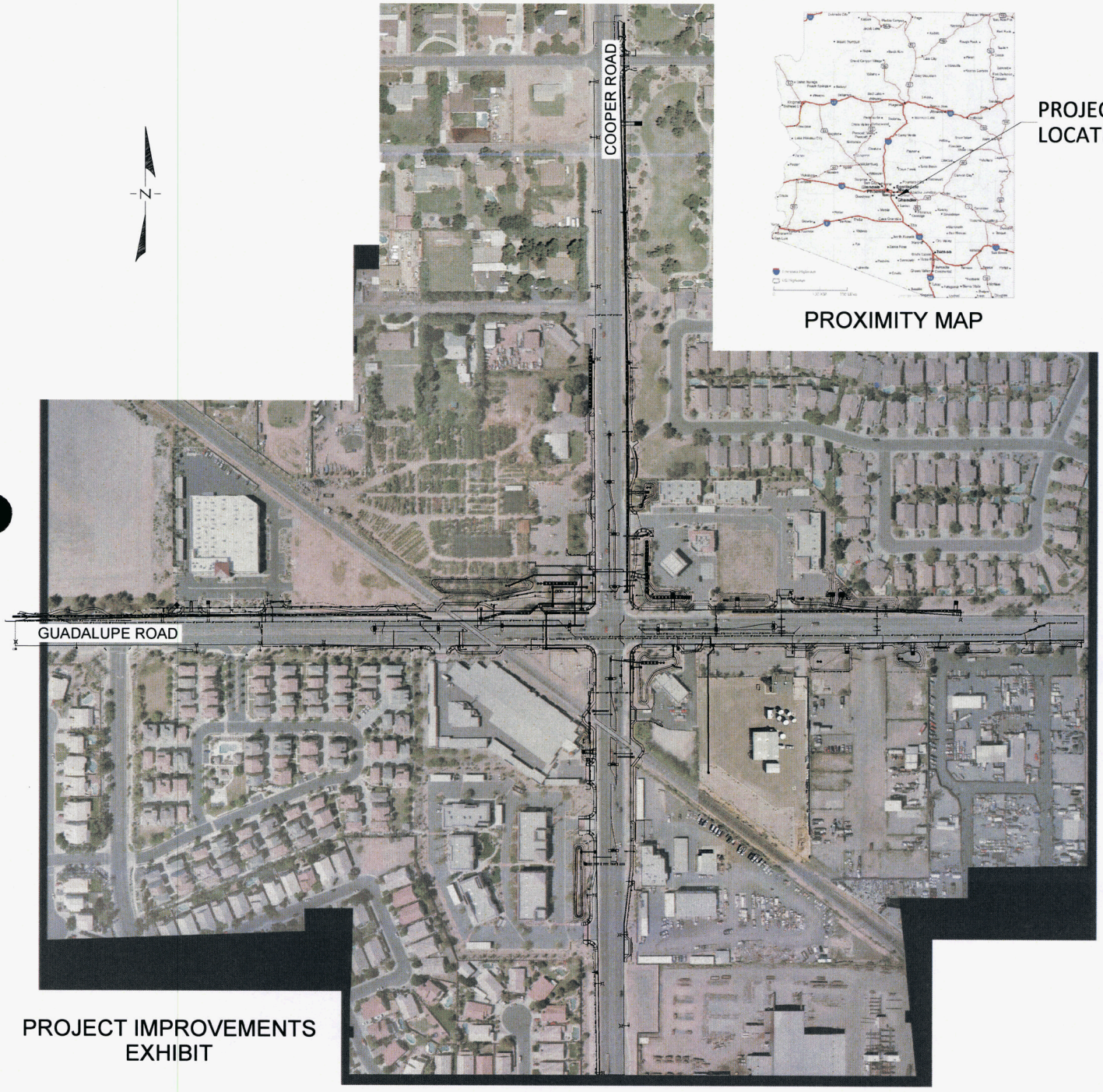
PENGAD 800-631-6989
EXHIBIT
P-2
ADMITTED



GUADALUPE

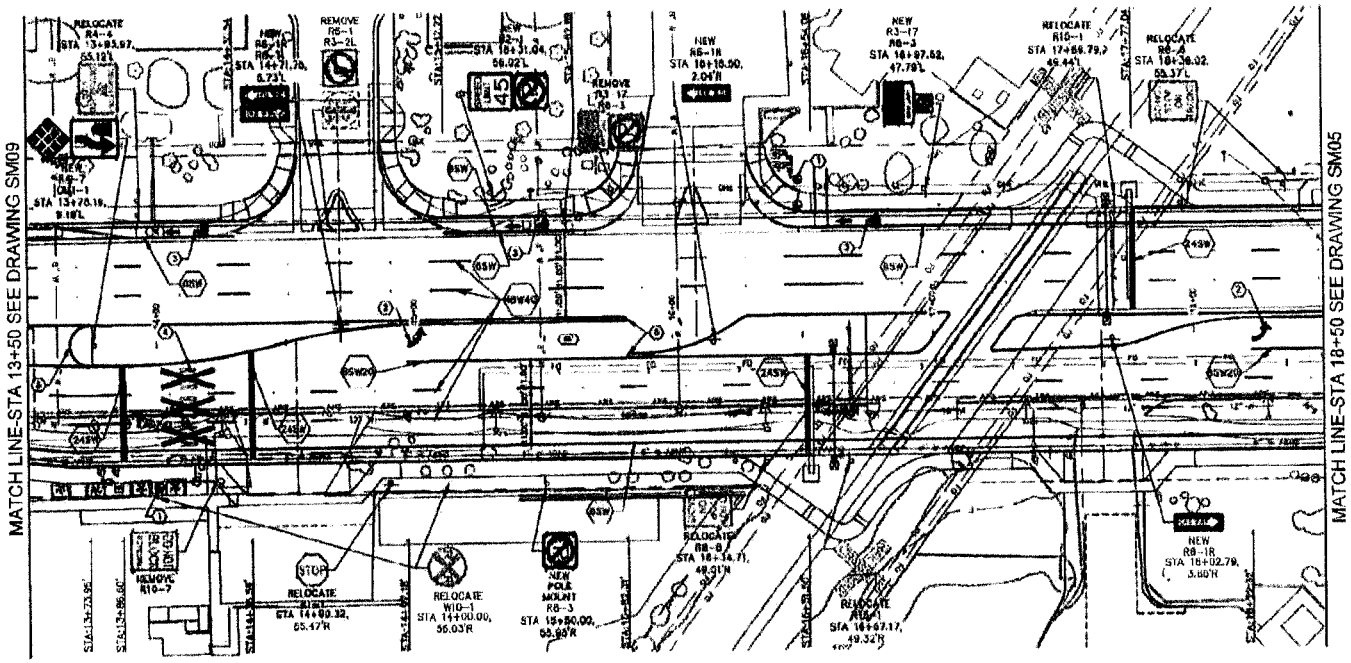
EXHIBIT
A-3
ADMITTED
PENGAD 800-631-6989

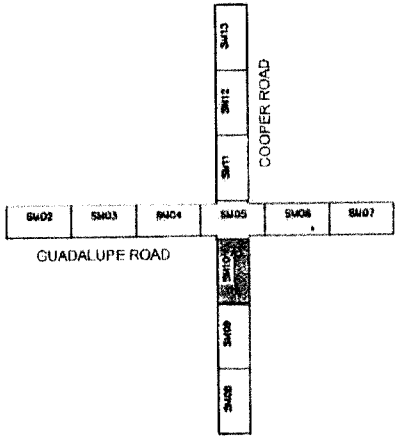
ST094 - COOPER AND GUADALUPE INTERSECTION



PROXIMITY MAP

PROJECT IMPROVEMENTS EXHIBIT





KEY MAP

1. PAVEMENT MARKER FOR FIRE HYDRANT PER T.O.G. DET. 61
2. ARROW PER M.U.T.C.D. FIGURE 3B-24 AND T.O.G. DET. 301C
3. BIKE SYMBOL AND ARROW PER T.O.G. DET. 301A
4. HIGHWAY-RAIL GRADE CROSSING PAVEMENT MARKING PER M.U.T.C.D. SECT. 8B.27 AND T.O.G. DET. 301C
5. MEDIAN END TO BE PAINTED PER T.O.G. DET 304

TSA TURN LANE STORAGE LENGTH (IN FEET)

TSA CAP OR TAPER LENGTH (IN FEET)

GILBERT ARIZONA

RPA RITOCH-POWELL & Associates 602.263.1177 www.ritochpowell.com

95% PRELIMINARY NOT FOR CONSTRUCTION

COOPER/GUADALUPE IMPROVEMENTS
PROJECT NO. ST094

SIGNING AND MARKING PLAN
STA 13+50 TO STA 18+50

DESIGNED RJC | DRAWN RPA | CHECKED FEH | FWA NO. | SHEET NO. 64
DATE 11/03 | DATE 11/03 | DATE 11/03 | SM10

PENGAD 800-631-6989

EXHIBIT P-4 ADMITTED

MATCH LINE-STA 21+50 SEE DRAWING SM11

MATCH LINE-STA 17+50 SEE DRAWING SM04

MATCH LINE-STA 22+50 SEE DRAWING SM06

MATCH LINE-STA 18+50 SEE DRAWING SM10

GUADALUPE ROAD

COOPER ROAD

SM02 | SM03 | SM04 | SM05 | SM06 | SM07

SM13 | SM12 | SM11 | SM10 | SM09 | SM08

GUADALUPE ROAD

KEY MAP

N

SCALE: 1" = 20'

GILBERT
ARIZONA

RPA
RITOCH-POWELL & Associates
602.263.1177
www.ritochpowell.com

*NOTE:
STATION INFORMATION FROM COOPER ROAD CENTERLINE.

1. PAVEMENT MARKER FOR FIRE HYDRANT PER T.O.D. DET. 61
2. ARROW PER M.U.T.C.D. FIGURE 3B-24 AND T.O.D., DET. 301C
3. BIKE SYMBOL AND ARROW PER T.O.D. DET. 301A
4. HIGHWAY-RAIL GRADE CROSSING PAVEMENT MARKING PER M.U.T.C.D. DECT. 8D.07 AND T.O.D. DET. 301C
5. MEDIAN END TO BE PAINTED PER T.O.D. DET 304

[300] TURN LANE STORAGE LENGTH (IN FEET)

[100] GAP OR TAPER LENGTH (IN FEET)

85% PRELIMINARY NOT FOR CONSTRUCTION

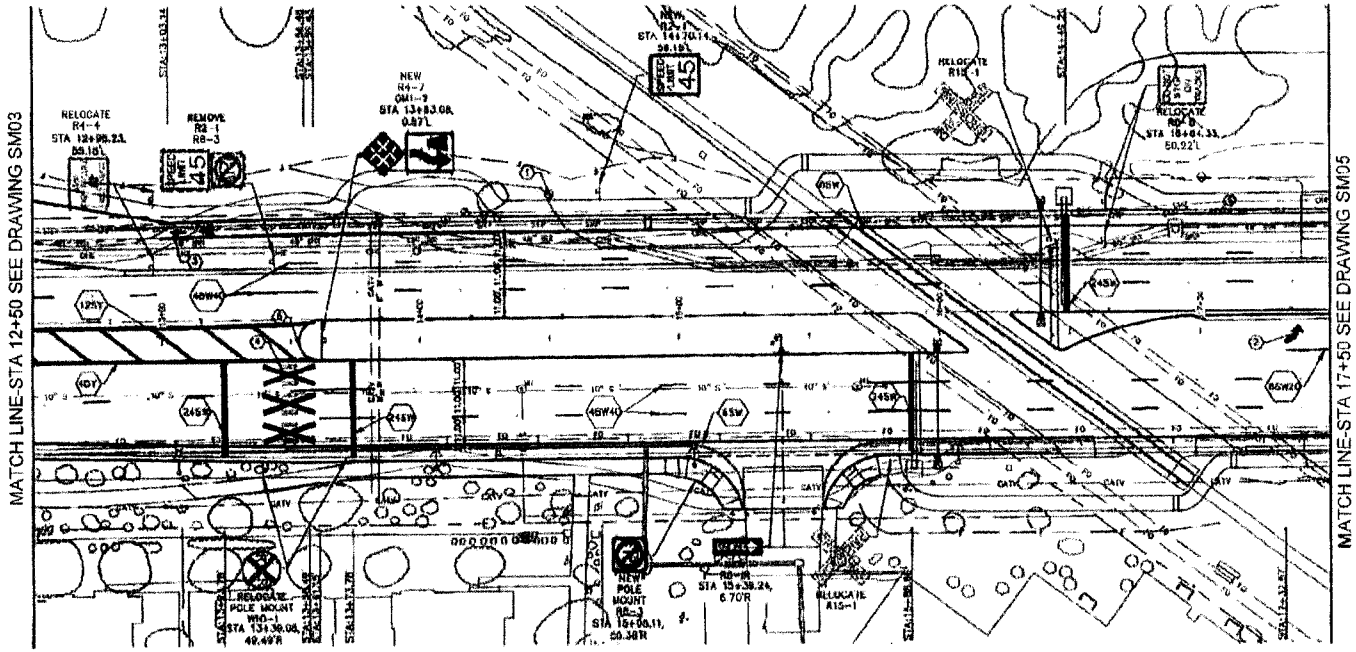
NO.	BY	DATE	REVISION	APPR.	DATE

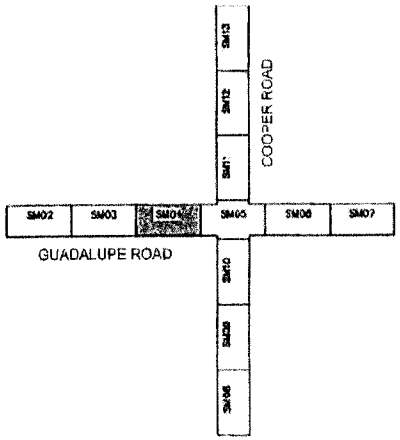
COOPER/GUADALUPE IMPROVEMENTS
PROJECT NO. ST094

SIGNING AND MARKING PLAN
STA 17+50 TO STA 22+50

DESIGNED	DRAWN	CHECKED	FSM NO.	SHEET NO.	TOTAL SHEETS
RJC	MRA	FDH			
DATE 11/03	DATE 11/03	DATE 11/03	SM05	79	OF 158

CIP PROJECT NO. ST094





1. PAVEMENT MARKER FOR FIRE HYDRANT PER T.O.G. DET. 61
2. ARROW PER M.U.T.C.D. FIGURE 3B-24 AND T.O.G. DET. 301C
3. BIKE SYMBOL AND ARROW PER T.O.G. DET. 301A
4. HIGHWAY RAIL GRADE CROSSING PAVEMENT MARKING PER M.U.T.C.D. SECT. 9B.27 AND T.O.G. DET. 301C
5. MEDIAN END TO BE PAINTED PER T.O.G. DET. 304

(XXX) TURN LANE STORAGE LENGTH (IN FEET)

(XXX) GAP OR TAPER LENGTH (IN FEET)

N

SCALE 1" = 20

GILBERT ARIZONA

RPA RITOCH-POWELL & Associates 602.263.1177 www.ritochpowell.com

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NO.	BY	DATE	REVISION	APPR.	DATE

COOPER/GUADALUPE IMPROVEMENTS
PROJECT NO. ST094

SIGNING AND MARKING PLAN
STA 12+50 TO STA 17+50

DESIGNED	DRAWN	DESIGN	CHK. BY	SHEET NO.	TOTAL SHEETS
	RJG	RPA	PEJC	SM04	78 OF 158
DATE	DATE	DATE	DATE		
11/13	11/03		11/03		

CITY PROJECT NO. ST094

EXHIBIT
A-5
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AZ CORP COMMISSION
DOCKET CONTROL

Arizona Corporation Commission
DOCKETED
JUL 24 2014
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COMMISSIONERS

BOB STUMP – Chairman
GARY PIERCE
BRENDA BURNS
BOB BURNS
SUSAN BITTER SMITH

BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE APPLICATION OF THE TOWN OF GILBERT TO UPGRADE EXISTING CROSSINGS OF THE UNION PACIFIC RAILROAD COMPANY AT COOPER ROAD, AAR/DOT NO 741-816-D, AND AT GUADALUPE ROAD, AAR/DOT NO. 741-815-W, IN THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA	DOCKET NO. RR-3639A-14-0157 **NOTICE OF FILING AFFIDAVIT OF PUBLICATION**

The Town of Gilbert ("Gilbert"), by and through undersigned counsel, hereby files its Notice of Affidavit of Publication as required by Procedural Order dated May 28, 2014. A copy of the Affidavit is attached hereto. Gilbert also confirms that it has provided a copy of the Application and the May 28, 2014 Procedural Order to surrounding adjacent property owners via certified mail. Also, copies of the U.S. Postal Service Certified Mail Receipts are attached hereto.

DATED this 22nd day of July, 2014.

TOWN OF GILBERT ATTORNEY'S OFFICE
L. MICHAEL HAMBLIN, Town Attorney

By _____
Jack A. Vincent
Assistant Town Attorney
50 East Civic Center Drive
Gilbert, Arizona 85296
Attorneys for Town of Gilbert

TOWN OF GILBERT ATTORNEY'S OFFICE
50 East Civic Center Drive
Gilbert Arizona 85296
(480) 503-6107

TOWN OF GILBERT ATTORNEY'S OFFICE
50 East Civic Center Drive
Gilbert Arizona 85296
(480) 503-6107

PROOF OF AND CERTIFICATE OF MAILING

I hereby certify that on this 22nd day of July, 2014, I caused the foregoing document to be served on the Arizona Corporation Commission by mailing the original and thirteen (13) copies of the above to:

Docket Control
ARIZONA CORPORATION COMMISSION
1200 West Washington
Phoenix, Arizona 85007

Copies of the foregoing mailed
this 22nd, day of July, 2014 to:

The Honorable Scott M. Hesla
Hearing Division
ARIZONA CORPORATION COMMISSION
1200 W. Washington Street
Phoenix, Arizona 85007

Tom Condit
Town of Gilbert
90 E. Civic Center Drive
Gilbert, Arizona 85296

W. Reed Campbell
BEAUGUREAU, HANCOCK,
STOLL & SCHWARTZ, P.C.
302 E. Coronado Road
Phoenix, Arizona 85004
Attorneys for Union Pacific Railroad Company

Alex Popovici, Manager
Industry & Public Projects
UNION PACIFIC RAILROAD COMPANY
631 South 7th Street
Phoenix, Arizona 85034

///

Janice Alward, Chief Counsel
Legal Division
ARIZONA CORPORATION COMMISSION
1200 W. Washington Street
Phoenix, Arizona 85007

Robert E. Marvin, Division Director
Safety Division
ARIZONA CORPORATION COMMISSION
1200 W. Washington Street
Phoenix, Arizona 85007

Brian Lehman, Chief
Railroad Safety Section of the Safety Division
ARIZONA CORPORATION COMMISSION
1200 W. Washington Street
Phoenix, Arizona 85007

COASH & COASH, INC.
Court Reporting Video and Videoconferencing
1802 N. 7th Street
Phoenix, Arizona 85006

By: Marsha Spencer
Marsha Spencer, Assistant to Jack Vincent

TOWN OF GILBERT ATTORNEY'S OFFICE
50 East Civic Center Drive
Gilbert Arizona 85296
(480) 503-6107

IN THE MATTER OF THE APPLICATION OF THE TOWN OF GILBERT TO UPGRADE EXISTING CROSSINGS OF THE UNION PACIFIC RAILROAD COMPANY AT COOPER ROAD, AAR/DOT NO. 741-816-D, AND AT GUADALUPE ROAD, AAR/DOT NO. 741-815-W, IN THE TOWN OF GILBERT, MARICOPA COUNTY, ARIZONA (DOCKET NO. RR-00000A-14-0157)

On May 12, 2014, the Town of Gilbert ("Town") filed with the Arizona Corporation Commission ("Commission") an application for approval for Union Pacific Railroad Company ("Railroad") to upgrade the following existing crossings located at the Railroad's tracks: at Cooper Road in Gilbert, Arizona, at AAR/DOT NO. 741-816-D; and at Guadalupe Road in Gilbert, Arizona, at AAR/DOT NO. 741-815-W.

The application is available for inspection during regular business hours at the Commission's offices, 1200 West Washington Street, Phoenix, Arizona, and on the Internet via the Commission website (www.azcc.gov) using the e-docket function.

The Commission will hold a hearing on this matter commencing on August 26, 2014, at 10:00 a.m., at the Commission's offices, 1200 West Washington Street, Hearing Room No. 2, Phoenix, Arizona. Public comments will be taken on the first day of the hearing.

The law provides for an open public hearing at which, under appropriate circumstances, interested parties may intervene. Intervention shall be permitted to any person entitled by law to intervene and having a direct and substantial interest in the matter. Persons desiring to intervene must file a written motion to intervene with the commission, which motion should be sent to Applicant or its counsel and to all parties of record, and which, at the minimum, shall contain the following:

The name, address, and telephone number of the proposed intervener and of Any party upon whom service of documents is to be made of different than the intervener.

A short statement of the proposed intervener's interest in the proceeding (e.g., a customer of Railroad, a neighboring property owner, a crossing user, etc.).

A statement certifying that a copy of the motion to intervene has been mailed to the Applicant or its counsel and to all parties of record in the case.

The granting of motions to intervene shall be governed by A.A.C. R14-3-105, except that all motions to intervene must be filed on or before July 23, 2014. The granting of intervention, among other things, entitles a party to present sworn evidence at hearing and to cross-examine other witnesses. However, failure to intervene will not preclude any interested party from appearing at the hearing and making a statement on such person's own behalf.

If you have any questions about this application, you may contact the Applicant Gregory Smith, P.E. Town Engineer at 480-503-6844 (address: 90 E. Civic Center Drive, Gilbert, AZ 85296). If you wish to file written comments on the application or want further information on intervention, you may write the Consumer Services Section of the Commission at 1200 West Washington Street, Phoenix, Arizona 85007, call 602-542-4251 or 1-800-222-7000, or appear at the hearing and make comment.

The Commission does not discriminate on the basis of disability in admission to its public meetings. Persons with a disability may request a reasonable accommodation such as a sign language interpreter, as well as request this document in an alternative format, by contacting Shaylin Bernal, ADA Coordinator, voice phone number 602-542-3931, e-mail SABernal@azcc.gov. Requests should be made as early as possible to allow time to arrange the accommodation.

Pub: July 9, 2014

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Tabitha Weaver, being first duly sworn, upon oath deposes and says: That she is a Sr. legal advertising representative of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

June 9, 2014

Sworn to before me this
9th day of
July A.D. 2014

MANUEL VARGAS
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 30, 2015

Notary Public

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City, State, ZIP+4: Gilbert AZ 85299

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Total Postage & Fees	$ $4.70	06/10/2014

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City, State, ZIP+4: Mesa AZ 85210

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GILBERT AZ 85233

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MESA MT-VIEW AZ USPS 85213-9998

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Street, Apt. No.; or PO Box No.: 997 N Guadalupe Rd.
City, State, ZIP+4: Gilbert AZ 85233

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Total Postage & Fees	$ $4.70

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City, State, ZIP+4: Gilbert AZ 85233

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City, State, ZIP+4: Tempe AZ 85284

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City, State, ZIP+4: Mesa AZ 85201

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LONG BEACH CA 90810

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USPS 90213-9998

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Treasure Franchise Company LLC
Street, Apt. No.; or PO Box No. 2350 E 223rd St 4th Floor
City, State, ZIP+4 Carson CA 90810

PS Form 3800, August 2006 See Reverse for Instructions

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City, State,

David C. LaPlante
Senior Manager - Real Estate
Special and Public Projects
Union Pacific Railroad
1400 Douglas St. STOP 1690
Omaha, NE 68179

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Alexander Popovici
Manager Industry & Public Projects - UPRR
631 S. 7St.
Phoenix, AZ 85034

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EXHIBIT
A-6
ADMITTED

GILBERT
ARIZONA

Chris Watson
Railroad Safety Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, AZ 85007

June 19, 2014

Bridget Humphrey, Attorney
Legal Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, AZ 85007

Re: Town of Gilbert's First Set of Data Request to Union Pacific Docket No. RR-03639A-14-0357 for Guadalupe Road Crossing – 741815W and Cooper Road Crossing – 741816D

Dear Mr. Watson and Ms. Humphrey,

This memorandum and attachments provide the first set of data request for Docket No. RR-03639A-14-0157 from the Town of Gilbert, Arizona.

CW 1.1 Provide Average Daily Traffic Counts for each of the locations.

Guadalupe Road – 18,846 vehicles per day (April 2014)
Cooper Road – 32,488 vehicles per day (April 2014)

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.2 Please describe the current Level of Service (LOS) at each intersection.

The intersection of Cooper Road and Guadalupe Road operates at LOS D (55 seconds of delay per vehicle) during the AM peak hour and at LOS E (67 seconds of delay per vehicle) during the PM peak hour based on a 2012 study completed for this project.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.3 Provide any traffic studies done by the road authorities for each area.

Please see attached PDF file titled "FINAL TECH MEMO_Cooper Guadalupe Traffic Analysis 100412.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.4 Provide the population of the City the crossing is located in.

Gilbert, AZ – 229,972 (2014)

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.5 Provide what warning devices are currently installed at the crossing.

Gates (side mounted), Flashing Lights (side mounted and cantilever), cross-bucks, audible bell and pavement markings.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.6 Provide distances in miles to the next public crossing on either side of the proposed project location. Are any of these grade separations?

McQueen Road Crossing (741814P) 1.13 miles NW of Guadalupe Road Crossing
Gilbert Road Crossing (741819Y) 1.3 miles SE of Cooper Road Crossing

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.7 How and why was grade separation not decided on at this time? Please provide any studies that were done to support these answers.

A grade separated crossing requires a minimum of 23'4" from the top of rail to bottom of bridge. To achieve this significant elevation change from existing grade and as result of the close proximity of each crossing to the intersection of Cooper Rd and Guadalupe Rd, the entire intersection would be required to be raised approximately 15'.

Several factors make this significant grade modification not feasible:

1) *Adjacent developed commercial / light industrial properties would require total takes of properties to account for the significant fill slopes.*
2) *Adjacent SRP well site, with confirmed prior rights, would have to remain un-impacted. This would require intersection shifting significantly (60 foot minimum) to the north and east or substantial retaining walls.*
3) *Intersection is located in a FEMA Zone AE floodplain. Embankment footprint required for grade separated crossing would require substantial excavation for detention basin to offset embankment displacement of floodplain volume. Lengthy FEMA CLOMR and LOMR permit approval process would be required to construct embankment if mapped FEMA floodplain.*

Answer by Frank Henderson, Project Engineer, Ritoch-Powell & Associates, 3838 N Central Ave, Suite 1250, Phoenix, AZ 85012

CW 1.8 If this crossing was grade separated, provide a cost estimate of the project.

Civil improvements for grade separated intersection (excluding right-of-way and utility relocation costs) are estimated to be:

> *Roadway / Drainage Improvements: $15,000,000*
> *Bridges (2) and retaining walls: $20,000,000*
> ***Civil Improvements Total: $35,000,000***

Answer by Frank Henderson, Project Engineer, Ritoch-Powell & Associates, 3838 N Central Ave, Suite 1250, Phoenix, AZ 85012

CW 1.9 Please describe what the surrounding areas are zoned for near this intersection. i.e. Are there going to be new housing developments, industrial parks etc.

Near the Cooper Road and Guadalupe Road intersection and crossings the land is zoned commercial on the NW, NE and SW corners. It is zoned light industrial on the SE corner. Light industrial zoning follows the railroad to the north and south. A multi-family residential neighborhood is located on Guadalupe Road 200 feet west of the crossing. All of the land is adjacent to the intersection and crossings is currently developed. It is planned that the nursery on the NW corner of Cooper/Guadalupe will redevelop into a commercial property at some time in the future.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.10 Please supply the following: number of daily train movements through the crossing, speed of the trains, and the type of movements being made (i.e. thru freight or switching). Is this a passenger train route?

The estimated daily train movements through these crossings are 11 per day. The speed of the railroad track at this location is 65 mph, but trains are traveling at a lower speed due to the junction north of Baseline Road. There are no passenger trains on this route currently.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.11 Please provide the names and locations of all schools (elementary, junior high and high school) within the area of the crossing.

There are no schools in the immediate area of the crossings.

Oak Tree Elementary is located at the corners of Neely Street and Houston Avenue approximately 0.7 miles from the intersection. Playa Del Ray Elementary is located at Horne Street and Cayman Drive approximately 0.65 miles from the intersection.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.12 Please provide school bus route information concerning the crossing, including the number of times a day a school bus crosses this crossing.

The exact number of school bus crossings is not known at this time.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.13 Please provide information about any hospitals in the area and whether the crossing is used extensively by emergency service vehicles.

No hospitals are in the area of the Cooper Road and Guadalupe Road intersection and crossing. The Town of Gilbert has a fire station located on Guadalupe Road approximately 0.75 west of the intersection that has emergency vehicles that use the crossings. The Town of Gilbert has a fire station located on Cooper Road approximately 0.75 south of the intersection that has emergency vehicles using the crossing. The Cooper Road fire station will close and move locations in 2015.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.14 Please provide total cost of the railroad improvements to each crossing.

Estimates provided by UPRR for Install Automatic Flashing Light Crossing Signals (03/07/14):

Guadalupe Road:	***$817,007***
Cooper Road:	***$573,655***

Estimates provided by UPRR for crossing surface including ties, rail, OTM (04/07/14):

Guadalupe Road:	***$303,648***
Cooper Road:	***$286,204***

There are also some annual maintenance costs provided by UPRR in amounts of $15,130 and $13,770 for Guadalupe and Cooper Roads respectively, which basis of need to be further clarified between Gilbert and UPRR.

Answer by Jack Gierak, Senior Project Manager, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.15 Provide any information as to whether vehicles carrying hazardous materials utilize this crossing and the number of times a day they might cross it.

No known vehicles carrying hazardous materials use these crossings. The crossings are located in a light industrial section of the Town of Gilbert so there may be hazardous material delivery occasionally.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.16 Please provide the posted vehicular speed limit for the roadway.

Guadalupe Road – 45mph
Cooper Road – 45 mph

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.17 Do any buses (other than school buses) utilize the crossing, and how many times a day do they cross the crossing.

No bus routes are located on Cooper Road or Guadalupe Road in this section of Gilbert. No other bus service is known.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.18 Please indicate whether any spur lines have been removed within the last three years inside a 10 mile radius of any crossings covered in this application. Please include the reason for the removal, date of the removal and whether an at-grade crossing or crossings were removed in order to remove the spur line.

No spur removals within 10 miles of the Cooper Road and Guadalupe Road intersection are known.

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.19 Please fill in the attached FI-JWA Grade Separation Guidelines Table, (from FHWA's 2007 revised second edition Railroad Highway Grade-Crossing Handbook, page 151) with a yes or no answer as to whether each item applies. Also, please provide all information to support your answers of yes or no (i.e. vehicle delay numbers, any calculations that were performed to get the answers).

		Cooper Road	Guadalupe Road
The highway is a part of the designated Interstate Highway System	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
The highway is otherwise designed to have full controlled access	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
The posted highway speed equals or exceeds 70 mph	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
AADT exceeds 100,000 in urban areas or 50,000 in rural areas	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
Maximum authorized train speed exceeds 110 mph	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
An average of 150 or more trains per day or 300 million gross tons/year	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
Crossing exposure (trains/day x AADT) exceeds 1M in urban or 250k in rural; or passenger train crossing exposure exceeds 800k in urban or 200k in rural	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO
Expected accident frequency for active devices with gates, as calculated by the US DOT Accident Prediction Formula including five-year accident history, exceeds 0.5	Crossing Currently meets the criteria	NO (a = 0.172)	NO (a = 0.148)
	Crossing meets the criteria by 2030	NO	NO
Vehicle delay exceeds 40 vehicle hours per day	Crossing Currently meets the criteria	NO	NO
	Crossing meets the criteria by 2030	NO	NO

	K	EI	MT	DT	HP	MS	HT	HL	Accident Frequency (a)	Number of Crashes (N) Table 24
Cooper Road	0.001088	86.98	1.34	1	1	1	1	1.36	0.172461439	0.057
Guadalupe Road	0.001088	74.63	1.34	1	1	1	1	1.36	0.147974215	0.057
Based on the follow assumptions:										
Cooper Road: 11 trains per day; 32,488 vehicles per day; No reported accidents in past 5 years										
Guadalupe Road: 11 trains per day; 18,846 vehicles per day; No reported accidents in past 5 years										

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

CW 1.20 Based on the current single track configuration at the crossings specified by this application, please provide the current traffic blocking delay per train. Please indicate the time in which vehicular traffic is delayed (1) to allow the train to pass at a crossing and (2) due to trains stopped on the track for any purpose. The delay is measured from the point that the warning devices are activated at the crossing to the time after the train has cleared the crossing and the warning devices are reset.

(1) Based on 1 mile of train at 35 mph (35 mph is used in lieu of 60 mph to be conservative and account for the proximity of the junction to the north), 25 seconds of preemption time, and 15 seconds for the warning devices to reset, the average delay time per train is 2.4 minutes. At eleven trains per day, the average delay time is 26.4 minutes per day.

(2) Based on a stopping time of 28 seconds and a time of 125 seconds to accelerate and to clear the track and 25 seconds of preemption time and 15 seconds for the warning devices to reset, the average delay time per train if a train stops on the track is 3.2 minutes. These times are based on one mile of train and charts from Railroad Engineering, Second Edition, John Wiley & Sons, Inc. 1982 (Figure 10.10 to estimate deceleration time and Figure 10.4 to estimate acceleration time to clear one mile of train).

Answer by Erik Guderian, Town Traffic Engineer, Town of Gilbert, 90 E Civic Center Drive, Gilbert, AZ 85296

Sincerely,

Gregory B. Smith, P.E./P.S.
Town Engineer
Town of Gilbert
Public Works Department
90 E. Civic Center Drive
Gilbert, AZ 85296

Erik Guderian, P.E.
Town Traffic Engineer
Town of Gilbert
Public Works Department
90 E. Civic Center Drive
Gilbert, AZ 85296

Attachments: Final Tech Memo_ Cooper Guadalupe Traffic Analysis

YSMA
Transportation Engineering Solutions

TECHNICAL MEMORANDUM

October 04, 2012

To: Mr. Erik Guderian, P.E.
Town Traffic Engineer
Town of Gilbert
50 East Civic Center Drive
Gilbert, Arizona 85296

From: Yogesh Mantri, P.E., PTOE
Y.S. Mantri & Associates LLC

Subj.: Cooper Road and Guadalupe Road Intersection Improvements (Project No. ST094) Traffic Analysis.

1.0 BACKGROUND

The Town of Gilbert (TOG) plans to improve the Cooper Road & Guadalupe Road intersection through Capital Improvement Project ST094. Both the roads are four lane arterial roadways. A single left turn lane is provided on all legs of the intersection. A Union Pacific Railroad track runs very close to the intersection, crossing both Cooper Road and Guadalupe Rd within a few hundred feet of the intersection.

One of the objectives of this project is to improve the level of service of the intersection through capacity enhancement. Various alternatives are being considered to achieve this goal.

2.0 OBJECTIVE OF THE STUDY

The objective of the study is to evaluate the intersection geometry purely from the traffic engineering point of view (intersection capacity and level of service) to identify the optimum lane configuration required to handle the horizon year projected traffic volumes.

3.0 EXISTING INTERSECTION OPERATIONS

Currently the intersection operates with lagging protected/permitted left turn phasing. Extensive queue and delays are observed to develop at the intersection during the peak hours. The volumes of traffic approaching the intersection appear to exceed the capacity of some movements, causing delays in traffic clearing the intersection.

The intersection operations are further complicated by the passage of trains on the nearby track during which all but two of the twelve possible traffic movements are restricted. Railroad operations are currently not tied to the traffic signal operations. The design of appropriate

preemption time is also an important aspect and is being considered through this project. However, this study does not delve into railroad preemption design.

4.0 SYNCHRO MODEL

4.1 Synchro Network

Currently both Cooper Road south of Baseline Road and Guadalupe Road east of Country Club Drive in the Town of Gilbert limits exist as four lane arterials (four thru lanes with a two way left turn lane). Areas served by Cooper Road and Guadalupe Road in the five to six miles of the intersection appear to be fully developed. It appears unlikely that either of these roads in the vicinity of the intersection will be widened as part of any planned area development.

Although, the subject of this study is the Cooper Road and Guadalupe Road intersection alone, other intersections in the vicinity were included in the traffic model to take into account coordination and the resulting platooning of vehicles. Thus the following intersections were included in the Synchro model for analysis:

- Cooper Road and Houston Avenue;
- Cooper Road and Trail Crossing ;
- Cooper Road and Elliot Road;
- Guadalupe Road and McQueen Rd;
- Guadalupe Road and Valero Street;
- Guadalupe Road and Neely Street; and
- Guadalupe Road and Gilbert Road.

In addition to these intersections, "dummy" nodes were introduced on the west and the north legs of the subject intersection to account for adding or dropping lanes for the various alternatives considered. These dummy nodes were coded as unsignalized intersections with stop control on the side streets and free through movement on the main streets. On the west and south legs this was achieved by adding or dropping lanes at the Velero Street intersection and the Trail crossing intersection respectively.

4.2 Lane Geometry & Signal Phasing

Data obtained from the Maricopa Association of Governments (MAG) regional model shows both Cooper Road and Guadalupe Road continuing as four lane arterials in the horizon year 2031. See Appendix A for MAG model showing the number of lanes in the Town's street network for year 2011 (used for year 2012 analysis) and year 2031.

Based on existing conditions and previous improvement design, the through lanes were coded as 11 ft wide lanes, single left turn lanes as 12 ft wide lanes and dual left turn lanes as 11 ft wide lanes. The storage lengths were coded based on previous improvement design with 180 ft for eastbound, 130 ft for northbound, 245 ft for westbound and 195 ft for southbound left turn storage.

The traffic signal was coded to have lagging protected/permitted left turn phasing for single left turn lanes and protected only phasing for dual left turn lanes.

5.0 ANALYSIS PERIOD & TRAFFIC VOLUMES

5.1 Analysis Period

The present year (year 2012) and horizon year (year 2032) were considered for the analysis.

5.2 Turning Movement Counts

Turning movement and daily traffic counts were obtained at the Cooper Road and Guadalupe Road intersection during the third week of May 2012 for the three mid-week (Tue, Wed, Thu) days. The highest of these volumes, on Thursday May 17, 2012, was used for the intersection analysis. See Appendix B for the turning movement counts and daily traffic recorded in May 2012.

Average Daily Traffic (ADT) projections for the years 2008, 2011 and 2031 were obtained from the MAG regional model. See Appendix C for the projected traffic obtained from MAG.

A. Year 2012 Volume Derivation

A comparison of the traffic volumes recorded in May 2012 for the Cooper Road and Guadalupe intersection with the volumes projected using the MAG 2011 regional traffic forecasting model (MAG model) revealed a significant difference. Therefore, it was decided to derive the volumes (peak hour turning movements) at the surrounding intersections for the year 2012 using an actual growth rate experienced by the Cooper and Guadalupe road intersection. This growth rate was based on increase in traffic from year 2009 to year 2012. The 2009 traffic data for the subject intersection was supplied by the Town and 2012 data was gathered in the field. Also, the 2009 traffic data for surrounding intersections was captured from the Synchro file provided by the Town.

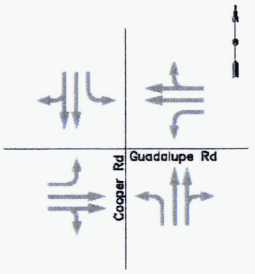
B. Year 2032 Volume Derivation

A comparison of the year 2011 and year 2031 traffic volumes in the MAG regional model, shows an insignificant increase in the traffic volume at the subject intersection between the years 2011 and 2031. The average growth rate for traffic on Cooper Road amounted to only 0.02% per the MAG model. During discussions with the project team at the meeting held on September 19, 2012 to discuss the traffic volumes and the initial assessment of the alternatives, it was agreed that the growth rate as shown by the MAG projections was inadequate. After extensive discussion based on the increase in traffic volumes in the past and the recent decline in traffic volumes due to the depressed economy, it was decided that a 0.5% annual growth rate will be used.

Hence, the year 2032 traffic volumes were estimated by applying a growth rate of 0.5% to the year 2012 design volumes. See Appendix D for year 2012 & 2032 Design Volumes.

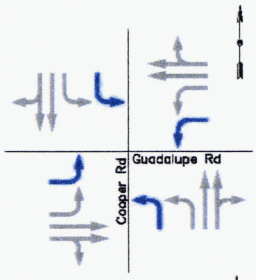
6.0 ALTERNATIVES EVALUATION

Nine alternative intersection lane configurations were considered for the improvement to the Cooper Road and Guadalupe Road intersection. These alternatives were evaluated using the Synchro model for both year 2012 and year 2032 volumes. The alternatives evaluated are as described below:



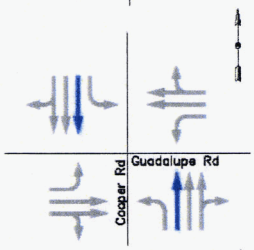
A. Existing Geometry

This is a "no-build" alternative, which represents the existing conditions at the intersection. The existing lane configuration has single left turn lane and two through lanes with shared right turn movements on all approaches.



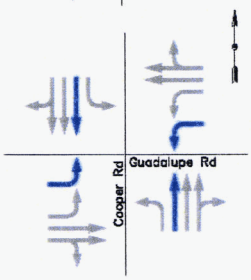
B. ALT 1: Previous Design Alternative

This alternative evaluates the previous proposed improvement, which consists of adding dual left turn lanes on all approaches.



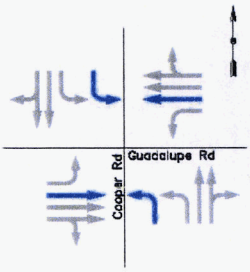
C. ALT 2: Additional Thru Lanes on Cooper Road

This alternative evaluates the addition of through capacity in the north and south directions by adding the third through lane in each direction to the existing geometry.



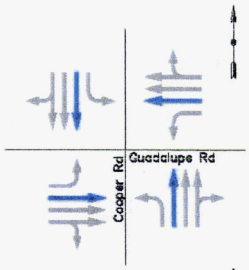
D. ALT 3: Dual Left Turns on Guadalupe Rd in addition to ALT 2

This alternative evaluates the geometry which adds dual left turn lanes on Guadalupe Road and a through lane in each direction on Cooper Road.



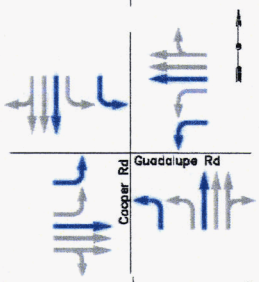
E. ALT 4: Additional Thru Lanes on Guadalupe with Dual Lefts on Cooper

This alternative evaluates the geometry with the addition of dual left turn lanes on Cooper Road and the third through lane in each direction on Guadalupe.



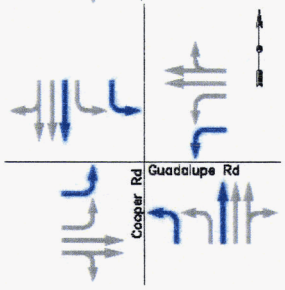
F. ALT 5: Additional Thru Lanes in all directions

This alternative evaluates the geometry with addition of the third through lane in each direction on both Cooper Road and Guadalupe Road.



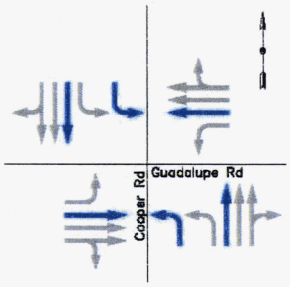
G. ALT 6: Additional Thru and Dual left Turns in all directions

This alternative evaluates the model with addition of both the third through lane and dual left turns in each direction on both Cooper Road and Guadalupe Road.



H. ALT 7: Additional Thru and Dual Left lanes on Cooper with Dual Left Turns on Guadalupe

This alternative evaluates the model with addition of both through and dual left turn lanes on Cooper Road and installing dual left turns only on Guadalupe Road.



I. ALT 8: Additional Thru and Dual Left lanes on Cooper with Thru Lanes on Guadalupe

This alternative evaluates the model with addition of both through and dual left turn lanes on Cooper Road and installing the third through lanes only on Guadalupe Road.

7.0 INTERSECTION PERFORMANCE

All the alternatives listed above were analyzed for level of service (LOS) and delay using Synchro. Brief descriptions of results of the Synchro analysis for each alternative are outlined below in Table 1. The detailed results of the LOS and delay for each scenario, intersection approach and turn movement for the subject intersection are shown in Table 2. The Synchro output showing the results of each analysis run is attached in Appendix E.

Table 1 Summary of Synchro Analysis

Alternative	Year 2012	Year 2031
A) Existing Geometry	• Overall Intersection functions at a LOS D during AM and LOS E during PM peak hours. • Northbound thru and Southbound thru movements fail during AM peak and PM peak respectively. • Eastbound approach and Westbound left turn movement fails during PM peak hour. • **Overall intersection delay is 55 Sec in AM and 67 Sec in PM peak hour.**	• Overall Intersection operates at LOS E during AM and LOS F (failing) during PM peak hours. • Westbound approach fails during both peak hours. • Westbound, Northbound thru and Eastbound, Westbound, Southbound left turn movements fail during AM peak hour. • Eastbound, Westbound and Southbound approach fails during PM peak hour. • Northbound thru Fails during PM Peak Hour. • **Overall intersection delay is 48 Sec in AM and 130 Sec in PM peak hour..**
B) ALT 1: Dual lefts on all approaches.	• Overall Intersection functions at a LOS D during AM and LOS E during PM peak hours. • Southbound left turn movement fails during AM peak hour. • Eastbound approach fails during PM peak hour. • Eastbound, Southbound thru and Westbound left turn movements fail during PM peak hour. • **Overall intersection delay is 54 Sec in AM and 60 Sec in PM peak hour.**	• Overall Intersection functions at a LOS E during AM and LOS F (failing) during PM peak hours. • Westbound approach fails during AM peak hour. • Westbound/ Northbound thru and Southbound left turn movements fail during AM peak hour. • Eastbound and Westbound approaches fail during PM peak hour. • Eastbound/ Southbound thru movements and Westbound/ Southbound left turn movements fail during the PM peak hour. • **Overall intersection delay is 72 Sec in AM and 83 Sec in PM peak hour**
C) ALT 2: Thru lanes on Cooper Road	• Overall Intersection functions at LOS D during both peak hours. • All approaches function at LOS D or better during both peak hours. • **Overall intersection delay is 35**	• Overall Intersection functions at a LOS D during AM and LOS E during PM peak hours. • Westbound approach functions at LOS E during the AM peak hour. • Eastbound and Westbound

	Sec in AM and 48 Sec in PM peak hour.	approach functions at LOS E during the PM peak hour. • Westbound left turn movement fails during the PM peak hour. **Overall intersection delay is 49 Sec in AM and 55 Sec in PM peak hour.**
D) ALT 3: Dual lefts on Guadalupe Rd in addition to Thru lanes on Cooper Rd	• Overall Intersection functions at LOS D during both peak hours. • All approaches function at LOS D or better during both peak hours. • **Overall intersection delay is 38 Sec in AM and 45 Sec in PM peak hour.**	• Overall Intersection functions at LOS D during both peak hours. • Westbound approach functions at LOS E during AM peak hour. • Eastbound and Westbound approaches function at LOS E during PM peak hour. • Westbound left turn movement fails during the PM peak hour. • **Overall intersection delay is 48 Sec in AM and 53 Sec in PM peak hour.**
E) ALT 4: Thru Lanes on Guadalupe Rd with dual left turns on Cooper Rd	• Overall Intersection functions at LOS D during both peak hours. • Westbound approach functions at LOS E during AM peak hour. • Eastbound approach functions at LOS E during PM peak hour. • **Overall intersection delay is 43 Sec in AM and 48 Sec in PM peak hour.**	• Overall Intersection functions at a LOS D during AM and LOS E during PM peak hours. • Westbound approach functions at LOS E during both peak hours. • Southbound left turn movement fails during AM peak hour. • Eastbound approach fails during PM peak hour. • Westbound left turn movement fails during PM peak hour. • **Overall intersection delay is 55 Sec in AM and 67 Sec in PM peak hour..**
F) ALT 5: Thru lanes on all approaches	• Overall Intersection functions at LOS C during both peak hours. • All approaches function at LOS D or better during both peak hours. • **Overall intersection delay is 34 Sec in AM and 45 Sec in PM peak hour.**	• Overall Intersection functions at a LOS C during AM and LOS D during PM peak hours. • All approaches and individual turn movements function at LOS D or better during AM peak hour. • Eastbound approach functions at LOS E during PM peak hour. • All other approaches function at LOS D or better during PM peak hour.

		Overall intersection delay is 35 Sec in AM and 47 Sec in PM peak hour..
G) ALT 6: Thru lanes + dual lefts on all approaches	• Overall Intersection functions at LOS C during both peak hours. • All approaches function at LOS D or better during AM and PM peak hour. • **Overall intersection delay is 41 Sec in AM and 45 Sec in PM peak hour.**	• Overall Intersection functions at LOS D during both peak hours. • All approaches function at LOS D or better during AM peak hour. • Eastbound approach functions at LOS E during PM peak hour. • All other approaches function at LOS D or better during PM peak hour. • **Overall intersection delay is 39 Sec in AM and 41 Sec in PM peak hour.**
H) ALT 7: Additional Thru and dual left turn lanes on Cooper Rd with dual lefts on Guadalupe	• Overall Intersection functions at LOS D during both peak hours. • All approaches function at LOS D or better during AM peak hour. • Eastbound approach functions at LOS E during PM peak hour. • All other approaches function at LOS D or better during PM peak hour. • **Overall intersection delay is 41 Sec in AM and 43 Sec in PM peak hour.**	• Overall Intersection functions at LOS D during both peak hours. • Westbound approach functions at LOS E during AM peak hour. • All other approaches function at LOS D or better during AM peak hour. • Eastbound approach functions at LOS E during PM peak hour. • All other approaches function at LOS D or better during PM peak hour. • **Overall intersection delay is 48 Sec in AM and 51 Sec in PM peak hour.**
I) ALT 8: Thru Lanes and dual left turns on Cooper Rd + Thru lanes on Guadalupe	• Overall Intersection functions at LOS C during both peak hours. • All approaches function at LOS D or better during both peak hours. • **Overall intersection delay is 32 Sec in AM and 34 Sec in PM peak hour.**	• Overall Intersection functions at LOS D during both peak hours. • All approaches function at LOS D or better during AM peak hour. • Eastbound approach functions at LOS E during PM peak hour. • All other approaches function at LOS D or better during PM peak hour. • **Overall intersection delay is 35 Sec in AM and 43 Sec in PM peak hour.**

7.1 Summary of Findings

A. The present intersection configuration is inadequate to serve the current year traffic volumes and the future (Year 2032) traffic volumes. Several movements operate at the failing LOS of F for the current volumes and the overall intersection functions at a failing LOS F for future PM peak hour volumes.

B. With the previously proposed improvements that install dual left turn lanes at all approaches, at least one approach and several movements have a failing LOS of F for both current and horizon year volumes. The overall intersection functions at a failing LOS F for future PM peak hour volumes.

C. Overall, the Alternative 8 which involves installing three thru lanes on all approaches with dual left turn lanes on Cooper Road yields the best Level of Service and least delays.

D. Installing dual left turn lanes does not appear to improve the level of service of the intersections over single left turn lanes where additional thru lanes are installed on the same approach. The installation of dual left turn lanes requires a protected only left turn phasing. This prevents the left turning traffic from using portions of the thru phase where they could utilize gaps in oncoming thru traffic to complete the left turns. Where the proportion of left turning traffic is low compared to oncoming thru traffic, dual left turn lanes do not appear to provide significant improvement in the LOS of the intersection.

E. The addition of thru lanes on Cooper Road always yields better intersection operations compared to addition of lane for any other movement of the intersection.

F. On Guadalupe Road approaches the addition of thru lanes is more beneficial to the intersection operation than the addition of dual left turn lanes.

Table 2: SYNCHRO Analysis Results for Cooper Rd & Guadalupe Rd Intersection

HCM 2010 - LOS & DELAY FOR VARIOUS IMPROVEMENT ALTERNATIVES

Base Modelling Parameters

Ideal Sat. Flow Rate	1900 vphpl	HCM Platoon Ratio	1.33 (Pead direction-peak approach)
Grade	0 %		1.00 (Other approaches)
Total Lost Time	4 sec	Headway Factor	1.00
Left Turning Speed	20 mph	Cycle Length	110 sec
Right Turning Speed	12 mph		
Lane Utilization Factor			
Left Turn Lane	1.00 (Single)		
	0.97 (dual)		
Thru+Shared Lane	0.95 (2 Thur)		
	0.85 (3 Thru)		

YEAR: 2012

A) Existing Network

Description: Base Network, Single protected + permitted left turns, Shared Right, No improvements

YEAR 2012: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Level of Service:		D	(AM)	E	(PM)							
AM		D			E			E			C	
	E	C	C	E	E	E	D	F	F	E	C	C
PM		F			D			D			E	
	E	F	F	F	D	D	D	D	D	E	F	F
Total Delay (sec):		54.9	(AM)	66.8	(PM)							
AM		36.4			67.3			65.2			34	
	55.9	29.8	29.9	55.6	70.3	71.2	50.2	65.7	69.2	63.9	28.6	28.9
PM		99.5			47.4			42.8			70.8	
	61.4	105.7	106.8	85.9	35.6	35.9	51.3	41.8	42.6	74.9	68.4	72

B) ALT 1: Previous Design Alternative

Description: Dual Left Turns, Two Thru Lane + Shared Right Turn Lane all Directions

YEAR 2012: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	2	0	2	2	0	2	2	0	2	2	0
Level of Service:		D	(AM)	E	(PM)							
AM		D			E			D			D	
	E	D	D	E	E	E	E	D	D	F	C	C
PM		F			D			D			E	
	E	F	F	F	D	D	D	D	D	E	F	F
Total Delay (sec):		53.6	(AM)	59.8	(PM)							
AM		45			72.4			50.7			40.1	
	65.5	38.1	38.2	56.7	76.5	77.4	58.8	48.3	50.8	80.1	32.9	33.3
PM		85.3			55			39.5			58.9	
	65.5	88.3	89.4	95.7	42.3	43	54.7	38.1	38.7	69.5	55.8	58.7

C) ALT 2: Additional Thru Lanes on Cooper

Description: Third Thru Lane added to North & South Legs. Left Turns remain single with prot/perm phasing

YEAR 2012: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	2	0	1	2	0	1	3	0	1	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		C			D			C			C	
	E	C	C	D	D	D	D	C	C	D	C	C
PM		D			D			D			D	
	D	D	D	E	C	C	D	C	D	E	D	D
Total Delay (sec):		35.2	(AM)	41	(PM)							
AM		34.8			47.8			28.6			30.3	
	55.3	27.9	27.9	46.8	47.8	48.4	41.7	25.5	28.6	54.4	25.6	27
PM		43.8			38.3			36.5			43.4	
	41.4	43.9	44.5	70.8	28.4	28.6	46.9	34.5	38.3	57.6	38.5	45.8

D) ALT 3: Dual Left Turns on Guadalupe Rd in addition to ALT 2

Desciption: Third Thru Lane added to North & South Legs. Dual Left Turns added to Guadalupe Rd. Prot. Phasing for E-W Lefts

YEAR 2012: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	2	0	2	2	0	1	3	0	1	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		D			D			C			C	
	E	C	C	D	D	D	D	C	D	D	C	C
PM		D			D			D			D	
	D	D	D	E	C	C	D	C	D	E	C	D
Total Delay (sec):		37	(AM)	41.3	(PM)							
AM		37.7			44.6			34.1			32.3	
	57.7	30.9	31	49.7	42.9	43.3	43.9	31	35.6	53.4	27.9	29.7
PM		47.7			42.6			35.3			40.5	
	54.7	46.1	46.7	77.3	31.9	32.2	48.5	33.3	36.4	62	35	41.1

YEAR: 2032

A) Existing Network

Description: Base Network, Single protected + permitted left turns, Shared Right, No improvements

YEAR 2032: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Level of Service:		E	(AM)	F	(PM)							
AM		D			F			E			D	
	F	D	D	F	F	F	E	F	F	F	C	C
PM		F			F			D			F	
	F	F	F	F	E	E	D	D	D	F	F	F
Total Delay (sec):		78.7	(AM)	88.7	(PM)							
AM		47.9			129.6			69.1			48.4	
	82.8	36	36.2	98.9	138	139.1	74.1	65.4	71.4	149	30.6	30.9
PM		140.5			94.4			42			82.6	
	87.2	149.4	150.5	221.7	55.2	56.4	53.9	40.7	41.6	121.8	73.4	79.7

B) ALT 1: Previous Design Alternative

Description: Dual Left Turns, Two Thru Lane + Shared Right Turn Lane all Directions

YEAR 2032: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	2	0	2	2	0	2	2	0	2	2	0
Level of Service:		E	(AM)	F	(PM)							
AM		D			F			E			D	
	E	D	D	E	F	F	E	F	F	F	D	D
PM		F			F			D			E	
	E	F	F	F	E	E	E	D	D	F	F	F
Total Delay (sec):		72.4	(AM)	83.6	(PM)							
AM		49.4			109.7			68.5			45.9	
	72.4	41.5	41.8	61.9	123.3	124.3	61.1	66.6	72.7	102.5	35.7	36.1
PM		138.3			94			40.1			71.5	
	74.9	149	150.1	196.6	62.1	63.7	56.2	38.5	39.3	91.5	65.5	71.3

C) ALT 2: Additional Thru Lanes on Cooper

Description: Third Thru Lane added to North & South Legs. Left Turns remain single with prot/perm phasing

YEAR 2032: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	2	0	1	2	0	1	3	0	1	3	0
Level of Service:		D	(AM)	E	(PM)							
AM		D			E			D			D	
	E	C	C	E	E	E	E	D	D	E	C	C
PM		E			E			D			D	
	E	E	E	F	C	C	D	D	D	E	D	D
Total Delay (sec):		49.2	(AM)	55.1	(PM)							
AM		41.3			68			45.3			37	
	78.3	28.7	28.8	69.7	67	68	64.9	39.9	46.9	74.8	29.6	31.6
PM		69.2			62.4			44.6			49.2	
	63.3	69.7	70.8	160.5	32.5	32.8	52.4	42.1	47.8	76.1	42.1	50

D) ALT 3: Dual Left Turns on Guadalupe Rd in addition to ALT 2

Desciption: Third Thru Lane added to North & South Legs. Dual Left Turns added to Guadalupe Rd. Prot. Phasing for E-W Lefts

YEAR 2032: Intersection Level of Service & Delay

	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	2	0	2	2	0	1	3	0	1	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		D			E			D			D	
	E	D	D	E	E	E	E	D	D	E	C	C
PM		E			E			D			D	
	D	E	E	F	D	D	D	D	D	E	D	D
Total Delay (sec):		48.2	(AM)	52.7	(PM)							
AM		43.9			66.6			42.9			36.4	
	69	35.4	35.5	55.8	69.3	70.3	64.7	37.5	43.9	74.7	29.1	30.9
PM		56.1			55.6			47.4			52.5	
	52.5	56.2	57.2	120.9	35.6	36	52.5	44.6	51.4	77.2	45.6	54

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E) ALT 4: Additional Thru Lanes on Guadalupe with Dual Lefts on Cooper

Desciption: Third Thru Lane added to East & West Legs. Dual Left Turns added to Cooper Rd. Prot. Phasing for N-S Lefts

YEAR 2012: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	3	0	1	3	0	2	2	0	2	2	0
Level of Service:		D	(AM)	D	(PM)							
AM		D			E			C			C	
	E	D	D	E	E	E	E	C	C	E	C	C
PM		E			D			C			D	
	D	E	E	E	D	D	D	C	C	E	D	D
Total Delay (sec):		42.9	(AM)	47.5	(PM)							
AM		45.4			62.2			33.2			33.6	
	69.2	37.2	37.8	74.5	55.2	64.7	59.4	28.9	29.9	74.2	26.3	26.5
PM		64			44.9			34.9			46.3	
	53	61.7	73.8	76.2	35	36.3	52.8	33.3	33.8	66.2	42.1	44.3

E) ALT 4: Additional Thru Lanes on Guadalupe with Dual Lefts on Cooper

Desciption: Third Thru Lane added to East & West Legs. Dual Left Turns added to Cooper Rd. Prot. Phasing for N-S Lefts

YEAR 2032: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	3	0	1	3	0	2	2	0	2	2	0
Level of Service:		D	(AM)	E	(PM)							
AM		D			E			D			D	
	E	D	D	E	E	F	E	D	D	F	C	C
PM		F			E			D			D	
	F	F	F	F	D	D	E	C	C	E	D	D
Total Delay (sec):		54.9	(AM)	66.6	(PM)							
AM		46			76.9			50.6			39.8	
	62.6	40	40.9	75.6	72.8	85.3	57.8	47.3	51.9	90.6	30.7	31.1
PM		116.4			76.5			35.2			50	
	81.6	118.2	130.7	169.9	46.1	51.8	55.3	33.5	34.1	68.6	45	49.3

F) ALT 5: Additional Thru Lanes in all directions

Desciption: Third Thru Lane added to all Legs. Left turns remain single with prot/perm phasing

YEAR 2012: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	3	0	1	3	0	1	3	0	1	3	0
Level of Service:		C	(AM)	C	(PM)							
AM		C			D			C			C	
	D	C	C	D	D	D	C	B	C	D	C	C
PM		D			D			C			C	
	D	D	E	E	C	C	D	C	C	D	C	C
Total Delay (sec):		30.1	(AM)	34.3	(PM)							
AM		34.2			45.1			21.1			23.8	
	46	30.1	30.5	51.8	41.2	46.7	32.2	18.7	20.7	39.7	20.6	21.6
PM		49.9			42.9			24.6			26.2	
	47.6	47.6	55.4	75.5	32.7	33.8	40.2	23	24.3	49.9	21.5	24.2

F) ALT 5: Additional Thru Lanes in all directions

Desciption: Third Thru Lane added to all Legs. Left turns remain single with prot/perm phasing

YEAR 2032: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	3	0	1	3	0	1	3	0	1	3	0
Level of Service:		C	(AM)	D	(PM)							
AM		C			D			C			C	
	D	C	C	D	D	D	D	C	C	D	C	C
PM		E			D			C			D	
	E	E	E	E	C	C	D	C	C	E	C	C
Total Delay (sec):		34.4	(AM)	43.7	(PM)							
AM		35			46.9			28.5			28.3	
	47.6	30.5	31	53.3	42.7	49.1	42.8	25	28.8	53.9	23.3	24.7
PM		65.9			44			32.8			36.4	
	57.9	63.3	74.8	78.8	33.1	34.1	49.9	30.7	33.2	77.6	28.2	32.9

G) ALT 6: Additional Thru and Dual Left Turns in all directions

Desciption: Third Thru Lane and Dual Lefts added to all Legs. Left turns are all with prot. phasing

YEAR 2012: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	3	0	2	3	0	2	3	0	2	3	0
Level of Service:		C	(AM)	C	(PM)							
AM		D			D			C			C	
	D	D	D	D	D	D	D	C	C	D	C	C
PM		D			D			C			C	
	D	D	D	E	C	D	D	C	C	D	C	C
Total Delay (sec):		34.2	(AM)	34.8	(PM)							
AM		40.9			44.7			27.1			29.3	
	54.9	36	36.6	51.6	41.2	45.3	50.7	22.7	25.1	50	25.2	26.5
PM		46.2			41.1			30.1			27.4	
	52.6	43.3	48.4	60.2	34.9	36.2	52	27.9	29.7	53.7	22.3	25.1

G) ALT 6: Additional Thru and Dual Left Turns in all directions

Desciption: Third Thru Lane and Dual Lefts added to all Legs. Left turns are all with prot. phasing

YEAR 2032: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	3	0	2	3	0	2	3	0	2	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		D			D			D			D	
	D	C	C	D	D	D	D	D	D	D	C	C
PM		E			D			C			C	
	E	D	E	E	D	D	E	C	C	E	C	C
Total Delay (sec):		38.7	(AM)	40.5	(PM)							
AM		37.4			40.9			39.7			35.1	
	49.7	33.1	33.5	51.1	36.9	39.9	51.8	35.7	42	53.6	31	33.4
PM		57.1			46.1			33.1			31.9	
	62.7	53	61.8	72.5	37.5	39.4	56.9	30.6	32.9	63.8	25.5	29.4

H) ALT 7: Additional Thru & Dual Lefts on Cooper with Dual Lefts on Guadalupe

Desciption: Third Thru Lane added only on Cooper. Dual Lefts added to all Legs. Left turns are all with prot. phasing

YEAR 2012: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	2	0	2	2	0	2	3	0	2	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		D			D			D			D	
	E	C	C	D	D	D	D	C	D	E	C	C
PM		E			D			C			C	
	E	E	E	E	D	D	D	C	C	E	C	C
Total Delay (sec):		40.3	(AM)	42.6	(PM)							
AM		41.1			49.7			35.4			36.3	
	63.4	33.5	33.6	54.9	47.9	48.4	53.9	31.2	35.4	63.2	30.9	32.9
PM		63.4			44			34.2			34.3	
	59.1	63.7	64.6	67.8	36.7	37	53.7	31.9	34.3	67.8	27.7	31.6

H) ALT 7: Additional Thru & Dual Lefts on Cooper with Dual Lefts on Guadalupe

Desciption: Third Thru Lane added only on Cooper. Dual Lefts added to all Legs. Left turns are all with prot. phasing

YEAR 2032: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	2	2	0	2	2	0	2	3	0	2	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		D			E			D			D	
	E	D	D	E	E	E	E	D	D	E	C	D
PM		E			D			D			D	
	E	E	E	E	D	D	D	D	D	E	D	D
Total Delay (sec):		48.1	(AM)	51	(PM)							
AM		44.8			64.4			43.3			37.8	
	71.9	35.5	35.7	57.1	66.1	67	64.3	37.9	44.3	59.8	33.1	35.6
PM		69.8			45			41.1			48.4	
	62.5	70.6	71.7	72.5	36.4	36.8	54.8	38.5	43	67.7	42.5	50.4

I) ALT 8: Additional Thru & Dual Lefts on Cooper with Addl. Thru on Guadalupe

Desciption: Third Thru Lane added on both Guadalupe & Cooper . Dual Lefts added only on Cooper. Left turns on Cooper are prot. only and on Guadalupe are with prot/perm phasing

YEAR 2012: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	3	0	1	3	0	2	3	0	2	3	0
Level of Service:		C	(AM)	C	(PM)							
AM		C			D			C			C	
	D	C	C	D	D	D	D	C	C	D	C	C
PM		D			D			C			C	
	D	D	D	E	C	C	D	C	C	D	C	C
Total Delay (sec):		32.2	(AM)	34.1	(PM)							
AM		34.4			42.9			25.8			28.3	
	46.6	30.1	30.5	49.1	39.5	43.8	48.6	21.6	24	50.4	23.9	25.3
PM		44.6			39.7			29.9			27.4	
	45.2	42.6	47.9	64.4	31.9	32.8	50.3	27.8	29.7	51	22.7	25.6

I) ALT 8: Additional Thru & Dual Lefts on Cooper with Addl. Thru on Guadalupe

Desciption: Third Thru Lane added on both Guadalupe & Cooper . Dual Lefts added only on Cooper. Left turns on Cooper are prot. only and on Guadalupe are with prot/perm phasing

YEAR 2032: Intersection Level of Service & Delay												
	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lanes	1	3	0	1	3	0	2	3	0	2	3	0
Level of Service:		D	(AM)	D	(PM)							
AM		C			D			C			C	
	D	C	C	D	D	D	D	C	D	D	C	C
PM		E			D			C			C	
	D	E	E	E	C	C	D	C	C	E	C	C
Total Delay (sec):		35.3	(AM)	43.3	(PM)							
AM		33			40.9			34.6			30.9	
	46.3	28.4	28.8	46.7	37.6	42.3	41.7	31.5	37.3	44.2	27.7	30.1
PM		68.5			42.7			33.7			33.8	
	53.6	68.9	79	73.2	33	34.2	52.4	31.4	34.1	60.1	28	32.8

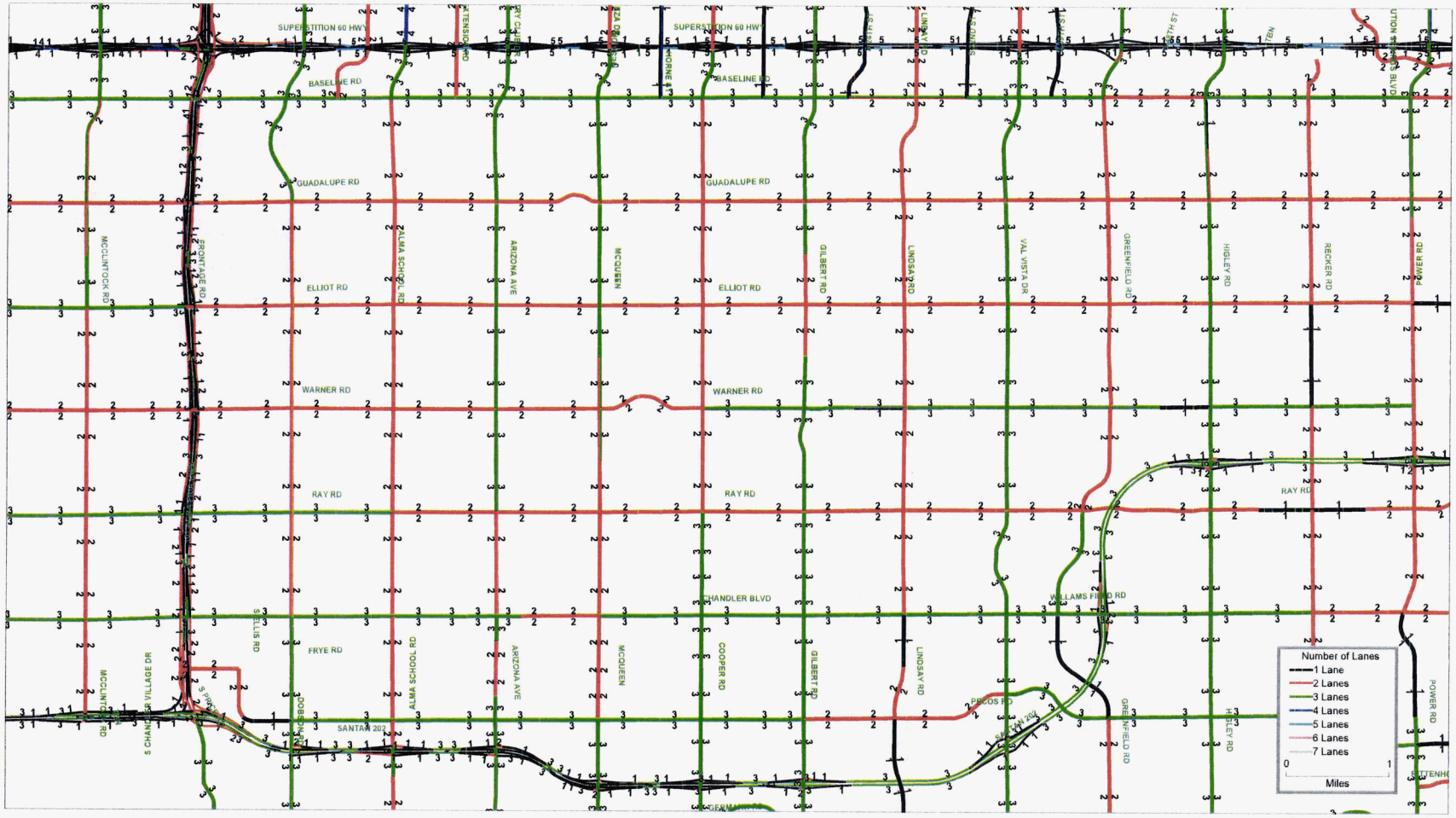
YSMA
Transportation Engineering Solutions

APPENDIX A

MAG Regional Model - Number of Lanes for Year 2011 & Year 2031

MARICOPA ASSOCIATION of GOVERNMENTS

2011 Map by Number of Lanes

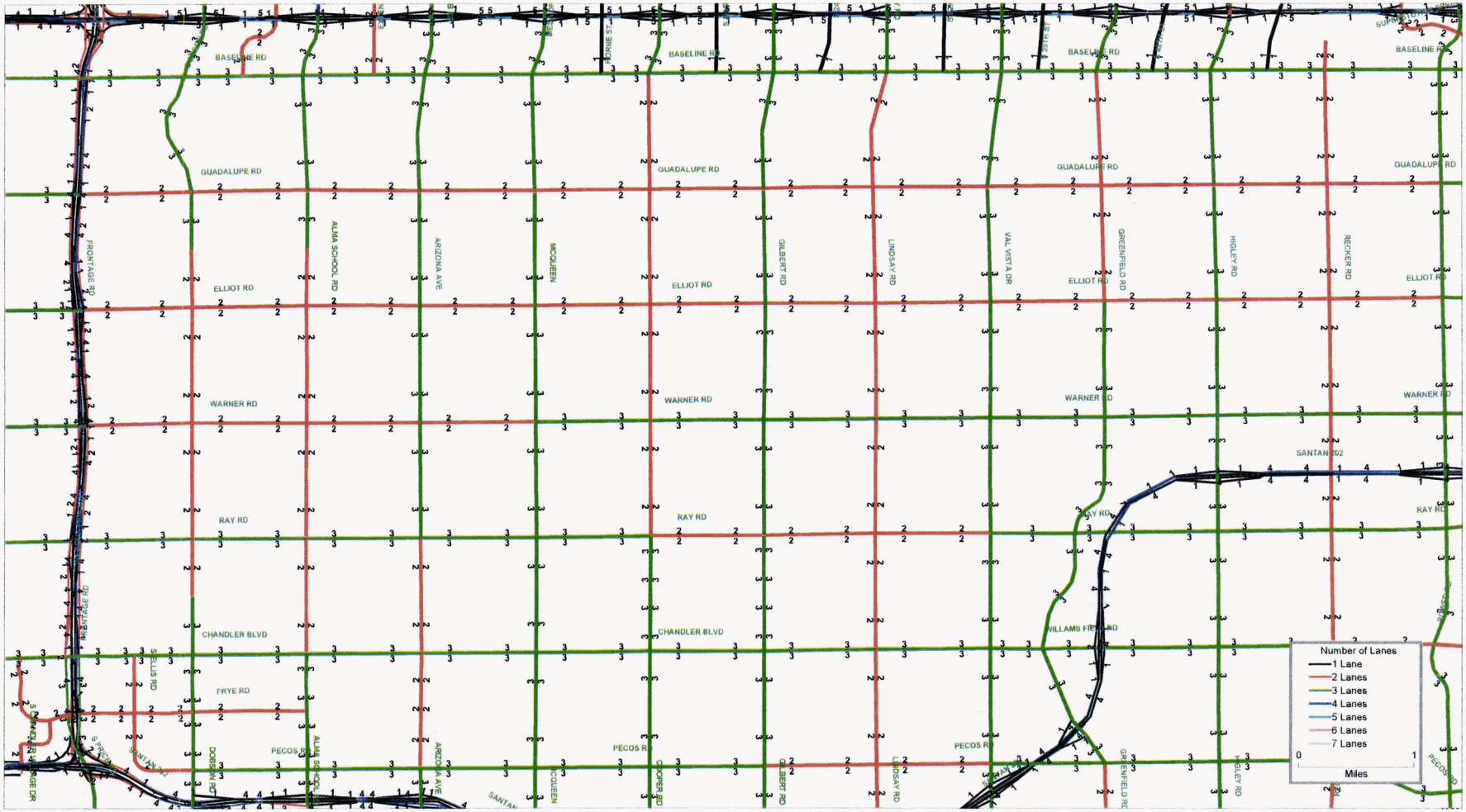


Sreevatsa Nippani, Tue Jul 03 10:52:47 2012

Source: I:\13_TRANSCAD_DEMAND_MODEL\20111025.07.07.07.TC50R2 - CONFORMITY RUNS 2011 11 - latest for requests\Results\2011

MARICOPA ASSOCIATION of GOVERNMENTS

2031 Map by Number of Lanes



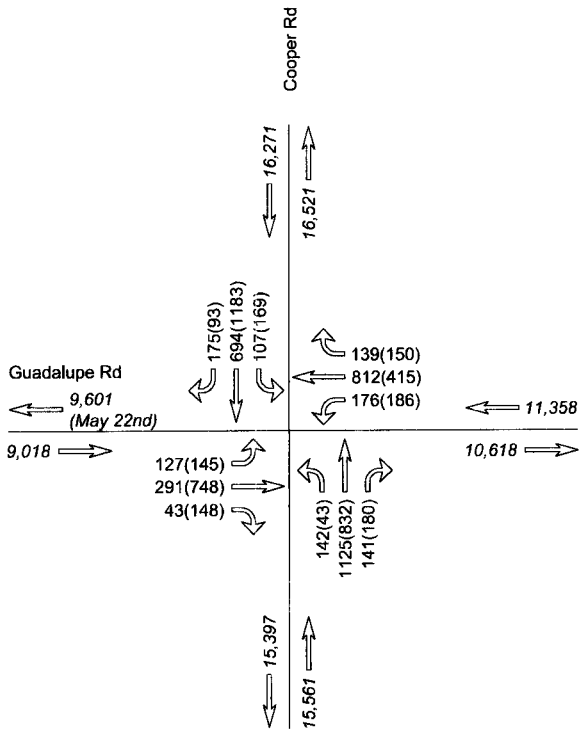
Sreevatsa Nippani, Tue Jul 03 11:53:47 2012

Source: I:\13_TRANSCAD_DEMAND_MODEL\20111025.07.07.07.TC50R2 - CONFORMITY RUNS 2011 11 - latest for requests\Results\2031

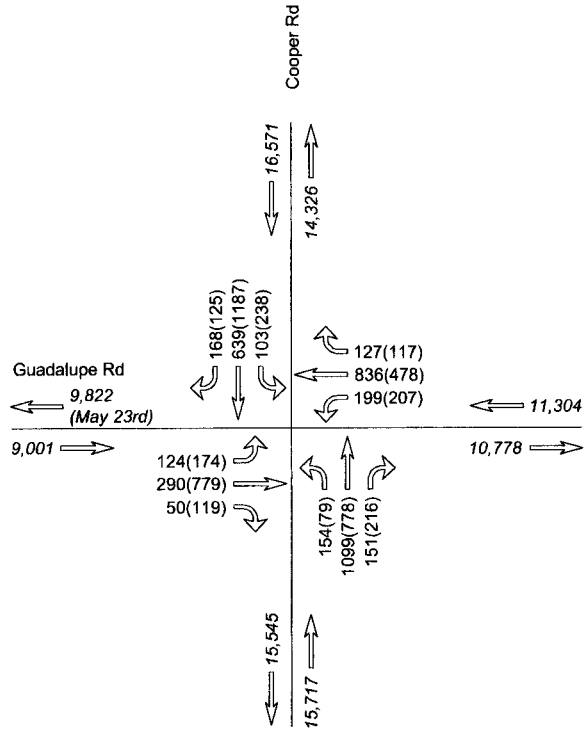
APPENDIX B

Turning Movement Counts & Average Daily Traffic – May 2012

Tuesday, May 15th, 2012
AM Peak Hour - 7:15 to 8:15
PM Peak Hour - 4:30 to 5:30

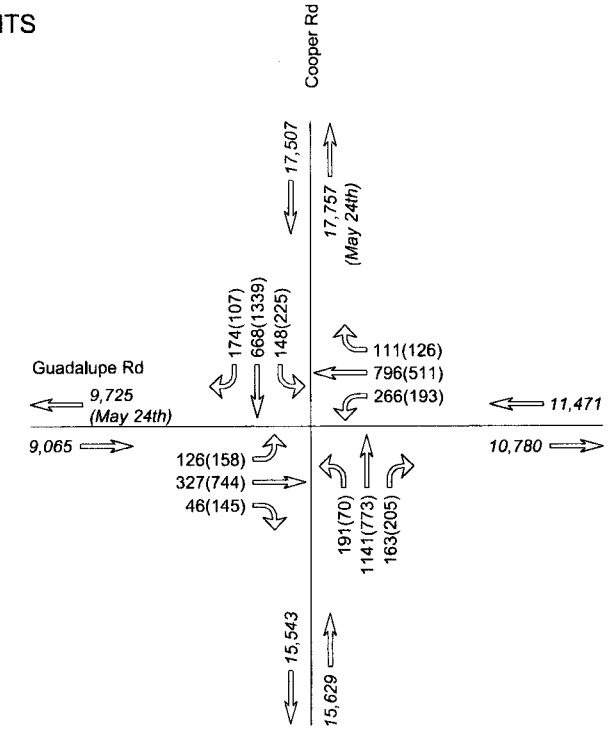


Wednesday, May 16th, 2012
AM Peak Hour - 7:15 to 8:15
PM Peak Hour - 4:30 to 5:30



NTS

Thursday, May 17th, 2012
AM Peak Hour - 7:30 to 8:30
PM Peak Hour - 5:00 to 6:00



LEGEND
XX(XX) - AM(PM) Turning Movement Counts
XXX - 24-Hr Tube Counts

YSMA
Transportation Engineering Solutions

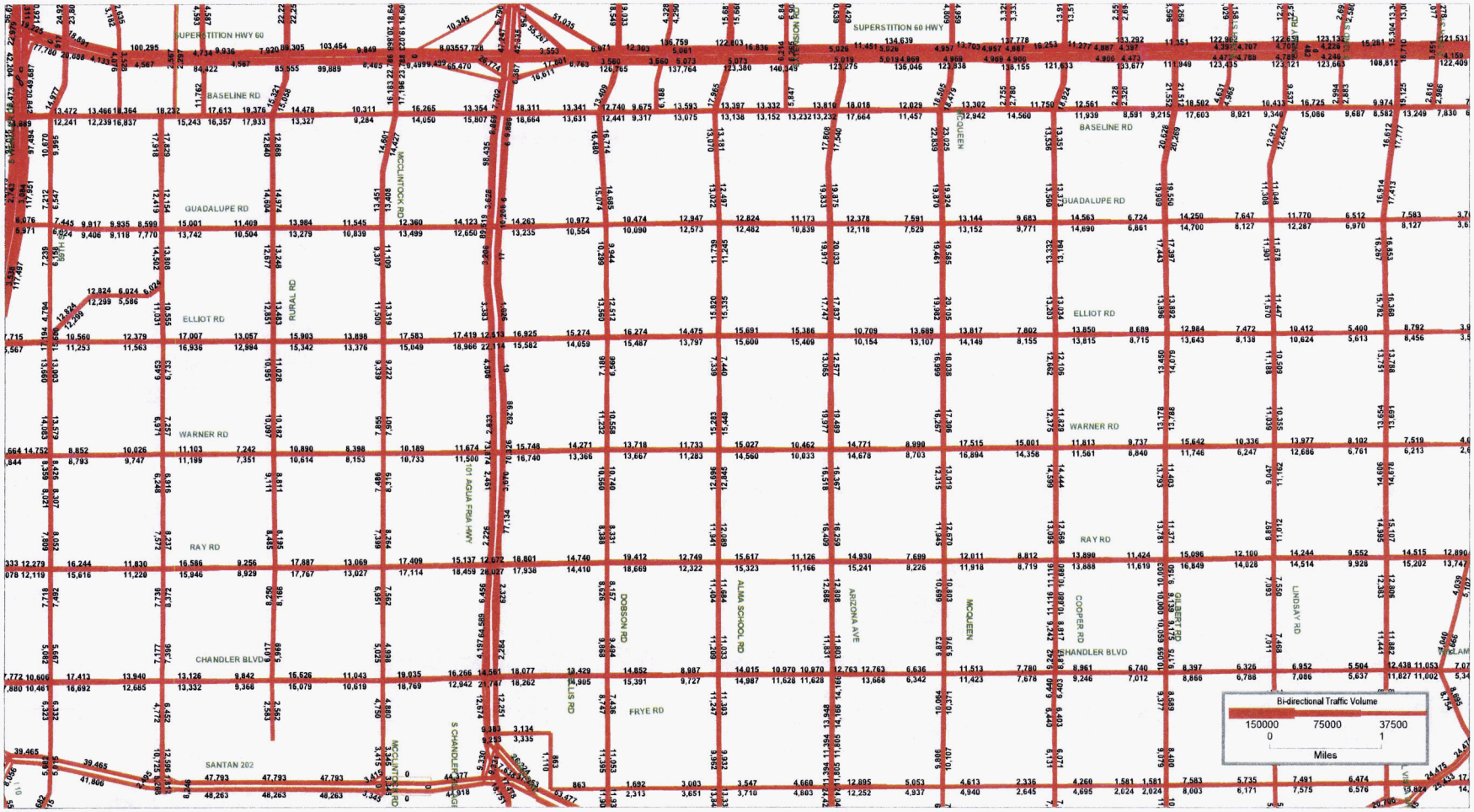
Cooper Rd and Guadalupe Rd Traffic Counts

APPENDIX C

MAG Regional Model - Average Daily Traffic for Years 2008, 2011 & 2031

MARICOPA ASSOCIATION of GOVERNMENTS

2008 Average Daily Traffic Volumes



Sreevatsa Nippani, Fri Jun 29 14:06:17 2012

Source: I:\13_TRANSCAD_DEMAND_MODEL\20111025.07.07.07.TC50R2 - CONFORMITY RUNS 2011 11 - latest for requests\Results\2008

MARICOPA ASSOCIATION of GOVERNMENTS

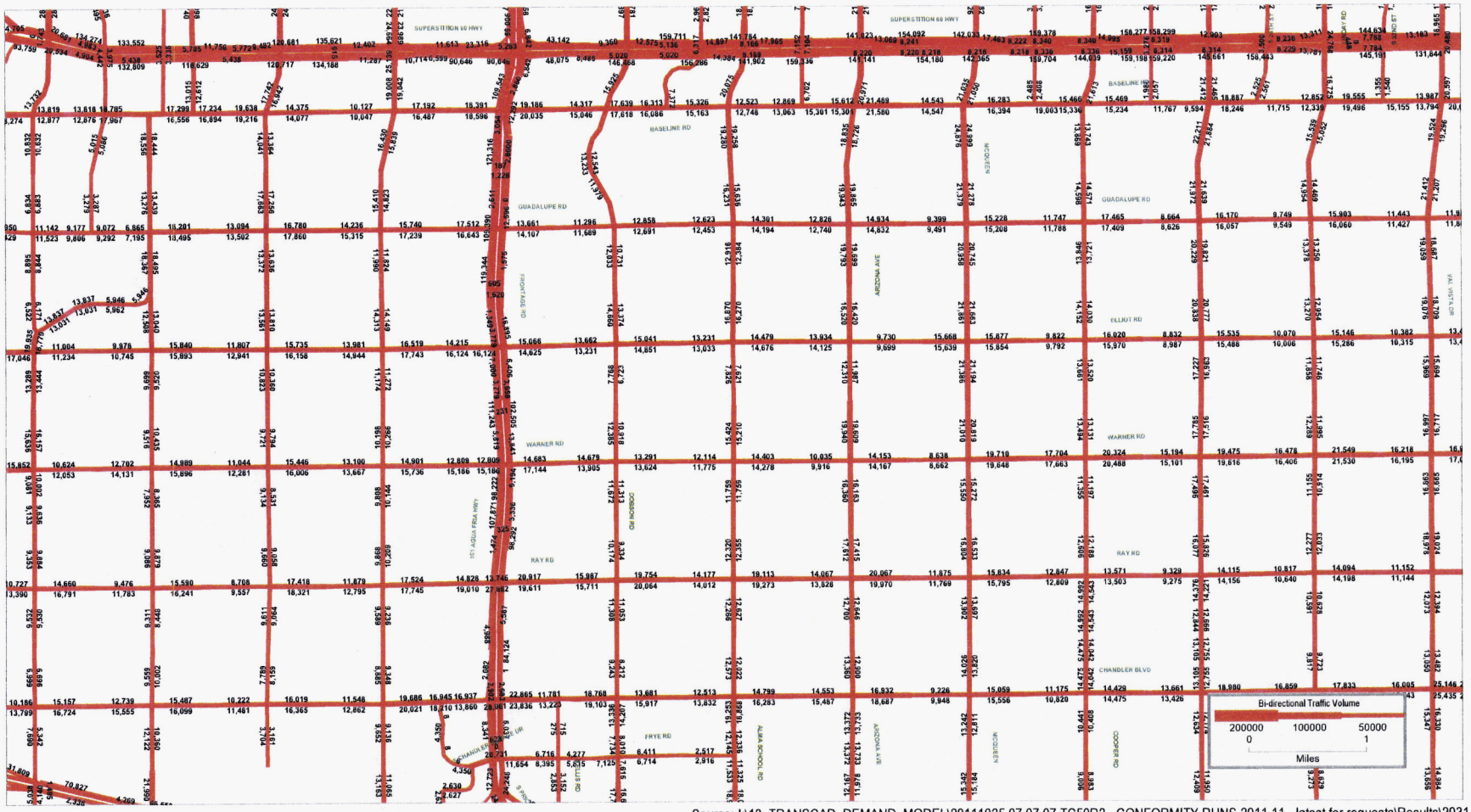
2011 Average Daily Traffic Volumes

Sreevatsa Nippani, Fri Jun 29 15:12:41 2012

Source: I:\13_TRANSCAD_DEMAND_MODEL\20111025.07.07.07.TC50R2 - CONFORMITY RUNS 2011 11 - latest for requests\Results\2011

MARICOPA ASSOCIATION of GOVERNMENTS

2031 Average Daily Traffic Volumes



Sreevatsa Nippani, Thu Jun 28 14:39:58 2012

Source: I:\13_TRANSCAD_DEMAND_MODEL\20111025.07.07.07.TC50R2 - CONFORMITY RUNS 2011 11 - latest for requests\Results\2031

APPENDIX D

Year 2012 and Year 2032 Design Volumes

Design Volumes (Intersection Turning Movement Counts) for SYNCHRO Analysis

Year 2012 AM Peak Hour

Intersection Name	Int. ID in Synchro	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Guadalupe Rd & Velero St	101	95		81					418	25	50	1111	
Guadalupe Rd & Gilbert Rd	103	199	644	85	277	490	231	179	180	107	138	913	398
Guadalupe Rd & Neely St	104	166	27	22	36	34	43	19	407	103	90	982	60
Guadalupe Rd & Cooper Rd	105	191	1141	163	148	668	174	126	327	46	266	796	111
Guadalupe Rd & McQueen Rd	106	255	1291	98	74	660	103	85	265	80	156	821	150
Cooper Rd & Houston Ave	110	68	1449	124	41	880	17	33	28	49	192	43	112
Cooper Rd & Trail Crossing	121		1495			980							
Cooper Rd & Elliot Rd	305	360	1095	84	125	709	195	123	362	104	98	807	155

Year 2012 PM Peak Hour

Intersection Name	Int. ID in Synchro	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Guadalupe Rd & Velero St	101	24		56					991	104	89	599	
Guadalupe Rd & Gilbert Rd	103	225	517	80	524	1076	222	387	926	231	237	588	214
Guadalupe Rd & Neely St	104	76	13	19	24	18	41	59	1079	118	13	678	36
Guadalupe Rd & Cooper Rd	105	70	773	205	225	1339	107	158	744	145	193	511	126
Guadalupe Rd & McQueen Rd	106	114	650	106	185	1520	92	132	743	246	139	444	86
Cooper Rd & Houston Ave	110	51	967	58	137	1553	51	44	27	64	58	18	50
Cooper Rd & Trail Crossing	121		1048			1677							
Cooper Rd & Elliot Rd	305	142	662	91	260	1213	127	208	879	231	113	478	172

Year 2032 AM Peak Hour

Intersection Name	Int. ID in Synchro	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Guadalupe Rd & Velero St	101	105		90					463	28	56	1229	0
Guadalupe Rd & Gilbert Rd	103	220	712	94	307	542	256	198	199	119	153	1009	440
Guadalupe Rd & Neely St	104	184	30	25	40	38	48	21	450	114	100	1086	67
Guadalupe Rd & Cooper Rd	105	212	1261	181	164	739	193	140	362	51	294	880	123
Guadalupe Rd & McQueen Rd	106	282	1427	109	82	730	114	94	293	89	173	908	166
Cooper Rd & Houston Ave	110	76	1601	138	46	973	19	37	31	55	213	48	124
Cooper Rd & Trail Crossing	121		1654			1084							
Cooper Rd & Elliot Rd	305	398	1210	93	139	784	216	136	400	115	109	892	172

Year 2032 PM Peak Hour

Intersection Name	Int. ID in Synchro	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Guadalupe Rd & Velero St	101	27		62					1097	115	99	663	0
Guadalupe Rd & Gilbert Rd	103	249	572	89	579	1189	246	428	1024	256	262	650	237
Guadalupe Rd & Neely St	104	84	15	21	27	20	46	66	1193	131	15	750	40
Guadalupe Rd & Cooper Rd	105	78	855	227	249	1480	119	175	823	161	214	565	140
Guadalupe Rd & McQueen Rd	106	126	719	118	205	1680	102	146	821	272	154	491	96
Cooper Rd & Houston Ave	110	57	1069	65	152	1716	57	49	30	71	65	20	56
Cooper Rd & Merrill Ave	116		1160			1855							
Cooper Rd & Elliot Rd	305	157	732	101	288	1341	141	230	972	256	125	529	191

APPENDIX E

SYNCHRO Output

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Capacity, veh/h	160	911	127	323	885	123	244	1197	170	184	1140	297
Arriving On Green	0.05	0.28	0.28	0.04	0.28	0.28	0.05	0.50	0.50	0.06	0.40	0.40
Sat Flow, veh/h	1774.0	3200.3	446.4	1774.0	3200.4	446.3	1774.0	3191.9	453.6	1774.0	2851.7	742.7
Grp Volume(v), veh/h	137.0	205.6	199.8	289.1	503.6	482.3	207.6	721.1	696.3	160.9	474.2	441.0
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1784.0	1774.0	1862.7	1784.0	1774.0	1862.7	1782.7	1774.0	1862.7	1731.7
Q Serve(g_s), s	3.4	9.0	9.1	1.7	27.2	27.2	1.5	38.0	38.0	5.0	20.8	20.8
Cycle Q Clear(g_c), s	3.4	9.0	9.1	1.7	27.2	27.2	1.5	38.0	38.0	5.0	20.8	20.8
Proportion In Lane	1.000		0.250	1.000		0.250	1.000		0.254	1.000		0.429
Lane Grp Cap(c), veh/h	160.3	530.0	507.6	322.8	514.9	493.1	244.2	698.8	668.8	184.5	744.6	692.2
V/C Ratio(X)	0.855	0.388	0.394	0.896	0.978	0.978	0.850	1.032	1.041	0.872	0.637	0.637
Avail Cap(c_a), veh/h	250.9	530.0	507.6	427.9	514.9	493.1	349.5	698.8	668.8	246.2	744.6	692.2
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.983	0.983	0.983	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	46.6	29.1	29.2	40.9	36.3	36.3	41.9	25.4	25.4	45.6	24.5	24.5
Incr Delay (d2), s/veh	9.3	0.7	0.7	14.7	34.0	34.8	8.3	40.3	43.8	18.3	4.1	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	55.9	29.8	29.9	55.6	70.3	71.2	50.2	65.7	69.2	63.9	28.6	28.9
Lane Group LOS	E	C	C	E	E	E	D	F	F	E	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		36.4			67.3			65.2			34.0	
Approach LOS		D			E			E			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	9.82	35.82		9.00	35.00		8.99	45.00		11.47	47.49	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	11.00	29.00		11.00	29.00		11.00	39.00		11.00	39.00	
Max Q Clear Time (g_c+I1), s	5.88	11.64		4.20	29.66		4.01	40.50		7.49	23.28	
Green Extension Time (p_c)	0.07	10.18		0.24	0.00		0.15	0.00		0.06	13.79	

Intersection Summary	
HCM 2010 Control Delay	54.9
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Capacity, veh/h	191	742	145	224	855	210	126	1016	269	260	1390	111
Arriving On Green	0.04	0.24	0.24	0.09	0.30	0.30	0.03	0.36	0.36	0.11	0.54	0.54
Sat Flow, veh/h	1774.0	3030.6	590.6	1774.0	2890.1	710.1	1774.0	2839.8	752.8	1774.0	3406.9	270.8
Grp Volume(v), veh/h	171.7	497.1	469.2	209.8	357.3	335.1	76.1	551.0	512.0	244.6	792.2	779.5
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1758.5	1774.0	1862.7	1737.4	1774.0	1862.7	1729.9	1774.0	1862.7	1815.0
Q Serve(g_s), s	2.7	26.0	26.0	8.4	17.7	17.9	0.4	28.6	28.7	7.7	43.3	43.3
Cycle Q Clear(g_c), s	2.7	26.0	26.0	8.4	17.7	17.9	0.4	28.6	28.7	7.7	43.3	43.3
Proportion In Lane	1.000		0.336	1.000		0.409	1.000		0.435	1.000		0.149
Lane Grp Cap(c), veh/h	191.4	456.1	430.6	224.5	551.0	514.0	125.8	666.7	619.1	259.7	760.2	740.7
V/C Ratio(X)	0.897	1.090	1.090	0.934	0.648	0.652	0.605	0.827	0.827	0.942	1.042	1.052
Avail Cap(c_a), veh/h	292.2	456.1	430.6	234.9	551.0	514.0	268.3	666.7	619.1	313.2	760.2	740.7
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.858	0.858	0.858	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	48.1	40.1	40.1	46.6	32.6	32.6	49.7	31.1	31.1	44.1	24.3	24.3
Incr Delay (d2), s/veh	13.2	65.7	66.7	39.3	3.0	3.3	1.7	10.8	11.5	30.8	44.2	47.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	61.4	105.7	106.8	85.9	35.6	35.9	51.3	41.8	42.6	74.9	68.4	72.0
Lane Group LOS	E	F	F	F	D	D	D	D	D	E	F	F
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		99.5			47.4			42.8			70.8	
Approach LOS		F			D			D			E	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.97	33.00		14.38	38.41		8.47	45.00		13.80	50.33	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	11.00	27.00		11.00	27.00		13.00	39.00		13.00	39.00	
Max Q Clear Time (g_c+I1), s	4.66	28.00		10.38	19.87		2.36	30.66		9.69	45.33	
Green Extension Time (p_c)	0.11	0.00		0.02	5.70		0.05	7.93		0.11	0.00	

Intersection Summary	
HCM 2010 Control Delay	66.8
HCM 2010 Level of Service	E

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	2	0	2	2	0
Capacity, veh/h	179	727	101	339	875	122	253	1280	182	188	1090	284
Arriving On Green	0.05	0.23	0.23	0.10	0.27	0.27	0.10	0.53	0.53	0.05	0.38	0.38
Sat Flow, veh/h	3441.6	3200.3	446.4	3441.6	3200.4	446.3	3441.6	3191.9	453.6	3441.6	2851.7	742.7
Grp Volume(v), veh/h	137.0	205.6	199.8	289.1	503.6	482.3	207.6	721.1	696.3	160.9	474.2	441.0
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1784.0	1720.8	1862.7	1784.0	1720.8	1862.7	1782.7	1720.8	1862.7	1731.7
Q Serve(g_s), s	4.3	10.5	10.7	9.1	29.5	29.5	6.5	40.8	41.6	5.1	23.1	23.2
Cycle Q Clear(g_c), s	4.3	10.5	10.7	9.1	29.5	29.5	6.5	40.8	41.6	5.1	23.1	23.2
Proportion In Lane	1.000		0.250	1.000		0.250	1.000		0.254	1.000		0.429
Lane Grp Cap(c), veh/h	179.1	423.0	405.1	338.7	509.4	487.8	252.6	747.1	715.0	188.2	712.3	662.1
V/C Ratio(X)	0.765	0.486	0.493	0.854	0.989	0.989	0.822	0.965	0.974	0.855	0.666	0.666
Avail Cap(c_a), veh/h	188.2	423.0	405.1	470.6	509.4	487.8	313.7	747.1	715.0	188.2	712.3	662.1
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.983	0.983	0.983	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	51.3	36.8	36.9	48.7	39.7	39.7	48.8	24.9	25.0	51.4	28.1	28.1
Incr Delay (d2), s/veh	14.1	1.2	1.3	8.0	36.9	37.7	9.7	23.4	25.8	28.7	4.9	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	65.5	38.1	38.2	56.7	76.5	77.4	58.5	48.3	50.8	80.1	32.9	33.3
Lane Group LOS	E	D	D	E	E	E	E	D	D	F	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		45.0			72.4			50.7			40.1	
Approach LOS		D			E			D			D	

[redacted]her												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	10.71	31.91		15.80	37.00		13.05	51.00		11.00	48.95	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	7.00	22.00		16.00	31.00		11.00	45.00		7.00	41.00	
Max Q Clear Time (g_c+I1), s	6.81	13.20		11.57	32.03		8.99	44.11		7.59	25.65	
Green Extension Time (p_c)	0.00	6.13		0.23	0.00		0.07	0.86		0.00	13.50	

Intersection Summary			
HCM 2010 Control Delay		53.6	
HCM 2010 Level of Service		D	

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	2	0	2	2	0
Capacity, veh/h	202	781	152	222	761	187	111	1071	284	275	1448	115
Arriving On Green	0.06	0.26	0.26	0.06	0.26	0.26	0.03	0.38	0.38	0.11	0.57	0.57
Sat Flow, veh/h	3441.6	3030.6	590.6	3441.6	2890.1	710.1	3441.6	2839.8	752.8	3441.6	3406.9	270.8
Grp Volume(v), veh/h	171.7	497.1	469.2	209.8	357.3	335.1	76.1	551.0	512.0	244.6	792.2	779.5
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1758.5	1720.8	1862.7	1737.4	1720.8	1862.7	1729.9	1720.8	1862.7	1815.0
Q Serve(g_s), s	5.4	28.0	28.0	6.6	19.0	19.1	2.4	28.4	28.5	7.6	46.2	46.2
Cycle Q Clear(g_c), s	5.4	28.0	28.0	6.6	19.0	19.1	2.4	28.4	28.5	7.6	46.2	46.2
Proportion In Lane	1.000		0.336	1.000		0.409	1.000		0.435	1.000		0.149
Lane Grp Cap(c), veh/h	202.0	479.9	453.0	221.7	490.6	457.6	110.7	702.7	652.6	275.0	791.6	771.3
V/C Ratio(X)	0.850	1.036	1.036	0.946	0.728	0.732	0.687	0.784	0.785	0.889	1.001	1.011
Avail Cap(c_a), veh/h	253.3	479.9	453.0	221.7	490.6	457.6	190.0	702.7	652.6	316.7	791.6	771.3
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.875	0.875	0.875	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	50.7	40.3	40.3	50.7	36.5	36.5	52.1	29.9	29.9	48.1	23.6	23.6
Incr Delay (d2), s/veh	14.8	48.0	49.1	45.1	5.9	6.4	2.7	8.2	8.8	21.4	32.2	35.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	65.5	88.3	89.4	95.7	42.3	43.0	54.7	38.1	38.7	69.5	55.8	58.7
Lane Group LOS	E	F	F	F	D	D	D	D	D	E	F	F
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		85.3			55.0			39.5			58.9	
Approach LOS		F			D			D			E	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.38	35.00		12.00	35.62		8.50	48.00		13.68	53.19	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	9.00	29.00		8.00	28.00		7.00	42.00		11.00	46.00	
Max Q Clear Time (g_c+I1), s	7.37	30.00		8.60	21.13		4.38	30.46		9.62	48.19	
Green Extension Time (p_c)	0.05	0.00		0.00	5.51		0.02	10.84		0.07	0.00	

Intersection Summary	
HCM 2010 Control Delay	59.8
HCM 2010 Level of Service	E

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	3	0	1	3	0
Capacity, veh/h	168	978	136	355	981	137	282	1625	232	195	1455	375
Arriving On Green	0.04	0.31	0.31	0.04	0.31	0.31	0.05	0.50	0.50	0.04	0.38	0.38
Sat Flow, veh/h	1774.0	3200.3	446.4	1774.0	3200.4	446.3	1774.0	4305.8	615.1	1774.0	3859.4	994.5
Grp Volume(v), veh/h	137.0	205.6	199.8	289.1	503.6	482.3	207.6	912.1	505.3	160.9	594.3	320.9
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1784.0	1774.0	1862.7	1784.0	1774.0	1583.3	1754.2	1774.0	1583.3	1687.2
Q Serve(g_s), s	2.0	8.7	8.8	0.0	25.9	25.9	0.0	23.4	23.4	1.8	14.5	14.7
Cycle Q Clear(g_c), s	2.0	8.7	8.8	0.0	25.9	25.9	0.0	23.4	23.4	1.8	14.5	14.7
Proportion In Lane	1.000		0.250	1.000		0.250	1.000		0.351	1.000		0.589
Lane Grp Cap(c), veh/h	167.6	569.1	545.1	354.5	571.1	547.0	281.8	1195.4	662.2	195.4	1194.1	636.2
V/C Ratio(X)	0.817	0.361	0.367	0.816	0.882	0.882	0.737	0.763	0.763	0.823	0.498	0.504
Avail Cap(c_a), veh/h	239.9	591.5	566.5	425.0	591.5	566.5	352.5	1195.4	662.2	266.8	1194.1	636.2
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.982	0.982	0.982	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	46.3	27.3	27.4	38.4	33.2	33.2	38.0	21.5	21.5	44.2	24.1	24.1
Incr Delay (d2), s/veh	8.9	0.5	0.6	8.4	14.6	15.2	3.7	4.1	7.2	10.2	1.5	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	55.3	27.9	27.9	46.8	47.8	48.4	41.7	25.5	28.6	54.4	25.6	27.0
Lane Group LOS	E	C	C	D	D	D	D	C	C	D	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		34.8			47.8			28.6			30.3	
Approach LOS		C			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.89	37.79		9.00	37.90		8.99	45.04		8.94	45.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	9.00	33.00		9.00	33.00		9.00	39.00		9.00	39.00	
Max Q Clear Time (g_c+I1), s	4.50	11.33		2.50	28.39		2.50	25.93		4.29	17.24	
Green Extension Time (p_c)	0.06	11.71		0.23	3.51		0.15	11.58		0.08	18.21	

Intersection Summary	
HCM 2010 Control Delay	35.2
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	3	0	1	3	0
Capacity, veh/h	256	930	181	227	968	238	138	1175	310	262	1588	127
Arriving On Green	0.04	0.31	0.31	0.07	0.34	0.34	0.03	0.31	0.31	0.10	0.46	0.46
Sat Flow, veh/h	1774.0	3030.6	590.6	1774.0	2890.1	710.1	1774.0	3838.7	1012.1	1774.0	4597.3	367.3
Grp Volume(v), veh/h	171.7	497.1	469.2	209.8	357.3	335.1	76.1	692.3	370.8	244.6	1002.5	569.3
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1758.5	1774.0	1862.7	1737.4	1774.0	1583.3	1684.1	1774.0	1583.3	1797.9
Q Serve(g_s), s	0.0	24.7	24.7	5.7	15.5	15.6	0.0	19.0	19.2	6.0	29.0	29.0
Cycle Q Clear(g_c), s	0.0	24.7	24.7	5.7	15.5	15.6	0.0	19.0	19.2	6.0	29.0	29.0
Proportion In Lane	1.000		0.336	1.000		0.409	1.000		0.601	1.000		0.204
Lane Grp Cap(c), veh/h	255.7	571.4	539.5	226.8	624.2	582.2	137.8	969.3	515.5	262.3	1093.5	620.9
V/C Ratio(X)	0.672	0.870	0.870	0.925	0.572	0.576	0.552	0.714	0.719	0.932	0.917	0.917
Avail Cap(c_a), veh/h	365.1	589.2	556.2	286.0	624.2	582.2	348.3	969.3	515.5	403.2	1093.5	620.9
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.858	0.858	0.858	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	40.5	32.1	32.1	43.3	26.8	26.8	45.7	30.2	30.3	40.8	25.2	25.2
Incr Delay (d2), s/veh	1.0	11.8	12.4	27.5	1.6	1.7	1.2	4.3	8.0	16.8	13.4	20.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	41.4	43.9	44.5	70.8	28.4	28.6	46.9	34.5	38.3	57.6	38.5	45.8
Lane Group LOS	D	D	D	E	C	C	D	C	D	E	D	D
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		43.8			38.3			36.5			43.4	
Approach LOS		D			D			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.95	37.07		11.73	39.84		8.37	37.00		12.21	40.84	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	11.00	32.00		11.00	32.00		16.00	31.00		16.00	31.00	
Max Q Clear Time (g_c+I1), s	2.00	26.73		7.66	17.57		2.00	21.20		8.01	30.99	
Green Extension Time (p_c)	0.14	4.34		0.09	10.28		0.06	9.20		0.21	0.01	

Intersection Summary	
HCM 2010 Control Delay	41.0
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	1	3	0	1	3	0
Capacity, veh/h	182	867	121	344	1018	142	260	1495	214	186	1357	350
Arriving On Green	0.05	0.27	0.27	0.10	0.32	0.32	0.05	0.46	0.46	0.04	0.35	0.35
Sat Flow, veh/h	3441.6	3200.3	446.4	3441.6	3200.4	446.3	1774.0	4305.8	615.1	1774.0	3859.4	994.5
Grp Volume(v), veh/h	137.0	205.6	199.8	289.1	503.6	482.3	207.6	912.1	505.3	160.9	594.3	320.9
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1784.0	1720.8	1862.7	1784.0	1774.0	1583.3	1754.2	1774.0	1583.3	1687.2
Q Serve(g_s), s	4.0	9.1	9.3	8.3	25.5	25.5	0.5	25.3	25.3	2.9	15.1	15.4
Cycle Q Clear(g_c), s	4.0	9.1	9.3	8.3	25.5	25.5	0.5	25.3	25.3	2.9	15.1	15.4
Proportion In Lane	1.000		0.250	1.000		0.250	1.000		0.351	1.000		0.589
Lane Grp Cap(c), veh/h	181.9	504.6	483.2	343.9	592.3	567.2	260.0	1099.4	609.0	185.6	1113.4	593.2
V/C Ratio(X)	0.753	0.408	0.413	0.841	0.850	0.850	0.799	0.830	0.830	0.867	0.534	0.541
Avail Cap(c_a), veh/h	204.8	504.6	483.2	512.1	628.2	601.7	383.4	1099.4	609.0	301.2	1113.4	593.2
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.983	0.983	0.983	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	47.1	30.1	30.2	44.6	32.1	32.1	40.3	24.5	24.5	45.4	26.1	26.2
Incr Delay (d2), s/veh	10.6	0.7	0.8	5.1	10.8	11.2	3.6	6.4	11.0	8.0	1.8	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	57.7	30.9	31.0	49.7	42.9	43.3	43.9	31.0	35.6	53.4	27.9	29.7
Lane Group LOS	E	C	C	D	D	D	D	C	D	D	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		37.7			44.6			34.1			32.3	
Approach LOS		D			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	10.33	34.31		15.07	39.05		8.99	42.00		9.43	42.45	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	7.00	26.00		16.00	35.00		12.00	36.00		12.00	36.00	
Max Q Clear Time (g_c+I1), s	6.46	11.77		10.82	27.98		2.96	27.84		5.39	17.85	
Green Extension Time (p_c)	0.01	8.88		0.26	5.08		0.18	7.48		0.10	15.55	

Intersection Summary	
HCM 2010 Control Delay	37.0
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	1	3	0	1	3	0
Capacity, veh/h	205	923	180	236	907	223	142	1241	327	261	1646	132
Arriving On Green	0.06	0.30	0.30	0.07	0.31	0.31	0.03	0.32	0.32	0.09	0.48	0.48
Sat Flow, veh/h	3441.6	3030.6	590.6	3441.6	2890.1	710.1	1774.0	3838.7	1012.1	1774.0	4597.3	367.3
Grp Volume(v), veh/h	171.7	497.1	469.2	209.8	357.3	335.1	76.1	692.3	370.8	244.6	1002.5	569.3
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1758.5	1720.8	1862.7	1737.4	1774.0	1583.3	1684.1	1774.0	1583.3	1797.9
Q Serve(g_s), s	5.0	25.8	25.8	6.2	16.6	16.7	0.0	19.3	19.5	5.8	29.2	29.2
Cycle Q Clear(g_c), s	5.0	25.8	25.8	6.2	16.6	16.7	0.0	19.3	19.5	5.8	29.2	29.2
Proportion In Lane	1.000		0.336	1.000		0.409	1.000		0.601	1.000		0.204
Lane Grp Cap(c), veh/h	204.5	567.5	535.8	236.1	584.6	545.3	142.0	1024.0	544.6	261.5	1133.7	643.7
V/C Ratio(X)	0.840	0.876	0.876	0.889	0.611	0.615	0.536	0.676	0.681	0.935	0.884	0.884
Avail Cap(c_a), veh/h	303.5	584.1	551.4	236.1	584.6	545.3	325.9	1024.0	544.6	383.9	1133.7	643.7
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.858	0.858	0.858	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	47.5	33.6	33.6	47.1	29.7	29.8	47.4	29.9	30.0	42.3	24.8	24.8
Incr Delay (d2), s/veh	7.2	12.5	13.1	30.2	2.2	2.4	1.1	3.4	6.4	19.7	10.1	16.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	54.7	46.1	46.7	77.3	31.9	32.2	48.5	33.3	36.4	62.0	35.0	41.1
Lane Group LOS	D	D	D	E	C	C	D	C	D	E	C	D
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		47.7			42.6			35.3			40.5	
Approach LOS		D			D			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.06	38.09		12.00	39.03		8.42	40.00		11.96	43.53	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	10.00	33.00		8.00	31.00		15.00	34.00		15.00	34.00	
Max Q Clear Time (g_c+I1), s	7.04	27.83		8.17	18.73		2.00	21.49		7.77	31.24	
Green Extension Time (p_c)	0.08	4.26		0.00	9.03		0.05	11.60		0.20	2.68	

Intersection Summary	
HCM 2010 Control Delay	41.3
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	2	0	2	2	0
Capacity, veh/h	159	893	123	311	959	133	253	1434	204	193	1232	321
Arriving On Green	0.05	0.21	0.21	0.06	0.22	0.22	0.10	0.60	0.60	0.06	0.43	0.43
Sat Flow, veh/h	1774.0	4328.5	595.8	1774.0	4323.3	600.2	3441.6	3191.9	453.6	3441.6	2851.7	742.7
Grp Volume(v), veh/h	137.0	257.9	147.5	289.1	632.7	353.1	207.6	721.1	696.3	160.9	474.2	441.0
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1757.6	1774.0	1583.3	1756.8	1720.8	1862.7	1782.7	1720.8	1862.7	1731.7
Q Serve(g_s), s	3.7	7.5	7.8	5.2	20.8	20.9	6.3	34.3	35.0	4.9	20.7	20.7
Cycle Q Clear(g_c), s	3.7	7.5	7.8	5.2	20.8	20.9	6.3	34.3	35.0	4.9	20.7	20.7
Proportion In Lane	1.000		0.339	1.000		0.342	1.000		0.254	1.000		0.429
Lane Grp Cap(c), veh/h	158.9	653.5	362.7	310.8	702.6	389.8	252.8	836.7	800.8	193.2	804.5	747.9
V/C Ratio(X)	0.862	0.395	0.407	0.930	0.901	0.906	0.821	0.862	0.870	0.832	0.590	0.590
Avail Cap(c_a), veh/h	206.2	711.2	394.7	330.6	711.2	394.6	289.9	836.7	800.8	193.2	804.5	747.9
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.982	0.982	0.982	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.2	36.6	36.7	44.3	40.4	40.5	47.5	18.8	18.9	49.9	23.1	23.1
Incr Delay (d2), s/veh	20.0	0.5	1.0	30.2	14.8	24.2	11.9	10.1	11.1	24.2	3.2	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	69.2	37.2	37.8	74.5	55.2	64.7	59.4	28.9	29.9	74.2	26.3	26.5
Lane Group LOS	E	D	D	E	E	E	E	C	C	E	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		45.4			62.2			33.2			33.6	
Approach LOS		D			E			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	10.15	29.05		11.81	30.71		12.85	55.00		11.00	53.15	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	9.00	25.00		9.00	25.00		10.00	49.00		7.00	46.00	
Max Q Clear Time (g_c+I1), s	6.22	10.27		7.75	23.42		8.82	37.47		7.45	23.24	
Green Extension Time (p_c)	0.04	9.20		0.06	1.29		0.05	10.39		0.00	19.11	

Intersection Summary	
HCM 2010 Control Delay	42.9
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	2	0	2	2	0
Capacity, veh/h	197	854	165	226	1001	242	113	1132	300	276	1520	121
Arriving On Green	0.04	0.21	0.21	0.08	0.26	0.26	0.03	0.40	0.40	0.11	0.59	0.59
Sat Flow, veh/h	1774.0	4096.4	793.1	1774.0	3916.1	946.3	3441.6	2839.8	752.8	3441.6	3406.9	270.8
Grp Volume(v), veh/h	171.7	623.9	342.4	209.8	447.0	245.4	76.1	551.0	512.0	244.6	792.2	779.5
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1722.8	1774.0	1583.3	1695.8	1720.8	1862.7	1729.9	1720.8	1862.7	1815.0
Q Serve(g_s), s	2.3	20.5	20.7	7.9	12.9	13.3	2.3	26.6	26.6	7.4	41.9	42.9
Cycle Q Clear(g_c), s	2.3	20.5	20.7	7.9	12.9	13.3	2.3	26.6	26.6	7.4	41.9	42.9
Proportion In Lane	1.000		0.460	1.000		0.558	1.000		0.435	1.000		0.149
Lane Grp Cap(c), veh/h	196.9	660.3	359.3	225.6	809.2	433.3	113.1	742.7	689.7	276.2	831.0	809.7
V/C Ratio(X)	0.872	0.945	0.953	0.930	0.552	0.566	0.673	0.742	0.742	0.885	0.953	0.963
Avail Cap(c_a), veh/h	332.2	661.4	359.8	277.5	809.2	433.3	326.7	742.7	689.7	326.7	831.0	809.7
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.875	0.875	0.875	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	47.4	41.1	41.2	46.3	34.0	34.1	50.4	27.0	27.0	46.6	20.4	20.6
Incr Delay (d2), s/veh	5.5	20.6	32.6	29.9	1.0	2.1	2.5	6.3	6.8	19.6	21.7	23.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	53.0	61.7	73.8	76.2	35.0	36.3	52.8	33.3	33.8	66.2	42.1	44.3
Lane Group LOS	D	E	E	E	D	D	D	C	C	E	D	D
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		64.0			44.9			34.9			46.3	
Approach LOS		E			D			C			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.97	28.97		13.92	33.92		8.46	49.00		13.45	53.99	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	13.00	23.00		13.00	23.00		11.00	43.00		11.00	43.00	
Max Q Clear Time (g_c+I1), s	4.31	22.68		9.85	15.27		4.30	28.63		9.38	44.91	
Green Extension Time (p_c)	0.14	0.29		0.09	6.15		0.04	13.34		0.08	0.00	

Intersection Summary	
HCM 2010 Control Delay	47.5
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	1	3	0	1	3	0
Capacity, veh/h	177	1043	144	318	1048	145	324	1819	260	231	1628	420
Arriving On Green	0.04	0.24	0.24	0.04	0.24	0.24	0.06	0.56	0.56	0.04	0.42	0.42
Sat Flow, veh/h	1774.0	4328.5	595.8	1774.0	4323.3	600.2	1774.0	4305.8	615.1	1774.0	3859.4	994.5
Grp Volume(v), veh/h	137.0	257.9	147.5	289.1	632.7	353.1	207.6	912.1	505.3	160.9	594.3	320.9
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1757.6	1774.0	1583.3	1756.8	1774.0	1583.3	1754.2	1774.0	1583.3	1687.2
Q Serve(g_s), s	1.6	6.4	6.6	2.2	17.9	18.1	0.0	19.4	19.4	0.0	12.7	12.9
Cycle Q Clear(g_c), s	1.6	6.4	6.6	2.2	17.9	18.1	0.0	19.4	19.4	0.0	12.7	12.9
Proportion In Lane	1.000		0.339	1.000		0.342	1.000		0.351	1.000		0.589
Lane Grp Cap(c), veh/h	176.8	762.9	423.4	318.0	767.3	425.7	324.2	1337.6	741.0	231.4	1335.9	711.8
V/C Ratio(X)	0.775	0.338	0.348	0.909	0.825	0.830	0.640	0.682	0.682	0.695	0.445	0.451
Avail Cap(c_a), veh/h	329.0	801.5	444.9	467.7	801.5	444.7	436.9	1337.6	741.0	345.0	1335.9	711.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.982	0.982	0.982	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	43.3	29.7	29.8	38.9	34.0	34.1	31.5	16.3	16.3	38.3	19.5	19.6
Incr Delay (d2), s/veh	2.7	0.4	0.7	12.9	7.2	12.6	0.7	2.5	4.4	1.4	1.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	46.0	30.1	30.5	51.8	41.2	46.7	32.2	18.7	20.7	39.7	20.6	21.6
Lane Group LOS	D	C	C	D	D	D	C	B	C	D	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		34.2			45.1			21.1			23.8	
Approach LOS		C			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.86	29.84		9.00	29.98		8.98	47.05		8.93	47.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	13.00	25.00		13.00	25.00		11.00	41.00		11.00	41.00	
Max Q Clear Time (g_c+I1), s	4.06	9.09		4.66	20.57		2.50	21.90		2.50	15.37	
Green Extension Time (p_c)	0.10	9.71		0.27	3.40		0.17	16.26		0.12	20.91	

Intersection Summary	
HCM 2010 Control Delay	30.1
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	1	3	0	1	3	0
Capacity, veh/h	217	924	179	226	1027	248	191	1609	424	277	1954	156
Arriving On Green	0.04	0.23	0.23	0.08	0.26	0.26	0.03	0.42	0.42	0.05	0.57	0.57
Sat Flow, veh/h	1774.0	4096.4	793.1	1774.0	3916.1	946.3	1774.0	3838.7	1012.1	1774.0	4597.3	367.3
Grp Volume(v), veh/h	171.7	623.9	342.4	209.8	447.0	245.4	76.1	692.3	370.8	244.6	1002.5	569.3
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1722.8	1774.0	1583.3	1695.8	1774.0	1583.3	1684.1	1774.0	1583.3	1797.9
Q Serve(g_s), s	1.1	19.0	19.2	6.6	12.2	12.5	0.0	16.3	16.4	1.7	23.8	23.8
Cycle Q Clear(g_c), s	1.1	19.0	19.2	6.6	12.2	12.5	0.0	16.3	16.4	1.7	23.8	23.8
Proportion In Lane	1.000		0.460	1.000		0.558	1.000		0.601	1.000		0.204
Lane Grp Cap(c), veh/h	217.3	714.6	388.8	226.1	830.1	444.5	190.9	1327.0	705.7	277.4	1345.8	764.1
V/C Ratio(X)	0.790	0.873	0.881	0.928	0.538	0.552	0.398	0.522	0.525	0.882	0.745	0.745
Avail Cap(c_a), veh/h	324.3	726.7	395.3	268.3	830.1	444.5	325.5	1327.0	705.7	401.4	1345.8	764.1
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.858	0.858	0.858	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	44.1	37.4	37.5	44.2	31.8	31.9	39.7	21.6	21.7	38.6	17.7	17.7
Incr Delay (d2), s/veh	3.5	10.2	17.9	31.2	0.9	1.9	0.5	1.4	2.7	11.2	3.8	6.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	47.6	47.6	55.4	75.5	32.7	33.8	40.2	23.0	24.3	49.9	21.5	24.2
Lane Group LOS	D	D	E	E	C	C	D	C	C	D	C	C
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		49.9			42.9			24.6			26.2	
Approach LOS		D			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.96	29.62		12.62	33.27		8.40	49.00		8.99	49.60	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	11.00	24.00		11.00	24.00		12.00	43.00		12.00	43.00	
Max Q Clear Time (g_c+I1), s	3.11	21.25		8.57	14.51		2.00	18.44		3.73	25.83	
Green Extension Time (p_c)	0.13	2.37		0.07	7.34		0.05	21.60		0.21	15.60	

Intersection Summary	
HCM 2010 Control Delay	34.3
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	3	0	2	3	0	2	3	0	2	3	0
Capacity, veh/h	182	891	123	342	1092	152	256	1728	247	210	1496	385
Arriving On Green	0.05	0.21	0.21	0.10	0.25	0.25	0.10	0.53	0.53	0.06	0.39	0.39
Sat Flow, veh/h	3441.6	4328.5	595.8	3441.6	4323.3	600.2	3441.6	4305.8	615.1	3441.6	3859.4	994.5
Grp Volume(v), veh/h	137.0	257.9	147.5	289.1	632.7	353.1	207.6	912.1	505.3	160.9	594.3	320.9
Grp Sat Flow(s),veh/h/ln	1720.8	1583.3	1757.6	1720.8	1583.3	1756.8	1720.8	1583.3	1754.2	1720.8	1583.3	1687.2
Q Serve(g_s), s	4.1	7.3	7.5	8.5	19.3	19.4	6.1	22.5	22.5	4.8	14.6	14.8
Cycle Q Clear(g_c), s	4.1	7.3	7.5	8.5	19.3	19.4	6.1	22.5	22.5	4.8	14.6	14.8
Proportion In Lane	1.000		0.339	1.000		0.342	1.000		0.351	1.000		0.589
Lane Grp Cap(c), veh/h	181.8	651.9	361.8	342.4	799.7	443.7	256.5	1270.5	703.8	209.5	1227.3	653.9
V/C Ratio(X)	0.754	0.396	0.408	0.844	0.791	0.796	0.809	0.718	0.718	0.768	0.484	0.491
Avail Cap(c_a), veh/h	233.4	651.9	361.8	500.2	859.1	476.6	366.8	1270.5	703.8	366.8	1227.3	653.9
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.983	0.983	0.983	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	48.2	35.4	35.5	45.7	36.0	36.1	45.8	19.7	19.7	47.7	23.8	23.9
Incr Delay (d2), s/veh	6.7	0.5	1.0	5.9	5.1	9.2	5.0	3.1	5.5	2.2	1.4	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	54.9	36.0	36.6	51.6	41.2	45.3	50.7	22.7	25.1	50.0	25.2	26.5
Lane Group LOS	D	D	D	D	D	D	D	C	C	D	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		40.9			44.7			27.1			29.3	
Approach LOS		D			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	10.45	28.25		15.27	33.06		12.69	48.41		11.28	47.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	8.00	21.00		16.00	29.00		12.00	41.00		12.00	41.00	
Max Q Clear Time (g_c+I1), s	6.55	10.01		11.02	21.91		8.60	24.98		7.25	17.34	
Green Extension Time (p_c)	0.03	7.39		0.25	5.16		0.12	13.92		0.10	19.55	

Intersection Summary	
HCM 2010 Control Delay	34.2
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	3	0	2	3	0	2	3	0	2	3	0
Capacity, veh/h	205	988	191	243	989	239	114	1442	380	280	1948	156
Arriving On Green	0.06	0.24	0.24	0.07	0.25	0.25	0.03	0.38	0.38	0.11	0.56	0.56
Sat Flow, veh/h	3441.6	4096.4	793.1	3441.6	3916.1	946.3	3441.6	3838.7	1012.1	3441.6	4597.3	367.3
Grp Volume(v), veh/h	171.7	623.9	342.4	209.8	447.0	245.4	76.1	692.3	370.8	244.6	1002.5	569.3
Grp Sat Flow(s),veh/h/ln	1720.8	1583.3	1722.8	1720.8	1583.3	1695.8	1720.8	1583.3	1684.1	1720.8	1583.3	1797.9
Q Serve(g_s), s	5.1	19.3	19.5	6.3	12.8	13.1	2.3	18.1	18.3	7.3	24.8	24.8
Cycle Q Clear(g_c), s	5.1	19.3	19.5	6.3	12.8	13.1	2.3	18.1	18.3	7.3	24.8	24.8
Proportion In Lane	1.000		0.460	1.000		0.558	1.000		0.601	1.000		0.204
Lane Grp Cap(c), veh/h	204.7	763.7	415.5	243.4	799.3	428.0	114.1	1189.3	632.5	280.0	1342.0	761.9
V/C Ratio(X)	0.839	0.817	0.824	0.862	0.559	0.573	0.667	0.582	0.586	0.873	0.747	0.747
Avail Cap(c_a), veh/h	331.5	793.0	431.4	331.5	799.3	428.0	198.9	1189.3	632.5	430.9	1342.0	761.9
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.875	0.875	0.875	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	48.3	37.2	37.3	47.7	33.8	33.9	49.6	25.9	26.0	45.8	18.5	18.5
Incr Delay (d2), s/veh	4.3	6.0	11.1	12.5	1.1	2.3	2.4	2.0	3.8	8.0	3.8	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	52.6	43.3	48.4	60.2	34.9	36.2	52.0	27.9	29.7	53.7	22.3	25.1
Lane Group LOS	D	D	D	E	C	D	D	C	C	D	C	C
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		46.2			41.1			30.1			27.4	
Approach LOS		D			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.18	32.04		12.34	33.21		8.44	45.99		13.45	51.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	11.00	27.00		11.00	27.00		7.00	38.00		14.00	45.00	
Max Q Clear Time (g_c+I1), s	7.13	21.54		8.26	15.13		4.27	20.30		9.27	26.78	
Green Extension Time (p_c)	0.10	4.50		0.10	8.86		0.02	16.04		0.19	16.48	

Intersection Summary	
HCM 2010 Control Delay	34.8
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	3	0	2	3	0
Capacity, veh/h	180	846	118	340	995	139	254	1523	218	205	1310	338
Arriving On Green	0.05	0.26	0.26	0.10	0.31	0.31	0.10	0.47	0.47	0.06	0.34	0.34
Sat Flow, veh/h	3441.6	3200.3	446.4	3441.6	3200.4	446.3	3441.6	4305.8	615.1	3441.6	3859.4	994.5
Grp Volume(v), veh/h	137.0	205.6	199.8	289.1	503.6	482.3	207.6	912.1	505.3	160.9	594.3	320.9
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1784.0	1720.8	1862.7	1784.0	1720.8	1583.3	1754.2	1720.8	1583.3	1687.2
Q Serve(g_s), s	4.2	9.8	10.0	8.9	27.4	27.4	6.4	26.6	26.6	5.0	16.4	16.7
Cycle Q Clear(g_c), s	4.2	9.8	10.0	8.9	27.4	27.4	6.4	26.6	26.6	5.0	16.4	16.7
Proportion In Lane	1.000		0.250	1.000		0.250	1.000		0.351	1.000		0.589
Lane Grp Cap(c), veh/h	179.8	492.5	471.7	340.0	579.2	554.8	254.5	1120.2	620.5	205.3	1074.9	572.7
V/C Ratio(X)	0.762	0.417	0.424	0.850	0.869	0.869	0.816	0.814	0.814	0.784	0.553	0.560
Avail Cap(c_a), veh/h	192.2	492.5	471.7	480.6	606.9	581.2	352.4	1120.2	620.5	224.3	1074.9	572.7
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.982	0.982	0.982	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	50.2	32.7	32.7	47.6	34.9	34.9	47.7	25.4	25.4	49.8	28.9	28.9
Incr Delay (d2), s/veh	13.2	0.8	0.8	7.3	13.0	13.4	6.2	5.8	10.0	13.4	2.1	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	63.4	33.5	33.6	54.9	47.9	48.4	53.9	31.2	35.4	63.2	30.9	32.9
Lane Group LOS	E	C	C	D	D	D	D	C	D	E	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		41.1			49.7			35.4			36.3	
Approach LOS		D			D			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	10.61	35.40		15.61	40.41		12.94	45.00		11.41	43.46	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	7.00	27.00		16.00	36.00		12.00	39.00		8.00	35.00	
Max Q Clear Time (g_c+I1), s	6.72	12.47		11.38	29.92		8.85	29.06		7.45	19.16	
Green Extension Time (p_c)	0.01	9.01		0.24	4.48		0.11	9.00		0.01	13.78	

Intersection Summary	
HCM 2010 Control Delay	40.3
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	3	0	2	3	0
Capacity, veh/h	203	847	165	241	840	206	112	1328	350	276	1809	145
Arriving On Green	0.06	0.28	0.28	0.07	0.29	0.29	0.03	0.35	0.35	0.11	0.52	0.52
Sat Flow, veh/h	3441.6	3030.6	590.6	3441.6	2890.1	710.1	3441.6	3838.7	1012.1	3441.6	4597.3	367.3
Grp Volume(v), veh/h	171.7	497.1	469.2	209.8	357.3	335.1	76.1	692.3	370.8	244.6	1002.5	569.3
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1758.5	1720.8	1862.7	1737.4	1720.8	1583.3	1684.1	1720.8	1583.3	1797.9
Q Serve(g_s), s	5.3	28.0	28.0	6.5	18.0	18.1	2.3	19.6	19.7	7.5	27.9	27.9
Cycle Q Clear(g_c), s	5.3	28.0	28.0	6.5	18.0	18.1	2.3	19.6	19.7	7.5	27.9	27.9
Proportion In Lane	1.000		0.336	1.000		0.409	1.000		0.601	1.000		0.204
Lane Grp Cap(c), veh/h	203.2	520.6	491.4	241.3	541.2	504.8	111.9	1095.5	582.6	275.6	1246.1	707.5
V/C Ratio(X)	0.845	0.955	0.955	0.869	0.660	0.664	0.680	0.632	0.636	0.887	0.804	0.805
Avail Cap(c_a), veh/h	289.6	522.5	493.3	289.6	541.2	504.8	193.1	1095.5	582.6	321.8	1246.1	707.5
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.858	0.858	0.858	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.8	37.9	37.9	49.2	33.3	33.3	51.2	29.3	29.3	47.3	22.1	22.1
Incr Delay (d2), s/veh	9.2	25.8	26.8	18.6	3.3	3.7	2.6	2.6	5.0	20.5	5.6	9.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	59.1	63.7	64.6	67.8	36.7	37.0	53.7	31.9	34.3	67.8	27.7	31.6
Lane Group LOS	E	E	E	E	D	D	D	C	C	E	C	C
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		63.4			44.0			34.2			34.3	
Approach LOS		E			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.31	36.89		12.50	38.07		8.48	44.00		13.57	49.09	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	10.00	31.00		10.00	31.00		7.00	38.00		11.00	42.00	
Max Q Clear Time (g_c+I1), s	7.29	30.05		8.46	20.13		4.34	21.75		9.50	29.88	
Green Extension Time (p_c)	0.07	0.84		0.06	8.18		0.02	14.83		0.07	11.26	

Intersection Summary	
HCM 2010 Control Delay	42.6
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	327	46	266	796	111	191	1141	163	148	668	174
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	3	0	2	3	0
Capacity, veh/h	180	1081	149	324	1085	151	263	1727	247	210	1490	384
Arriving On Green	0.04	0.25	0.25	0.04	0.25	0.25	0.10	0.53	0.53	0.06	0.39	0.39
Sat Flow, veh/h	1774.0	4328.5	595.8	1774.0	4323.3	600.2	3441.6	4305.8	615.1	3441.6	3859.4	994.5
Grp Volume(v), veh/h	137.0	257.9	147.5	289.1	632.7	353.1	207.6	912.1	505.3	160.9	594.3	320.9
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1757.6	1774.0	1583.3	1756.8	1720.8	1583.3	1754.2	1720.8	1583.3	1687.2
Q Serve(g_s), s	1.3	6.5	6.7	1.7	18.2	18.3	5.7	21.2	21.2	4.5	13.8	14.0
Cycle Q Clear(g_c), s	1.3	6.5	6.7	1.7	18.2	18.3	5.7	21.2	21.2	4.5	13.8	14.0
Proportion In Lane	1.000		0.339	1.000		0.342	1.000		0.351	1.000		0.589
Lane Grp Cap(c), veh/h	179.7	790.8	438.9	323.7	794.8	440.9	262.6	1270.4	703.8	210.1	1222.2	651.2
V/C Ratio(X)	0.762	0.326	0.336	0.893	0.796	0.801	0.791	0.718	0.718	0.766	0.486	0.493
Avail Cap(c_a), veh/h	346.2	847.0	470.1	487.9	847.0	469.9	389.4	1270.4	703.8	283.2	1222.2	651.2
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.983	0.983	0.983	1.000	1.000	1.000	0.876	0.876	0.876	1.000	1.000	1.000
Uniform Delay (d), s/veh	44.2	29.8	29.9	39.4	34.1	34.1	42.9	18.5	18.5	45.0	22.6	22.6
Incr Delay (d2), s/veh	2.5	0.3	0.6	9.7	5.4	9.7	5.7	3.1	5.5	5.5	1.4	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	46.6	30.1	30.5	49.1	39.5	43.8	48.6	21.6	24.0	50.4	23.9	25.3
Lane Group LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Volume, veh/h		542			1275			1625			1076	
Approach Delay, s/veh		34.4			42.9			25.8			28.3	
Approach LOS		C			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.88	31.28		9.00	31.40		12.42	46.00		10.93	44.52	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	14.00	27.00		14.00	27.00		12.00	40.00		9.00	37.00	
Max Q Clear Time (g_c+I1), s	3.84	9.18		4.24	20.82		8.23	23.67		6.98	16.52	
Green Extension Time (p_c)	0.11	10.48		0.29	4.58		0.22	14.16		0.05	17.28	

Intersection Summary	
HCM 2010 Control Delay	32.2
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	158	744	145	193	511	126	70	773	205	225	1339	107
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	3	0	2	3	0
Capacity, veh/h	228	982	190	227	1063	257	116	1417	374	281	1917	153
Arriving On Green	0.04	0.24	0.24	0.07	0.27	0.27	0.03	0.37	0.37	0.11	0.55	0.55
Sat Flow, veh/h	1774.0	4096.4	793.1	1774.0	3916.1	946.3	3441.6	3838.7	1012.1	3441.6	4597.3	367.3
Grp Volume(v), veh/h	171.7	623.9	342.4	209.8	447.0	245.4	76.1	692.3	370.8	244.6	1002.5	569.3
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1722.8	1774.0	1583.3	1695.8	1720.8	1583.3	1684.1	1720.8	1583.3	1797.9
Q Serve(g_s), s	0.4	18.8	19.0	6.0	12.1	12.4	2.2	17.8	17.9	7.0	24.5	24.5
Cycle Q Clear(g_c), s	0.4	18.8	19.0	6.0	12.1	12.4	2.2	17.8	17.9	7.0	24.5	24.5
Proportion In Lane	1.000		0.460	1.000		0.558	1.000		0.601	1.000		0.204
Lane Grp Cap(c), veh/h	228.4	759.4	413.1	227.2	859.7	460.4	116.4	1168.9	621.7	281.3	1320.7	749.8
V/C Ratio(X)	0.752	0.822	0.829	0.924	0.520	0.533	0.654	0.592	0.596	0.869	0.759	0.759
Avail Cap(c_a), veh/h	387.7	786.1	427.7	330.2	859.7	460.4	205.1	1168.9	621.7	444.3	1320.7	749.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.875	0.875	0.875	1.000	1.000	1.000	0.952	0.952	0.952	1.000	1.000	1.000
Uniform Delay (d), s/veh	43.5	36.2	36.3	44.4	31.1	31.2	48.1	25.6	25.7	44.4	18.5	18.5
Incr Delay (d2), s/veh	1.7	6.3	11.6	19.9	0.8	1.6	2.2	2.1	4.0	6.6	4.1	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	45.2	42.6	47.9	64.4	31.9	32.8	50.3	27.8	29.7	51.0	22.7	25.6
Lane Group LOS	D	D	D	E	C	C	D	C	C	D	C	C
Approach Volume, veh/h		1138			902			1139			1816	
Approach Delay, s/veh		44.6			39.7			29.9			27.4	
Approach LOS		D			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.96	31.15		12.15	34.34		8.40	44.17		13.23	49.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	14.00	26.00		14.00	26.00		7.00	36.00		14.00	43.00	
Max Q Clear Time (g_c+I1), s	2.40	20.99		8.03	14.41		4.20	19.94		9.04	26.53	
Green Extension Time (p_c)	0.16	4.16		0.14	8.69		0.02	14.67		0.20	15.01	

Intersection Summary	
HCM 2010 Control Delay	34.1
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Capacity, veh/h	173	807	113	316	817	114	251	1310	186	163	1190	311
Arriving On Green	0.06	0.25	0.25	0.06	0.26	0.26	0.06	0.55	0.55	0.05	0.42	0.42
Sat Flow, veh/h	1774.0	3199.1	447.5	1774.0	3199.5	447.1	1774.0	3191.6	453.8	1774.0	2849.9	744.2
Grp Volume(v), veh/h	152.2	227.9	221.0	319.6	556.7	533.5	230.4	794.6	772.8	178.3	525.0	488.0
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1783.8	1774.0	1862.7	1783.9	1774.0	1862.7	1782.7	1774.0	1862.7	1731.4
Q Serve(g_s), s	5.2	11.4	11.6	7.0	28.0	28.0	3.7	45.0	45.0	6.0	25.1	25.1
Cycle Q Clear(g_c), s	5.2	11.4	11.6	7.0	28.0	28.0	3.7	45.0	45.0	6.0	25.1	25.1
Proportion In Lane	1.000		0.251	1.000		0.251	1.000		0.255	1.000		0.430
Lane Grp Cap(c), veh/h	173.3	469.8	449.9	316.2	475.6	455.5	250.8	764.4	731.6	162.7	777.7	722.8
V/C Ratio(X)	0.878	0.485	0.491	1.011	1.170	1.171	0.919	1.039	1.056	1.095	0.675	0.675
Avail Cap(c_a), veh/h	178.9	475.6	455.5	316.2	475.6	455.5	263.4	764.4	731.6	162.7	777.7	722.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.979	0.979	0.979	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.7	34.9	35.0	45.6	40.8	40.8	45.0	24.9	24.9	50.6	25.9	25.9
Incr Delay (d2), s/veh	33.1	1.1	1.2	53.3	97.2	98.2	29.1	40.5	46.5	98.4	4.7	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	82.8	36.0	36.2	98.9	138.0	139.1	74.1	65.4	71.4	149.0	30.6	30.9
Lane Group LOS	F	D	D	F	F	F	E	F	F	F	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		47.9			129.6			69.1			48.4	
Approach LOS		D			F			E			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.66	34.66		12.00	35.00		10.22	52.00		11.00	52.78	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	8.00	29.00		8.00	29.00		7.00	46.00		7.00	46.00	
Max Q Clear Time (g_c+I1), s	7.72	14.10		9.50	30.50		6.20	47.50		8.50	27.57	
Green Extension Time (p_c)	0.01	10.03		0.00	0.00		0.03	0.00		0.00	16.71	

Intersection Summary	
HCM 2010 Control Delay	78.7
HCM 2010 Level of Service	E

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	2	0	1	2	0
Capacity, veh/h	204	743	145	178	713	176	124	1110	294	254	1498	119
Arriving On Green	0.06	0.25	0.25	0.06	0.25	0.25	0.03	0.39	0.39	0.11	0.58	0.58
Sat Flow, veh/h	1774.0	3028.7	592.3	1774.0	2885.9	713.7	1774.0	2840.2	752.5	1774.0	3406.1	271.5
Grp Volume(v), veh/h	190.2	550.1	519.5	232.6	396.0	370.3	84.8	608.9	567.2	270.7	873.4	864.7
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1758.2	1774.0	1862.7	1736.8	1774.0	1862.7	1729.9	1774.0	1862.7	1814.8
Q Serve(g_s), s	5.8	27.0	27.0	7.0	22.4	22.4	1.1	32.5	32.7	9.0	48.4	48.4
Cycle Q Clear(g_c), s	5.8	27.0	27.0	7.0	22.4	22.4	1.1	32.5	32.7	9.0	48.4	48.4
Proportion In Lane	1.000		0.337	1.000		0.411	1.000		0.435	1.000		0.150
Lane Grp Cap(c), veh/h	204.3	457.2	431.6	178.3	460.3	429.2	123.9	728.2	676.3	253.5	819.2	798.1
V/C Ratio(X)	0.931	1.203	1.204	1.304	0.860	0.863	0.684	0.836	0.839	1.068	1.066	1.083
Avail Cap(c_a), veh/h	207.3	457.2	431.6	178.3	460.3	429.2	210.6	728.2	676.3	253.5	819.2	798.1
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.836	0.836	0.836	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.3	41.5	41.5	50.2	39.6	39.6	51.5	30.3	30.4	46.3	22.8	22.8
Incr Delay (d2), s/veh	37.9	107.9	109.0	171.5	15.6	16.8	2.3	10.4	11.2	75.6	50.6	56.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	87.2	149.4	150.5	221.7	55.2	56.4	53.9	40.7	41.6	121.8	73.4	79.7
Lane Group LOS	F	F	F	F	E	E	D	D	D	F	F	F
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		140.5			94.4			42.0			82.6	
Approach LOS		F			F			D			F	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.82	34.00		12.00	34.18		8.63	50.00		14.00	55.37	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	8.00	28.00		8.00	28.00		10.00	44.00		10.00	44.00	
Max Q Clear Time (g_c+I1), s	7.84	29.00		9.00	24.44		3.08	34.69		11.00	50.37	
Green Extension Time (p_c)	0.00	0.00		0.00	3.14		0.04	9.02		0.00	0.00	

Intersection Summary	
HCM 2010 Control Delay	88.7
HCM 2010 Level of Service	F

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	2	0	2	2	0
Capacity, veh/h	188	677	95	367	844	118	275	1306	186	188	1094	286
Arriving On Green	0.05	0.21	0.21	0.11	0.26	0.26	0.11	0.54	0.54	0.05	0.38	0.38
Sat Flow, veh/h	3441.6	3199.1	447.5	3441.6	3199.5	447.1	3441.6	3191.6	453.8	3441.6	2849.9	744.2
Grp Volume(v), veh/h	152.2	227.9	221.0	319.6	556.7	533.5	230.4	794.6	772.8	178.3	525.0	488.0
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1783.8	1720.8	1862.7	1783.9	1720.8	1862.7	1782.7	1720.8	1862.7	1731.4
Q Serve(g_s), s	4.8	12.1	12.3	10.1	29.0	29.0	7.2	45.0	45.0	5.7	26.6	26.6
Cycle Q Clear(g_c), s	4.8	12.1	12.3	10.1	29.0	29.0	7.2	45.0	45.0	5.7	26.6	26.6
Proportion In Lane	1.000		0.251	1.000		0.251	1.000		0.255	1.000		0.430
Lane Grp Cap(c), veh/h	187.7	394.2	377.5	366.8	491.1	470.3	274.6	762.0	729.3	187.7	715.0	664.6
V/C Ratio(X)	0.811	0.578	0.585	0.871	1.134	1.134	0.839	1.043	1.060	0.950	0.734	0.734
Avail Cap(c_a), veh/h	187.7	394.2	377.5	438.0	491.1	470.3	312.9	762.0	729.3	187.7	715.0	664.6
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.976	0.976	0.976	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	51.4	39.0	39.0	48.4	40.5	40.5	48.5	25.1	25.1	51.8	29.1	29.1
Incr Delay (d2), s/veh	21.0	2.5	2.8	13.5	82.8	83.8	12.6	41.6	47.6	50.7	6.6	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	72.4	41.5	41.8	61.9	123.3	124.3	61.1	66.6	72.7	102.5	35.7	36.1
Lane Group LOS	E	D	D	E	F	F	E	F	F	F	D	D
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		49.4			109.7			68.5			45.9	
Approach LOS		D			F			E			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.00	30.28		16.72	36.00		13.78	52.00		11.00	49.22	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	7.00	22.00		15.00	30.00		11.00	46.00		7.00	42.00	
Max Q Clear Time (g_c+I1), s	7.31	14.76		12.56	31.50		9.73	47.50		8.18	29.10	
Green Extension Time (p_c)	0.00	5.56		0.16	0.00		0.06	0.00		0.00	11.98	

Intersection Summary	
HCM 2010 Control Delay	72.4
HCM 2010 Level of Service	E

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	2	0	2	2	0
Capacity, veh/h	219	743	145	188	682	169	113	1136	301	282	1529	122
Arriving On Green	0.06	0.25	0.25	0.05	0.24	0.24	0.03	0.40	0.40	0.11	0.60	0.60
Sat Flow, veh/h	3441.6	3028.7	592.3	3441.6	2885.9	713.7	3441.6	2840.2	752.5	3441.6	3406.1	271.5
Grp Volume(v), veh/h	190.2	550.1	519.5	232.6	396.0	370.3	84.8	608.9	567.2	270.7	873.4	864.7
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1758.2	1720.8	1862.7	1736.8	1720.8	1862.7	1729.9	1720.8	1862.7	1814.8
Q Serve(g_s), s	6.0	27.0	27.0	6.0	22.7	22.8	2.7	32.0	32.2	8.6	49.4	49.4
Cycle Q Clear(g_c), s	6.0	27.0	27.0	6.0	22.7	22.8	2.7	32.0	32.2	8.6	49.4	49.4
Proportion In Lane	1.000		0.337	1.000		0.411	1.000		0.435	1.000		0.150
Lane Grp Cap(c), veh/h	219.0	457.2	431.6	187.7	440.3	410.5	113.4	745.1	692.0	281.6	836.1	814.6
V/C Ratio(X)	0.869	1.203	1.204	1.239	0.899	0.902	0.747	0.817	0.820	0.961	1.045	1.061
Avail Cap(c_a), veh/h	219.0	457.2	431.6	187.7	440.3	410.5	187.7	745.1	692.0	281.6	836.1	814.6
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.814	0.814	0.814	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	51.0	41.5	41.5	52.0	40.7	40.8	52.7	29.4	29.5	48.8	22.2	22.2
Incr Delay (d2), s/veh	23.9	107.5	108.6	144.6	21.4	23.0	3.4	9.1	9.9	42.7	43.4	49.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	74.9	149.0	150.1	196.6	62.1	63.7	56.2	38.5	39.3	91.5	65.5	71.3
Lane Group LOS	E	F	F	F	E	E	E	D	D	F	F	F
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		138.3			94.0			40.1			71.5	
Approach LOS		F			F			D			E	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	12.00	34.00		11.00	33.00		8.63	51.00		14.00	56.37	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	8.00	28.00		7.00	27.00		7.00	45.00		10.00	48.00	
Max Q Clear Time (g_c+I1), s	8.03	29.00		8.00	24.77		4.69	34.20		10.61	51.37	
Green Extension Time (p_c)	0.00	0.00		0.00	2.01		0.02	10.42		0.00	0.00	

Intersection Summary	
HCM 2010 Control Delay	83.6
HCM 2010 Level of Service	F

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	3	0	1	3	0
Capacity, veh/h	174	1028	144	342	985	138	252	1485	213	201	1396	362
Arriving On Green	0.06	0.32	0.32	0.04	0.31	0.31	0.07	0.46	0.46	0.07	0.36	0.36
Sat Flow, veh/h	1774.0	3199.1	447.5	1774.0	3199.5	447.1	1774.0	4303.0	617.5	1774.0	3853.9	999.2
Grp Volume(v), veh/h	152.2	227.9	221.0	319.6	556.7	533.5	230.4	1008.6	558.8	178.3	659.0	354.1
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1783.8	1774.0	1862.7	1783.9	1774.0	1583.3	1753.8	1774.0	1583.3	1686.4
Q Serve(g_s), s	4.6	10.1	10.3	3.0	31.6	31.7	3.7	32.1	32.1	5.7	18.0	18.2
Cycle Q Clear(g_c), s	4.6	10.1	10.3	3.0	31.6	31.7	3.7	32.1	32.1	5.7	18.0	18.2
Proportion In Lane	1.000		0.251	1.000		0.251	1.000		0.352	1.000		0.592
Lane Grp Cap(c), veh/h	174.0	598.8	573.5	341.8	573.2	549.0	252.5	1092.6	605.1	200.6	1147.0	610.8
V/C Ratio(X)	0.875	0.381	0.385	0.935	0.971	0.972	0.913	0.923	0.923	0.889	0.575	0.580
Avail Cap(c_a), veh/h	189.3	598.8	573.5	381.5	573.2	549.0	313.3	1092.6	605.1	231.0	1147.0	610.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.976	0.976	0.976	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	48.8	28.1	28.2	42.2	36.6	36.7	44.0	27.7	27.7	47.8	27.5	27.6
Incr Delay (d2), s/veh	29.6	0.6	0.6	27.4	30.4	31.3	20.9	12.2	19.3	27.0	2.1	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	78.3	28.7	28.8	69.7	67.0	68.0	64.9	39.9	46.9	74.8	29.6	31.6
Lane Group LOS	E	C	C	E	E	E	E	D	D	E	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		41.3			68.0			45.3			37.0	
Approach LOS		D			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.07	41.47		9.60	40.00		10.32	44.00		12.16	45.84	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	8.00	34.00		8.00	34.00		10.00	38.00		10.00	38.00	
Max Q Clear Time (g_c+I1), s	7.13	12.79		5.46	34.17		6.21	34.58		8.16	20.68	
Green Extension Time (p_c)	0.02	12.85		0.14	0.00		0.12	3.29		0.04	15.62	

Intersection Summary	
HCM 2010 Control Delay	49.2
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	2	0	1	2	0	1	3	0	1	3	0
Capacity, veh/h	215	902	176	201	968	239	127	1143	302	285	1703	137
Arriving On Green	0.04	0.30	0.30	0.07	0.34	0.34	0.03	0.30	0.30	0.14	0.49	0.49
Sat Flow, veh/h	1774.0	3028.7	592.3	1774.0	2885.9	713.7	1774.0	3835.1	1015.2	1774.0	4595.1	369.1
Grp Volume(v), veh/h	190.2	550.1	519.5	232.6	396.0	370.3	84.8	766.9	409.2	270.7	1108.2	629.9
Grp Sat Flow(s),veh/h/ln	1774.0	1862.7	1758.2	1774.0	1862.7	1736.8	1774.0	1583.3	1683.6	1774.0	1583.3	1797.6
Q Serve(g_s), s	2.3	31.6	31.6	8.0	19.3	19.3	0.9	24.1	24.2	10.3	35.7	35.7
Cycle Q Clear(g_c), s	2.3	31.6	31.6	8.0	19.3	19.3	0.9	24.1	24.2	10.3	35.7	35.7
Proportion In Lane	1.000		0.337	1.000		0.411	1.000		0.603	1.000		0.205
Lane Grp Cap(c), veh/h	215.2	555.1	523.9	201.1	624.7	582.5	126.5	943.6	501.7	285.3	1173.3	666.0
V/C Ratio(X)	0.884	0.991	0.992	1.157	0.634	0.636	0.670	0.813	0.816	0.949	0.944	0.946
Avail Cap(c_a), veh/h	281.5	555.1	523.9	201.1	624.7	582.5	298.3	943.6	501.7	328.4	1173.3	666.0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.814	0.814	0.814	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	47.3	37.6	37.6	48.3	30.1	30.1	50.2	34.9	35.0	43.4	26.2	26.2
Incr Delay (d2), s/veh	16.0	32.1	33.3	112.1	2.4	2.6	2.1	7.2	12.9	32.7	15.9	23.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	63.3	69.7	70.8	160.5	32.5	32.8	52.4	42.1	47.8	76.1	42.1	50.0
Lane Group LOS	E	E	E	F	C	C	D	D	D	E	D	D
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		69.2			62.4			44.6			49.2	
Approach LOS		E			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.98	39.00		13.00	43.02		8.60	39.00		16.39	46.79	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	9.00	33.00		9.00	33.00		15.00	33.00		15.00	33.00	
Max Q Clear Time (g_c+I1), s	4.29	33.62		10.00	21.34		2.95	26.21		12.28	37.74	
Green Extension Time (p_c)	0.10	0.00		0.00	9.27		0.06	6.58		0.11	0.00	

Intersection Summary	
HCM 2010 Control Delay	55.1
HCM 2010 Level of Service	E

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	1	3	0	1	3	0
Capacity, veh/h	191	811	113	371	978	137	252	1514	217	201	1424	369
Arriving On Green	0.06	0.25	0.25	0.11	0.31	0.31	0.06	0.47	0.47	0.06	0.37	0.37
Sat Flow, veh/h	3441.6	3199.1	447.5	3441.6	3199.5	447.1	1774.0	4303.0	617.5	1774.0	3853.9	999.2
Grp Volume(v), veh/h	152.2	227.9	221.0	319.6	556.7	533.5	230.4	1008.6	558.8	178.3	659.0	354.1
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1783.8	1720.8	1862.7	1783.9	1774.0	1583.3	1753.8	1774.0	1583.3	1686.4
Q Serve(g_s), s	4.7	11.2	11.4	9.9	32.0	32.0	3.5	31.8	31.8	5.5	17.9	18.1
Cycle Q Clear(g_c), s	4.7	11.2	11.4	9.9	32.0	32.0	3.5	31.8	31.8	5.5	17.9	18.1
Proportion In Lane	1.000		0.251	1.000		0.251	1.000		0.352	1.000		0.592
Lane Grp Cap(c), veh/h	191.2	472.0	452.0	370.7	569.2	545.0	252.4	1114.2	617.0	200.5	1170.3	623.2
V/C Ratio(X)	0.796	0.483	0.489	0.862	0.978	0.979	0.913	0.905	0.906	0.889	0.563	0.568
Avail Cap(c_a), veh/h	191.2	472.0	452.0	509.9	569.2	545.0	316.6	1114.2	617.0	233.3	1170.3	623.2
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.979	0.979	0.979	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	50.4	34.3	34.4	47.4	37.1	37.2	44.2	27.1	27.1	48.1	27.1	27.2
Incr Delay (d2), s/veh	18.7	1.1	1.1	8.4	32.2	33.1	20.5	10.4	16.8	26.5	2.0	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	69.0	35.4	35.5	55.8	69.3	70.3	64.7	37.5	43.9	74.7	29.1	30.9
Lane Group LOS	E	D	D	E	E	E	E	D	D	E	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		43.9			66.6			42.9			36.4	
Approach LOS		D			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.00	34.37		16.63	40.00		10.09	45.00		12.00	46.92	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	7.00	24.00		17.00	34.00		10.00	39.00		10.00	39.00	
Max Q Clear Time (g_c+I1), s	7.22	13.90		12.36	34.50		5.97	34.27		8.00	20.59	
Green Extension Time (p_c)	0.00	7.38		0.27	0.00		0.12	4.53		0.05	16.51	

Intersection Summary	
HCM 2010 Control Delay	48.2
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	1	3	0	1	3	0
Capacity, veh/h	224	951	186	224	906	224	126	1105	293	285	1673	134
Arriving On Green	0.07	0.31	0.31	0.07	0.31	0.31	0.03	0.29	0.29	0.15	0.48	0.48
Sat Flow, veh/h	3441.6	3028.7	592.3	3441.6	2885.9	713.7	1774.0	3835.1	1015.2	1774.0	4595.1	369.1
Grp Volume(v), veh/h	190.2	550.1	519.5	232.6	396.0	370.3	84.8	766.9	409.2	270.7	1108.2	629.9
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1758.2	1720.8	1862.7	1736.8	1774.0	1583.3	1683.6	1774.0	1583.3	1797.6
Q Serve(g_s), s	5.9	30.9	30.9	7.0	19.9	20.0	1.0	24.5	24.6	10.7	36.3	36.4
Cycle Q Clear(g_c), s	5.9	30.9	30.9	7.0	19.9	20.0	1.0	24.5	24.6	10.7	36.3	36.4
Proportion In Lane	1.000		0.337	1.000		0.411	1.000		0.603	1.000		0.205
Lane Grp Cap(c), veh/h	224.5	585.2	552.4	224.0	584.9	545.4	126.4	912.6	485.2	285.1	1153.2	654.6
V/C Ratio(X)	0.847	0.940	0.941	1.039	0.677	0.679	0.671	0.840	0.843	0.949	0.961	0.962
Avail Cap(c_a), veh/h	415.9	588.8	555.7	224.0	584.9	545.4	297.8	912.6	485.2	321.7	1153.2	654.6
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.814	0.814	0.814	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.7	35.9	35.9	50.3	32.1	32.2	50.3	36.0	36.0	43.5	27.0	27.0
Incr Delay (d2), s/veh	2.8	20.3	21.3	70.6	3.5	3.8	2.2	8.7	15.4	33.8	18.6	27.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	52.5	56.2	57.2	120.9	35.6	36.0	52.5	44.6	51.4	77.2	45.6	54.0
Lane Group LOS	D	E	E	F	D	D	D	D	D	E	D	D
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		56.1			55.6			47.4			52.5	
Approach LOS		E			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	12.02	40.79		12.00	40.78		8.60	38.00		16.78	46.17	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	14.00	35.00		8.00	29.00		15.00	32.00		15.00	32.00	
Max Q Clear Time (g_c+I1), s	7.88	32.94		9.00	22.00		2.96	26.59		12.68	38.40	
Green Extension Time (p_c)	0.16	1.85		0.00	5.91		0.06	5.27		0.10	0.00	

Intersection Summary	
HCM 2010 Control Delay	52.7
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	2	0	2	2	0
Capacity, veh/h	175	785	108	340	964	134	276	1384	197	195	1168	305
Arriving On Green	0.06	0.18	0.18	0.10	0.22	0.22	0.11	0.58	0.58	0.06	0.41	0.41
Sat Flow, veh/h	1774.0	4326.5	597.4	1774.0	4320.8	602.3	3441.6	3191.6	453.8	3441.6	2849.9	744.2
Grp Volume(v), veh/h	152.2	285.9	163.1	319.6	700.3	389.9	230.4	794.6	772.8	178.3	525.0	488.0
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1757.3	1774.0	1583.3	1756.5	1720.8	1862.7	1782.7	1720.8	1862.7	1731.4
Q Serve(g_s), s	4.9	8.6	8.9	9.3	23.4	23.5	7.0	44.2	45.9	5.5	24.6	24.6
Cycle Q Clear(g_c), s	4.9	8.6	8.9	9.3	23.4	23.5	7.0	44.2	45.9	5.5	24.6	24.6
Proportion In Lane	1.000		0.340	1.000		0.343	1.000		0.255	1.000		0.430
Lane Grp Cap(c), veh/h	174.9	574.7	318.9	340.3	706.3	391.7	276.5	808.0	773.2	194.7	763.7	709.9
V/C Ratio(X)	0.870	0.497	0.511	0.939	0.992	0.995	0.833	0.983	0.999	0.915	0.687	0.688
Avail Cap(c_a), veh/h	251.9	686.8	381.1	343.6	706.3	391.7	324.5	808.0	773.2	194.7	763.7	709.9
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.976	0.976	0.976	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	48.0	39.1	39.2	43.1	41.1	41.1	46.7	22.1	22.4	49.8	25.7	25.7
Incr Delay (d2), s/veh	14.6	0.9	1.8	32.5	31.7	44.2	11.1	25.2	29.5	40.8	5.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	62.6	40.0	40.9	75.6	72.8	85.3	57.8	47.3	51.9	90.6	30.7	31.1
Lane Group LOS	E	D	D	E	E	F	E	D	D	F	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		46.0			76.9			50.6			39.8	
Approach LOS		D			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.40	26.25		15.81	30.65		13.52	53.00		11.00	50.48	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	12.00	24.00		12.00	24.00		11.00	47.00		7.00	43.00	
Max Q Clear Time (g_c+I1), s	7.41	11.38		11.79	26.01		9.46	48.44		7.97	27.06	
Green Extension Time (p_c)	0.07	8.87		0.01	0.00		0.07	0.00		0.00	14.61	

Intersection Summary	
HCM 2010 Control Delay	54.9
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	2	0	2	2	0
Capacity, veh/h	205	792	154	197	805	196	115	1204	319	301	1629	130
Arriving On Green	0.06	0.19	0.19	0.07	0.21	0.21	0.03	0.42	0.42	0.12	0.64	0.64
Sat Flow, veh/h	1774.0	4091.7	797.1	1774.0	3908.7	952.6	3441.6	2840.2	752.5	3441.6	3406.1	271.5
Grp Volume(v), veh/h	190.2	691.5	378.1	232.6	495.6	270.7	84.8	608.9	567.2	270.7	873.4	864.7
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1722.1	1774.0	1583.3	1694.6	1720.8	1862.7	1729.9	1720.8	1862.7	1814.8
Q Serve(g_s), s	5.6	21.0	21.0	8.0	16.0	16.4	2.6	30.4	30.5	8.4	49.2	51.4
Cycle Q Clear(g_c), s	5.6	21.0	21.0	8.0	16.0	16.4	2.6	30.4	30.5	8.4	49.2	51.4
Proportion In Lane	1.000		0.463	1.000		0.562	1.000		0.435	1.000		0.150
Lane Grp Cap(c), veh/h	205.0	612.9	333.3	197.2	652.0	348.9	114.6	789.7	733.4	301.5	890.9	868.0
V/C Ratio(X)	0.928	1.128	1.134	1.180	0.760	0.776	0.740	0.771	0.773	0.898	0.980	0.996
Avail Cap(c_a), veh/h	226.9	612.9	333.3	197.2	652.0	348.9	190.3	789.7	733.4	348.9	890.9	868.0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.836	0.836	0.836	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	48.7	43.8	43.8	48.9	40.6	40.7	52.0	26.7	26.8	47.5	19.3	19.6
Incr Delay (d2), s/veh	33.0	74.5	87.0	121.0	5.6	11.1	3.3	6.8	7.3	21.1	25.8	29.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	81.6	118.2	130.7	169.9	46.1	51.8	55.3	33.5	34.1	68.6	45.0	49.3
Lane Group LOS	F	F	F	F	D	D	E	C	C	E	D	D
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		116.4			76.5			35.2			50.0	
Approach LOS		F			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.66	28.00		13.00	29.34		8.61	53.00		14.51	58.89	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	9.00	22.00		9.00	22.00		7.00	47.00		12.00	52.00	
Max Q Clear Time (g_c+I1), s	7.65	23.00		10.00	18.38		4.65	32.49		10.42	53.36	
Green Extension Time (p_c)	0.04	0.00		0.00	3.19		0.02	13.87		0.09	0.00	

Intersection Summary	
HCM 2010 Control Delay	66.6
HCM 2010 Level of Service	E

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	1	3	0	1	3	0
Capacity, veh/h	178	1037	143	347	1112	155	278	1680	241	204	1533	397
Arriving On Green	0.05	0.24	0.24	0.07	0.26	0.26	0.06	0.52	0.52	0.05	0.40	0.40
Sat Flow, veh/h	1774.0	4326.5	597.4	1774.0	4320.8	602.3	1774.0	4303.0	617.5	1774.0	3853.9	999.2
Grp Volume(v), veh/h	152.2	285.9	163.1	319.6	700.3	389.9	230.4	1008.6	558.8	178.3	659.0	354.1
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1757.3	1774.0	1583.3	1756.5	1774.0	1583.3	1753.8	1774.0	1583.3	1686.4
Q Serve(g_s), s	3.2	7.2	7.4	4.6	20.0	20.1	0.9	25.2	25.2	3.1	15.0	15.2
Cycle Q Clear(g_c), s	3.2	7.2	7.4	4.6	20.0	20.1	0.9	25.2	25.2	3.1	15.0	15.2
Proportion In Lane	1.000		0.340	1.000		0.343	1.000		0.352	1.000		0.592
Lane Grp Cap(c), veh/h	178.1	758.9	421.1	347.1	815.3	452.2	278.3	1236.2	684.6	204.4	1259.6	670.8
V/C Ratio(X)	0.855	0.377	0.387	0.921	0.859	0.862	0.828	0.816	0.816	0.872	0.523	0.528
Avail Cap(c_a), veh/h	352.3	835.3	463.5	489.8	835.3	463.3	390.8	1236.2	684.6	303.8	1259.6	670.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.979	0.979	0.979	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	43.3	30.1	30.2	38.1	33.5	33.6	36.8	19.9	19.9	41.9	21.7	21.8
Incr Delay (d2), s/veh	4.4	0.4	0.8	15.2	9.1	15.5	5.9	5.1	8.8	11.9	1.6	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	47.6	30.5	31.0	53.3	42.7	49.1	42.8	25.0	28.8	53.9	23.3	24.7
Lane Group LOS	D	C	C	D	D	D	D	C	C	D	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		35.0			46.9			28.5			28.3	
Approach LOS		C			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	9.69	29.71		11.38	31.40		8.99	44.00		9.69	44.70	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	15.00	26.00		15.00	26.00		11.00	38.00		11.00	38.00	
Max Q Clear Time (g_c+I1), s	5.68	9.87		7.08	22.58		3.40	27.70		5.64	17.67	
Green Extension Time (p_c)	0.12	10.68		0.30	2.82		0.19	9.61		0.10	18.07	

Intersection Summary	
HCM 2010 Control Delay	34.4
HCM 2010 Level of Service	C

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/2/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	1	3	0	1	3	0
Capacity, veh/h	207	926	180	248	1113	271	148	1410	373	285	1894	152
Arriving On Green	0.04	0.23	0.23	0.10	0.28	0.28	0.03	0.37	0.37	0.10	0.55	0.55
Sat Flow, veh/h	1774.0	4091.7	797.1	1774.0	3908.7	952.6	1774.0	3835.1	1015.2	1774.0	4595.1	369.1
Grp Volume(v), veh/h	190.2	691.5	378.1	232.6	495.6	270.7	84.8	766.9	409.2	270.7	1108.2	629.9
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1722.1	1774.0	1583.3	1694.6	1774.0	1583.3	1683.6	1774.0	1583.3	1797.6
Q Serve(g_s), s	3.4	22.9	23.1	9.7	14.1	14.4	0.0	21.4	21.5	7.2	31.4	31.5
Cycle Q Clear(g_c), s	3.4	22.9	23.1	9.7	14.1	14.4	0.0	21.4	21.5	7.2	31.4	31.5
Proportion In Lane	1.000		0.463	1.000		0.562	1.000		0.603	1.000		0.205
Lane Grp Cap(c), veh/h	207.2	716.4	389.6	248.1	902.0	482.7	147.6	1164.1	618.9	285.0	1305.0	740.8
V/C Ratio(X)	0.918	0.965	0.970	0.938	0.549	0.561	0.575	0.659	0.661	0.950	0.849	0.850
Avail Cap(c_a), veh/h	348.3	716.4	389.6	285.3	902.0	482.7	254.8	1164.1	618.9	313.3	1305.0	740.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.836	0.836	0.836	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	47.5	40.6	40.7	45.8	32.2	32.3	48.6	28.0	28.0	42.6	21.2	21.2
Incr Delay (d2), s/veh	10.5	22.7	34.1	33.1	0.9	1.8	1.2	2.7	5.1	35.1	7.0	11.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	57.9	63.3	74.8	78.8	33.1	34.1	49.9	30.7	33.2	77.6	28.2	32.9
Lane Group LOS	E	E	E	E	C	C	D	C	C	E	C	C
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		65.9			44.0			32.8			36.4	
Approach LOS		E			D			C			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	9.56	31.00		15.78	37.22		8.59	46.00		13.31	50.72	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	14.00	25.00		14.00	25.00		11.00	40.00		11.00	40.00	
Max Q Clear Time (g_c+I1), s	5.42	25.09		11.71	16.42		2.00	23.54		9.23	33.46	
Green Extension Time (p_c)	0.15	0.00		0.08	7.11		0.05	15.50		0.08	6.34	

Intersection Summary	
HCM 2010 Control Delay	43.7
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	3	0	2	3	0	2	3	0	2	3	0
Capacity, veh/h	200	1028	142	374	1246	174	280	1517	218	227	1300	337
Arriving On Green	0.06	0.24	0.24	0.11	0.29	0.29	0.11	0.47	0.47	0.07	0.34	0.34
Sat Flow, veh/h	3441.6	4326.5	597.4	3441.6	4320.8	602.3	3441.6	4303.0	617.5	3441.6	3853.9	999.2
Grp Volume(v), veh/h	152.2	285.9	163.1	319.6	700.3	389.9	230.4	1008.6	558.8	178.3	659.0	354.1
Grp Sat Flow(s),veh/h/ln	1720.8	1583.3	1757.3	1720.8	1583.3	1756.5	1720.8	1583.3	1753.8	1720.8	1583.3	1686.4
Q Serve(g_s), s	4.4	7.7	8.0	9.3	20.6	20.7	6.7	30.0	30.0	5.2	17.8	18.0
Cycle Q Clear(g_c), s	4.4	7.7	8.0	9.3	20.6	20.7	6.7	30.0	30.0	5.2	17.8	18.0
Proportion In Lane	1.000		0.340	1.000		0.343	1.000		0.352	1.000		0.592
Lane Grp Cap(c), veh/h	199.6	752.4	417.5	374.3	913.1	506.5	279.6	1116.7	618.5	226.7	1068.1	568.8
V/C Ratio(X)	0.762	0.380	0.391	0.854	0.767	0.770	0.824	0.903	0.903	0.786	0.617	0.622
Avail Cap(c_a), veh/h	303.4	775.5	430.4	539.4	992.7	550.6	370.9	1116.7	618.5	303.4	1068.1	568.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.976	0.976	0.976	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	47.4	32.6	32.7	44.7	33.2	33.2	44.8	25.5	25.5	47.0	28.3	28.4
Incr Delay (d2), s/veh	2.3	0.4	0.8	6.4	3.7	6.7	7.0	10.2	16.5	6.6	2.7	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	49.7	33.1	33.5	51.1	36.9	39.9	51.8	35.7	42.0	53.6	31.0	33.4
Lane Group LOS	D	C	C	D	D	D	D	D	D	D	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		37.4			40.9			39.7			35.1	
Approach LOS		D			D			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	10.92	31.25		16.10	36.44		13.29	43.00		11.73	41.43	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	10.00	26.00		17.00	33.00		12.00	37.00		10.00	35.00	
Max Q Clear Time (g_c+I1), s	6.95	10.46		11.81	23.23		9.19	32.47		7.71	20.48	
Green Extension Time (p_c)	0.07	10.39		0.29	7.21		0.12	4.34		0.07	13.27	

Intersection Summary	
HCM 2010 Control Delay	38.7
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	3	0	2	3	0	2	3	0	2	3	0
Capacity, veh/h	222	981	191	263	984	240	115	1429	378	303	1964	158
Arriving On Green	0.06	0.24	0.24	0.08	0.25	0.25	0.03	0.37	0.37	0.12	0.57	0.57
Sat Flow, veh/h	3441.6	4091.7	797.1	3441.6	3908.7	952.6	3441.6	3835.1	1015.2	3441.6	4595.1	369.1
Grp Volume(v), veh/h	190.2	691.5	378.1	232.6	495.6	270.7	84.8	766.9	409.2	270.7	1108.2	629.9
Grp Sat Flow(s),veh/h/ln	1720.8	1583.3	1722.1	1720.8	1583.3	1694.6	1720.8	1583.3	1683.6	1720.8	1583.3	1797.6
Q Serve(g_s), s	5.9	22.9	23.0	7.2	14.9	15.3	2.6	21.6	21.7	8.3	30.4	30.5
Cycle Q Clear(g_c), s	5.9	22.9	23.0	7.2	14.9	15.3	2.6	21.6	21.7	8.3	30.4	30.5
Proportion In Lane	1.000		0.463	1.000		0.562	1.000		0.603	1.000		0.205
Lane Grp Cap(c), veh/h	221.7	759.2	412.8	263.3	797.4	426.8	115.2	1180.3	627.5	303.2	1353.2	768.2
V/C Ratio(X)	0.858	0.911	0.916	0.884	0.621	0.634	0.736	0.650	0.652	0.893	0.819	0.820
Avail Cap(c_a), veh/h	287.8	764.9	415.9	287.8	797.4	426.8	159.9	1180.3	627.5	383.7	1353.2	768.2
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.836	0.836	0.836	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.9	39.8	39.9	49.2	35.7	35.9	51.5	27.9	28.0	47.0	19.9	19.9
Incr Delay (d2), s/veh	12.9	13.2	21.9	23.3	1.7	3.5	5.3	2.6	4.9	16.8	5.6	9.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	62.7	53.0	61.8	72.5	37.5	39.4	56.9	30.6	32.9	63.8	25.5	29.4
Lane Group LOS	E	D	E	E	D	D	E	C	C	E	C	C
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		57.1			46.1			33.1			31.9	
Approach LOS		E			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.93	32.81		13.23	34.11		8.60	47.12		14.48	53.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	10.00	27.00		10.00	27.00		6.00	40.00		13.00	47.00	
Max Q Clear Time (g_c+I1), s	7.89	25.02		9.21	17.31		4.63	23.68		10.35	32.49	
Green Extension Time (p_c)	0.07	1.78		0.04	7.92		0.01	15.37		0.14	13.74	

Intersection Summary	
HCM 2010 Control Delay	40.5
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	3	0	2	3	0
Capacity, veh/h	188	822	115	370	991	138	273	1514	217	223	1300	337
Arriving On Green	0.05	0.26	0.26	0.11	0.31	0.31	0.11	0.47	0.47	0.06	0.34	0.34
Sat Flow, veh/h	3441.6	3199.1	447.5	3441.6	3199.5	447.1	3441.6	4303.0	617.5	3441.6	3853.9	999.2
Grp Volume(v), veh/h	152.2	227.9	221.0	319.6	556.7	533.5	230.4	1008.6	558.8	178.3	659.0	354.1
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1783.8	1720.8	1862.7	1783.9	1720.8	1583.3	1753.8	1720.8	1583.3	1686.4
Q Serve(g_s), s	4.8	11.4	11.5	10.0	32.3	32.3	7.2	32.3	32.3	5.6	19.1	19.3
Cycle Q Clear(g_c), s	4.8	11.4	11.5	10.0	32.3	32.3	7.2	32.3	32.3	5.6	19.1	19.3
Proportion In Lane	1.000		0.251	1.000		0.251	1.000		0.352	1.000		0.592
Lane Grp Cap(c), veh/h	188.3	478.7	458.4	369.8	577.0	552.5	273.5	1114.1	617.0	223.5	1068.2	568.8
V/C Ratio(X)	0.808	0.476	0.482	0.864	0.965	0.966	0.843	0.905	0.906	0.798	0.617	0.622
Avail Cap(c_a), veh/h	188.3	478.7	458.4	502.0	577.4	552.9	282.4	1114.1	617.0	282.4	1068.2	568.8
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.976	0.976	0.976	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	51.3	34.5	34.6	48.2	37.3	37.3	48.4	27.5	27.5	50.6	30.4	30.5
Incr Delay (d2), s/veh	20.6	1.0	1.1	9.0	28.9	29.8	15.9	10.4	16.8	9.3	2.7	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	71.9	35.5	35.7	57.1	66.1	67.0	64.3	37.9	44.3	59.8	33.1	35.6
Lane Group LOS	E	D	D	E	E	E	E	D	D	E	C	D
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		44.8			64.4			43.3			37.8	
Approach LOS		D			E			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.00	35.19		16.78	40.98		13.72	45.59		12.12	44.00	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	7.00	25.00		17.00	35.00		10.00	38.00		10.00	38.00	
Max Q Clear Time (g_c+I1), s	7.30	14.02		12.52	34.80		9.71	34.77		8.10	21.82	
Green Extension Time (p_c)	0.00	7.90		0.26	0.17		0.01	3.12		0.06	14.67	

Intersection Summary	
HCM 2010 Control Delay	48.1
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/3/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	2	2	0	2	2	0	2	3	0	2	3	0
Capacity, veh/h	222	900	176	263	893	221	115	1211	321	302	1700	137
Arriving On Green	0.06	0.30	0.30	0.08	0.31	0.31	0.03	0.32	0.32	0.12	0.49	0.49
Sat Flow, veh/h	3441.6	3028.7	592.3	3441.6	2885.9	713.7	3441.6	3835.1	1015.2	3441.6	4595.1	369.1
Grp Volume(v), veh/h	190.2	550.1	519.5	232.6	396.0	370.3	84.8	766.9	409.2	270.7	1108.2	629.9
Grp Sat Flow(s),veh/h/ln	1720.8	1862.7	1758.2	1720.8	1862.7	1736.8	1720.8	1583.3	1683.6	1720.8	1583.3	1797.6
Q Serve(g_s), s	5.9	31.7	31.7	7.2	20.1	20.2	2.6	23.5	23.7	8.4	35.8	35.9
Cycle Q Clear(g_c), s	5.9	31.7	31.7	7.2	20.1	20.2	2.6	23.5	23.7	8.4	35.8	35.9
Proportion In Lane	1.000		0.337	1.000		0.411	1.000		0.603	1.000		0.205
Lane Grp Cap(c), veh/h	221.6	553.6	522.5	263.3	576.1	537.1	115.2	999.9	531.6	301.8	1171.6	665.1
V/C Ratio(X)	0.858	0.994	0.994	0.884	0.687	0.689	0.736	0.767	0.770	0.897	0.946	0.947
Avail Cap(c_a), veh/h	287.7	553.6	522.5	287.7	576.1	537.1	191.8	999.9	531.6	351.6	1171.6	665.1
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.814	0.814	0.814	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	49.9	37.7	37.7	49.2	32.6	32.6	51.6	33.3	33.3	47.1	26.3	26.3
Incr Delay (d2), s/veh	12.6	32.9	34.0	23.3	3.8	4.1	3.2	5.3	9.7	20.7	16.1	24.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	62.5	70.6	71.7	72.5	36.4	36.8	54.8	38.5	43.0	67.7	42.5	50.4
Lane Group LOS	E	E	E	E	D	D	D	D	D	E	D	D
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		69.8			45.0			41.1			48.4	
Approach LOS		E			D			D			D	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	11.93	39.00		13.24	40.30		8.60	41.00		14.44	46.84	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	10.00	33.00		10.00	33.00		7.00	35.00		12.00	40.00	
Max Q Clear Time (g_c+I1), s	7.89	33.74		9.21	22.16		4.63	25.66		10.35	37.89	
Green Extension Time (p_c)	0.07	0.00		0.04	8.71		0.02	8.98		0.09	2.07	

Intersection Summary	
HCM 2010 Control Delay	51.0
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	362	51	294	880	123	212	1261	181	164	739	193
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	3	0	2	3	0
Capacity, veh/h	179	1109	153	349	1169	163	289	1541	221	233	1318	342
Arriving On Green	0.04	0.26	0.26	0.06	0.27	0.27	0.11	0.48	0.48	0.07	0.34	0.34
Sat Flow, veh/h	1774.0	4326.5	597.4	1774.0	4320.8	602.3	3441.6	4303.0	617.5	3441.6	3853.9	999.2
Grp Volume(v), veh/h	152.2	285.9	163.1	319.6	700.3	389.9	230.4	1008.6	558.8	178.3	659.0	354.1
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1757.3	1774.0	1583.3	1756.5	1720.8	1583.3	1753.8	1720.8	1583.3	1686.4
Q Serve(g_s), s	2.4	6.8	7.0	3.4	19.1	19.2	6.0	26.7	26.7	4.7	15.9	16.1
Cycle Q Clear(g_c), s	2.4	6.8	7.0	3.4	19.1	19.2	6.0	26.7	26.7	4.7	15.9	16.1
Proportion In Lane	1.000		0.340	1.000		0.343	1.000		0.352	1.000		0.592
Lane Grp Cap(c), veh/h	179.2	811.4	450.3	348.7	856.7	475.2	289.4	1134.4	628.3	233.0	1082.6	576.5
V/C Ratio(X)	0.849	0.352	0.362	0.916	0.817	0.820	0.796	0.889	0.889	0.765	0.609	0.614
Avail Cap(c_a), veh/h	411.1	893.8	496.0	555.2	893.8	495.8	597.8	1134.4	628.3	411.0	1082.6	576.5
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	0.976	0.976	0.976	1.000	1.000	1.000	0.838	0.838	0.838	1.000	1.000	1.000
Uniform Delay (d), s/veh	42.2	28.0	28.1	36.8	31.5	31.5	40.1	22.5	22.5	42.2	25.2	25.3
Incr Delay (d2), s/veh	4.2	0.4	0.7	9.8	6.1	10.8	1.6	9.0	14.9	2.0	2.5	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	46.3	28.4	28.8	46.7	37.6	42.3	41.7	31.5	37.3	44.2	27.7	30.1
Lane Group LOS	D	C	C	D	D	D	D	C	D	D	C	C
Approach Volume, veh/h		601			1410			1798			1191	
Approach Delay, s/veh		33.0			40.9			34.6			30.9	
Approach LOS		C			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	8.96	30.60		10.28	31.92		12.75	40.00		11.24	38.49	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	17.00	27.00		17.00	27.00		17.00	34.00		12.00	29.00	
Max Q Clear Time (g_c+I1), s	4.92	9.51		5.93	21.67		8.51	29.17		7.19	18.61	
Green Extension Time (p_c)	0.14	11.33		0.35	4.25		0.26	4.63		0.12	9.68	

Intersection Summary	
HCM 2010 Control Delay	35.3
HCM 2010 Level of Service	D

HCM 2010 Signalized Intersection Summary
105: Cooper Road & Guadalupe Rd

10/4/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	823	161	214	565	140	78	855	227	249	1480	119
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Queue, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking, Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow Rate	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Lanes	1	3	0	1	3	0	2	3	0	2	3	0
Capacity, veh/h	208	908	177	249	1089	265	118	1369	362	305	1889	152
Arriving On Green	0.04	0.22	0.22	0.10	0.28	0.28	0.03	0.36	0.36	0.12	0.55	0.55
Sat Flow, veh/h	1774.0	4091.7	797.1	1774.0	3908.7	952.6	3441.6	3835.1	1015.2	3441.6	4595.1	369.1
Grp Volume(v), veh/h	190.2	691.5	378.1	232.6	495.6	270.7	84.8	766.9	409.2	270.7	1108.2	629.9
Grp Sat Flow(s),veh/h/ln	1774.0	1583.3	1722.1	1774.0	1583.3	1694.6	1720.8	1583.3	1683.6	1720.8	1583.3	1797.6
Q Serve(g_s), s	3.5	22.5	22.7	9.4	13.9	14.2	2.5	21.3	21.4	8.0	30.8	30.8
Cycle Q Clear(g_c), s	3.5	22.5	22.7	9.4	13.9	14.2	2.5	21.3	21.4	8.0	30.8	30.8
Proportion In Lane	1.000		0.463	1.000		0.562	1.000		0.603	1.000		0.205
Lane Grp Cap(c), veh/h	207.6	702.5	382.1	249.0	881.9	471.9	118.3	1130.2	600.9	304.8	1301.7	738.9
V/C Ratio(X)	0.916	0.984	0.990	0.934	0.562	0.574	0.716	0.679	0.681	0.888	0.851	0.852
Avail Cap(c_a), veh/h	368.2	702.5	382.1	309.0	881.9	471.9	332.0	1130.2	600.9	398.4	1301.7	738.9
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	0.814	0.814	0.814	1.000	1.000	1.000	0.937	0.937	0.937	1.000	1.000	1.000
Uniform Delay (d), s/veh	46.4	40.2	40.2	44.7	32.0	32.1	49.6	28.3	28.3	45.2	20.8	20.8
Incr Delay (d2), s/veh	7.2	26.7	38.7	28.5	1.0	2.1	2.8	3.1	5.8	14.8	7.2	11.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Group Delay (d), s/veh	53.6	66.9	79.0	73.2	33.0	34.2	52.4	31.4	34.1	60.1	28.0	32.8
Lane Group LOS	D	E	E	E	C	C	D	C	C	E	C	C
Approach Volume, veh/h		1260			999			1261			2009	
Approach Delay, s/veh		68.5			42.7			33.7			33.8	
Approach LOS		E			D			C			C	

Timer												
Assigned Phase	7	4		3	8		5	2		1	6	
Phase Duration (G+Y+Rc), s	9.62	30.00		15.49	35.87		8.56	44.00		14.18	49.62	
Change Period (Y+Rc), s	4.00	6.00		4.00	6.00		4.00	6.00		4.00	6.00	
Max Green Setting (Gmax), s	15.00	24.00		15.00	24.00		11.00	38.00		13.00	40.00	
Max Q Clear Time (g_c+I1), s	5.48	24.69		11.39	16.22		4.53	23.41		10.03	32.84	
Green Extension Time (p_c)	0.16	0.00		0.11	6.51		0.05	13.82		0.15	6.93	

Intersection Summary	
HCM 2010 Control Delay	43.3
HCM 2010 Level of Service	D