LODI CITY COUNCIL

Carnegie Forum
305 West Pine Street, Lodi

"SHIRTSLEEVE" SESSION
Date: August 12, 2014
Time: 7:00 a.m.

For information regarding this Agenda please contact:
Jennifer M. Robison
City Clerk
Telephone: (209) 333-6702

Informal Informational Meeting

A. Roll Call by City Clerk

B. Topic(s)

B-1 2014 Signal Priority Study (PW)

B-2 Roundabout Presentation (PW)

C. Comments by Public on Non-Agenda Items

D. Adjournment

Pursuant to Section 54954.2(a) of the Government Code of the State of California, this agenda was posted at least 72 hours in advance of the scheduled meeting at a public place freely accessible to the public 24 hours a day.

_____
Jennifer M. Robison
City Clerk

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AGENDA ITEM **B-1**

CITY OF LODI
COUNCIL COMMUNICATION

TM

AGENDA TITLE: 2014 Signal Priority Study

MEETING DATE: August 12, 2014 (Shirtsleeve Session)

PREPARED BY: Public Works Director

RECOMMENDED ACTION: 2014 Signal Priority Study

BACKGROUND INFORMATION: At the Shirtsleeve Session, the Public Works Department staff will present a summary of the City's Signal Priority Study. The following key items will be briefly discussed:

Primary Purpose – The Public Works Department began a program of studying non-signalized intersections with high volumes and accident history. The primary purpose of the program is to determine if any of these intersections meet the minimum traffic signal criteria established by Caltrans and, if so, in what order of priority they should be installed. It is necessary to prioritize the signal installations as the cost of installing traffic signals exceeds available construction funds.

Previous Intersections Installed Based on Past Signal Priority Studies – Since 2000, the City has installed 12 new signals throughout the City.

Caltrans Traffic Signal Guidelines – Caltrans has adopted nine traffic signal warrants that the City uses as a guideline to determine where signals are considered for installation.

Priority System Worksheet – After the Caltrans signal warrants and other factors are reviewed, the intersections are ranked using the priority system. Points are assigned for the traffic volumes entering the intersection, accident history, speed of traffic, proximity to nearest existing traffic signal, and special conditions.

Results – 13 of the 24 intersections studied satisfy the Caltrans guidelines. The scoring results are summarized in Table 1 below.

Funding – Staff has revenue for signal installation from the Congestion Mitigation and Air Quality Program (CMAQ), Regional Surface Transportation Program (RSTP), Gas Tax, and Local Development Impact Fees. There is $400,000 budgeted in Fiscal Year 2014/15 CIP for one traffic signal installation.

APPROVED: _____

Stephen Schwabauer, City Manager

TABLE 1

INTERSECTION	SCORE
1. Turner Road and Highway 99 Southbound Ramps	354
2. Victor Road (SR12) and Guild Avenue	348
3. Harney Lane and Mills Avenue	268
4. Elm Street and Mills Avenue	266
5. Turner Road and Highway 99 Northbound Ramps	220
6. Stockton Street and Century Boulevard	206
7. Turner Road and California Street / Edgewood Drive	184
8. Lockeford Street and Stockton Street	150
9. Stockton Street and Tokay Street	143
10. Turner Road and Sacramento Street	133
11. Ham Lane and Lodi Memorial Driveway	113
12. Century Boulevard and Mills Avenue	104
13. Cherokee Lane and Century Boulevard	51
14. Cherokee Lane and Elm Street	N/A, did not satisfy Caltrans warrants
15. Cherokee Lane and Pioneer Drive	N/A, did not satisfy Caltrans warrants
16. Cherokee Lane and Vine Street	N/A, did not satisfy Caltrans warrants
17. Church Street and Locust Street	N/A, did not satisfy Caltrans warrants
18. Church Street and Tokay Street	N/A, did not satisfy Caltrans warrants
19. Crescent Avenue and Tokay Street	N/A, did not satisfy Caltrans warrants
20. Elm Street and Pacific Avenue	N/A, did not satisfy Caltrans warrants
21. Lockeford Street and California Street	N/A, did not satisfy Caltrans warrants
22. Mills Avenue and Lockeford Street	N/A, did not satisfy Caltrans warrants
23. Pine Street and Stockton Street	N/A, did not satisfy Caltrans warrants
24. Turner Road and Loma Drive	N/A, did not satisfy Caltrans warrants

FISCAL IMPACT: Not applicable.

FUNDING AVAILABLE: Not applicable.

F. Wally Sandelin
Public Works Director

Prepared by Dorothy Kam, Assistant Engineer
FWS/DK/pmf
cc: City Engineer/Deputy Public Works Director
Transportation Manage/Senior Traffic Engineer

CITY OF LODI

PUBLIC WORKS DEPARTMENT

TRAFFIC SIGNAL
PRIORITY STUDY
(Abridged Edition)

July 2014

PREPARED BY:

Paula Fernandez, Transportation Manager/Senior Traffic Engineer
Dorothy Kam, Assistant Engineer

UNDER THE DIRECTION OF:

F. Wally Sandelin, Public Works Director
Charlie Swimley, Deput Public Works Director/City Engineer

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(Abridged Edition)

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I. SCOPE OF STUDY

In 1970, the Engineering Division began a program of studying high traffic volume and high accident non-signalized intersections within the City of Lodi. The primary purpose of these studies was to determine whether any of these intersections warranted the installation of traffic signals and, if so, in what order of priority should they be installed. The study is periodically updated with latest update performed in 2000.

II. THE WARRANTS

The warrants used for traffic control signals are those adopted by the State of California and published in the California Department of Transportation (Caltrans) "California Manual on Uniform Traffic Control Devices."

The satisfaction of a warrant is not necessarily justification for signals. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown. The City may also find it advantageous to install signals at one intersection ahead of another because of a scheduled street project or available funding.

The types of warrants are:

Warrant 1 – Eight-hour vehicular volume
Warrant 2 – Four-hour vehicular volume
Warrant 3 – Peak hour
Warrant 4 – Pedestrian volume
Warrant 5 – School crossings
Warrant 6 – Coordinated signal system
Warrant 7 – Crash experience
Warrant 8 – Roadway network
Warrant 9 – Intersection near a grade crossing

III. THE PRIORITIES

When the cost of installing traffic signals exceeds available construction funds, it is necessary to determine a systematic method of prioritizing signal installation. Intersections meeting one or more of the Caltrans Warrants are assigned priority ranking based on a point system.

In 1985, the City Council and the former Highway and Transportation Committee of the Chamber of Commerce expressed concerns over the relative weighting of various factors, such as, accidents and speeds in the 1970 priority system. The priority system was revised based upon a study that compared five systems used by northern California cities, including Lodi.

In summary, the intersections that meet the Caltrans signal warrants would rate highest on the priority system if they have the following characteristics:

a. High traffic volume entering the intersection;

b. Large number of accidents of a type that could be corrected by the installation of signals;

c. High approach speeds;

d. Be located a considerable distance from another signalized intersection.

Exhibit A is an example of the priority worksheet. A more detailed description of each priority characteristic is provided below.

Traffic Volumes – Points are assigned using a combination of total approach volume and percentage of minor street traffic. More points are given as the total approach volumes increase. Some additional points are given as the minor street percentage increases. Points for vehicular volumes are taken from a volume table shown on the priority worksheets.

As an example, an intersection with a total of 12,000 vehicles daily entering from all four approaches and 2,400 (20%) vehicles entering from the two minor approaches, scores a point rating of 92. The closer the traffic from the minor street approaches 50% of the total volume entering the intersection, the higher the point rating. The same intersection with 4,800 vehicles (40%) entering from the minor approaches receives a point rating of 132.

Collisions – For this category, only collisions corrected by the installation of a signal are considered; such as right angle collisions and most pedestrian collisions. A four-year period is evaluated with 12 points per collision for the present year and 6 points per collision for the second to fourth years. Pedestrian collisions count as 1.5 points. Assigning more points for the most current year makes the system more responsive to recent changes.

Approach Speed – Points given for approach speeds range from 0 points for 25 mph to 150 points for 50 mph and more. More points are given as the approach speeds on the major street increases given the higher potential of a more critical high speed collision. Four-way stop sign controlled intersections are given 0 points.

Coordinated Movement – Negative points are given to intersections within 1,200 feet of another signalized intersection. The minimum distance between signalized intersections is 600 feet. When signalized intersections are properly located and timed, traffic can effectively flow through the intersections.

Special Conditions – This factor is applied to two-way controlled intersections unless the collision history indicates existing four-way stop control is insufficient. Additional factors may be considered such as traffic at adjacent intersections, unusual geometry or project scheduling requirements.

IV. THE INTERSECTIONS

Since 2000, the Engineering Division studied many intersections to determine whether they warranted a traffic signal installation. As a result of these studies and other development and improvement projects, signals have been installed at the following twelve intersections since 2000:

1. Cherokee Lane and Tokay Street
2. Century Boulevard and Ham Lane
3. Century Boulevard and Lower Sacramento Road
4. Ham Lane and Harney Lane
5. Harney Lane and Lower Sacramento Road
6. Harney Lane and Stockton Street
7. Harney Lane and Reynolds Ranch Parkway
8. Lebaron Boulevard and Reynolds Ranch Parkway
9. Lockeford Street and Sacramento Street
10. Lodi Avenue and Mills Avenue
11. Lower Sacramento Road and Tokay Street
12. Reynolds Ranch Parkway and Rocky Lane

The following 21 traffic signals have been modified by either adding left turn phases (arrows) and/or upgrading the signal cabinet/controller equipment:

1. Central Avenue and Lodi Avenue
2. Cherokee Lane and Lockeford Street
3. Cherokee Lane and Lodi Avenue
4. Cherokee Lane and Pine Street
5. Cherokee Lane and Victor Road
6. Church Street and Elm Street
7. Church Street and Lockeford Street
8. Church Street and Lodi Avenue
9. Church Street and Turner Road
10. Elm Street and Ham Lane
11. Elm Street and Lower Sacramento Road
12. Fairmont Avenue and Lodi Avenue
13. Ham Lane and Lockeford Street
14. Ham Lane and Lodi Avenue
15. Ham Lane and Turner Street
16. Harney Lane and Hutchins Street
17. Lodi Avenue and Sacramento Street
18. Lower Sacramento Road (N) and Turner Road
19. Lower Sacramento Road and Vine Street
20. Mills Avenue and Turner Road
21. Pine Street and Sacramento Street

The current studied intersections that satisfied one or more of the Caltrans warrant(s) for the consideration of a traffic signal have been prioritized. The intersections that warrant consideration of a traffic signal are listed below, in priority order.

1.	Turner Road and Highway 99 SB ramps	354
2.	Victor Road (SR12) and Guild Avenue	348
3.	Harney Lane and Mills Avenue	268
4.	Elm Street and Mills Avenue	266
5.	Turner Road and Highway 99 NB ramps	220
6.	Stockton Street and Century Boulevard	206
7.	Turner Road and California Street / Edgewood Drive	184
8.	Lockeford Street and Stockton Street	150
9.	Stockton Street and Tokay Street	143
10.	Turner Road and Sacramento Street	133
11.	Ham Lane and Lodi Memorial driveway	113
12.	Century Boulevard and Mills Avenue	104
13.	Cherokee Lane and Century Boulevard	51

The Signal Priority Worksheets are presented in the Appendix; however, the signal warrant sheets, collision diagrams, and volume sheets for all of the intersections studied are not included in this abridged edition.

Intersections studied not meeting any warrant from the traffic signal warrant guidelines are as follows:

1. Cherokee Lane and Elm Street
2. Cherokee Lane and Pioneer Drive
3. Cherokee Lane and Vine Street
4. Church Street and Locust Street
5. Church Street and Tokay Street
6. Crescent Avenue and Tokay Street
7. Elm Street and Pacific Avenue
8. Lockeford Street and California Street
9. Mills Avenue and Lockeford Street
10. Pine Street and Stockton Street
11. Turner Road and Loma Drive

Appendix

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Turner Rd — Volume: 12.3
Minor St: Hwy 99 SB Ramps — Volume: 4.4 — % of Total 26
Total Volume: 16.7 — (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value — **236**

Accidents

12 points per accident for recent year: 0 X 12 = 0
6 points per accident for second to fourth year: 1 X 6 = 6
(Pedestrian accidents count as 1.5) — TOTAL **6**

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

112

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other	
(Describe)	

0

By: Dorothy Kam — Date: June 10, 2014 — TOTAL POINTS **354**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Victor Rd — **Volume:** 10.6
Minor St: Guild Ave — **Volume:** 4.4 — **% of Total** 29
Total Volume: 15.0 — **(Volumes in 1000's)**

FACTOR	COMPUTATIONS	POINTS
Volume		

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value — **POINTS: 180**

Accidents

12 points per accident for recent year — 1 X 12 = 12
6 points per accident for second to fourth year — 1 X 6 = 6
(Pedestrian accidents count as 1.5) — TOTAL **18**

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 150

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

POINTS: 0

By: Dorothy Kam — Date: June 10, 2014 — **TOTAL POINTS 348**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Harney Ln — Volume: 8.7
Minor St: Mills Ave — Volume: 1.6 — % of Total 16
Total Volume: 10.3 — (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

POINTS: 76

Accidents

12 points per accident for recent year — 2 X 12 = 24
6 points per accident for second to fourth year — 3 X 6 = 18
(Pedestrian accidents count as 1.5) — TOTAL

POINTS: 42

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 150

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other	
(Describe)	

POINTS: 0

By: Dorothy Kam — Date: June 10 , 2014 — **TOTAL POINTS 268**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Elm St — **Volume:** 7.8
Minor St: Mills Ave — **Volume:** 6.8 — **% of Total** 47
Total Volume: 14.6 — **(Volumes in 1000's)**

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

POINTS: 215

Accidents

12 points per accident for recent year — 1 X 12 = 12
6 points per accident for second to fourth year — 6.5 X 6 = 39
(Pedestrian accidents count as 1.5) — TOTAL

POINTS: 51

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 0

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

POINTS: 0

By: Dorothy Kam — Date: June 11, 2014 — **TOTAL POINTS** 266

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Turner Rd — Volume: 7.3
Minor St: Hwy 99 NB Ramps — Volume: 3.7 — % of Total 34
Total Volume: 11.0 — (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

POINTS: 108

Accidents

12 points per accident for recent year — 0 X 12 = 0
6 points per accident for second to fourth year — 0 X 6 = 0
(Pedestrian accidents count as 1.5) — TOTAL

POINTS: 0

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 112

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other	
(Describe)	

POINTS: 0

By: Dorothy Kam — Date: February 20, 2014 — **TOTAL POINTS 220**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Stockton St — **Volume:** 9.2
Minor St: Century Blvd — **Volume:** 1.2 — **% of Total** 12
Total Volume: 10.4 — **(Volumes in 1000's)**

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value — **POINTS: 45**

Accidents

12 points per accident for recent year — 2 X 12 = 24
6 points per accident for second to fourth year — 0 X 6 = 0
(Pedestrian accidents count as 1.5) — TOTAL — **POINTS: 24**

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 112

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other Salas Park	
(Describe)	25

POINTS: 25

By: Dorothy Kam — Date: June 20, 2014 — **TOTAL POINTS: 206**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Turner Rd Volume: 14.6
Minor St: California St / Edgewood Dr Volume: 1.6 % of Total 10
Total Volume: 16.2 (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS
Volume		48

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

Accidents

12 points per accident for recent year	1	X	12	=	12
6 points per accident for second to fourth year	2	X	6	=	12
(Pedestrian accidents count as 1.5)				TOTAL	24

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

112

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

0

By: Dorothy Kam Date: June 23, 2014 TOTAL POINTS 184

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Lockeford St — **Volume:** 9.7
Minor St: Stockton St — **Volume:** 3.8 — **% of Total** 28
Total Volume: 13.5 — **(Volumes in 1000's)**

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value — **161**

Accidents

12 points per accident for recent year — 1 X 12 = 12
6 points per accident for second to fourth year — 2 X 6 = 12
(Pedestrian accidents count as 1.5) — TOTAL **24**

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

0

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

-35

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other	
(Describe)	

0

By: Dorothy Kam — Date: June 23, 2014 — **TOTAL POINTS** **150**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Stockton St — Volume: 6.8
Minor St: Tokay St — Volume: 5.1 — % of Total 43
Total Volume: 11.9 (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

POINTS: 137

Accidents

12 points per accident for recent year — 0 X 12 = 0
6 points per accident for second to fourth year — 1 X 6 = 6
(Pedestrian accidents count as 1.5) — TOTAL

POINTS: 6

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 0

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

POINTS: 0

By: Dorothy Kam — Date: June 23, 2014 — **TOTAL POINTS 143**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Turner Rd — Volume: 15.2
Minor St: Sacramento St — Volume: 1.1 — % of Total 6
Total Volume: 16.3 — (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value — **48**

Accidents

12 points per accident for recent year — 1 X 12 = 12
6 points per accident for second to fourth year — 2 X 6 = 12
(Pedestrian accidents count as 1.5) — TOTAL **24**

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

96

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

-35

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

0

By: Dorothy Kam — Date: June 23, 2014 — TOTAL POINTS **133**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Ham Ln — Volume: 13.8
Minor St: Lodi Memorial Dwy — Volume: 1.5 — % of Total 10
Total Volume: 15.3 — (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

POINTS: 41

Accidents

12 points per accident for recent year — 0 X 12 = 0
6 points per accident for second to fourth year — 1 X 6 = 6
(Pedestrian accidents count as 1.5) — TOTAL

POINTS: 6

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 96

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: -80

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other	
(Describe)	

POINTS: 50

By: Dorothy Kam — Date: June 23, 2014 — **TOTAL POINTS 113**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Century Blvd — Volume: 4.8
Minor St: Mills Ave — Volume: 4.2 — % of Total 47
Total Volume: 9.0 — (Volumes in 1000's)

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value

POINTS: 80

Accidents

12 points per accident for recent year — 1 X 12 = 12
6 points per accident for second to fourth year — 2 X 6 = 12
(Pedestrian accidents count as 1.5) — TOTAL

POINTS: 24

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 0

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

POINTS: 0

By: Dorothy Kam — Date: February 6, 2014 — **TOTAL POINTS 104**

CITY OF LODI
Public Works Department

TRAFFIC SIGNAL PRIORITY WORKSHEET

Major St: Cherokee Ln — **Volume:** 7.4
Minor St: Century Blvd — **Volume:** 1.6 — **% of Total** 18
Total Volume: 9.0 — **(Volumes in 1000's)**

FACTOR	COMPUTATIONS	POINTS

Volume

Minor Street — Total Entering Intersection

%	8	9	10	11	12	13	14	15	16	17	18	19	20
5	4	5	6	8	10	12	15	18	21	24	27	30	33
10	10	12	15	18	22	26	30	34	41	48	55	62	70
15	25	31	37	45	53	62	71	80	93	106	119	132	145
20	42	51	60	76	92	108	124	140	160	180	200	220	240
25	51	62	72	90	107	125	142	160	180	208	232	256	280
30	61	73	85	104	123	142	161	180	208	236	264	292	320
35	63	75	87	108	128	148	169	188	210	249	278	308	338
40	65	77	89	111	132	154	176	196	229	261	292	323	355
45	67	79	91	114	137	160	183	206	240	273	306	338	372
50	68	80	95	117	141	165	190	215	250	285	320	353	389

Do not interpolate - use next highest value — **POINTS: 51**

Accidents

12 points per accident for recent year: 0 X 12 = 0
6 points per accident for second to fourth year: 0 X 6 = 0
(Pedestrian accidents count as 1.5) — TOTAL — **POINTS: 0**

Speed

Use highest 85 percentile approach speed (4-way stop =0)

Speed (mph)	26	28	30	32	34	36	38	40	42	44	46	48	50
Points	4	12	20	28	36	46	58	70	82	96	112	130	150

POINTS: 0

Coordinated Movement

Distance from proposed signal to nearest existing signal.
(Minimum distance is 600 feet)

Distance (ft)	1200	1000	900	800	700	600
Points	0	-20	-35	-50	-65	-80

POINTS: 0

Special Conditions

Apply to two-way stop controlled intersections unless accident history indicates existing four-way stop control is insufficient.

CONDITION	POINTS
Signal warranted under Caltrans pedestrian or school crossing warrant	100
Meets 50% of above requirements	75
Intersection adjacent to school, major pedestrian generator or RR tracks within intersection	50
On school or major generator route or RR tracks adjacent to intersection	25
Other _____	
(Describe) _____	

POINTS: 0

By: Dorothy Kam — Date: June 23, 2014 — **TOTAL POINTS: 51**

The City of Lodi

Public Works

Shirtsleeve Session
Signal Priority Study

August 12, 2014

Overview

- Background
- Signal Installations / Upgrades since 2000
- Study Methodology
- Study Results
- Typical Signal Costs
- Questions

Background

- 4 updates since 1970
- Last update in 2000
- Purpose: Evaluate need / priority
- 24 Intersections Studied
  - High Traffic Volumes
  - High Collision Rates
  - Non-Signalized

Signal Installation / Upgrade

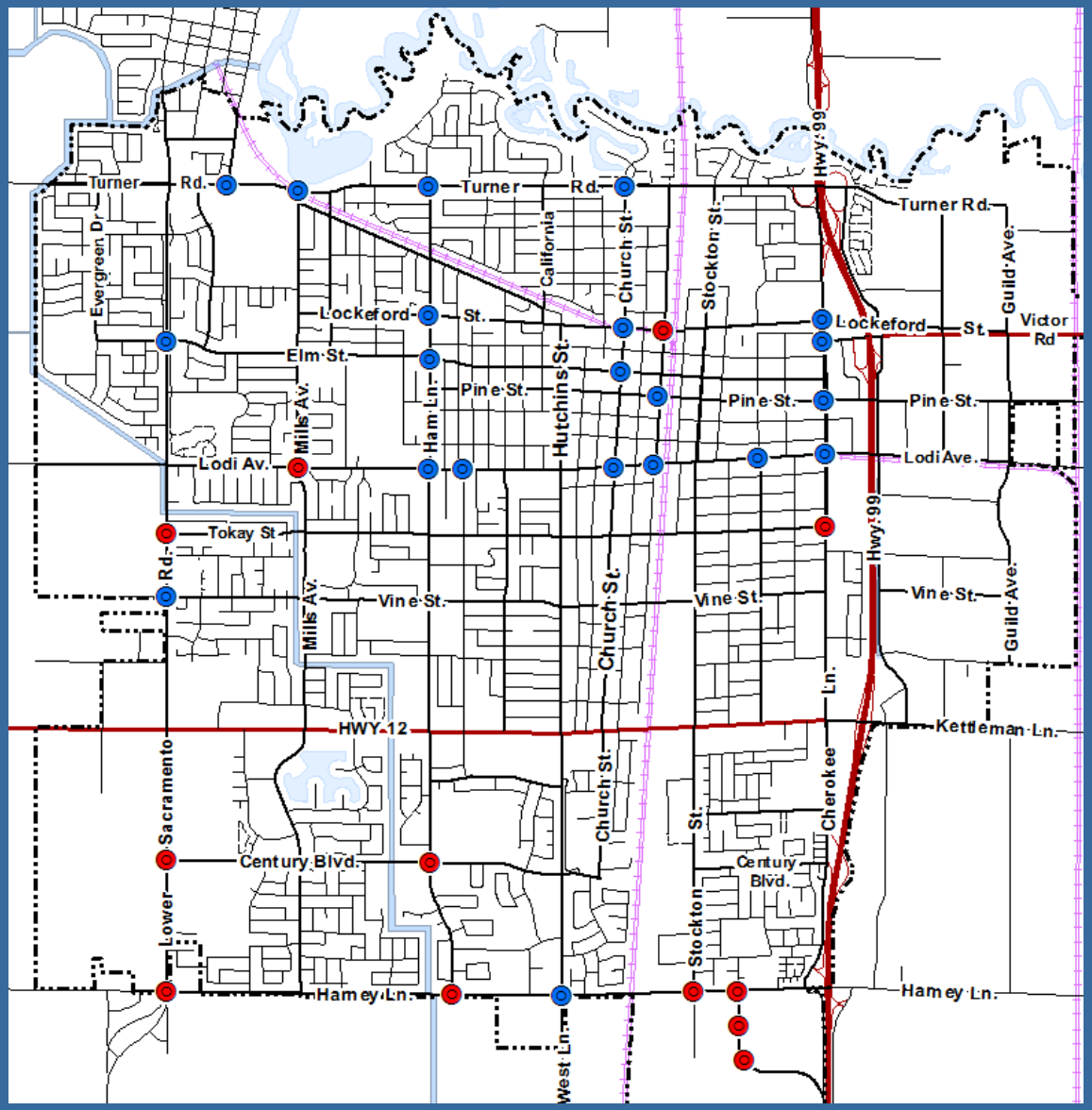
- 12 new signals installed since 2000
  - 3 Private Development (Reynolds Ranch)
  - 9 City Installed

- 21 signals upgraded
  - Left turn phase and/or
  - Upgrade signal cabinet / controller equipment

Signal Installations / Upgrades

Signals Installations & Upgrades Since 2000

- Signal Installations (12)
- Signal Upgrades (21)



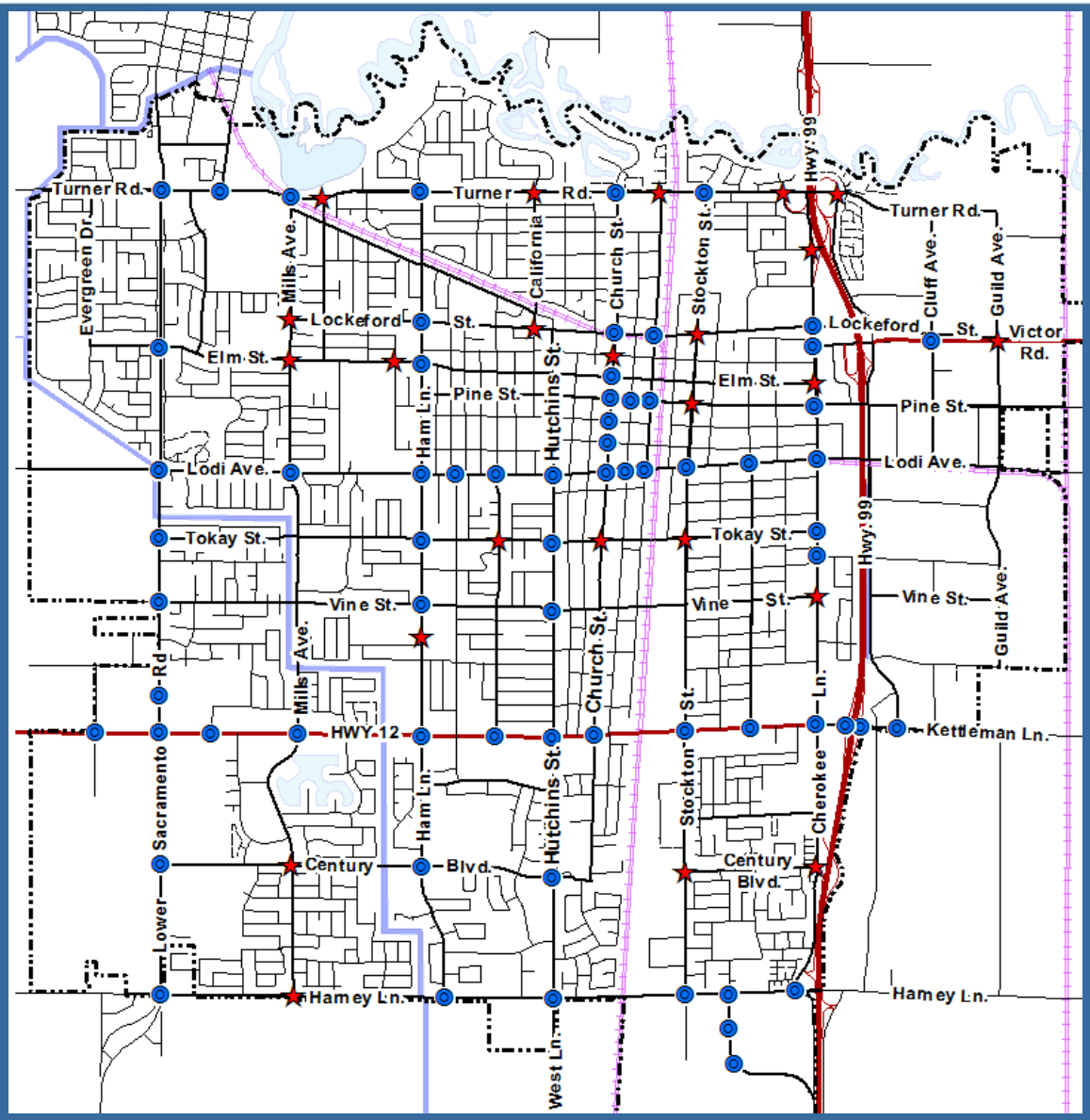
Study Methodology

- Volume Counts
- Collisions
- Approach Speed
- Coordinated Movement
- Special Conditions

Existing Traffic Signals & Study Locations

Existing Traffic Signals & Study Locations

- Existing Traffic Signals (67)
- Study Locations (24)



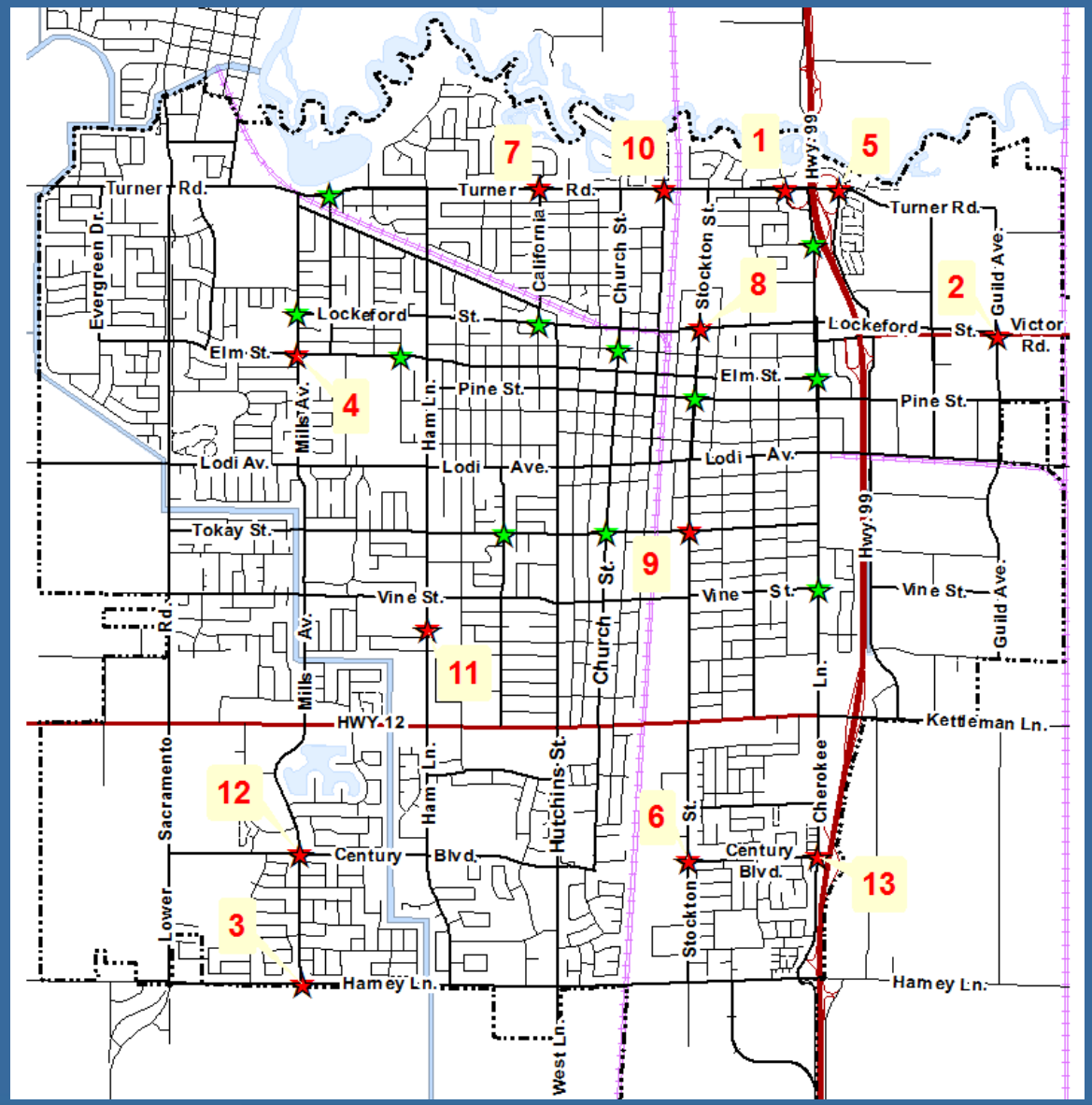
Study Results

- 13 of the 24 intersections studied met Caltrans Signal Criteria
- Ranked using the City's Traffic Signal Priority Worksheet

Study Results

Study Locations

- Meets Signal Criteria (13)
- Does Not Meet Signal Criteria (11)



Study Results

LOCATION	RANKING SCORE	2000 Study Ranking
1. Turner Rd & Hwy 99 SB Ramps	354	New
2. Victor Rd (SR12) & Guild Ave	348	New
3. Harney Ln & Mills Ave	268	New
4. Elm St & Mills Ave	266	9
5. Turner Rd & Hwy 99 NB Ramps	220	New
6. Stockton St & Century Blvd	206	New
7. Turner Rd & California St / Edgewood Dr	184	10
8. Lockeford St & Stockton St	150	4
9. Stockton St & Tokay St	143	7
10. Turner Rd & Sacramento	133	13
11. Ham Ln & Lodi Memorial	113	New
12. Century Blvd & Mills Ave	104	New
13. Cherokee Ln & Century Blvd	51	New
* Hutchins St S/ Harney Ln & EW street	N/A	New

Typical Signal Design, Construction and Maintenance Cost

- Design cost - $50,000 +/-
- Construction/Construction Inspection cost - $300,000 to 350,000
- Maintenance Cost (Inspection/Energy Expenses/Equipment Replacement) - $770 per signal

Questions

AGENDA ITEM B-2

CITY OF LODI
COUNCIL COMMUNICATION

TM

AGENDA TITLE: Roundabout Presentation

MEETING DATE: August 12, 2014 (Shirtsleeve Session)

PREPARED BY: Public Works Director

RECOMMENDED ACTION: Roundabout presentation

BACKGROUND INFORMATION: At the Shirtsleeve Session, the Public Works Department staff will present information regarding the history, pros and cons of roundabouts, future roundabout locations in our community and a Mythbusters video clip of four-way stop vs. roundabout.

FISCAL IMPACT: Not applicable.

FUNDING AVAILABLE: Not applicable.

F. Wally Sandelin
Public Works Director

Prepared by Dorothy Kam, Assistant Engineer
FWS/DK/pmf
cc: City Engineer/Deputy Public Works Director
Transportation Manage/Senior Traffic Engineer

APPROVED: _____
Stephen Schwabauer, City Manager

The City of Lodi

Public Works

Shirtsleeve Session Roundabout

August 12, 2014

The Roundabout

- One-way circular intersection without traffic signals
  - Yield control for entering traffic
  - Low speeds (Generally less than 30 mph)
  - Central island to separate traffic

- Often confused with:
  - Traffic Circle (much smaller)
  - Rotary (much larger)

History of the Roundabout

- 1963 First roundabout constructed in England
- 1990 First roundabout constructed in United States (Las Vegas)
- 1995 First freeway roundabout constructed at I-70 in Vail, Colorado
- Today, over 3,700 roundabouts in the U.S.

Reasons For A Roundabout

- Reduced overall delay
- Free flow of vehicles and bicycles
- Reduced collisions
  - collisions are less severe at lower speeds
- Reduced noise and air pollution
- Less expensive to construct and maintain
- Reduced speeds / safe U-turns
- Encouraged in General Plan

Reasons Against A Roundabout

- May require more right-of-way
- Unfamiliar maneuver at first
- Pedestrian crossings/crosswalks located further from intersection and uncontrolled
- Additional landscaping maintenance
- Bicyclists travel with vehicles through intersection

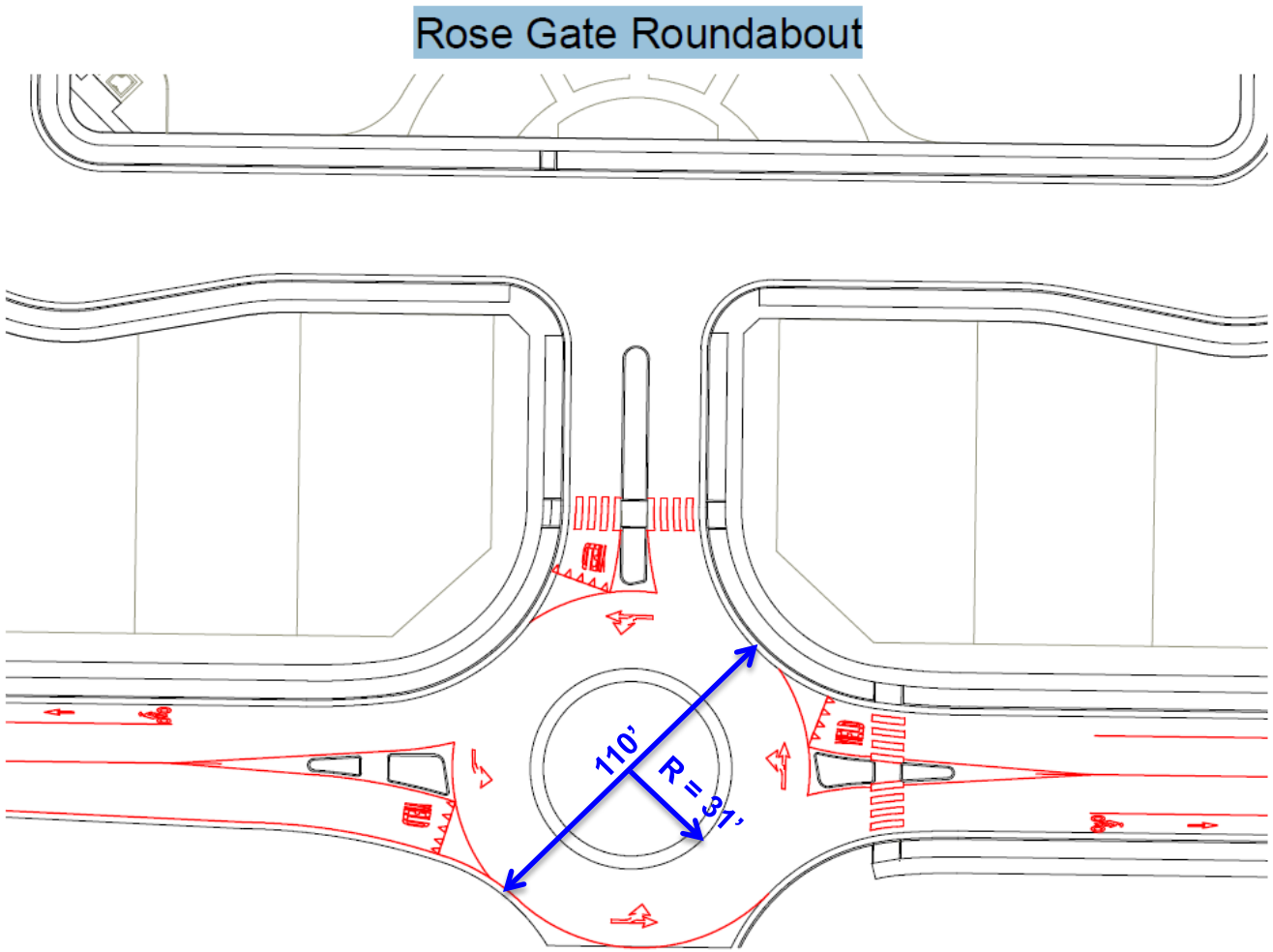
Lodi's First Roundabout

- Entrance to Rose Gate Subdivision
- Lodi Avenue – 6,700 vpd
- Capacity of 2 lane arterials – 10,500 to 17,500 vpd
- Roundabout capacity – Over 15,000 vpd
- Class II bicycle facility

Rose Gate Roundabout

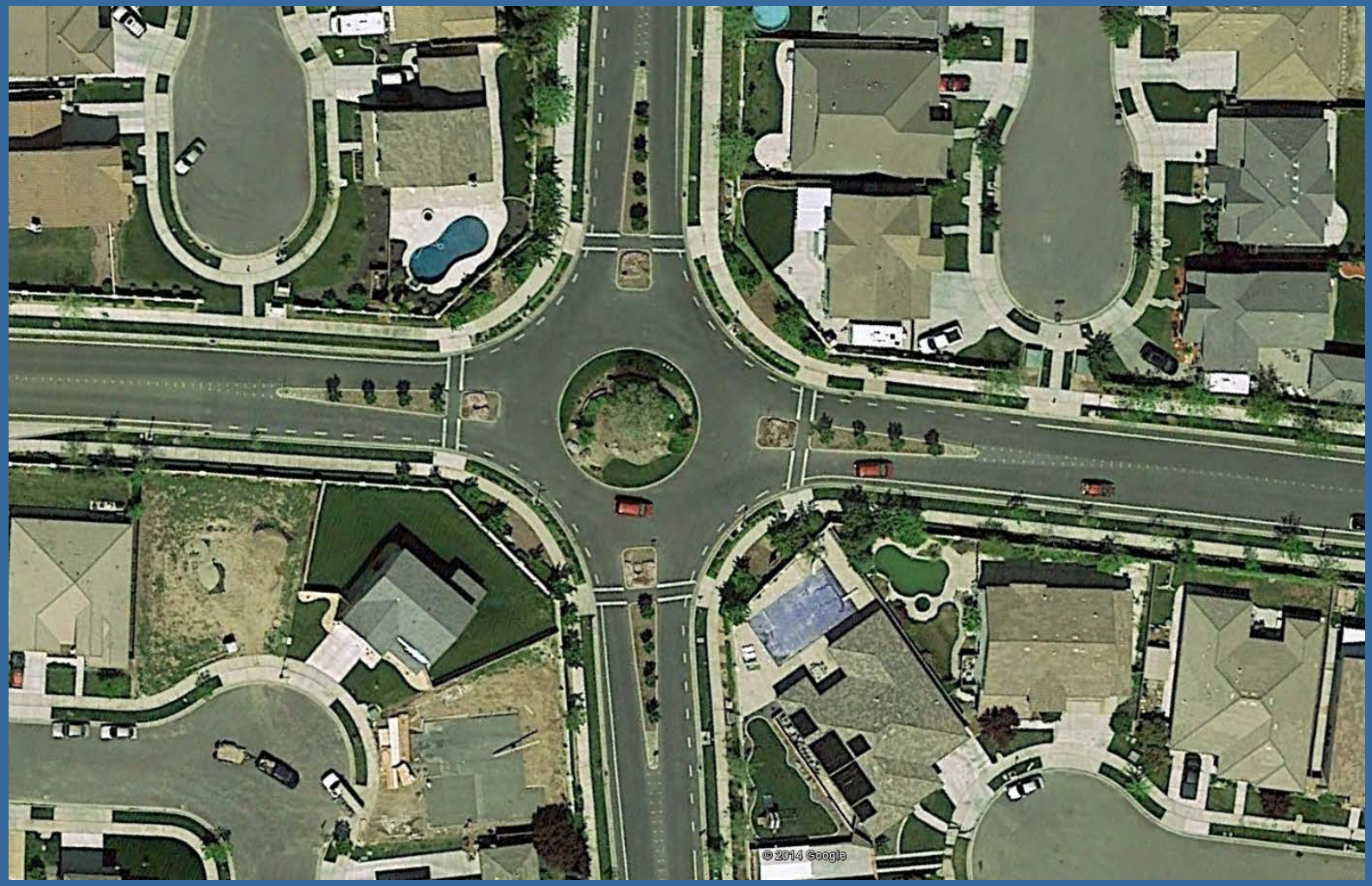
Rose Gate Subdivision

Roundabout Geometry



City of Oakdale

Bridle Ridge Wy-Greger St / Willowwood Dr



City of Oakdale

Bridle Ridge Wy-Greger St / Willowwood Dr

Questions