COUNTY OF KERN
RESOURCE MANAGEMENT AGENCY
ROADS DEPARTMENT
Office Memorandum

To: Ted James, Director
Planning Department
Attn: Holly Nelson, Supervising Planner

May 9, 2007

From: Patricia J. Ebel, Transportation Development Engineer
Roads Department

Subject: 7-4.4 TTM 6731, Zone Map 71-16

This Department has reviewed the traffic impact study, prepared by Minagar and Associates with a revised date of April 25, 2007, and concurs with its findings. A long with this memo is a copy of the approved study for your files.

This project will contribute 2.24% share to a traffic signal at the intersection of Bowman Road and China Lake Blvd. Based on a cost of $160,000 per signal from the City of Ridgecrest Developer Cost and Fee Study dated 2/01/06. This projects proportionate share toward this signal is $3,584.00 and is due prior to the recordation of this tract map.

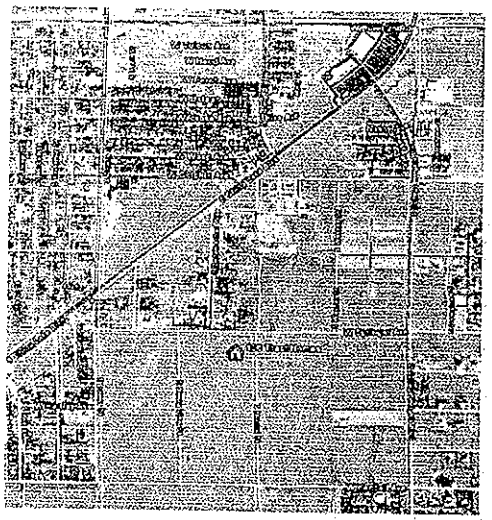
Thank you for the opportunity to comment on this project, if you have any questions or comments please contact Brian Blacklock of this Department.

Revised Traffic Impact Study
for
136 Tract Homes-TM 6731
in
Ridgecrest, CA

Presented to

City of Ridgecrest
Traffic Engineering Department
Department of Public Works
100 W California Ave.
Ridgecrest, CA 93555

Kern County
Roads Department
Kern County Roads Department
2700 M Street, Suite 400
Bakersfield, CA 93301



Prepared for

Taft Corporation
26740 Via Linda Street
Malibu, CA 90265

Presented by

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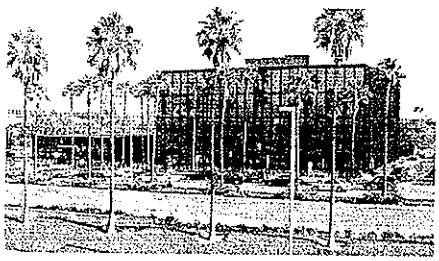

April 25, 2007

MINAGAR & ASSOCIATES, INC.
ITS Deployment / Engineering / Planning – Traffic Engineering – Transportation Planning Consultants

April 25, 2007

Mr. Brian R. Blacklock, P.E
Engineer I
Kern County Roads Department
2700 M Street, Suite 400
Bakersfield, CA 93301

Re: Revised Final Traffic Impact Study for 136 Tract Homes-TM 6731 for Taft Corporation Project, Ridgecrest, CA

Dear Mr. Blacklock:

Minagar & Associates, Inc. is pleased to present to you two (2) signed copies of the Revised Final Traffic Study Report for the subject project dated April 25, 2007. The report was revised per the March 20, 2007 comment letter of Kern County Roads Department to Minagar & Associates, Inc. All the eight (8) comments of the County have been fully executed & incorporated in the body of the enclosed report.

We look forward to the City's approval of the project.

Thank you very much for your continued support and cooperation on this important project. Should you have any questions, please contact me at (949)727-3399, Ext. 2# or more conveniently via e-mail at minagarf@minagarinc.com.

MINAGAR & ASSOCIATES, INC.
(Winner of the PTI's 2003 Best Transportation Technology Solutions Award in the U.S. and the APWA Southern California's 2005 Best Traffic Congestion/Mitigation Project)

Fred Minagar, MS, RCE, PE, FITE
President/Project Manager

CC:

Warren Maxwell, Kern County Roads Department
Kamyar Lashgari, Taft Corporation
Ben Sayani, AVL

STUDY APPROVED
Date 5·9·07 BRB

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Revised Traffic Impact Study
for
136 Tract Homes-TM 6731
in
Ridgecrest, CA

Prepared for:
City of Ridgecrest
Kern County

Prepared by:
MINAGAR & ASSOCIATES, INC.
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April 25, 2007

STUDY APPROVED
Date 5.9.07 BCB

136 TRACT HOMES FOR THE CITY OF RIDGECREST
REVISED TRAFFIC IMPACT STUDY

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Introduction

This report provides a summary of the results of a revised traffic impact analysis conducted for the proposed 136 Tract Homes project located at the southwest quadrant of the unsignalized unpaved intersection of S. Norma Street and W. Springer Avenue in the City of Ridgecrest, Kern County. The objective of this study is to evaluate the potential traffic impacts of the proposed residential development. This report has been prepared based upon the specific requirements (9/21/2006 e-mails of Mr. Warren Maxwell & Mr. Brian Blacklock) of Kern County Roads Department per *Caltrans Guides to Traffic Studies*.

The report has been revised per the March 20, 2007 letter received from the Kern County Roads Department. The report has addressed and incorporated all the eight (8) written comments.

Taft Corporation has proposed to construct 136 new tract homes in the City of Ridgecrest. Ridgecrest is located in California approximately 90 miles north of Los Angeles and 60 miles east of Bakersfield in the northeastern corner of Kern County. Interstate 395 and State Route 14 run north-south from southeastern Kern County and merge just west of Ridgecrest, providing access to the city via State Route 178. State Route 178 runs east from beyond the 14 and 395 interchanges, forming the border between Ridgecrest and China Lake Naval Weapons Center to the north. Here it briefly traverses south, and then east at the intersection of Ridgecrest Blvd. (westward) and China Lake Blvd. (southward). The development has one phase with completion set at the year 2008. Currently the site is an empty plot of land with a few residential homes to the north (of unpaved W. Springer Rd.). The site is situated within the unincorporated area of Kern County to the northeast adjacent to the City of Ridgecrest. Figure 1 illustrates the location of the proposed project in relation to the surrounding street system. The proposed project site is illustrated in Figure 2.

Subsequent to discussions with the Kern County Roads Department, this traffic analysis was prepared to evaluate traffic volumes of the project area for the following target analyses years:

- Existing Conditions (Year 2006)
- Cumulative Base without Project Conditions (Year 2008) – Existing Plus Approved/Pending Projects Plus Background Growth
- Future without Project Conditions (Year 2030) – Existing Plus Approved/Pending Projects Plus Future Growth
- Cumulative Base Plus Project Conditions (Year 2008) – Cumulative Base Plus Proposed Project
- Future Plus Project Conditions (Year 2030) – Future Plus Proposed Project

Intersections analyzed within this traffic impact study of the proposed 136 Tract Homes project are denoted in the report using the following numerology provided by Kern County Roads Department:

1. China Lake Boulevard at College Heights Boulevard
2. China Lake Boulevard at Bowman Road
3. China Lake Boulevard at Downs Street
4. Springer Avenue & College Heights Boulevard
5. Springer Avenue & Downs Street
6. Norma Street & Springer Avenue
7. Kendall Avenue & College Heights Boulevard

The locations of the seven study intersections are illustrated on Figure 3.

Existing Conditions (Year 2006)

In order to best assess the additional traffic volumes of the proposed project, a thorough analysis of the existing conditions has been conducted. The assessment of the existing conditions is inclusive of, but not limited to; schematics, geometry, traffic volumes, and performance and operations of the surrounding intersections within the scope of project as was outlined by the Kern County officials. Diagrams of the existing lane configurations at the analyzed intersections are contained in Appendix C. Only one of the analyzed intersections is signal controlled at China Lake Boulevard and College Heights Boulevard. There is also another unpaved intersection at S. Norma and W. Springer Ave. with no existing traffic. The other five intersections are stop sign controlled.

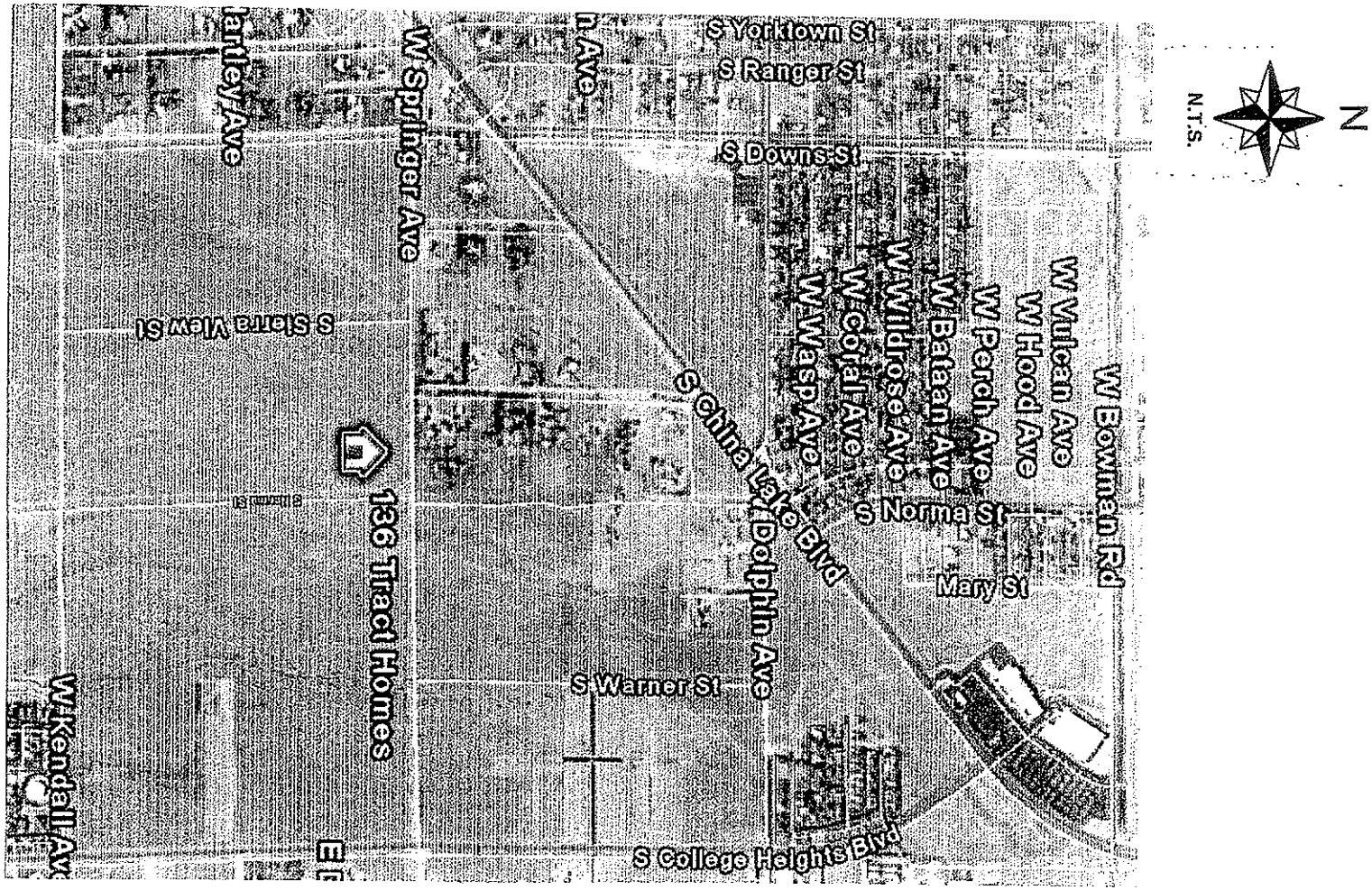

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Figure 1
Vicinity Map

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

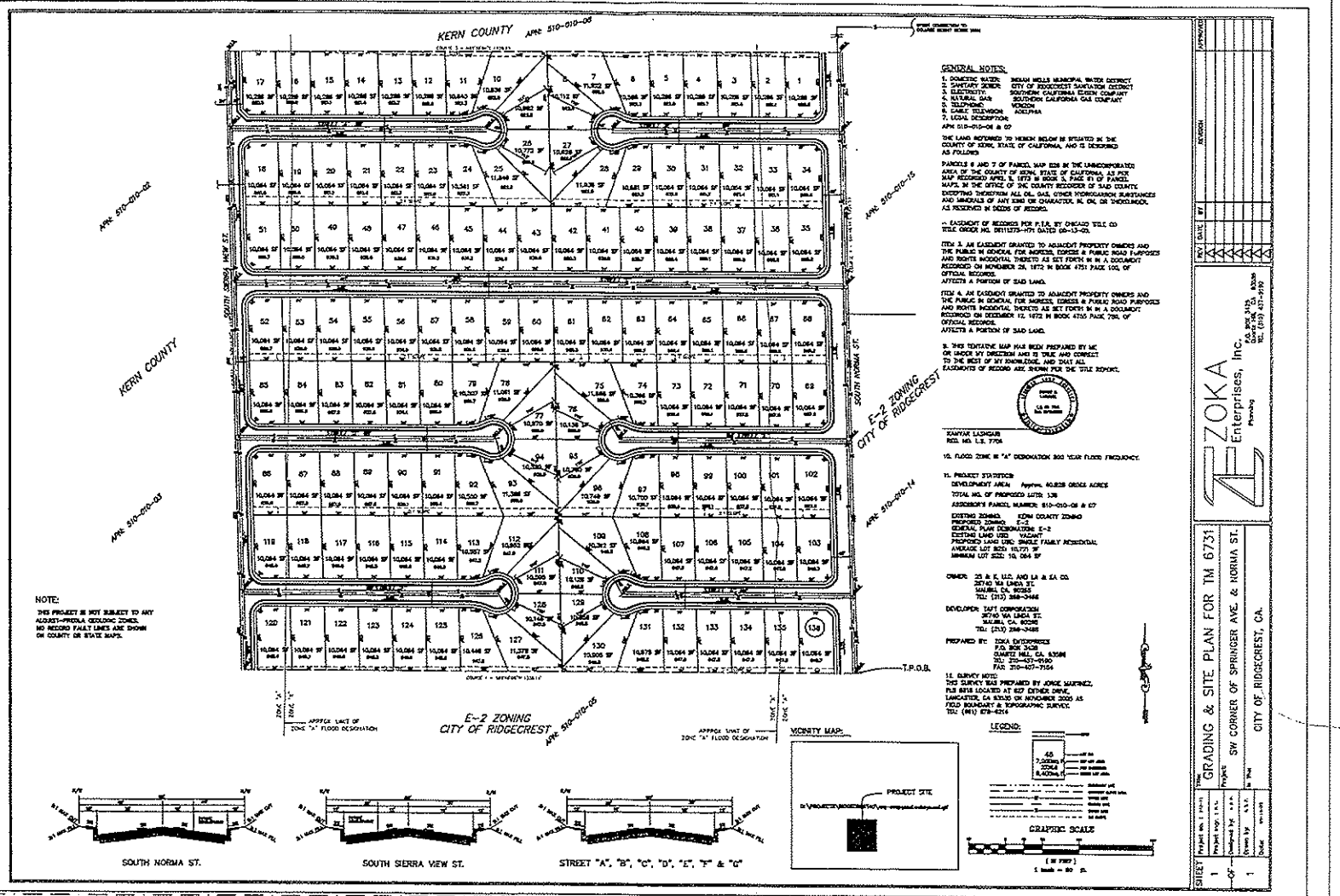

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Figure 2
Site Plan
136 Tract Homes

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

S. China Lake Boulevard is designated as an Arterial and traverses through the City of Ridgecrest in a generally north-south direction. China Lake Boulevard connects with Three Flags Highway US 395 to the south and terminates on the north end approximately 1 mile above the intersection at Bowman Road at State Route 178, which further continues both north and east. Currently it has 2 travels lanes in each direction.

S. College Heights Boulevard is designated as a Local Street and traverses through the City of Ridgecrest in a north-south direction. Currently it has 1 travel lane in each direction south of China Boulevard through both Springer Avenue and Kendall Avenue, and 2 travel lanes in each direction for a short distance of approximately 250 feet north of China Lake Boulevard beyond the driveway through the Shopping Center parking lot.

Bowman Road is designated as a Collector west of S. China Lake Blvd., and as a Local Street east of S. China Lake Blvd, traversing through the City of Ridgecrest in an east-west direction. Currently it has 1 travel lane per direction to either side of College Heights Boulevard. There is also an entrance to the Shopping Center from Bowman Road just before the intersection with College Heights Boulevard heading eastbound.

S. Downs Street is designated as Collector north of S. China Lake Blvd., and as a Local Street south of S. China Lake Blvd, traversing through the City of Ridgecrest in a north-south direction. The road is currently paved to the north of China Lake Boulevard with 2 travel lanes per direction, and unpaved to the south of China Lake Boulevard with 1 travel lane per direction.

Springer Avenue is designated as a Local Street and traverses through the City of Ridgecrest in an east-west direction. The road is currently unpaved and currently has 1 travel lane in each direction. Springer Avenue provides primary access to the project site from larger arterials.

S. Norma Street is designated as a Local Street, and is currently unpaved to the north and south of W. Springer Ave. It traverses through the City of Ridgecrest in a north-south direction. Currently it has 1 travel lane in each direction. The southwest quadrant of Norma Street and Springer Avenue includes the location of the project site, which will be accessible to drivers by heading southbound on Norma Street from Springer Avenue.

Kendall Avenue is designated as a Local Street and traverses through the City of Ridgecrest in an east-west direction. The road is currently paved to the west of College Heights Boulevard and unpaved to the east of College Heights Boulevard. Currently it has 1 travel lane in each direction.

Existing Traffic Volumes

In analyzing the existing traffic conditions, it is crucial that the analysis take place during peak hour periods. This is due to the fact that these periods are when changes to the utilization of the transportation infrastructure would be most significant. The 2006 existing weekday afternoon peak hour traffic volumes for the seven intersections are illustrated in Figure 3. The existing unpaved intersection of W. Springer Ave. and S. Norma St. had no traffic volumes. These are November 2006 volumes, and were collected for the period of 4:00 PM to 6:00 PM on Tuesday,

Wednesday, and Thursday per the request of the city officials. The turning movement counts are attached as Appendix A.

The performance of an intersection is measured by its Level of Service (LOS). The LOS basically indicates the operational conditions of an intersection during a given time period. Range of the LOS varies from "A" to "F" with "A" being the best. LOS definitions for the methodologies employed in this study are included in Table A.

Table A: Level of Service Definitions for TWSC & AWSC Intersections

Level of Service	Average Control Delay (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: Highway Capacity Manual 2000

TWSC - Two-Way Stop-Controlled Intersection

AWSC - All-Way Stop-Controlled Intersection

Table B: Measures of Effectiveness by Facility Type

Type of Facility	Measure of Effectiveness (MOE)
Basic Freeway Segments	Density (pc/mi/ln)
Ramps	Density (pc/mi/ln)
Ramp Terminals	Delay (sec/veh)
Multi-Lane Highways	Density (pc/mi/h)
Two-Lane Highways	Percent Time-Following
	Average Travel Speed (mi/hr)
Signalized Intersections	Control Delay per Vehicle (sec/veh)
Unsignalized Intersections	Average Control Delay per Vehicle (sec/veh)
Urban Streets	Average Travel Speed (mi/hr)

Source: Caltrans

Table C: Significant Impact Criteria Intersections

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum v/c	Maximum Service Flow Rate (pc/hr/ln)
A	11	55.0	0.29	600
B	18	55.0	0.47	990
C	26	54.9	0.68	1430
D	35	52.9	0.88	1850
E	41	51.2	1.00	2100

Source: Guide for the Preparation of Traffic Impact Studies, Caltrans, December 2002

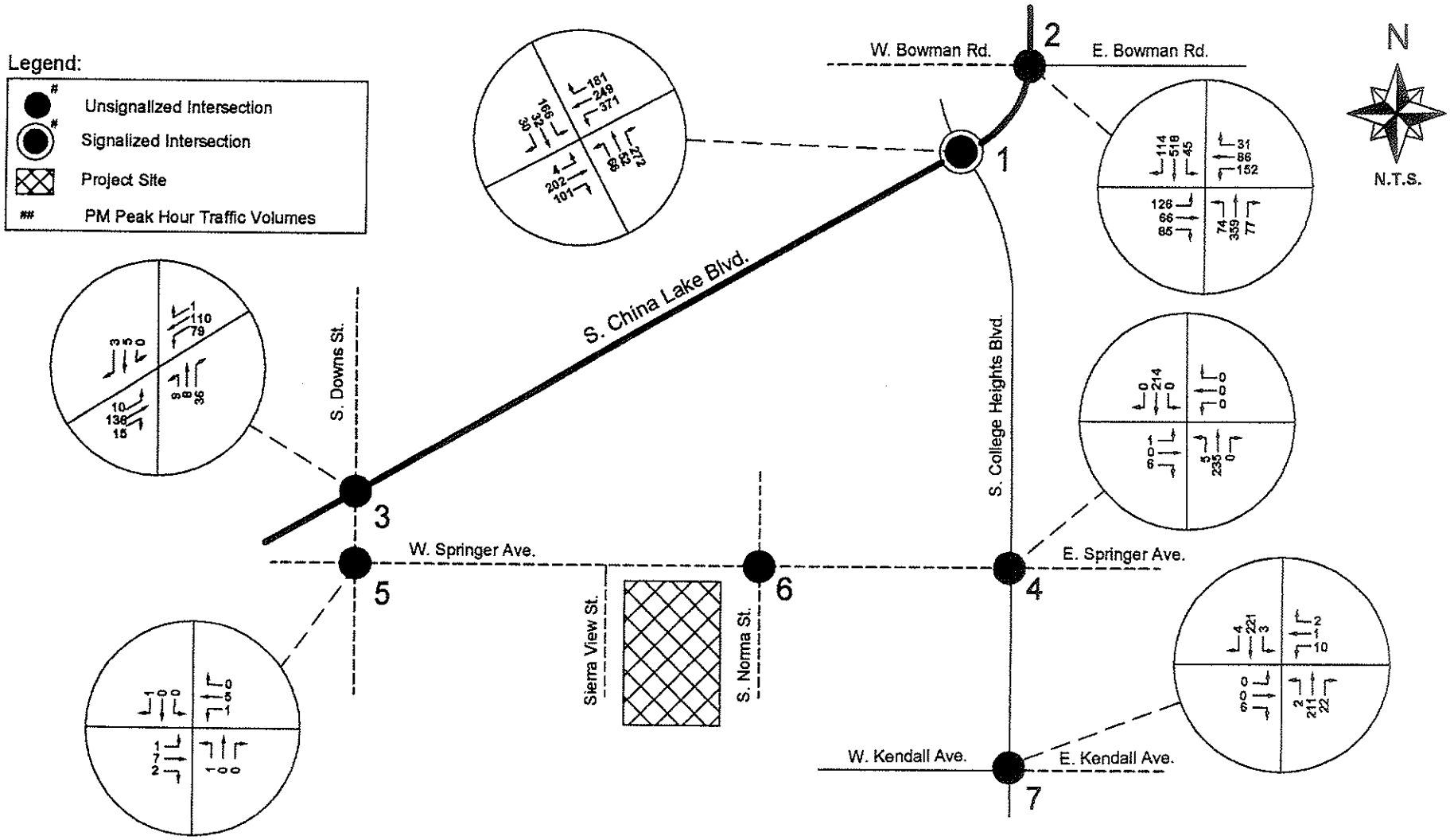

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Figure 3
Existing 2006 Peak Hour Volumes/ Study Intersections

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

Traffic conditions on all of the roadway facilities are analyzed using the Highway Capacity Manual (HCM) methodology, as required by the County policy.

Table 1 summarizes the existing weekday afternoon peak hour HCM delay values, and the corresponding Level of Service at each of the seven study intersections analyzed. As can be seen, all of the intersections currently operate at an acceptable Level of Service (i.e., "C" or better during afternoon peak hours).

Table 1
Intersection Delay and Level of Service Analysis of Existing Volumes

Intersections	Delay (sec/veh)					LOS				
	NB	SB	EB	WB	Int.	NB	SB	EB	WB	Int.
1. China Lake Blvd. at College Heights Blvd.	**28.6**	**51.0**	29.4	28.8	31.8	**C**	**D**	C	C	C
2. China Lake Blvd. at Bowman Road	*NA	*NA	***NA**	***NA**	*NA	*NA	*NA	***NA**	***NA**	A
3. China Lake Blvd. at Downs Street	**10.7**	**11.5**	0.5	3.2	3.3	**B**	**A**	A	A	A
4. Springer Avenue & College Heights. Blvd.	0.2	0.0	**9.9**	**0.0**	0.3	A	A	**A**	**A**	A
5. Springer Avenue & Downs Street	7.2	6.4	**6.9**	**7.0**	6.9	A	A	**A**	**A**	A
6. Norma Street & Springer Avenue	**6.9**	**6.9**	6.9	6.9	6.9	**A**	**A**	A	A	A
7. Kendall Avenue & College Heights. Blvd.	10.8	10.9	**0.0**	**5.6**	10.6	B	B	**A**	**A**	A

All Assessments for the PM Peak Hr
Minor Approach Delays & LOS are shown in **bold**
* NA = Not Available / Not Applicable

A Roadway Classification Map for the City of Ridgecrest is shown in Figure 5. The designations on the map match the circulation element of Kern County, illustrating the major corridors near the project site.

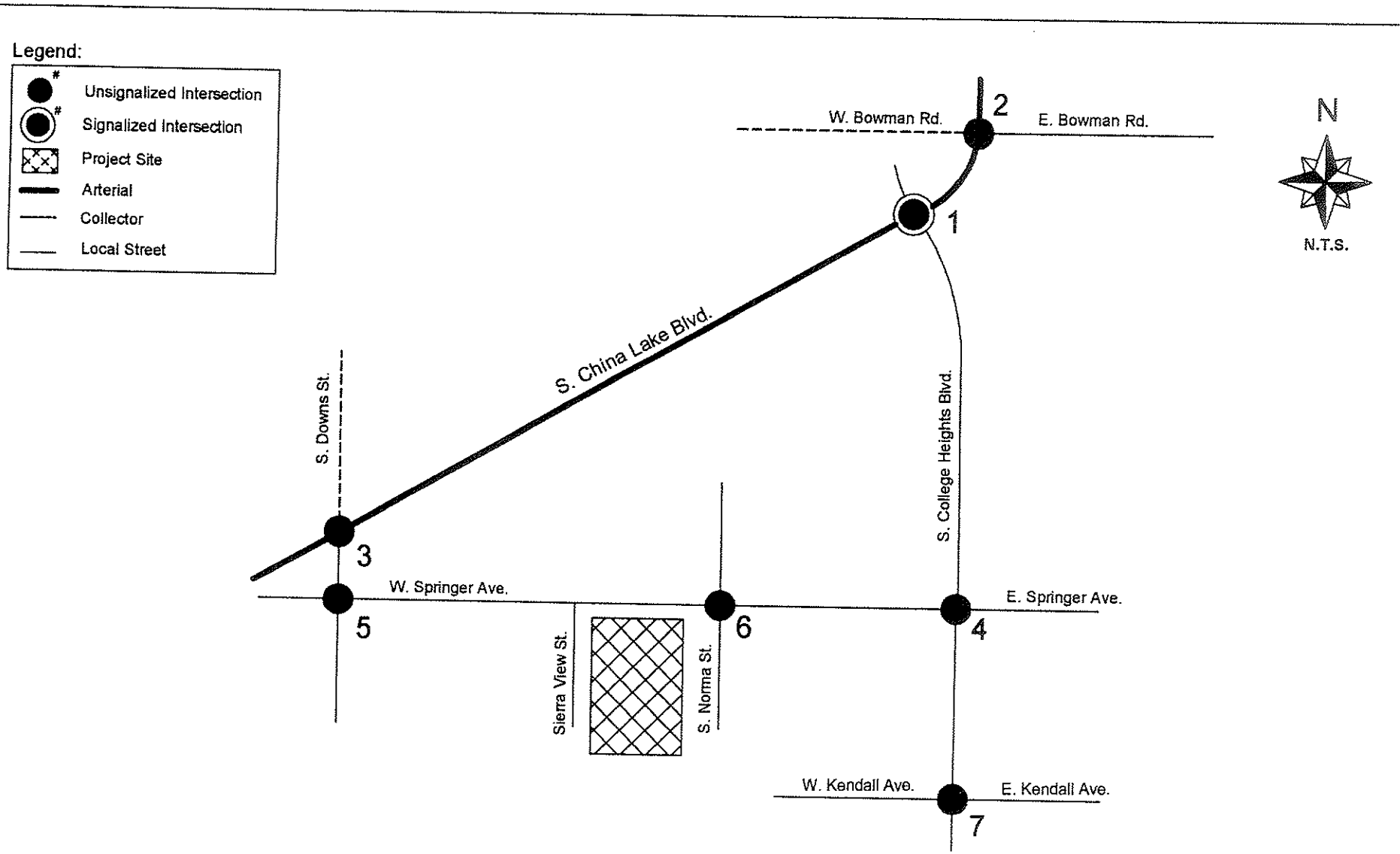

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Figure 4
Road Classification Map

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

Proposed Project

The proposed project includes the development of 137 new tract homes. The developer is pursuing an expeditious 2008 grand opening schedule. The project site is situated between W. Springer Avenue to the north, Sierra View Street to the west, and S. Norma Street to the east.

Project Access:

The 136 new tract homes are planned to be accessible via S. Norma Street and Sierra View Street, per observation of the provided site plan. Since primary access to the outside road network is obtained via W. Springer Avenue located at the north boundary, it is assumed that W. Springer Avenue is where the majority of all traffic generated by the new residential development would both enter and exit. The possibility of territory access via the south end of Norma Street or Sierra View St. is very minor.

Springer Avenue is designated as a Local Street and traverses through the City of Ridgecrest in an east-west direction. The road is currently unpaved and has 1 travel lane in each direction. Springer Avenue provides primary access to the project site from larger arterials.

S. Norma Street is designated as a Local Street, and is currently unpaved to the north and south of W. Springer Ave. It traverses through the City of Ridgecrest in a north-south direction. Currently it has 1 travel lane in each direction. The southwest quadrant of Norma Street and Springer Avenue includes the location of the project site, which will be accessible to drivers by heading southbound on Norma Street from Springer Avenue.

Project Trip Generation

Trip generation rates/equations from the document, Trip Generation, 7th Edition, Institute of Transportation Engineers, were used to develop trip generation estimates for the project. This manual is widely used in California and estimates the probable traffic generation rates for a range of land uses based upon studies and surveys of existing developments in comparable settings. The trip generation rates and the trip generation estimates used in this study for the proposed project are summarized in Table 2.

As indicated in Table 2, it is estimated that the project would generate a total of 1,302 daily trips, of which 102 vehicle trips per hour (VPH) would occur during the morning peak hour and 137 VPH during the afternoon peak hour. The majority of the AM peak period heads out of the project area while the majority of the trips in the PM peak period head into the project area. This is consistent with the travel patterns associated with a residential community.

Table 2
Trip Generation Rates/Estimates for Proposed Project

Land Use	Daily Rate			Weekday – AM Peak Hour			Weekday – PM Peak Hour		
	Rate	In	Out	Rate	In	Out	Rate	In	Out
Single Family Units (Trips per Dwelling Unit)	9.57	50%	50%	0.75	25%	75%	1.01	63%	37%

Land Use	Size	Daily Trips			AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Single Family Units (Trips per Dwelling Unit)	136 Units	651	651	1,302	25	77	102	87	50	137

Note:
Source: ITE Trip Generation Manual, 7th Edition

Project Trip Distribution and Assignment

The geographic distribution of the traffic generated by the proposed project is dependent on several factors. These factors include the type and density of the proposed land uses, the geographic distribution of employment or shops to which the potential residents of the proposed developments are headed, and the location of the projects in relation to the surrounding street system. The general distribution pattern developed for use in this study is depicted in Figure 5.

Project Peak Hour Turning Movement

Utilizing the estimated trip generation and the trip distribution pattern depicted in Figure 5, the traffic generated by the proposed project was assigned to the street network. Figure 6 illustrates peak hour traffic volumes generated by the proposed project at each of the analyzed intersections during the afternoon peak hour.

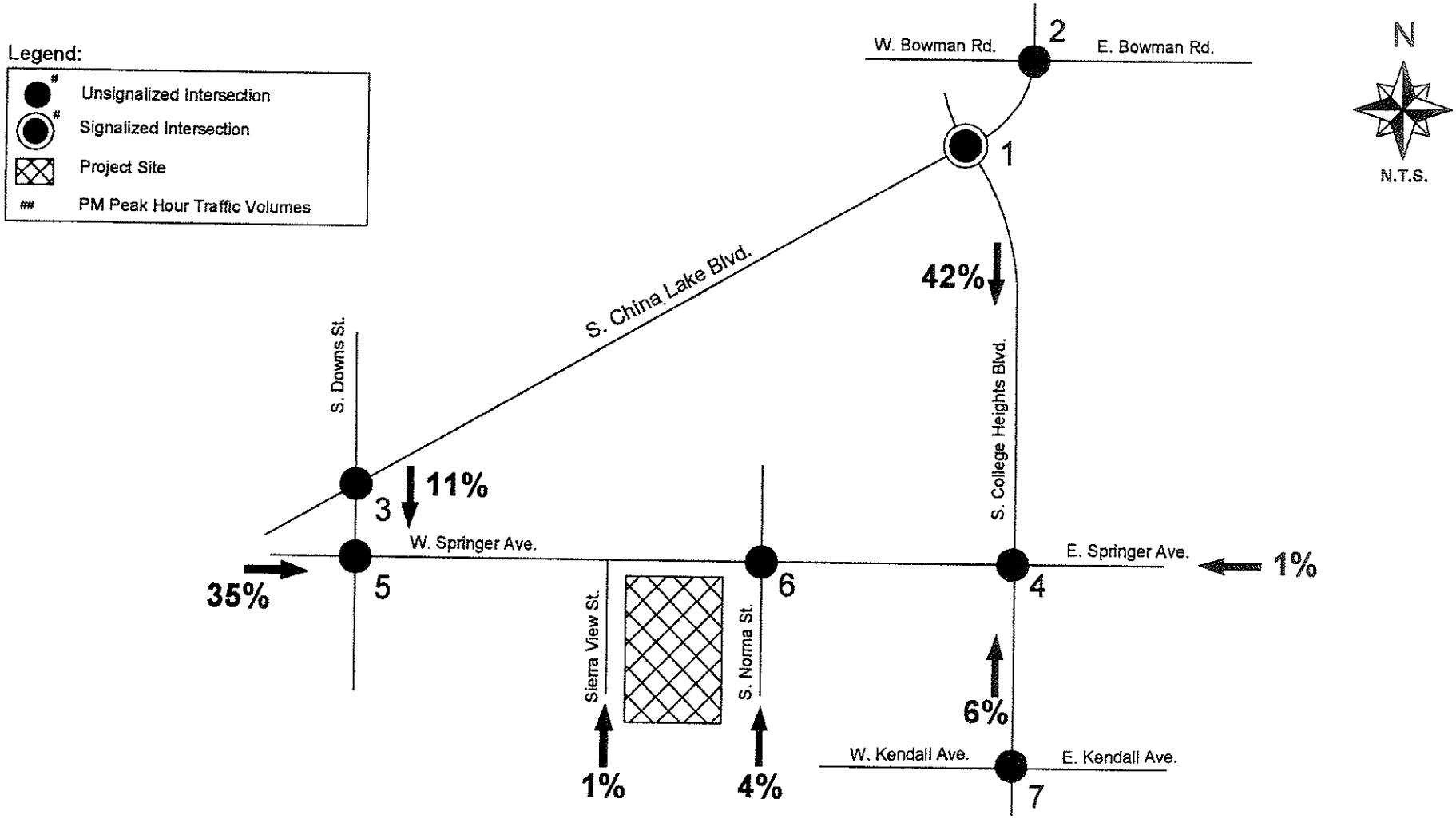

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Figure 5
Project Trip Distribution

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

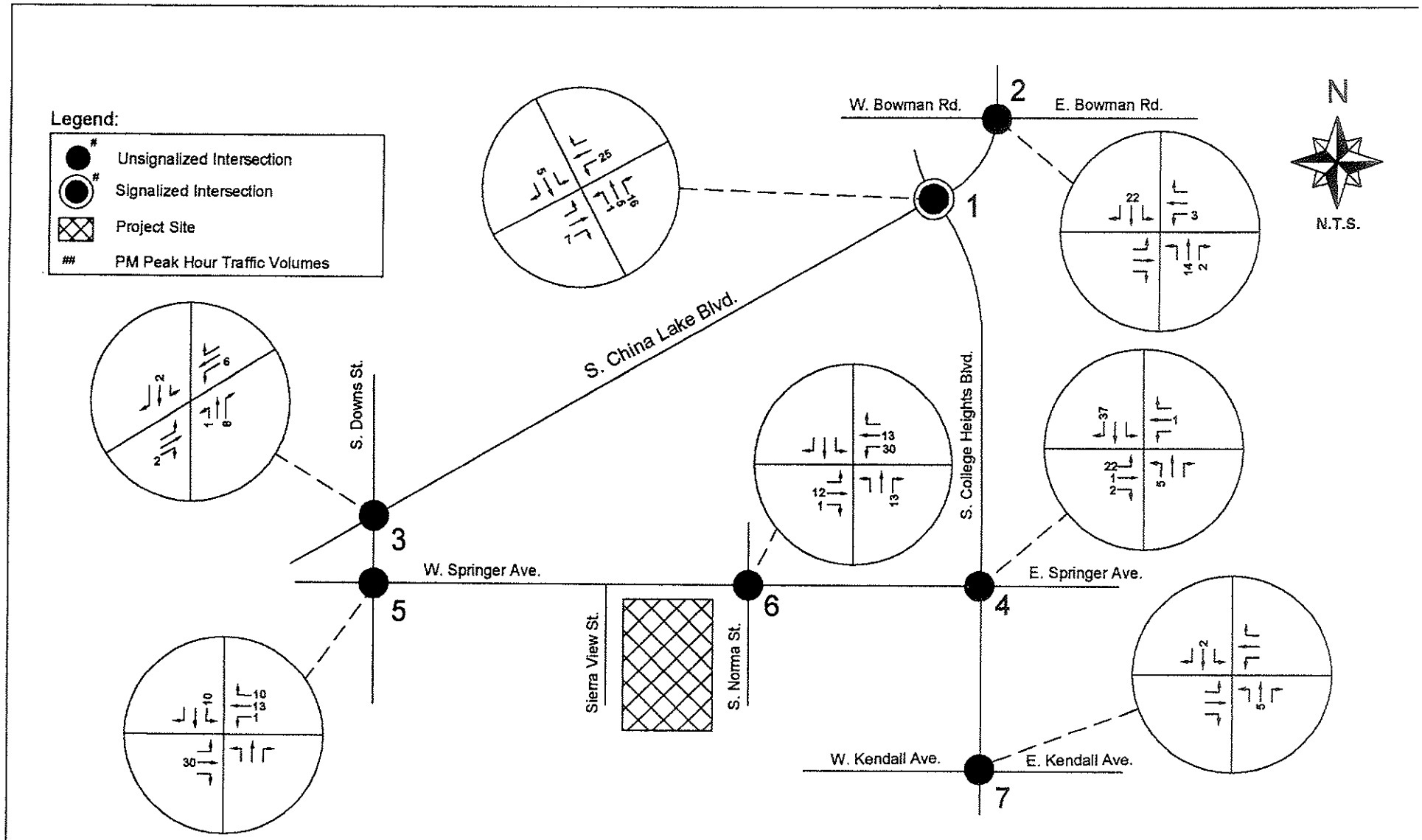

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Figure 6
Project PM
Peak Hour Volumes

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

Build-out Year 2008 without Project Conditions

The Build-out Year 2008 Without Project traffic projections reflect an amplified increase in traffic over existing conditions from the background traffic growth only. All effects caused by the development of the project site are neglected. These projections represent an estimated traffic volume and its effects for the year 2008.

As indicated by the County, the background traffic growth rate is given as 1.5% each year. For an opening year of 2008 this means that the existing traffic volumes are calculated to increase by 3% to reflect the year 2008 background traffic volumes.

Utilizing the estimated trip generation and the trip distribution pattern described above, the traffic generated by the existing volumes and background traffic growth was assigned to the street network. An approximate increase of 3% was applied to account for the background traffic growth within Ridgecrest after two years. The results of the delay and Level of Service values for the Build-out Year 2008 Without Project Conditions scenario are shown on Table 3. These results reveal that all of the intersections will operate at acceptable LOS (i.e., LOS A, B, C, or D). The calculated resulting traffic volumes are shown in Figure 7.

All of the HCM/HCS analysis printouts are attached as Appendix B.

Table 3
Intersection Delay and Level of Service Analysis for
Build-out Year 2008 Without Project

Intersections	Delay (sec/veh)					LOS				
	NB	SB	EB	WB	Int.	NB	SB	EB	WB	Int.
1. China Lake Blvd. at College Heights Blvd.	**28.7**	**53.6**	29.5	30.1	32.8	C	D	C	C	C
2. China Lake Blvd. at Bowman Road	*NA	*NA	***NA**	***NA**	*NA	*NA	*NA	*NA	*NA	B
3. China Lake Blvd. at Downs Street	**10.8**	**11.6**	0.5	3.2	3.3	B	B	A	A	A
4. Springer Avenue & College Heights. Blvd.	0.2	0.0	**10.0**	**0.0**	0.2	A	A	B	A	A
5. Springer Avenue & Downs Street	7.2	6.4	**6.9**	**7.0**	6.9	A	A	A	A	A
6. Norma Street & Springer Avenue	**6.9**	**6.9**	6.9	6.9	6.9	A	A	A	A	A
7. Kendall Avenue & College Heights. Blvd.	10.9	11.0	**0.0**	**5.6**	10.7	B	B	A	A	A

All Assessments for the PM Peak Hr
Minor Approach Delays & LOS are shown in **bold**
* NA = Not Available / Not Applicable

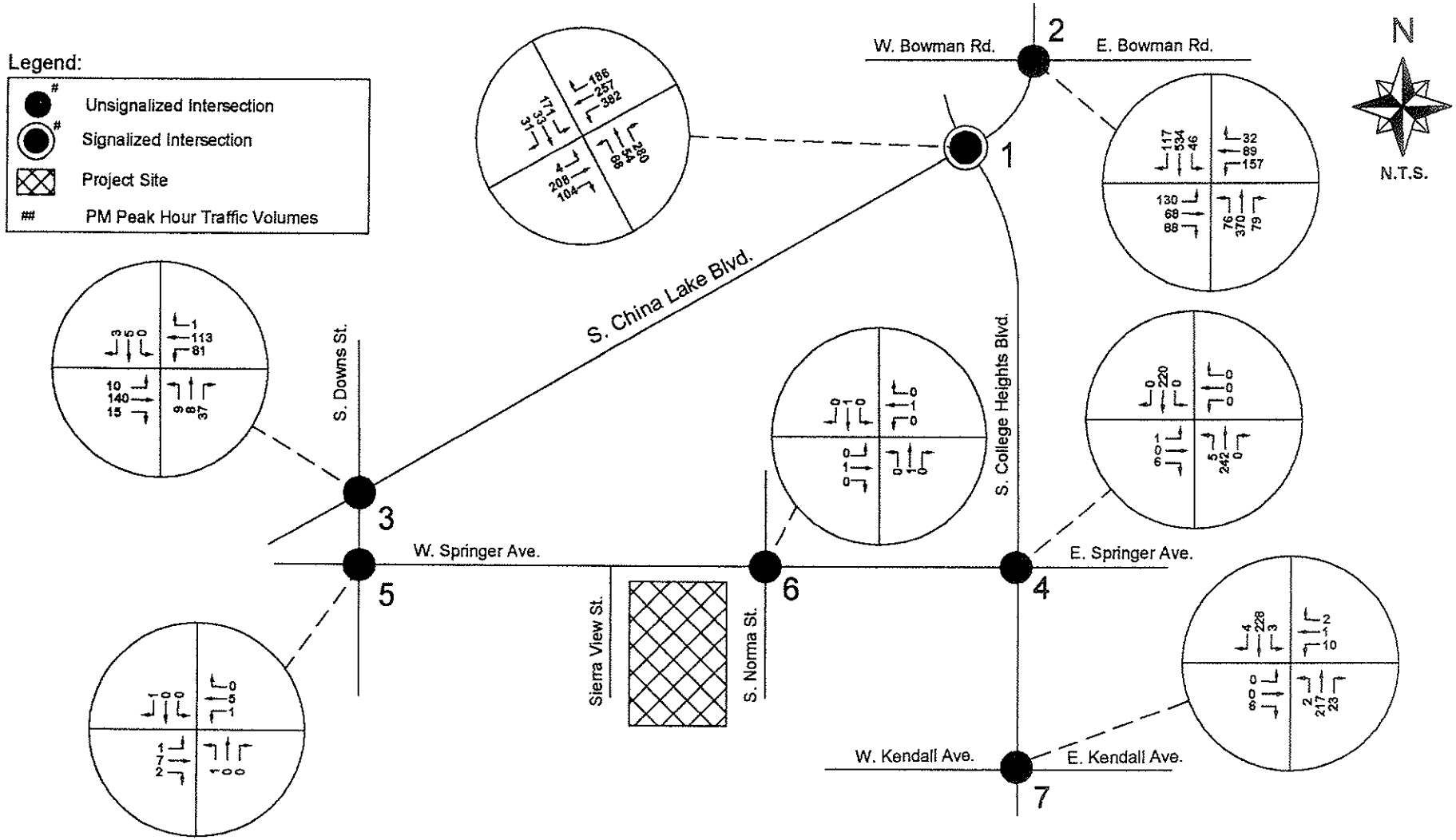

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Figure 7
Build Out Year 2008 Without Project
Peak Hour Volumes

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

Cumulative Plus Project Conditions (Build-out Year 2008 with Project)

The Cumulative Plus Project traffic projections reflect a similar amplified increase in traffic over existing conditions for the year 2008. These projections, however, do take into account effects caused by the development of the project site as well as from the background traffic growth for 2 years. The results clearly show that in the build-out year 2008 with the proposed project none of the intersections will have any unacceptable LOS (i.e., LOS E or F).

Table 4
Intersection Delay and Level of Service Analysis for Build-out Year 2008 With Project

Intersections	Delay (sec/veh)					LOS				
	NB	SB	EB	WB	Int.	NB	SB	EB	WB	Int.
1. China Lake Blvd. at College Heights Blvd.	**29.5**	**53.3**	29.5	30.4	33.0	**C**	**D**	C	C	C
2. China Lake Blvd. at Bowman Road	*NA	*NA	***NA**	***NA**	*NA	*NA	*NA	***NA**	***NA**	B
3. China Lake Blvd. at Downs Street	**10.9**	**12.1**	0.4	3.4	3.5	**B**	**B**	A	A	A
4. Springer Avenue & College Heights. Blvd.	0.4	0.0	**12.8**	**13.4**	1.0	A	A	**B**	**B**	A
5. Springer Avenue & Downs Street	7.3	7.3	**7.2**	**7.0**	7.1	A	A	**A**	**A**	A
6. Norma Street & Springer Avenue	**6.6**	**7.1**	7.0	7.4	7.1	**A**	**A**	A	A	A
7. Kendall Avenue & College Heights. Blvd.	10.9	11.0	**0.0**	**5.6**	10.7	B	B	**A**	**A**	A

All Assessments for the PM Peak Hr
Minor Approach Delays & LOS are shown in **bold**
* NA = Not Available / Not Applicable

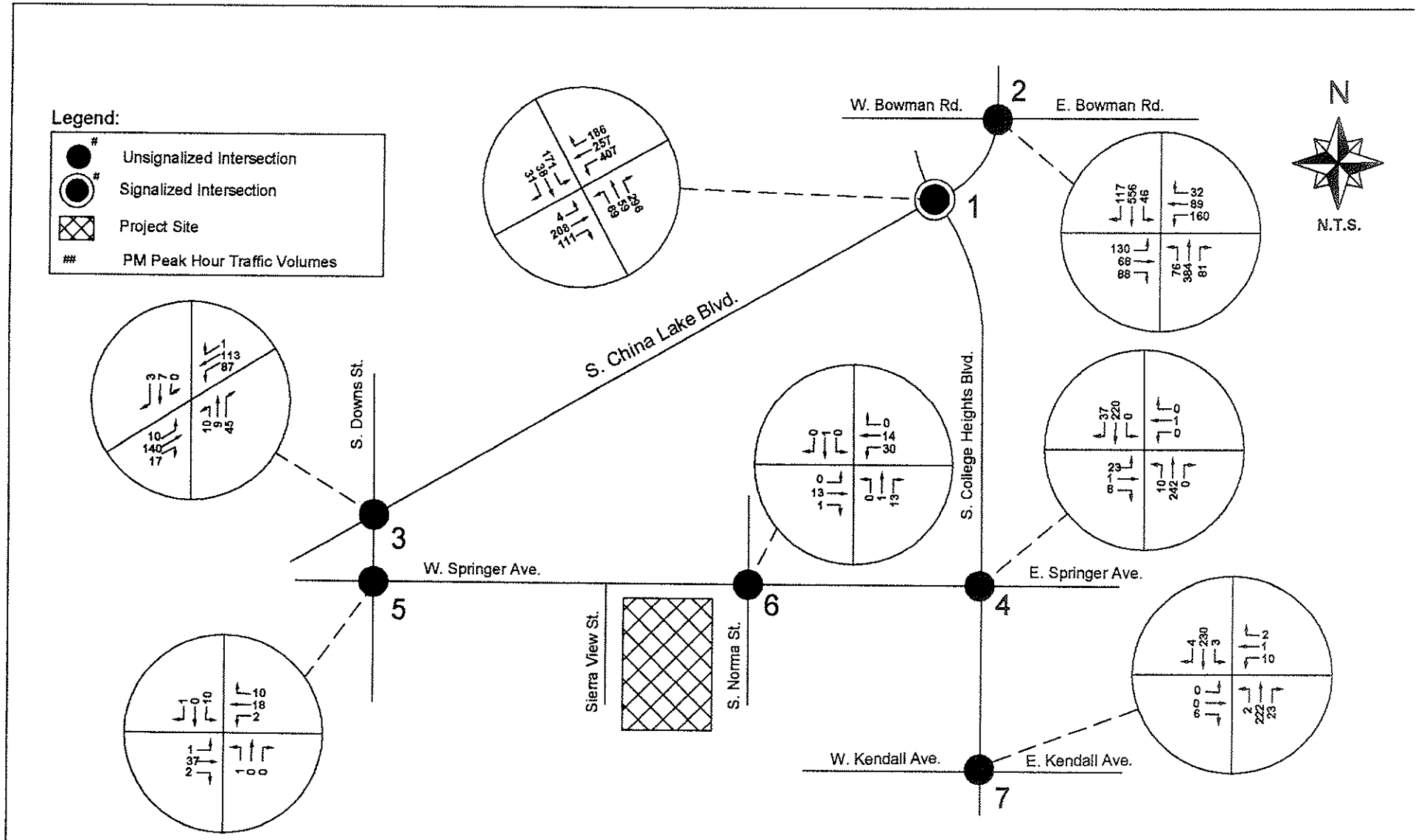

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Figure 8
Build Out Year 2008 With Project
Peak Hour Volumes

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

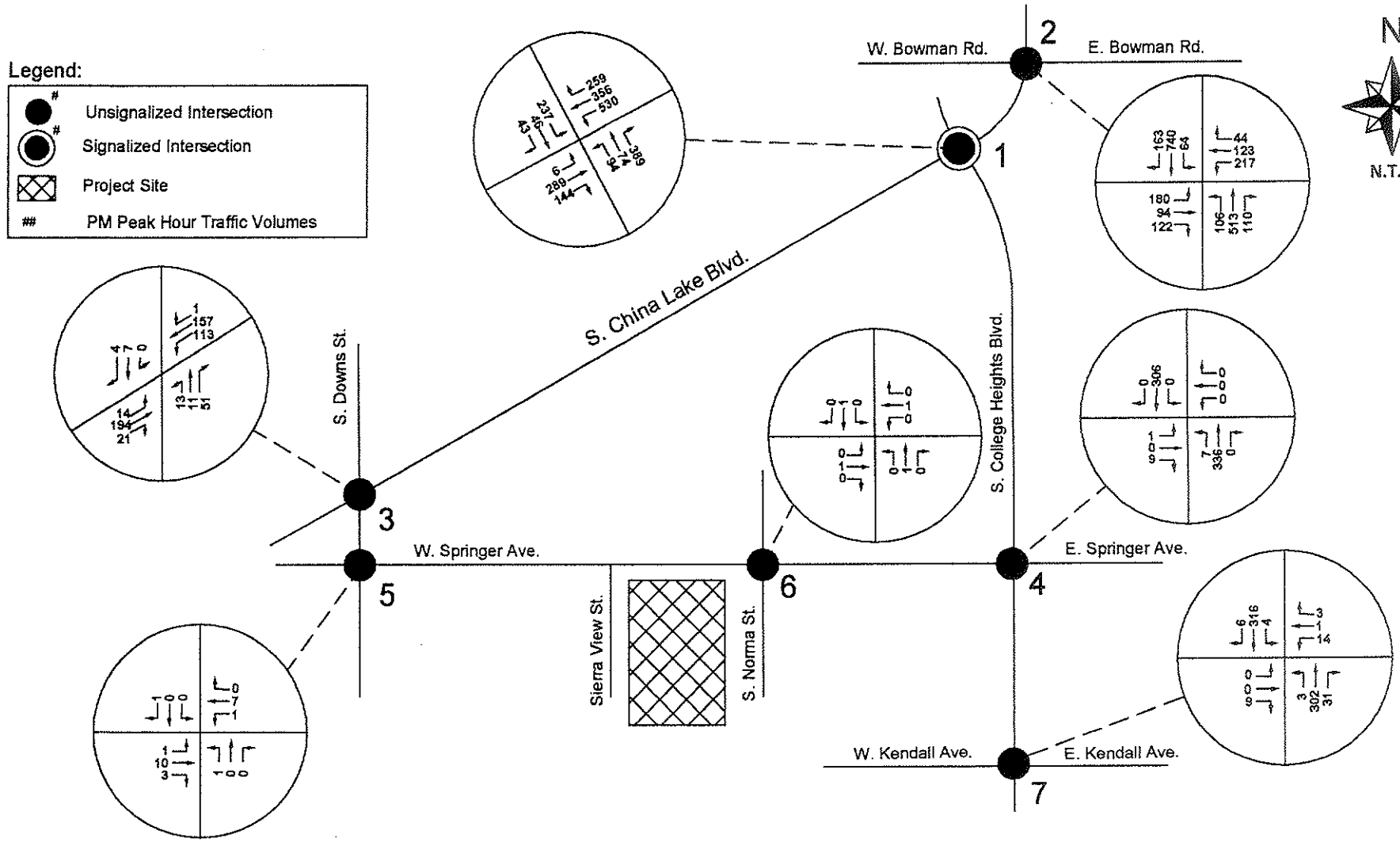

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Figure 9
Future Year 2030 Without Project
Peak Hour Volumes

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

Future Year 2030 with Project Conditions

The Future Year 2030 Project traffic projections reflect a similar amplified increase in traffic over existing conditions for the year 2030. These projections, however, do take into account effects caused by the development of the project site as well as the background traffic growth over 24 years. These results reveal that all the LOS' will be the same as the future year 2030 without the project. Again, the only intersection which will operate at an unacceptable LOS will be China Lake Blvd. at Bowman Road. Therefore, there will be no operational deterioration on any of the seven (7) intersections due to the proposed project.

Table 6
Intersection Delay and Level of Service Analysis for
Future Year 2030 With Project

Intersections	Delay (sec/veh)					LOS				
	NB	SB	EB	WB	Int.	NB	SB	EB	WB	Int.
1. China Lake Blvd. at College Heights Blvd.	**38.5**	**45.8**	78.2	35.1	46.3	**D**	**D**	E	D	D
2. China Lake Blvd. at Bowman Road	*NA	*NA	***NA**	***NA**	*NA	*NA	*NA	***NA**	***NA**	E
3. China Lake Blvd. at Downs Street	**13.0**	**14.3**	0.5	3.6	4.0	**B**	**B**	A	A	A
4. Springer Avenue & College Heights. Blvd.	0.3	0.9	**15.0**	**16.3**	1.1	A	A	**B**	**C**	A
5. Springer Avenue & Downs Street	7.4	7.4	**7.3**	**7.1**	7.2	A	A	**A**	**A**	A
6. Norma Street & Springer Avenue	**7.1**	**7.1**	6.7	7.2	6.9	**A**	**A**	A	A	A
7. Kendall Avenue & College Heights. Blvd.	12.3	12.4	**0.0**	**5.7**	12.0	B	B	**A**	**A**	A

All Assessments for the PM Peak Hr
Minor Approach Delays & LOS are shown in **bold**
* NA = Not Available / Not Applicable

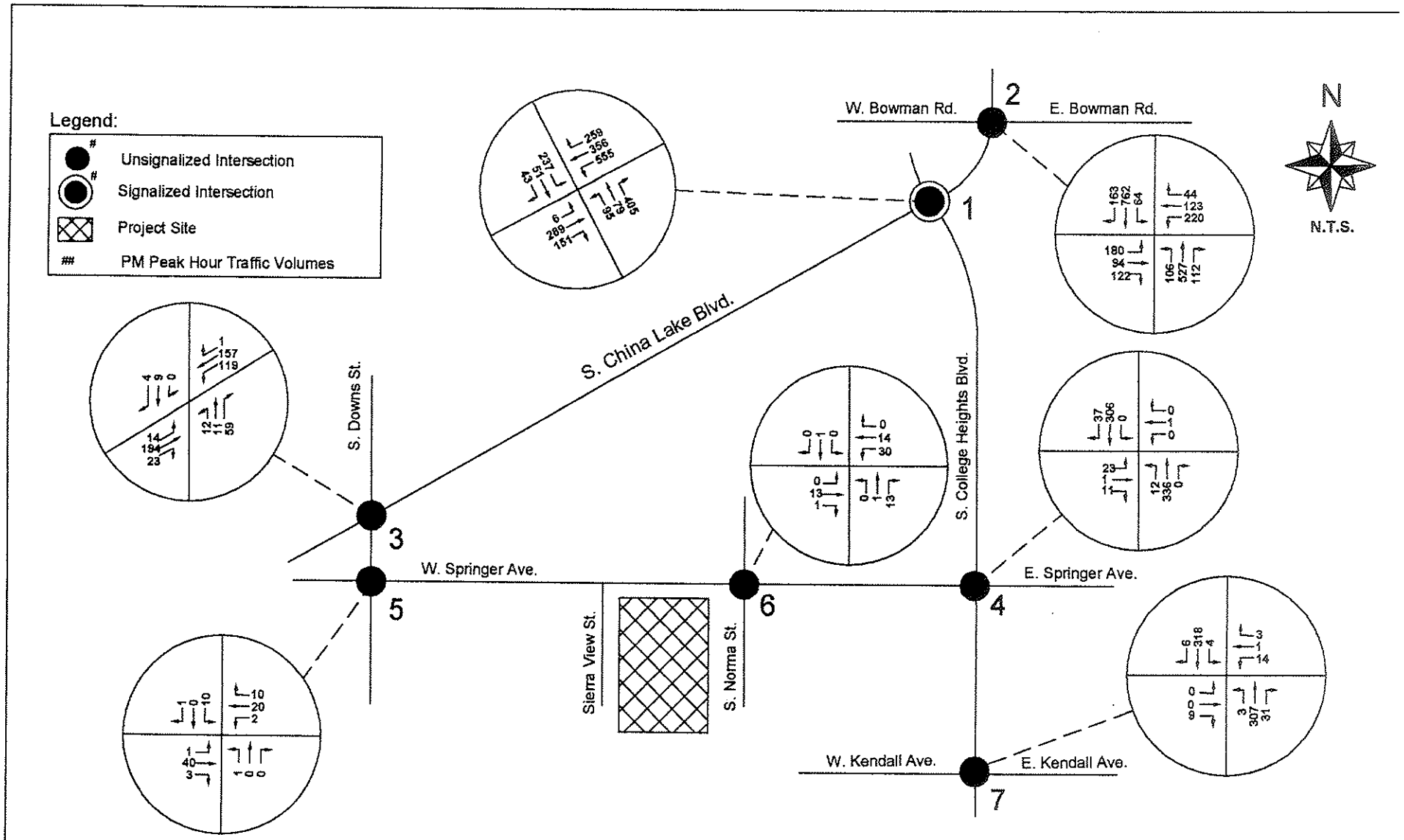

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Figure 10
Future Year 2030 With Project Peak Hour Volumes

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, Kern County

Traffic Impacts

In order to assess the potential impact of the proposed project on surrounding intersections and roadways, all the LOS figures are compared in the following fashion; without the new residential development project, with the new residential development project and significant levels for the HCM delay and volumes over capacity (v/c) ratios.

For the County of Kern, any intersection which falls below LOS "D" should have a mitigation plan. Table 7 compares the Cumulative Base scenario with the Cumulative Base Plus Project scenario and shows the increase of the V/C ratios. These results reveal that none of the intersections during the year 2008 will be impacted with the project and none will operate at unacceptable LOS.

Table 7
Project Impact Comparison Between
Build-out Year 2008 Without Project & Build-out Year 2008 With Project

Intersection	Peak Hour	Build-out Year 2008 Without Project			Build-out Year 2008 With Project			Project Impact
		Delay (sec/veh)	V/C	LOS	Delay (sec/veh)	V/C	LOS	V/C Increase
1. China Lake Blvd. at College Heights Blvd.	PM	32.8	0.55	C	33.0	0.56	C	0.01
2. China Lake Blvd. at Bowman Rd.	PM	N/A	N/A	B	N/A	N/A	B	N/A
3. China Lake Blvd. at Downs St.	PM	3.3	N/A	A	3.5	N/A	A	N/A
4. Springer Ave. & College Heights Blvd.	PM	0.2	N/A	A	1.0	N/A	A	N/A
5. Springer Ave. & Downs St.	PM	6.9	N/A	A	7.1	N/A	A	N/A
6. Norma St. & Springer Ave.	PM	6.9	N/A	A	7.1	N/A	A	N/A
7. Kendall Ave. & College Heights Blvd.	PM	10.7	N/A	A	10.7	N/A	A	N/A

Notes:
LOS: Describes traffic conditions on speed, travel time, freedom to maneuver, traffic interruptions, comfort and convenience.
N/A: Not Available/Not Applicable

Table 8
Project Impact Comparison Between
Future Year 2030 Without Project & Future Year 2030 With Project

Intersection	Peak Hour	Future Year 2030 Without Project			Future Year 2030 With Project			Project Impact
		Delay (sec/veh)	V/C	LOS	Delay (sec/veh)	V/C	LOS	V/C Increase
1. China Lake Blvd. at College Heights Blvd.	PM	45	0.76	D	46.3	0.77	D	0.01
2. China Lake Blvd. at Bowman Rd.	PM	N/A	N/A	E	N/A	N/A	E	N/A
3. China Lake Blvd. at Downs St.	PM	3.6	N/A	A	4.0	N/A	A	N/A
4. Springer Ave. & College Heights Blvd.	PM	0.3	N/A	A	1.1	N/A	A	N/A
5. Springer Ave. & Downs St.	PM	6.9	N/A	A	7.2	N/A	A	N/A
6. Norma St. & Springer Ave.	PM	6.9	N/A	A	6.9	N/A	A	N/A
7. Kendall Ave. & College Heights Blvd.	PM	12.0	N/A	A	12.0	N/A	A	N/A

Notes:
LOS: Describes traffic conditions on speed, travel time, freedom to maneuver, traffic interruptions, comfort and convenience.
N/A: Not Available/Not Applicable

The comparison results for the future year 2030 reveal that the proposed project would not have any potential significant impact on traffic. The LOS' for with and without the project would be the same.

Mitigation Measures

In order to comply with the County of Kern requirement to mitigate any intersection which its corresponding LOS would fall below the LOS "D", only the intersection of China Lake Blvd. at Bowman Rd. falls in the aforesaid category. However, it should be noted that this intersection will have the unacceptable LOS with and without the project. By signalizing the intersection (its warrant is discussed in the following section), the LOS will improve from E to B for both scenarios with and without the project. The results of mitigations are documented in the Appendix B of this report.

Traffic Signal Warrant Assessments

Out of all the seven locations in this study per the direction of Kern County, only one location is currently signalized (i.e., China Lake Blvd. at S. College Heights Blvd.). Due to the very low traffic volumes at five locations, no traffic signal assessment was conducted for them. However, for the unsignalized intersections of China Lake Blvd. at Bowman Rd. and China Lake Blvd. at Downs St., traffic signal installation warrant assessment was conducted. The results which are documented in Appendix E of this report reveal that only the intersection of China Lake Blvd. at Bowman Rd. is warranted (only one warrant is met) during the existing conditions even without the proposed project.

Conclusions

This study was undertaken to analyze the potential traffic impacts of the proposed project on the local street system. The following summarizes the results of this analysis:

- The proposed 136-residential-dwelling-unit development project is projected to generate a net incremental increase of approximately 1,302 daily trips, 102 weekday morning peak hour trips including 25 trips in and 77 trips out, and 137 weekday afternoon peak hour trips including 87 trips in and 50 trips out.

- A total of seven off-site intersections were analyzed within the study area for this project. Of the seven analyzed locations, all of the intersections currently operate at acceptable LOS levels of "A" or "C" during the afternoon peak hours without the proposed residential development project.

- During the future build-out year 2008, all the intersections will operate at the satisfactory LOS of "A", "B" or "C" during both with and without the project.

- During the future year 2030, all the intersections will operate at satisfactory LOS levels except the unsignalized intersection of China Lake Blvd. at Bowman Rd. which will operate at LOS "E" with and without the project.

- According to the Kern County criteria of an LOS falling below level "D" requiring supplemental mitigation measures. Only the unsignalized of intersection of China Lake Blvd. at Bowman Rd. during the future year 2030 for both with and without the project falls in the aforementioned category. By signalizing the intersection the corresponding LOS will improve from LOS "E" to "B". However, it should be noted that this intersection will have the same LOS with and without the project.

- The results of warrant assessments for all the seven intersections reveal that with the exception of the only existing intersection of China Lake Blvd. at S. College Heights Blvd. which is currently signalized, only one other intersection, China Lake Blvd. at

Bowman Rd. will be warranted for signalization during the build-out scenario of 2008. However, there would be no traffic impact or any unacceptable LOS (it is operating at LOS "A" now). The calculated increase of trips at this intersection in 2008 between Without Project and With Project traffic conditions is about 41 vehicular trips (1,786 to 1,827). Therefore, the 136 Tract Homes-TM 6731 Project will impact the intersection by contributing to it 2.24% additional vehicular traffic for the peak hour during this period.

- It is concluded that the proposed project of 136-tract homes would not have any potential significant traffic impact on the roadway system.

However, it should be noted that the determination of the final fees would be subject to the discussions with and approval of the County Engineer.

Appendix A:

Traffic Volumes

MINAGAR & ASSOCIATES, INC.

18662 MacArthur Blvd., Suite 435
Irvine, CA 92612
(949) 727-3399

File Name : China Lake Blvd & College Heights Blvd
Site Code : 00000001
Start Date : 11/09/2006
Page No : 1

Groups Printed- Unshifted

	China Lake Blvd Southbound					College Heights Blvd Westbound					China Lake Blvd Northbound					College Heights Blvd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	38	77	62	0	177	55	7	19	0	81	22	30	0	0	52	10	2	35	0	47	357
04:15 PM	31	54	70	0	155	66	11	17	0	94	20	48	2	0	70	6	9	47	0	62	381
04:30 PM	65	64	98	0	227	54	9	12	0	75	28	56	1	0	85	10	6	30	0	46	433
04:45 PM	47	67	105	1	220	72	15	14	0	101	22	50	1	0	73	9	7	38	0	54	448
Total	181	262	335	1	779	247	42	62	0	351	92	184	4	0	280	35	24	150	0	209	1619
05:00 PM	38	64	98	0	200	80	17	23	0	120	31	48	0	0	79	5	10	51	0	66	465
05:15 PM	43	75	109	0	227	62	13	17	0	92	26	59	4	0	89	10	6	41	0	57	465
05:30 PM	37	66	92	0	195	57	11	16	0	84	19	60	2	0	81	8	10	55	0	73	433
05:45 PM	35	69	88	0	192	60	10	17	0	87	22	55	2	0	79	8	7	48	0	63	421
Total	153	274	387	0	814	259	51	73	0	383	98	222	8	0	328	31	33	195	0	259	1784
Grand Total	334	536	722	1	1593	506	93	135	0	734	190	406	12	0	608	66	57	345	0	468	3403
Apprch %	21.0	33.6	45.3	0.1		68.9	12.7	18.4	0.0		31.3	66.8	2.0	0.0		14.1	12.2	73.7	0.0		
Total %	9.8	15.8	21.2	0.0	46.8	14.9	2.7	4.0	0.0	21.6	5.6	11.9	0.4	0.0	17.9	1.9	1.7	10.1	0.0	13.8	

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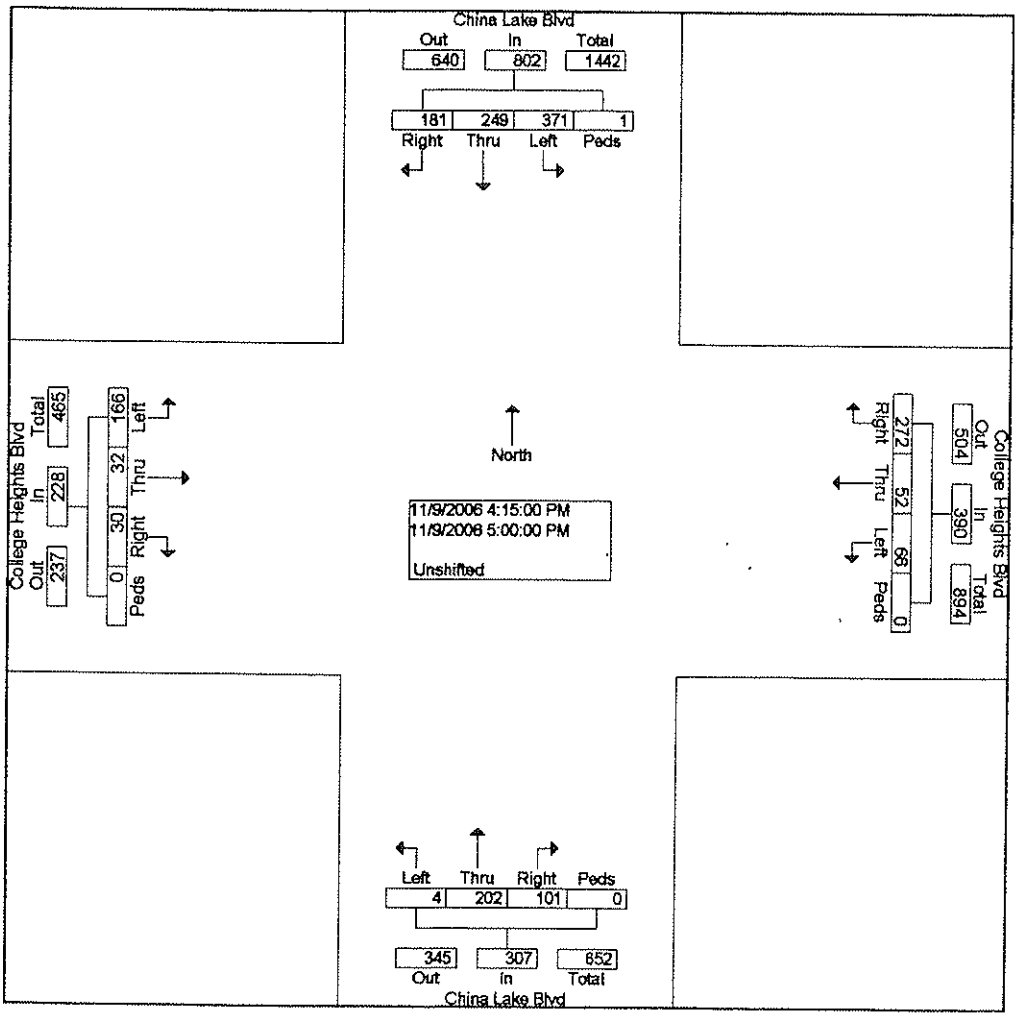
File Name : China Lake Blvd & College Heights Blvd
Site Code : 00000001
Start Date : 11/09/2006
Page No : 2

	China Lake Blvd Southbound					College Heights Blvd Westbound					China Lake Blvd Northbound					College Heights Blvd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	181	249	371	1	802	272	52	66	0	390	101	202	4	0	307	30	32	166	0	228	1727
Percent	22.6	31.0	46.3	0.1		69.7	13.3	16.9	0.0		32.9	65.8	1.3	0.0		13.2	14.0	72.8	0.0		
05:00 Volume	38	64	98	0	200	80	17	23	0	120	31	48	0	0	79	5	10	51	0	66	465
Peak Factor																					0.928
High Int.	04:30 PM					05:00 PM					04:30 PM					05:00 PM					
Volume	65	64	98	0	227	80	17	23	0	120	28	56	1	0	85	5	10	51	0	66	
Peak Factor					0.883					0.813					0.903					0.864	



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18662 MacArthur Blvd., Suite 435
Irvine, CA 92612
(949) 727-3399

File Name : China Lake Blvd &Bowman Rd
Site Code : 00000002
Start Date : 11/14/2006
Page No : 1

Groups Printed- Unshifted

	China Lake Blvd Southbound				Bowman Rd Westbound				China Lake Blvd Northbound				Bowman Rd Eastbound				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	23	98	12	0	8	8	26	0	17	98	23	0	8	12	31	0	364
04:15 PM	27	132	12	0	8	15	34	0	23	81	17	0	22	16	26	0	413
04:30 PM	28	133	9	0	11	25	42	0	21	93	13	0	26	15	28	0	444
04:45 PM	28	143	14	0	8	21	32	0	18	92	23	0	19	22	31	0	451
Total	106	506	47	0	35	69	134	0	79	364	76	0	75	65	116	0	1672
05:00 PM	31	110	10	0	4	25	44	0	15	93	21	0	18	13	41	0	425
05:15 PM	24	142	9	0	6	16	21	0	18	79	17	0	22	9	30	0	393
05:30 PM	16	114	11	0	6	13	16	0	21	90	32	0	18	12	24	0	373
05:45 PM	19	125	8	0	5	18	19	0	18	88	25	0	22	14	28	0	389
Total	90	491	38	0	21	72	100	0	72	350	95	0	80	48	123	0	1580
Grand Total	196	997	85	0	56	141	234	0	151	714	171	0	155	113	239	0	3252
Apprch %	15.3	78.0	6.7	0.0	13.0	32.7	54.3	0.0	14.6	68.9	16.5	0.0	30.6	22.3	47.1	0.0	
Total %	6.0	30.7	2.6	0.0	1.7	4.3	7.2	0.0	4.6	22.0	5.3	0.0	4.8	3.5	7.3	0.0	

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18662 MacArthur Blvd., Suite 435
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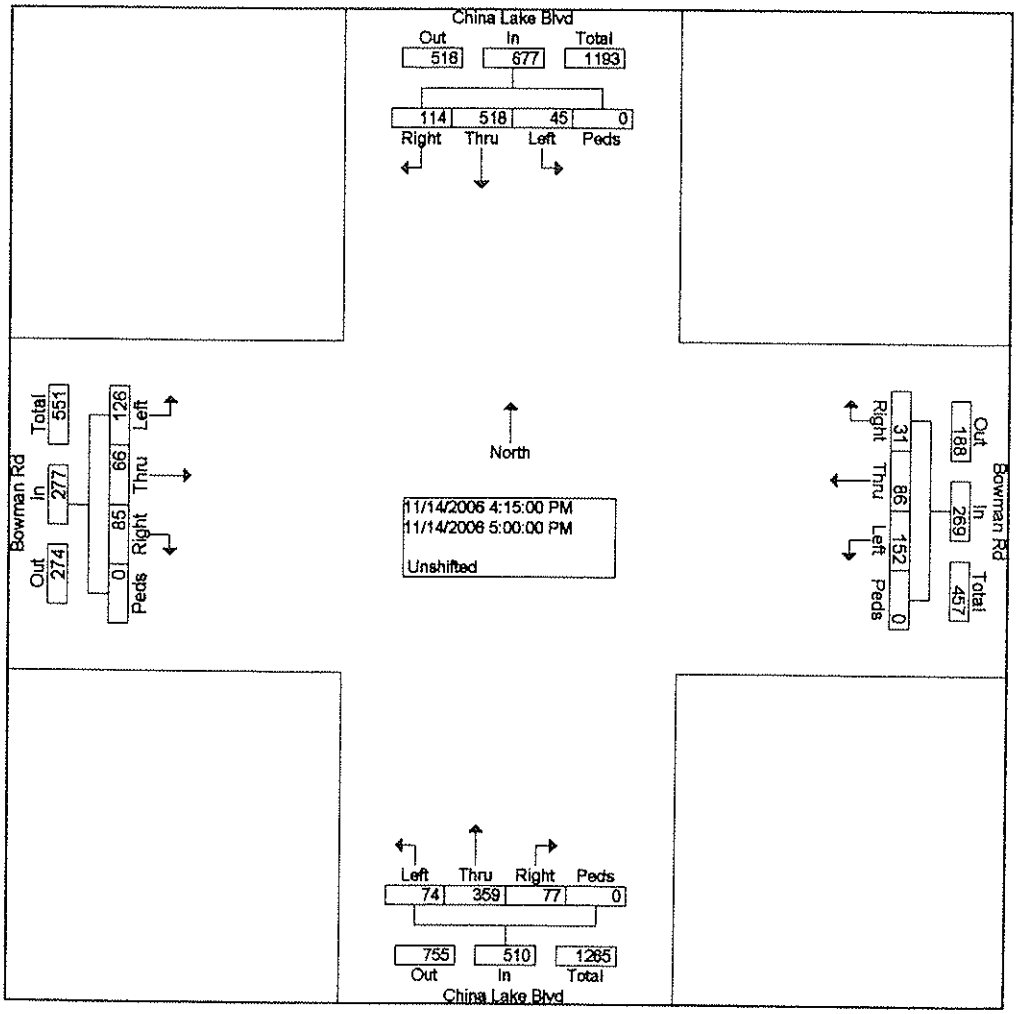
File Name : China Lake Blvd &Bowman Rd
Site Code : 00000002
Start Date : 11/14/2006
Page No : 2

	China Lake Blvd Southbound					Bowman Rd Westbound					China Lake Blvd Northbound					Bowman Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	114	518	45	0	677	31	86	152	0	269	77	359	74	0	510	85	66	126	0	277	1733
Percent	16.8	76.5	6.6	0.0		11.5	32.0	56.5	0.0		15.1	70.4	14.5	0.0		30.7	23.8	45.5	0.0		
04:45 Volume	28	143	14	0	185	8	21	32	0	61	18	92	23	0	133	19	22	31	0	72	451
Peak Factor																					0.961
High Int.	04:45 PM					04:30 PM					04:45 PM					04:45 PM					
Volume	28	143	14	0	185	11	25	42	0	78	18	92	23	0	133	19	22	31	0	72	
Peak Factor					0.915					0.862					0.959					0.962	



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(949) 727-3399

File Name : China Lake Blvd & Downs St.
Site Code : 00000003
Start Date : 11/15/2006
Page No : 1

Groups Printed- Unshifted

	Downs St. Southbound					China Lake Blvd Westbound					Downs St. Northbound					China Lake Blvd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	2	0	0	2	0	20	15	0	35	8	0	7	0	15	1	27	1	0	29	81
04:15 PM	1	0	0	0	1	0	17	12	0	29	10	1	1	0	12	4	30	1	0	35	77
04:30 PM	0	1	0	0	1	0	26	15	0	41	7	1	2	0	10	1	26	2	0	29	81
04:45 PM	2	1	0	0	3	1	37	19	0	57	9	4	5	0	18	2	51	4	0	57	135
Total	3	4	0	0	7	1	100	61	0	162	34	6	15	0	55	8	134	8	0	150	374
05:00 PM	0	3	0	0	3	0	30	33	0	63	10	2	1	0	13	8	29	3	0	40	119
05:15 PM	1	2	0	0	3	1	24	18	0	43	16	0	6	0	22	6	22	1	0	29	97
05:30 PM	1	1	0	0	2	1	25	14	0	40	10	3	2	0	15	8	26	0	0	34	91
05:45 PM	2	0	0	0	2	0	29	13	0	42	8	1	2	0	11	3	26	1	0	30	85
Total	4	6	0	0	10	2	108	78	0	188	44	6	11	0	61	25	103	5	0	133	392
Grand Total	7	10	0	0	17	3	208	139	0	350	78	12	26	0	116	33	237	13	0	283	766
Apprch %	41.2	58.8	0.0	0.0		0.9	59.4	39.7	0.0		67.2	10.3	22.4	0.0		11.7	83.7	4.6	0.0		
Total %	0.9	1.3	0.0	0.0	2.2	0.4	27.2	18.1	0.0	45.7	10.2	1.6	3.4	0.0	15.1	4.3	30.9	1.7	0.0	36.9	

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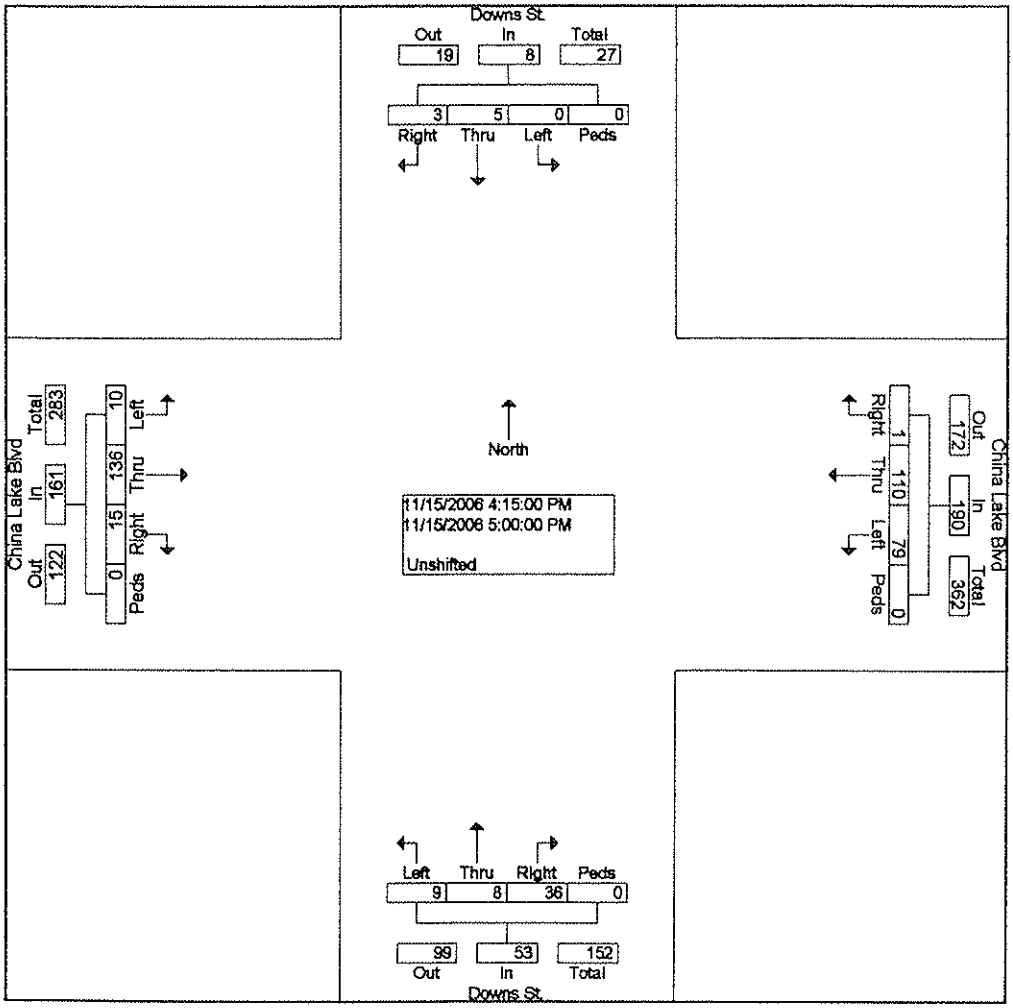
File Name : China Lake Blvd & Downs St.
Site Code : 00000003
Start Date : 11/15/2006
Page No : 2

	Downs St. Southbound					China Lake Blvd Westbound					Downs St. Northbound					China Lake Blvd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	3	5	0	0	8	1	110	79	0	190	36	8	9	0	53	15	136	10	0	161	412
Percent	37.5	62.5	0.0	0.0		0.5	57.9	41.6	0.0		67.9	15.1	17.0	0.0		9.3	84.5	6.2	0.0		
04:45 Volume	2	1	0	0	3	1	37	19	0	57	9	4	5	0	18	2	51	4	0	57	135
Peak Factor																					0.763
High Int.	04:45 PM					05:00 PM					04:45 PM					04:45 PM					
Volume	2	1	0	0	3	0	30	33	0	63	9	4	5	0	18	2	51	4	0	57	
Peak Factor					0.667					0.754					0.736					0.706	



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18662 MacArthur Blvd., Suite 435
Irvine, CA 92612
(949) 727-3399

File Name : College Heights Blvd & Springer Ave
Site Code : 00000004
Start Date : 11/16/2006
Page No : 1

Groups Printed- Unshifted

	College Heights Blvd Southbound					Springer Ave Westbound					College Heights Blvd Northbound					Springer Ave Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	34	0	0	34	0	0	0	0	0	0	47	5	0	52	2	0	0	0	2	88
04:15 PM	0	41	0	0	41	0	0	0	0	0	0	41	3	0	44	1	0	0	0	1	86
04:30 PM	0	40	0	0	40	0	0	0	0	0	0	57	0	0	57	1	0	1	0	2	99
04:45 PM	0	57	0	0	57	0	0	0	0	0	0	64	2	0	66	2	0	0	0	2	125
Total	0	172	0	0	172	0	0	0	0	0	0	209	10	0	219	6	0	1	0	7	398
05:00 PM	0	76	0	0	76	0	0	0	0	0	0	73	0	0	73	2	0	0	0	2	151
05:15 PM	0	76	0	0	76	0	0	0	0	0	0	67	6	0	73	3	0	0	0	3	152
05:30 PM	0	61	0	0	61	0	0	0	0	0	0	60	2	0	62	1	0	0	0	1	124
05:45 PM	0	59	0	0	59	0	0	0	0	0	0	58	2	0	60	2	0	0	0	2	121
Total	0	272	0	0	272	0	0	0	0	0	0	258	10	0	268	8	0	0	0	8	548
Grand Total	0	444	0	0	444	0	0	0	0	0	0	467	20	0	487	14	0	1	0	15	946
Apprch %	0.0	100.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	95.9	4.1	0.0		93.3	0.0	6.7	0.0		
Total %	0.0	46.9	0.0	0.0	46.9	0.0	0.0	0.0	0.0	0.0	0.0	49.4	2.1	0.0	51.5	1.5	0.0	0.1	0.0	1.6	

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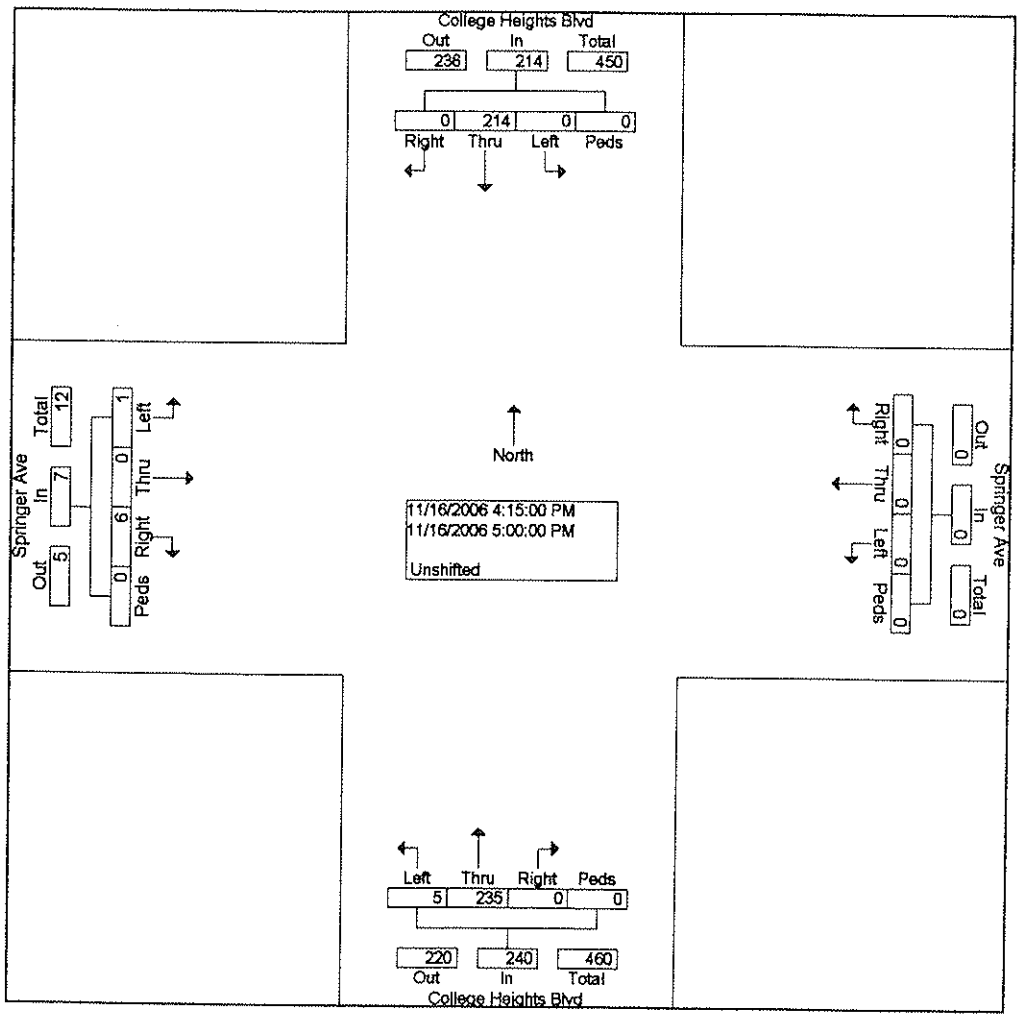
	College Heights Blvd Southbound					Springer Ave Westbound					College Heights Blvd Northbound					Springer Ave Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	0	214	0	0	214	0	0	0	0	0	0	235	5	0	240	6	0	1	0	7	461
Percent	0.0	100.0	0.0	0.0		0.0	0.0	0.0	0.0		0.0	97.9	2.1	0.0		85.7	0.0	14.3	0.0		
05:00 Volume	0	76	0	0	76	0	0	0	0	0	0	73	0	0	73	2	0	0	0	2	151
Peak Factor																					0.763
High Int.	05:00 PM					3:45:00 PM					05:00 PM					04:30 PM					
Volume	0	76	0	0	76	0	0	0	0	0	0	73	0	0	73	1	0	1	0	2	
Peak Factor					0.704										0.822					0.875	



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File Name : Springer Ave & Downs St.
Site Code : 00000005
Start Date : 11/15/2006
Page No : 1

Groups Printed- Unshifted

	Springer Ave Southbound					Downs St. Westbound					Springer Ave Northbound					Downs St. Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3
04:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2	1	0	0	3	4
04:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	4
Total	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	2	5	0	0	7	13
05:00 PM	1	0	0	0	1	0	1	1	0	2	0	0	1	0	1	0	2	1	0	3	7
05:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3
05:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	4
05:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	3
Total	1	0	0	0	1	0	5	1	0	6	0	0	1	0	1	0	8	1	0	9	17
Grand Total	1	0	0	0	1	0	11	1	0	12	0	0	1	0	1	2	13	1	0	16	30
Apprch %	100.0	0.0	0.0	0.0		0.0	91.7	8.3	0.0		0.0	0.0	100.0	0.0		12.5	81.3	6.3	0.0		
Total %	3.3	0.0	0.0	0.0	3.3	0.0	36.7	3.3	0.0	40.0	0.0	0.0	3.3	0.0	3.3	6.7	43.3	3.3	0.0	53.3	

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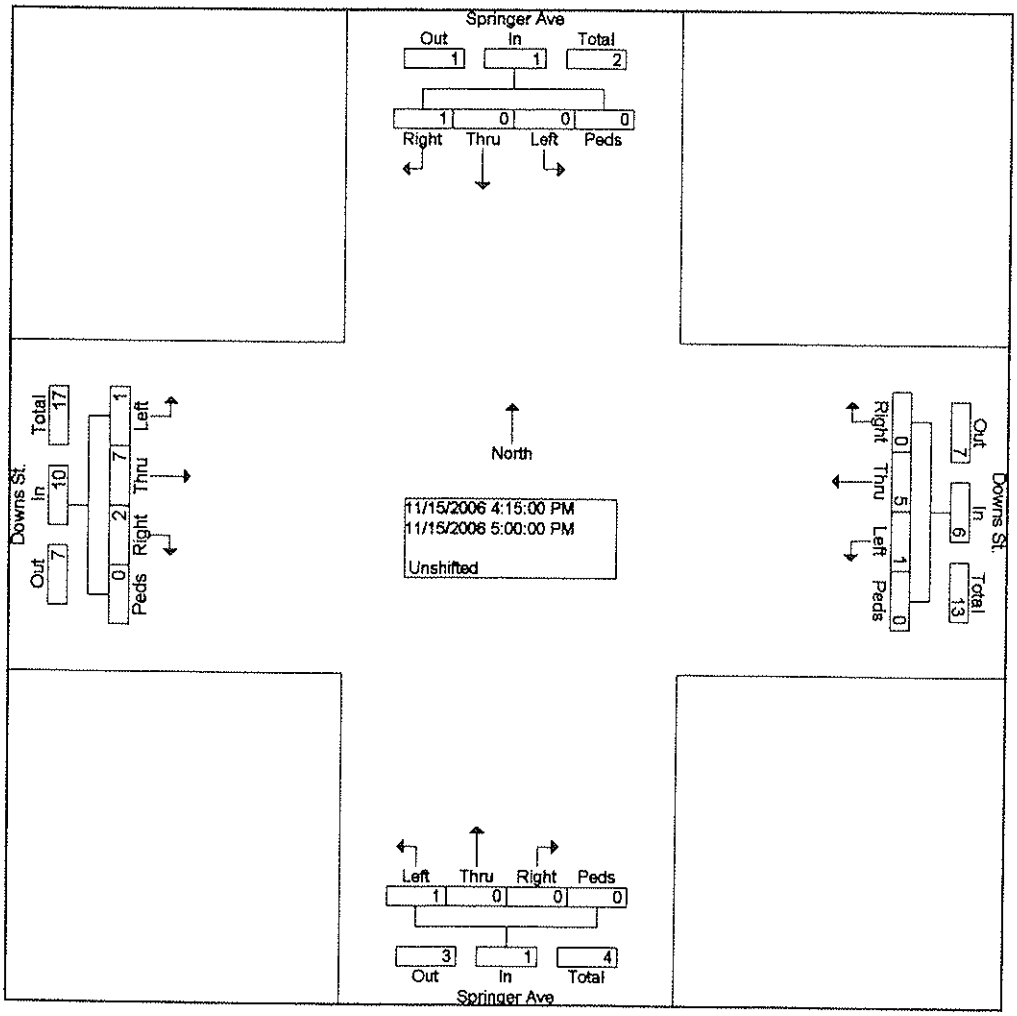
	Springer Ave Southbound					Downs St. Westbound					Springer Ave Northbound					Downs St. Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	1	0	0	0	1	0	5	1	0	6	0	0	1	0	1	2	7	1	0	10	18
Percent	100.0	0.0	0.0	0.0		0.0	83.3	16.7	0.0		0.0	0.0	100.0	0.0		20.0	70.0	10.0	0.0		
05:00 Volume	1	0	0	0	1	0	1	1	0	2	0	0	1	0	1	0	2	1	0	3	7
Peak Factor																					0.643
High Int.	05:00 PM					04:45 PM					05:00 PM					04:30 PM					
Volume	1	0	0	0	1	0	2	0	0	2	0	0	1	0	1	2	1	0	0	3	
Peak Factor					0.250					0.750					0.250					0.833	



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File Name : College Heights Blvd & Kendall Ave
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Groups Printed- Unshifted

	College Heights Blvd Southbound					Kendall Ave Westbound					College Heights Blvd Northbound					Kendall Ave Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
04:00 PM	0	21	1	0	22	0	0	1	0	1	2	44	1	0	47	1	1	0	0	2	72
04:15 PM	1	41	2	0	44	1	0	3	0	4	5	34	2	0	41	1	0	0	0	1	90
04:30 PM	1	43	0	0	44	0	1	3	0	4	7	50	0	0	57	2	0	0	0	2	107
04:45 PM	2	61	1	0	64	0	0	3	0	3	7	57	0	0	64	3	0	0	0	3	134
Total	4	166	4	0	174	1	1	10	0	12	21	185	3	0	209	7	1	0	0	8	403
05:00 PM	0	76	0	0	76	1	0	1	0	2	3	70	0	0	73	0	0	0	0	0	151
05:15 PM	1	76	0	0	77	1	0	4	0	5	7	60	0	0	67	1	0	0	0	1	150
05:30 PM	0	62	0	0	62	0	0	1	0	1	5	55	0	0	60	2	0	0	0	2	125
05:45 PM	0	59	1	0	60	0	0	0	0	0	0	58	0	0	58	1	0	0	0	1	119
Total	1	273	1	0	275	2	0	6	0	8	15	243	0	0	258	4	0	0	0	4	545
Grand Total	5	439	5	0	449	3	1	16	0	20	36	428	3	0	467	11	1	0	0	12	948
Apprch %	1.1	97.8	1.1	0.0		15.0	5.0	80.0	0.0		7.7	91.6	0.6	0.0		91.7	8.3	0.0	0.0		
Total %	0.5	46.3	0.5	0.0	47.4	0.3	0.1	1.7	0.0	2.1	3.8	45.1	0.3	0.0	49.3	1.2	0.1	0.0	0.0	1.3	

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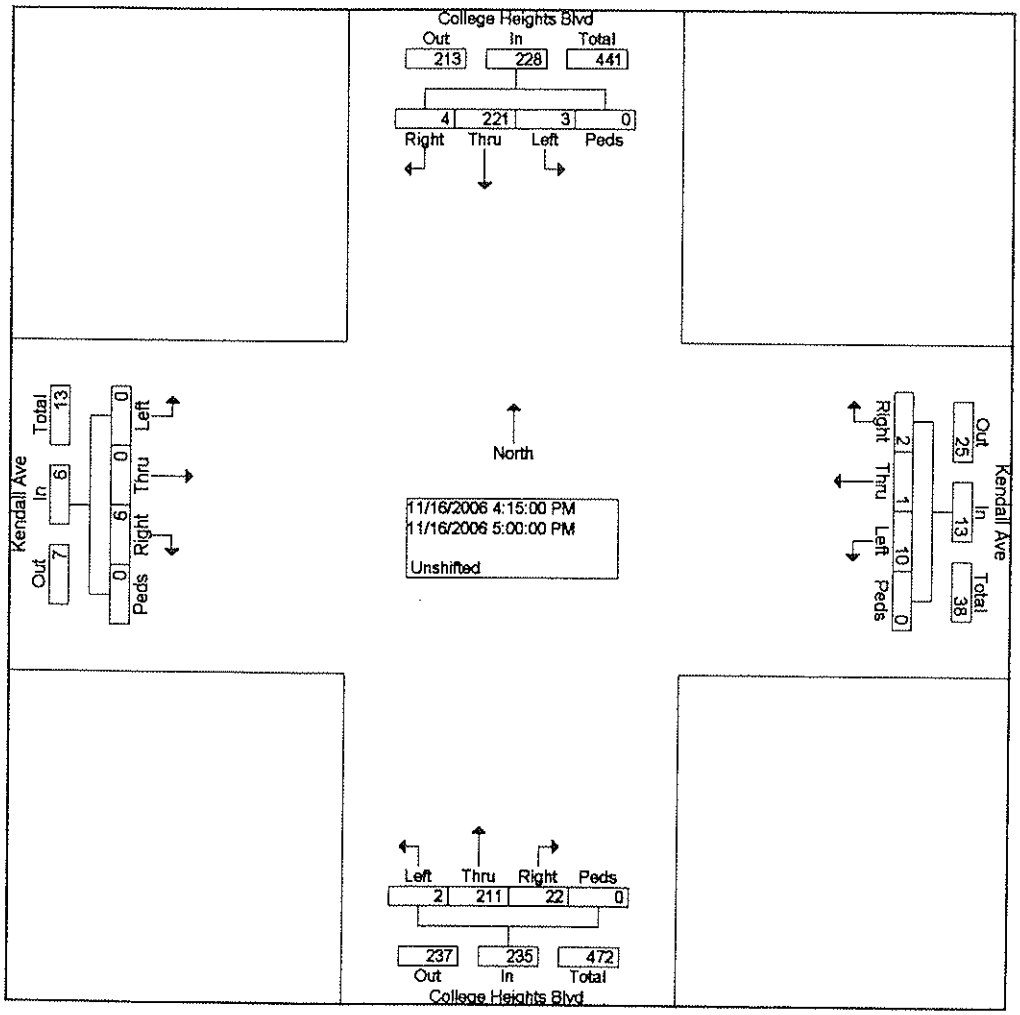
	College Heights Blvd Southbound					Kendall Ave Westbound					College Heights Blvd Northbound					Kendall Ave Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour From 04:00 PM to 05:00 PM - Peak 1 of 1																					
Intersection	04:15 PM																				
Volume	4	221	3	0	228	2	1	10	0	13	22	211	2	0	235	6	0	0	0	6	482
Percent	1.8	96.9	1.3	0.0		15.4	7.7	76.9	0.0		9.4	89.8	0.9	0.0		100.0	0.0	0.0	0.0		
05:00 Volume	0	76	0	0	76	1	0	1	0	2	3	70	0	0	73	0	0	0	0	0	151
Peak Factor																					0.798
High Int.	05:00 PM					04:15 PM					05:00 PM					04:45 PM					
Volume	0	76	0	0	76	1	0	3	0	4	3	70	0	0	73	3	0	0	0	3	
Peak Factor					0.750					0.813					0.805					0.500	



Appendix B:

HCS & Synchro Printouts

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	13	13	13	13	13	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3362		1829	3426		1829	3197		1770	1727	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3362		1829	3426		1829	3197		1770	1727	
Volume (vph)	4	202	101	371	249	181	66	52	272	166	32	30
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	220	110	403	271	197	72	57	296	180	35	33
RTOR Reduction (vph)	0	78	0	0	116	0	0	233	0	0	25	0
Lane Group Flow (vph)	4	252	0	403	352	0	72	120	0	180	43	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	16.0		21.0	33.0		8.0	17.0		10.0	19.0	
Effective Green, g (s)	4.0	16.0		21.0	33.0		8.0	17.0		10.0	19.0	
Actuated g/C Ratio	0.05	0.20		0.26	0.41		0.10	0.21		0.12	0.24	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	89	672		480	1413		183	679		221	410	
v/s Ratio Prot	0.00	c0.08		c0.22	0.10		0.04	c0.04		c0.10	0.02	
v/s Ratio Perm												
v/c Ratio	0.04	0.38		0.84	0.25		0.39	0.18		0.81	0.10	
Uniform Delay, d1	36.2	27.7		27.9	15.4		33.7	25.8		34.1	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.6		16.1	0.4		6.2	0.6		27.0	0.5	
Delay (s)	37.1	29.3		44.0	15.8		40.0	26.3		61.1	24.4	
Level of Service	D	C		D	B		D	C		E	C	
Approach Delay (s)		29.4			28.8			28.6			51.0	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	126	66	85	152	86	31	74	359	77	45	518	114
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Volume Combined (vph)	0	277	0	0	238	31	74	436	0	45	632	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.93	0.85	0.95	0.97	0.85	0.95	0.97	0.85	0.95	0.97	0.85
Saturated Flow (vph)	0	1771	0	0	1839	1615	1805	3522	0	1805	3520	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			0.0			2.3	4.9	14.9	0.0	3.0	21.5	0.0
Adj Reference Time (s)			0.0			8.0	8.9	18.9	0.0	8.0	25.5	0.0
Permitted Option												
Adj Saturation A (vph)	0	220		0	1247		120	1761		120	1760	
Reference Time A (s)	0.0	151.4		0.0	22.9		73.8	14.9		44.9	21.5	
Adj Saturation B (vph	0	0		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	16.4	26.8		NA	NA		NA	NA		NA	NA	
Reference Time (s)		26.8			22.9			73.8			44.9	
Adj Reference Time (s)		30.8			26.9			77.8			48.9	
Split Option												
Ref Time Combined (s)	0.0	18.8		0.0	15.5		4.9	14.9		3.0	21.5	
Ref Time Seperate (s)	8.4	4.6		10.1	5.4		4.9	12.2		3.0	17.7	
Reference Time (s)	18.8	18.8		15.5	15.5		14.9	14.9		21.5	21.5	
Adj Reference Time (s)	22.8	22.8		19.5	19.5		18.9	18.9		25.5	25.5	

Summary	EB WB	NE SW	Combined
Protected Option (s)	NA	34.5	
Permitted Option (s)	30.8	77.8	
Split Option (s)	42.3	44.4	
Minimum (s)	30.8	34.5	65.2

Right Turns	WBR
Adj Reference Time (s)	8.0
Cross Thru Ref Time (s)	18.9
Oncoming Left Ref Time (s)	22.8
Combined (s)	49.6

Intersection Summary

Intersection Capacity Utilization 54.4% ICU Level of Service A

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	136	15	79	110	1	9	8	36	0	5	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	148	16	86	120	1	10	9	39	0	5	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	121			164			475	470	156	505	478	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	121			164			475	470	156	505	478	120
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			94			98	98	96	100	99	100
cM capacity (veh/h)	1467			1414			468	458	890	427	454	931

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	11	164	86	121	58	0	5	3
Volume Left	11	0	86	0	10	0	0	0
Volume Right	0	16	0	1	39	0	0	3
cSH	1467	1700	1414	1700	687	1700	454	931
Volume to Capacity	0.01	0.10	0.06	0.07	0.08	0.00	0.01	0.00
Queue Length 95th (ft)	1	0	5	0	7	0	1	0
Control Delay (s)	7.5	0.0	7.7	0.0	10.7	0.0	13.0	8.9
Lane LOS	A		A		B	A	B	A
Approach Delay (s)	0.5		3.2		10.7	11.5		
Approach LOS					B	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	6	0	0	0	5	235	0	0	214	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	7	0	0	0	5	255	0	0	233	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	499	499	233	505	499	255	233			255		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	499	499	233	505	499	255	233			255		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	100	100			100		
cM capacity (veh/h)	481	471	807	472	471	783	1335			1310		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	0	261	233
Volume Left	1	0	5	0
Volume Right	7	0	0	0
cSH	735	1700	1335	1310
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	9.9	0.0	0.2	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.9	0.0	0.2	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Volume (vph)	1	7	2	1	5	0	1	0	0	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	8	2	1	5	0	1	0	0	0	0	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	7	1	1
Volume Left (vph)	1	1	1	0
Volume Right (vph)	2	0	0	1
Hadj (s)	-0.07	0.07	0.23	-0.57
Departure Headway (s)	3.8	4.0	4.2	3.4
Degree Utilization, x	0.01	0.01	0.00	0.00
Capacity (veh/h)	928	898	846	1056
Control Delay (s)	6.9	7.0	7.2	6.4
Approach Delay (s)	6.9	7.0	7.2	6.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	0	1	0	0	1	0	0	1	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	1	1	1	1
Volume Left (vph)	0	0	0	0
Volume Right (vph)	0	0	0	0
Hadj (s)	0.03	0.03	0.03	0.03
Departure Headway (s)	3.9	3.9	3.9	3.9
Degree Utilization, x	0.00	0.00	0.00	0.00
Capacity (veh/h)	906	908	910	908
Control Delay (s)	6.9	6.9	6.9	6.9
Approach Delay (s)	6.9	6.9	6.9	6.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	6	10	1	2	2	211	22	3	221	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	11	1	2	2	229	24	3	240	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3			7			152	28	3	166	30	2
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3			7			152	28	3	166	30	2
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	73	98	99	72	100
cM capacity (veh/h)	1619			1614			633	859	1081	617	857	1082

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	14	255	248
Volume Left	0	11	2	3
Volume Right	7	2	24	4
cSH	1619	1614	873	855
Volume to Capacity	0.00	0.01	0.29	0.29
Queue Length 95th (ft)	0	1	31	30
Control Delay (s)	0.0	5.6	10.8	10.9
Lane LOS		A	B	B
Approach Delay (s)	0.0	5.6	10.8	10.9
Approach LOS			B	B

Intersection Summary			
Average Delay	10.6		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	13	13	13	13	13	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3362		1829	3427		1829	3198		1770	1727	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3362		1829	3427		1829	3198		1770	1727	
Volume (vph)	4	208	104	382	257	186	68	54	280	171	33	31
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	226	113	415	279	202	74	59	304	186	36	34
RTOR Reduction (vph)	0	78	0	0	119	0	0	239	0	0	26	0
Lane Group Flow (vph)	4	261	0	415	362	0	74	124	0	186	44	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	16.0		21.0	33.0		8.0	17.0		10.0	19.0	
Effective Green, g (s)	4.0	16.0		21.0	33.0		8.0	17.0		10.0	19.0	
Actuated g/C Ratio	0.05	0.20		0.26	0.41		0.10	0.21		0.12	0.24	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	89	672		480	1414		183	680		221	410	
v/s Ratio Prot	0.00	c0.08		c0.23	0.11		0.04	c0.04		c0.11	0.03	
v/s Ratio Perm												
v/c Ratio	0.04	0.39		0.86	0.26		0.40	0.18		0.84	0.11	
Uniform Delay, d1	36.2	27.8		28.1	15.4		33.8	25.8		34.2	23.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.7		18.4	0.4		6.5	0.6		30.4	0.5	
Delay (s)	37.1	29.4		46.5	15.9		40.3	26.4		64.6	24.4	
Level of Service	D	C		D	B		D	C		E	C	
Approach Delay (s)		29.5			30.1			28.7			53.6	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	32.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	130	68	88	157	89	32	76	370	79	46	534	117
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Volume Combined (vph)	0	286	0	0	246	32	76	449	0	46	651	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.93	0.85	0.95	0.97	0.85	0.95	0.97	0.85	0.95	0.97	0.85
Saturated Flow (vph)	0	1771	0	0	1839	1615	1805	3522	0	1805	3520	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			0.0			2.4	5.1	15.3	0.0	3.1	22.2	0.0
Adj Reference Time (s)			0.0			8.0	9.1	19.3	0.0	8.0	26.2	0.0
Permitted Option												
Adj Saturation A (vph)	0	220		0	1247		120	1761		120	1760	
Reference Time A (s)	0.0	156.2		0.0	23.7		75.8	15.3		45.9	22.2	
Adj Saturation B (vph	0	0		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	16.6	27.4		NA	NA		NA	NA		NA	NA	
Reference Time (s)		27.4			23.7			75.8			45.9	
Adj Reference Time (s)		31.4			27.7			79.8			49.9	
Split Option												
Ref Time Combined (s)	0.0	19.4		0.0	16.0		5.1	15.3		3.1	22.2	
Ref Time Seperate (s)	8.6	4.7		10.4	5.6		5.1	12.6		3.1	18.2	
Reference Time (s)	19.4	19.4		16.0	16.0		15.3	15.3		22.2	22.2	
Adj Reference Time (s)	23.4	23.4		20.0	20.0		19.3	19.3		26.2	26.2	

Summary	EB WB	NE SW	Combined
Protected Option (s)	NA	35.2	
Permitted Option (s)	31.4	79.8	
Split Option (s)	43.4	45.5	
Minimum (s)	31.4	35.2	66.6

Right Turns	WBR
Adj Reference Time (s)	8.0
Cross Thru Ref Time (s)	19.3
Oncoming Left Ref Time (s)	23.4
Combined (s)	50.7

Intersection Summary			
Intersection Capacity Utilization	55.5%	ICU Level of Service	B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	140	15	81	113	1	9	8	37	0	5	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	152	16	88	123	1	10	9	40	0	5	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	124			168			487	482	160	518	490	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	124			168			487	482	160	518	490	123
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			94			98	98	95	100	99	100
cM capacity (veh/h)	1463			1409			459	450	885	417	446	927

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	11	168	88	124	59	0	5	3
Volume Left	11	0	88	0	10	0	0	0
Volume Right	0	16	0	1	40	0	0	3
cSH	1463	1700	1409	1700	682	1700	446	927
Volume to Capacity	0.01	0.10	0.06	0.07	0.09	0.00	0.01	0.00
Queue Length 95th (ft)	1	0	5	0	7	0	1	0
Control Delay (s)	7.5	0.0	7.7	0.0	10.8	0.0	13.2	8.9
Lane LOS	A		A		B	A	B	A
Approach Delay (s)	0.5		3.2		10.8	11.6		
Approach LOS					B	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	32.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	6	0	0	0	5	242	0	0	220	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	7	0	0	0	5	263	0	0	239	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	513	513	239	520	513	263	239			263		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	513	513	239	520	513	263	239			263		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	100	100			100		
cM capacity (veh/h)	470	463	800	462	463	776	1328			1301		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	0	268	239
Volume Left	1	0	5	0
Volume Right	7	0	0	0
cSH	727	1700	1328	1301
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	10.0	0.0	0.2	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.0	0.0	0.2	0.0
Approach LOS	B	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Volume (vph)	1	7	2	1	5	0	1	0	0	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	8	2	1	5	0	1	0	0	0	0	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	11	7	1	1
Volume Left (vph)	1	1	1	0
Volume Right (vph)	2	0	0	1
Hadj (s)	-0.07	0.07	0.23	-0.57
Departure Headway (s)	3.8	4.0	4.2	3.4
Degree Utilization, x	0.01	0.01	0.00	0.00
Capacity (veh/h)	928	898	846	1056
Control Delay (s)	6.9	7.0	7.2	6.4
Approach Delay (s)	6.9	7.0	7.2	6.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	0	1	0	0	1	0	0	1	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	1	1	1	1
Volume Left (vph)	0	0	0	0
Volume Right (vph)	0	0	0	0
Hadj (s)	0.03	0.03	0.03	0.03
Departure Headway (s)	3.9	3.9	3.9	3.9
Degree Utilization, x	0.00	0.00	0.00	0.00
Capacity (veh/h)	906	908	910	908
Control Delay (s)	6.9	6.9	6.9	6.9
Approach Delay (s)	6.9	6.9	6.9	6.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	6	10	1	2	2	217	23	3	228	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	11	1	2	2	236	25	3	248	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3			7			155	28	3	170	30	2
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3			7			155	28	3	170	30	2
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	73	98	99	71	100
cM capacity (veh/h)	1619			1614			624	859	1081	608	857	1082

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	14	263	255
Volume Left	0	11	2	3
Volume Right	7	2	25	4
cSH	1619	1614	873	855
Volume to Capacity	0.00	0.01	0.30	0.30
Queue Length 95th (ft)	0	1	32	31
Control Delay (s)	0.0	5.6	10.9	11.0
Lane LOS		A	B	B
Approach Delay (s)	0.0	5.6	10.9	11.0
Approach LOS			B	B

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	13	13	13	13	13	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3354		1829	3427		1829	3200		1770	1736	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3354		1829	3427		1829	3200		1770	1736	
Volume (vph)	4	208	111	407	257	186	69	59	296	171	38	31
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	226	121	442	279	202	75	64	322	186	41	34
RTOR Reduction (vph)	0	88	0	0	116	0	0	258	0	0	26	0
Lane Group Flow (vph)	4	259	0	442	365	0	75	128	0	186	49	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	16.0		22.0	34.0		8.0	16.0		10.0	18.0	
Effective Green, g (s)	4.0	16.0		22.0	34.0		8.0	16.0		10.0	18.0	
Actuated g/C Ratio	0.05	0.20		0.28	0.42		0.10	0.20		0.12	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	89	671		503	1456		183	640		221	391	
v/s Ratio Prot	0.00	c0.08		c0.24	0.11		0.04	c0.04		c0.11	0.03	
v/s Ratio Perm												
v/c Ratio	0.04	0.39		0.88	0.25		0.41	0.20		0.84	0.12	
Uniform Delay, d1	36.2	27.7		27.7	14.8		33.8	26.7		34.2	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	1.7		19.2	0.4		6.7	0.7		30.4	0.7	
Delay (s)	37.1	29.4		46.9	15.2		40.4	27.4		64.6	25.4	
Level of Service	D	C		D	B		D	C		E	C	
Approach Delay (s)		29.5			30.4			29.5			53.3	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	130	68	88	160	89	32	76	384	81	46	556	117
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Volume Combined (vph)	0	286	0	0	249	32	76	465	0	46	673	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.93	0.85	0.95	0.97	0.85	0.95	0.97	0.85	0.95	0.97	0.85
Saturated Flow (vph)	0	1771	0	0	1839	1615	1805	3523	0	1805	3523	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			0.0			2.4	5.1	15.8	0.0	3.1	22.9	0.0
Adj Reference Time (s)			0.0			8.0	9.1	19.8	0.0	8.0	26.9	0.0
Permitted Option												
Adj Saturation A (vph)	0	220		0	1242		120	1762		120	1762	
Reference Time A (s)	0.0	156.2		0.0	24.1		75.8	15.8		45.9	22.9	
Adj Saturation B (vph	0	0		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	16.6	27.4		NA	NA		NA	NA		NA	NA	
Reference Time (s)		27.4			24.1			75.8			45.9	
Adj Reference Time (s)		31.4			28.1			79.8			49.9	
Split Option												
Ref Time Combined (s)	0.0	19.4		0.0	16.2		5.1	15.8		3.1	22.9	
Ref Time Seperate (s)	8.6	4.7		10.6	5.6		5.1	13.1		3.1	18.9	
Reference Time (s)	19.4	19.4		16.2	16.2		15.8	15.8		22.9	22.9	
Adj Reference Time (s)	23.4	23.4		20.2	20.2		19.8	19.8		26.9	26.9	

Summary	EB WB	NE SW	Combined
Protected Option (s)	NA	36.0	
Permitted Option (s)	31.4	79.8	
Split Option (s)	43.6	46.8	
Minimum (s)	31.4	36.0	67.4

Right Turns	WBR
Adj Reference Time (s)	8.0
Cross Thru Ref Time (s)	19.8
Oncoming Left Ref Time (s)	23.4
Combined (s)	51.2

Intersection Summary

Intersection Capacity Utilization 56.1% ICU Level of Service B

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	140	17	87	113	1	10	9	45	0	7	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	152	18	95	123	1	11	10	49	0	8	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	124			171			502	496	161	540	505	123
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	124			171			502	496	161	540	505	123
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			93			98	98	94	100	98	100
cM capacity (veh/h)	1463			1407			445	440	884	396	435	927

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	11	171	95	124	70	0	8	3
Volume Left	11	0	95	0	11	0	0	0
Volume Right	0	18	0	1	49	0	0	3
cSH	1463	1700	1407	1700	682	1700	435	927
Volume to Capacity	0.01	0.10	0.07	0.07	0.10	0.00	0.02	0.00
Queue Length 95th (ft)	1	0	5	0	8	0	1	0
Control Delay (s)	7.5	0.0	7.7	0.0	10.9	0.0	13.4	8.9
Lane LOS	A		A		B	A	B	A
Approach Delay (s)	0.4		3.4		10.9	12.1		
Approach LOS					B	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	1	8	0	1	0	10	242	0	0	220	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	1	9	0	1	0	11	263	0	0	239	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	545	544	259	553	564	263	279			263		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	545	544	259	553	564	263	279			263		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	99	100	100	100	99			100		
cM capacity (veh/h)	446	442	779	435	431	776	1283			1301		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	1	274	279
Volume Left	25	0	11	0
Volume Right	9	0	0	40
cSH	499	431	1283	1301
Volume to Capacity	0.07	0.00	0.01	0.00
Queue Length 95th (ft)	6	0	1	0
Control Delay (s)	12.8	13.4	0.4	0.0
Lane LOS	B	B	A	
Approach Delay (s)	12.8	13.4	0.4	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Volume (vph)	1	37	2	2	18	10	1	0	0	10	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	40	2	2	20	11	1	0	0	11	0	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	43	33	1	12
Volume Left (vph)	1	2	1	11
Volume Right (vph)	2	11	0	1
Hadj (s)	0.01	-0.15	0.23	0.16
Departure Headway (s)	4.0	3.8	4.3	4.2
Degree Utilization, x	0.05	0.03	0.00	0.01
Capacity (veh/h)	897	933	810	834
Control Delay (s)	7.2	7.0	7.3	7.3
Approach Delay (s)	7.2	7.0	7.3	7.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	13	1	30	14	0	0	1	13	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	1	33	15	0	0	1	14	0	1	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	48	15	1
Volume Left (vph)	0	33	0	0
Volume Right (vph)	1	0	14	0
Hadj (s)	-0.01	0.17	-0.52	0.03
Departure Headway (s)	4.0	4.1	3.5	4.1
Degree Utilization, x	0.02	0.05	0.01	0.00
Capacity (veh/h)	895	866	993	863
Control Delay (s)	7.0	7.4	6.6	7.1
Approach Delay (s)	7.0	7.4	6.6	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	6	10	1	2	2	222	23	3	230	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	11	1	2	2	241	25	3	250	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3			7			157	28	3	173	30	2
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3			7			157	28	3	173	30	2
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			100	72	98	99	71	100
cM capacity (veh/h)	1619			1614			621	859	1081	601	857	1082

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	7	14	268	258
Volume Left	0	11	2	3
Volume Right	7	2	25	4
cSH	1619	1614	873	855
Volume to Capacity	0.00	0.01	0.31	0.30
Queue Length 95th (ft)	0	1	33	32
Control Delay (s)	0.0	5.6	10.9	11.0
Lane LOS		A	B	B
Approach Delay (s)	0.0	5.6	10.9	11.0
Approach LOS			B	B

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	13	13	13	13	13	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3362		1829	3426		1829	3196		1770	1727	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3362		1829	3426		1829	3196		1770	1727	
Volume (vph)	6	289	144	530	356	259	94	74	389	237	46	43
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	314	157	576	387	282	102	80	423	258	50	47
RTOR Reduction (vph)	0	69	0	0	147	0	0	343	0	0	37	0
Lane Group Flow (vph)	7	402	0	576	522	0	102	160	0	258	60	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	16.0		28.0	40.0		11.0	17.0		13.0	19.0	
Effective Green, g (s)	4.0	16.0		28.0	40.0		11.0	17.0		13.0	19.0	
Actuated g/C Ratio	0.04	0.18		0.31	0.44		0.12	0.19		0.14	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	79	598		569	1523		224	604		256	365	
v/s Ratio Prot	0.00	c0.12		c0.31	0.15		0.06	c0.05		c0.15	0.03	
v/s Ratio Perm												
v/c Ratio	0.09	0.67		1.01	0.34		0.46	0.26		1.01	0.16	
Uniform Delay, d1	41.3	34.6		31.0	16.4		36.7	31.2		38.5	29.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	5.9		40.8	0.6		6.5	1.1		58.3	1.0	
Delay (s)	43.5	40.5		71.8	17.0		43.3	32.2		96.8	30.0	
Level of Service	D	D		E	B		D	C		F	C	
Approach Delay (s)		40.5			42.4			34.1			78.5	
Approach LOS		D			D			C			E	

Intersection Summary

HCM Average Control Delay	45.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	180	94	122	217	123	44	106	513	110	64	740	163
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Volume Combined (vph)	0	396	0	0	340	44	106	623	0	64	903	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.93	0.85	0.95	0.97	0.85	0.95	0.97	0.85	0.95	0.97	0.85
Saturated Flow (vph)	0	1771	0	0	1839	1615	1805	3522	0	1805	3520	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			0.0			3.3	7.0	21.2	0.0	4.3	30.8	0.0
Adj Reference Time (s)			0.0			8.0	11.0	25.2	0.0	8.3	34.8	0.0
Permitted Option												
Adj Saturation A (vph)	0	220		0	1247		120	1761		120	1760	
Reference Time A (s)	0.0	216.3		0.0	32.7		105.7	21.2		63.8	30.8	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		216.3			32.7			105.7			63.8	
Adj Reference Time (s)		220.3			36.7			109.7			67.8	
Split Option												
Ref Time Combined (s)	0.0	26.8		0.0	22.2		7.0	21.2		4.3	30.8	
Ref Time Seperate (s)	12.0	6.5		14.4	7.8		7.0	17.5		4.3	25.2	
Reference Time (s)	26.8	26.8		22.2	22.2		21.2	21.2		30.8	30.8	
Adj Reference Time (s)	30.8	30.8		26.2	26.2		25.2	25.2		34.8	34.8	

Summary	EB WB	NE SW	Combined
Protected Option (s)	NA	45.8	
Permitted Option (s)	220.3	109.7	
Split Option (s)	57.0	60.0	
Minimum (s)	57.0	45.8	102.8

Right Turns	WBR
Adj Reference Time (s)	8.0
Cross Thru Ref Time (s)	25.2
Oncoming Left Ref Time (s)	30.8
Combined (s)	64.1

Intersection Summary

Intersection Capacity Utilization 85.7% ICU Level of Service E

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	194	21	113	157	1	13	11	51	0	7	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	211	23	123	171	1	14	12	55	0	8	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	172			234			677	670	222	720	681	171
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	172			234			677	670	222	720	681	171
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			96	96	93	100	98	100
cM capacity (veh/h)	1405			1334			331	340	817	287	335	873

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	15	234	123	172	82	0	8	4
Volume Left	15	0	123	0	14	0	0	0
Volume Right	0	23	0	1	55	0	0	4
cSH	1405	1700	1334	1700	559	1700	335	873
Volume to Capacity	0.01	0.14	0.09	0.10	0.15	0.00	0.02	0.00
Queue Length 95th (ft)	1	0	8	0	13	0	2	0
Control Delay (s)	7.6	0.0	8.0	0.0	12.5	0.0	16.0	9.1
Lane LOS	A		A		B	A	C	A
Approach Delay (s)	0.5		3.3		12.5	13.5		
Approach LOS					B	B		

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	9	0	0	0	7	336	0	0	306	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	10	0	0	0	8	365	0	0	333	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	713	713	333	723	713	365	333			365		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	713	713	333	723	713	365	333			365		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	100	99			100		
cM capacity (veh/h)	345	355	709	335	355	680	1227			1193		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	11	0	373	333
Volume Left	1	0	8	0
Volume Right	10	0	0	0
cSH	641	1700	1227	1193
Volume to Capacity	0.02	0.00	0.01	0.00
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	10.7	0.0	0.2	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.7	0.0	0.2	0.0
Approach LOS	B	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Volume (vph)	1	10	3	1	7	0	1	0	0	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	11	3	1	8	0	1	0	0	0	0	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	9	1	1
Volume Left (vph)	1	1	1	0
Volume Right (vph)	3	0	0	1
Hadj (s)	-0.08	0.06	0.23	-0.57
Departure Headway (s)	3.8	4.0	4.2	3.4
Degree Utilization, x	0.02	0.01	0.00	0.00
Capacity (veh/h)	931	899	843	1050
Control Delay (s)	6.9	7.0	7.2	6.4
Approach Delay (s)	6.9	7.0	7.2	6.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	1	0	0	1	0	0	1	0	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	0	1	0	0	1	0	0	1	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	1	1	1	1
Volume Left (vph)	0	0	0	0
Volume Right (vph)	0	0	0	0
Hadj (s)	0.03	0.03	0.03	0.03
Departure Headway (s)	3.9	3.9	3.9	3.9
Degree Utilization, x	0.00	0.00	0.00	0.00
Capacity (veh/h)	906	908	910	908
Control Delay (s)	6.9	6.9	6.9	6.9
Approach Delay (s)	6.9	6.9	6.9	6.9
Approach LOS	A	A	A	A

Intersection Summary			
Delay	6.9		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	9	14	1	3	3	302	31	4	316	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	10	15	1	3	3	328	34	4	343	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	4			10			216	40	5	236	43	3
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			10			216	40	5	236	43	3
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	61	97	99	59	99
cM capacity (veh/h)	1617			1610			498	844	1078	482	841	1081

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	20	365	354
Volume Left	0	15	3	4
Volume Right	10	3	34	7
cSH	1617	1610	856	837
Volume to Capacity	0.00	0.01	0.43	0.42
Queue Length 95th (ft)	0	1	54	53
Control Delay (s)	0.0	5.7	12.3	12.4
Lane LOS		A	B	B
Approach Delay (s)	0.0	5.7	12.3	12.4
Approach LOS			B	B

Intersection Summary			
Average Delay	12.0		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	13	13	13	13	13	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3357		1829	3426		1829	3198		1770	1734	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3357		1829	3426		1829	3198		1770	1734	
Volume (vph)	6	289	151	555	356	259	95	79	405	237	51	43
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	314	164	603	387	282	103	86	440	258	55	47
RTOR Reduction (vph)	0	75	0	0	146	0	0	362	0	0	34	0
Lane Group Flow (vph)	7	403	0	603	523	0	103	164	0	258	68	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.0	16.0		29.0	41.0		11.0	16.0		13.0	18.0	
Effective Green, g (s)	4.0	16.0		29.0	41.0		11.0	16.0		13.0	18.0	
Actuated g/C Ratio	0.04	0.18		0.32	0.46		0.12	0.18		0.14	0.20	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	79	597		589	1561		224	569		256	347	
v/s Ratio Prot	0.00	c0.12		c0.33	0.15		0.06	c0.05		c0.15	0.04	
v/s Ratio Perm												
v/c Ratio	0.09	0.68		1.02	0.33		0.46	0.29		1.01	0.19	
Uniform Delay, d1	41.3	34.6		30.5	15.7		36.7	32.1		38.5	30.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	6.0		43.2	0.6		6.7	1.3		58.3	1.3	
Delay (s)	43.5	40.6		73.7	16.3		43.4	33.3		96.8	31.2	
Level of Service	D	D		E	B		D	C		F	C	
Approach Delay (s)		40.6			43.5			35.0			78.2	
Approach LOS		D			D			C			E	

Intersection Summary

HCM Average Control Delay	45.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	180	94	122	220	123	44	106	527	112	64	762	163
Pedestrians												
Ped Button												
Pedestrian Timing (s)												
Free Right			No			No			No			No
Ideal Flow	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Green (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Refr Cycle Length (s)	120											
Volume Combined (vph)	0	396	0	0	343	44	106	639	0	64	925	0
Lane Utilization Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Turning Factor (vph)	0.95	0.93	0.85	0.95	0.97	0.85	0.95	0.97	0.85	0.95	0.97	0.85
Saturated Flow (vph)	0	1771	0	0	1839	1615	1805	3522	0	1805	3522	0
Ped Intf Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Frequency (%)		0.00			0.00			0.00			0.00	
Protected Option Allowed		No			No			Yes			Yes	
Reference Time (s)			0.0			3.3	7.0	21.8	0.0	4.3	31.5	0.0
Adj Reference Time (s)			0.0			8.0	11.0	25.8	0.0	8.3	35.5	0.0
Permitted Option												
Adj Saturation A (vph)	0	220		0	1243		120	1761		120	1761	
Reference Time A (s)	0.0	216.3		0.0	33.1		105.7	21.8		63.8	31.5	
Adj Saturation B (vph	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time B (s)	NA	NA		NA	NA		NA	NA		NA	NA	
Reference Time (s)		216.3			33.1			105.7			63.8	
Adj Reference Time (s)		220.3			37.1			109.7			67.8	
Split Option												
Ref Time Combined (s)	0.0	26.8		0.0	22.4		7.0	21.8		4.3	31.5	
Ref Time Seperate (s)	12.0	6.5		14.6	7.8		7.0	18.0		4.3	26.0	
Reference Time (s)	26.8	26.8		22.4	22.4		21.8	21.8		31.5	31.5	
Adj Reference Time (s)	30.8	30.8		26.4	26.4		25.8	25.8		35.5	35.5	

Summary	EB WB	NE SW	Combined
Protected Option (s)	NA	46.6	
Permitted Option (s)	220.3	109.7	
Split Option (s)	57.2	61.3	
Minimum (s)	57.2	46.6	103.8

Right Turns	WBR
Adj Reference Time (s)	8.0
Cross Thru Ref Time (s)	25.8
Oncoming Left Ref Time (s)	30.8
Combined (s)	64.6

Intersection Summary

Intersection Capacity Utilization 86.5% ICU Level of Service E

Reference Times and Phasing Options do not represent an optimized timing plan.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	194	23	119	157	1	12	11	59	0	9	4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	211	25	129	171	1	13	12	64	0	10	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	172			236			692	684	223	741	696	171
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	172			236			692	684	223	741	696	171
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			90			96	96	92	100	97	100
cM capacity (veh/h)	1405			1331			320	331	816	273	326	873

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2	SB 3
Volume Total	15	236	129	172	89	0	10	4
Volume Left	15	0	129	0	13	0	0	0
Volume Right	0	25	0	1	64	0	0	4
cSH	1405	1700	1331	1700	573	1700	326	873
Volume to Capacity	0.01	0.14	0.10	0.10	0.16	0.00	0.03	0.00
Queue Length 95th (ft)	1	0	8	0	14	0	2	0
Control Delay (s)	7.6	0.0	8.0	0.0	12.4	0.0	16.4	9.1
Lane LOS	A		A		B	A	C	A
Approach Delay (s)	0.5		3.4		12.4	14.2		
Approach LOS					B	B		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	1	11	0	1	0	12	336	0	0	306	37
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	1	12	0	1	0	13	365	0	0	333	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	745	744	353	757	764	365	373			365		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	745	744	353	757	764	365	373			365		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	98	100	100	100	99			100		
cM capacity (veh/h)	327	339	691	315	330	680	1186			1193		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	1	378	373
Volume Left	25	0	13	0
Volume Right	12	0	0	40
cSH	392	330	1186	1193
Volume to Capacity	0.10	0.00	0.01	0.00
Queue Length 95th (ft)	8	0	1	0
Control Delay (s)	15.2	15.9	0.4	0.0
Lane LOS	C	C	A	
Approach Delay (s)	15.2	15.9	0.4	0.0
Approach LOS	C	C		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Volume (vph)	1	40	3	2	20	10	1	0	0	10	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	43	3	2	22	11	1	0	0	11	0	1

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	48	35	1	12
Volume Left (vph)	1	2	1	11
Volume Right (vph)	3	11	0	1
Hadj (s)	0.00	-0.14	0.23	0.16
Departure Headway (s)	4.0	3.8	4.3	4.2
Degree Utilization, x	0.05	0.04	0.00	0.01
Capacity (veh/h)	899	929	807	830
Control Delay (s)	7.2	7.0	7.3	7.3
Approach Delay (s)	7.2	7.0	7.3	7.3
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	13	1	30	14	0	0	1	13	0	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	1	33	15	0	0	1	14	0	1	0

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	48	15	1
Volume Left (vph)	0	33	0	0
Volume Right (vph)	1	0	14	0
Hadj (s)	-0.01	0.17	-0.52	0.03
Departure Headway (s)	4.0	4.1	3.5	4.1
Degree Utilization, x	0.02	0.05	0.01	0.00
Capacity (veh/h)	895	866	993	863
Control Delay (s)	7.0	7.4	6.6	7.1
Approach Delay (s)	7.0	7.4	6.6	7.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.1		
HCM Level of Service	A		
Intersection Capacity Utilization	19.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Yield	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	9	14	1	3	3	307	31	4	308	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	10	15	1	3	3	334	34	4	335	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	4			10			212	40	5	239	43	3
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4			10			212	40	5	239	43	3
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	60	97	99	60	99
cM capacity (veh/h)	1617			1610			507	844	1078	477	841	1081

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	10	20	371	346
Volume Left	0	15	3	4
Volume Right	10	3	34	7
cSH	1617	1610	856	836
Volume to Capacity	0.00	0.01	0.43	0.41
Queue Length 95th (ft)	0	1	55	51
Control Delay (s)	0.0	5.7	12.4	12.3
Lane LOS		A	B	B
Approach Delay (s)	0.0	5.7	12.4	12.3
Approach LOS			B	B

Intersection Summary			
Average Delay	12.0		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	13	16	12	12	12	11	13	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.96			1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.98			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1978			1865	1794	1770	3445		1711	3558	
Flt Permitted		0.57			0.61	1.00	0.24	1.00		0.35	1.00	
Satd. Flow (perm)		1159			1169	1794	441	3445		637	3558	
Volume (vph)	180	94	122	217	123	44	106	513	110	64	740	163
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	102	133	236	134	48	115	558	120	70	804	177
RTOR Reduction (vph)	0	42	0	0	0	30	0	44	0	0	45	0
Lane Group Flow (vph)	0	389	0	0	370	18	115	634	0	70	936	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.1			15.1	15.1	16.9	16.9		16.9	16.9	
Effective Green, g (s)		15.1			15.1	15.1	16.9	16.9		16.9	16.9	
Actuated g/C Ratio		0.38			0.38	0.38	0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		438			441	677	186	1456		269	1503	
v/s Ratio Prot								0.18			c0.26	
v/s Ratio Perm		c0.34			0.32	0.01	0.26			0.11		
v/c Ratio		0.89			0.84	0.03	0.62	0.44		0.26	0.62	
Uniform Delay, d1		11.7			11.3	7.8	9.0	8.2		7.5	9.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		19.2			13.1	0.0	14.5	1.0		2.3	2.0	
Delay (s)		30.8			24.5	7.8	23.5	9.1		9.8	11.0	
Level of Service		C			C	A	C	A		A	B	
Approach Delay (s)		30.8			22.5			11.2			10.9	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	13	16	12	12	12	11	13	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.96			1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.98			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1978			1865	1794	1770	3446		1711	3561	
Flt Permitted		0.57			0.61	1.00	0.24	1.00		0.34	1.00	
Satd. Flow (perm)		1150			1167	1794	441	3446		619	3561	
Volume (vph)	180	94	122	220	123	44	106	527	112	64	762	163
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	102	133	239	134	48	115	573	122	70	828	177
RTOR Reduction (vph)	0	42	0	0	0	30	0	43	0	0	43	0
Lane Group Flow (vph)	0	389	0	0	373	18	115	652	0	70	962	0
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		15.1			15.1	15.1	16.9	16.9		16.9	16.9	
Effective Green, g (s)		15.1			15.1	15.1	16.9	16.9		16.9	16.9	
Actuated g/C Ratio		0.38			0.38	0.38	0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		434			441	677	186	1456		262	1505	
v/s Ratio Prot								0.19			c0.27	
v/s Ratio Perm		c0.34			0.32	0.01	0.26			0.11		
v/c Ratio		0.90			0.85	0.03	0.62	0.45		0.27	0.64	
Uniform Delay, d1		11.7			11.4	7.8	9.0	8.2		7.5	9.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		20.6			13.9	0.0	14.5	1.0		2.5	2.1	
Delay (s)		32.3			25.3	7.8	23.5	9.2		10.0	11.2	
Level of Service		C			C	A	C	A		B	B	
Approach Delay (s)		32.3			23.3			11.2			11.1	
Approach LOS		C			C			B			B	

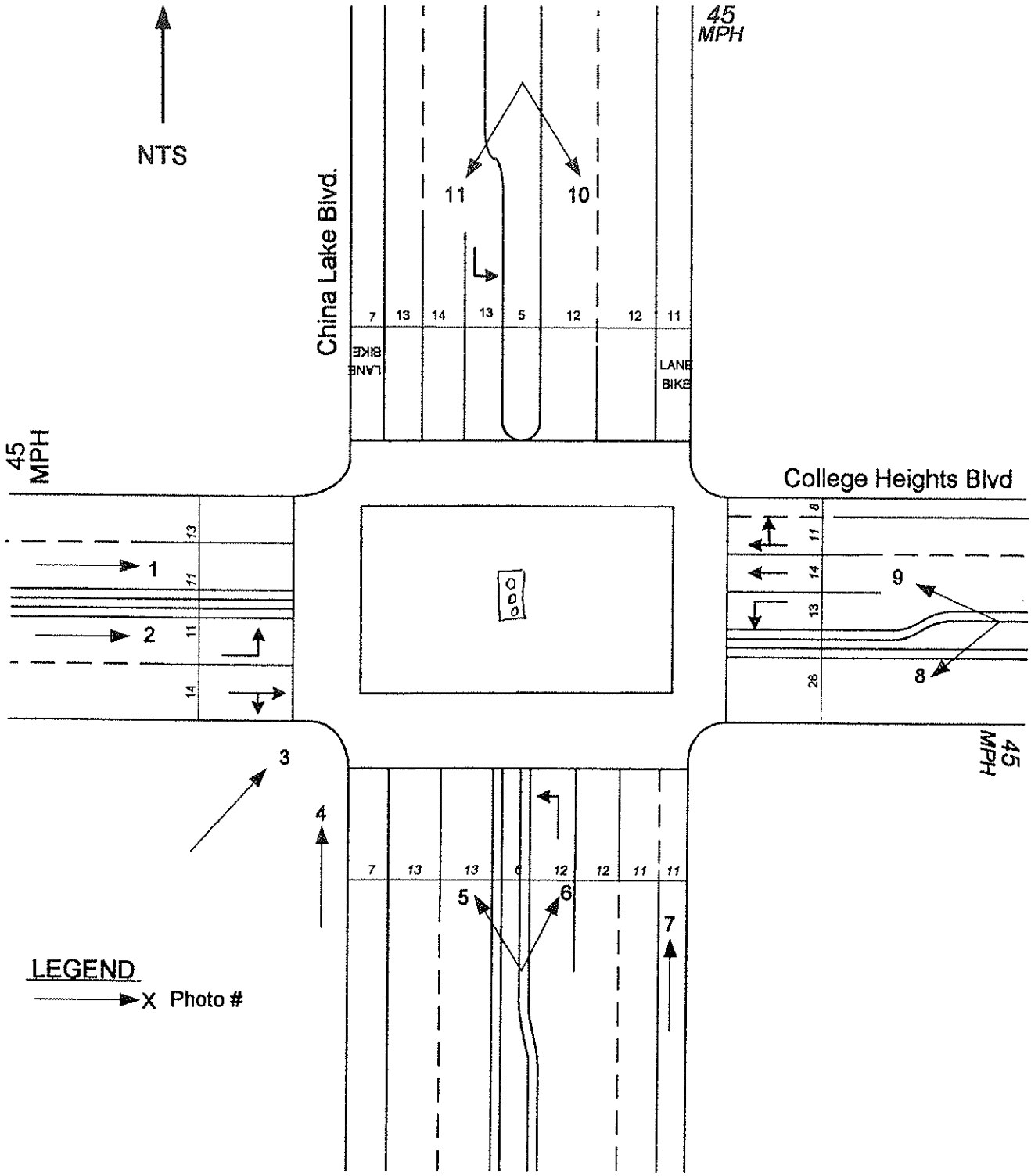
Intersection Summary

HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Appendix C:

Existing Intersection Layouts

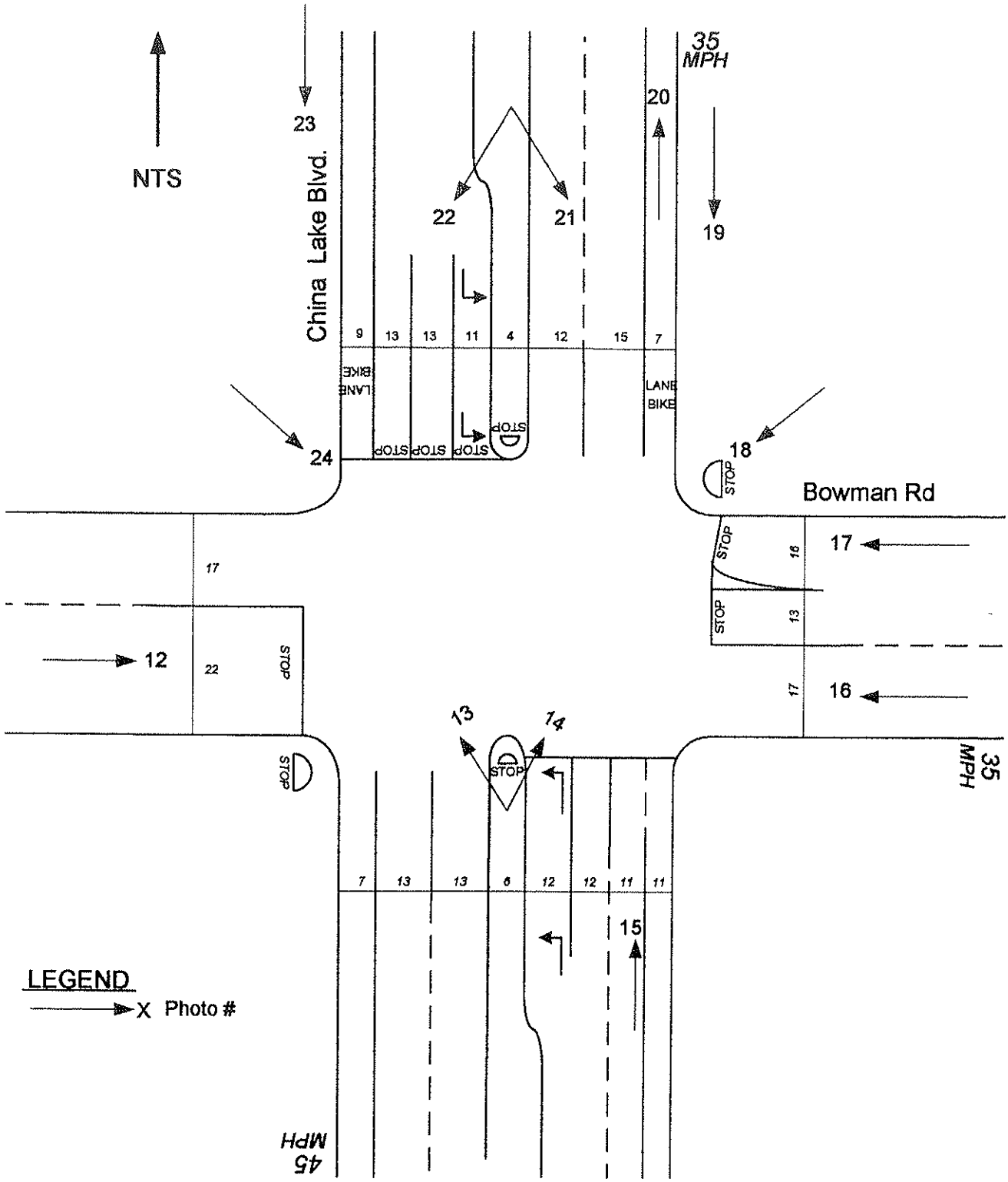


Loc. #1

MINAGAR & ASSOCIATES, INC.

ITS- TRAFFIC ENGINEERING- TRANSPORTATION PLANNING-CIVIL
18662 MACARTHUR BLVD., SUITE 435
IRVINE, CA 92612

City of Ridgecrest
College Heights Blvd. & China Lake Blvd.



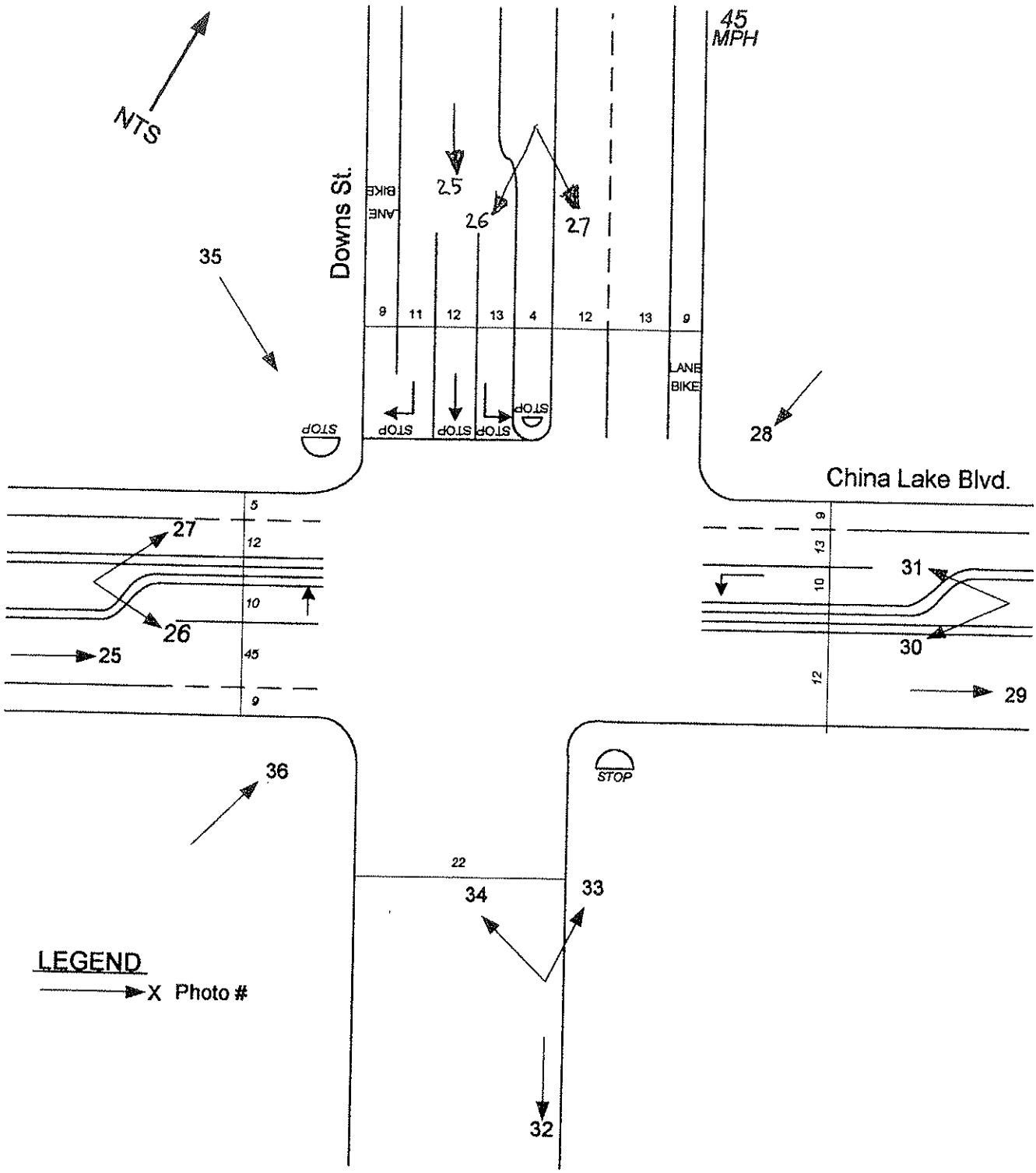
Loc. # 2

MINAGAR & ASSOCIATES, INC.

ITS- TRAFFIC ENGINEERING-TRANSPORTATION PLANNING-CIVIL
18662 MACARTHUR BLVD., SUITE 435
IRVINE, CA 92612

City of Ridgecrest

China Lake Blvd. & Bowman Rd.



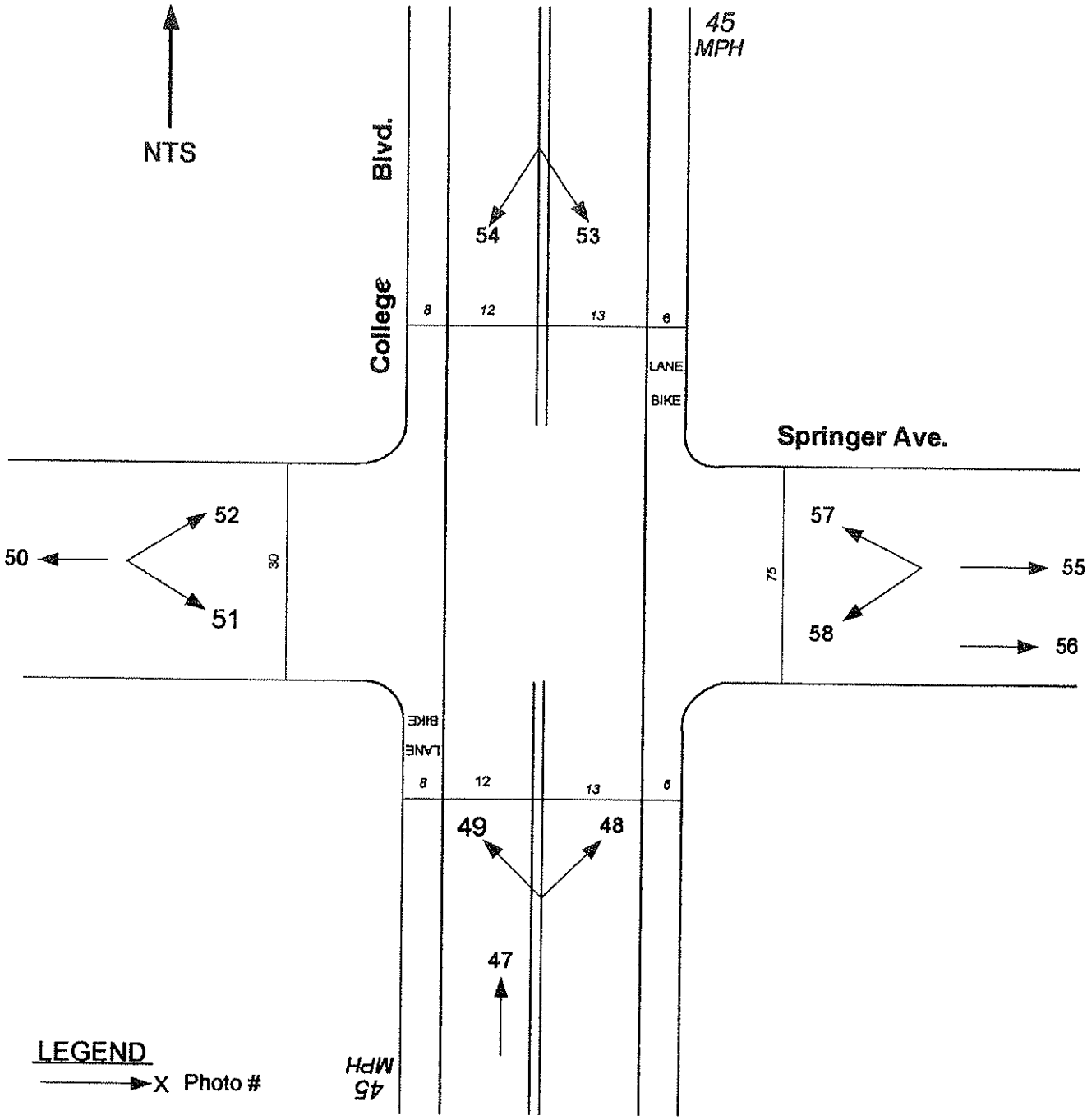
Loc. # 3

MINAGAR & ASSOCIATES, INC.

ITS- TRAFFIC ENGINEERING- TRANSPORTATION PLANNING-CIVIL
18662 MACARTHUR BLVD., SUITE 435
IRVINE, CA 92612

City of Ridgecrest

China Lake Blvd. & Downs St.



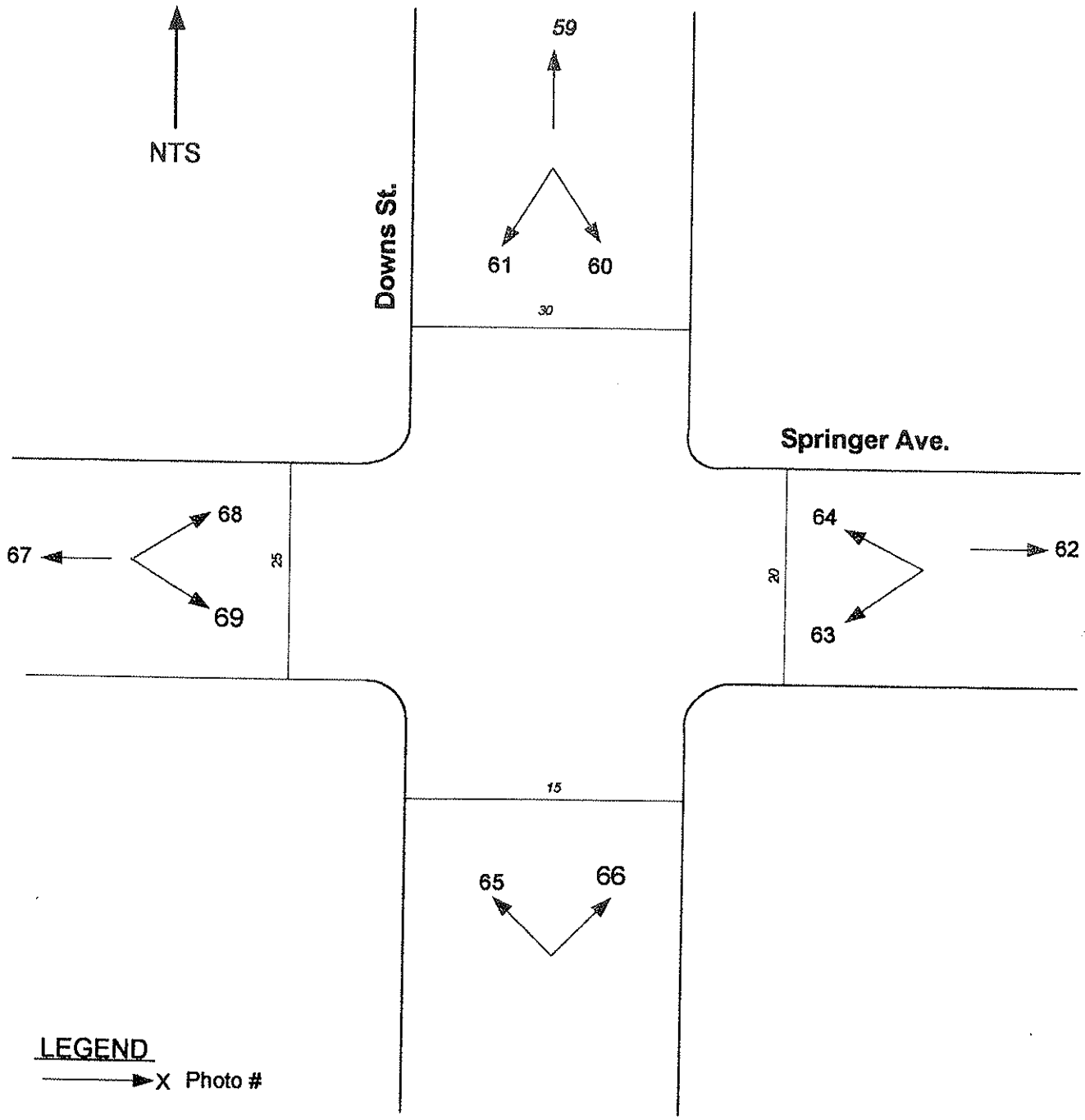
Loc. #4

MINAGAR & ASSOCIATES, INC.

ITS- TRAFFIC ENGINEERING- TRANSPORTATION PLANNING-CIVIL
18662 MACARTHUR BLVD., SUITE 435
IRVINE, CA 92612

City of Ridgecrest

College Heights Blvd & Kendall Ave.

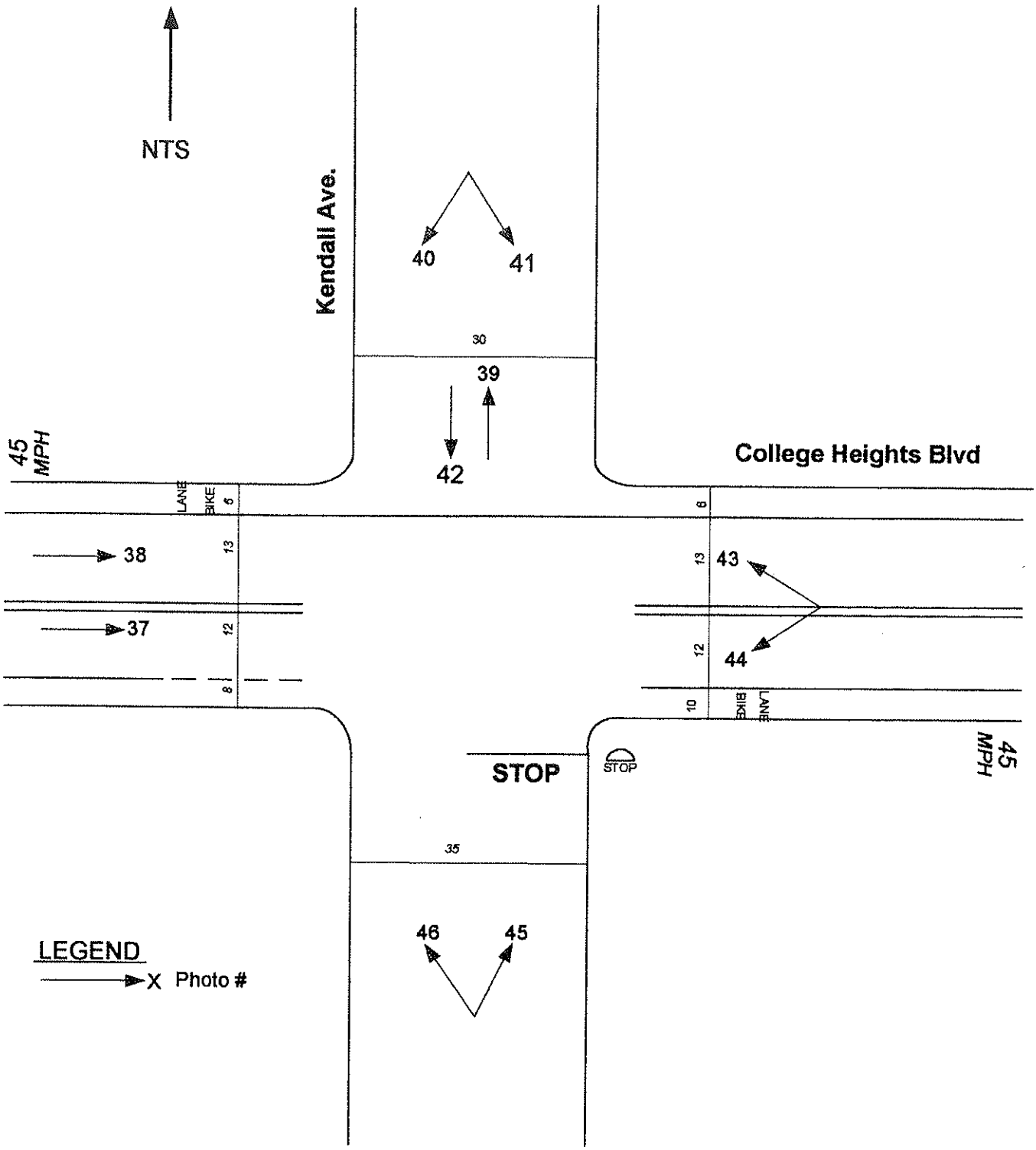


Loc. #5

MINAGAR & ASSOCIATES, INC.

ITS- TRAFFIC ENGINEERING- TRANSPORTATION PLANNING-CIVIL
18662 MACARTHUR BLVD., SUITE 435
IRVINE, CA 92612

City of Ridgecrest
Springer Ave. & Downs St.



Loc. #7

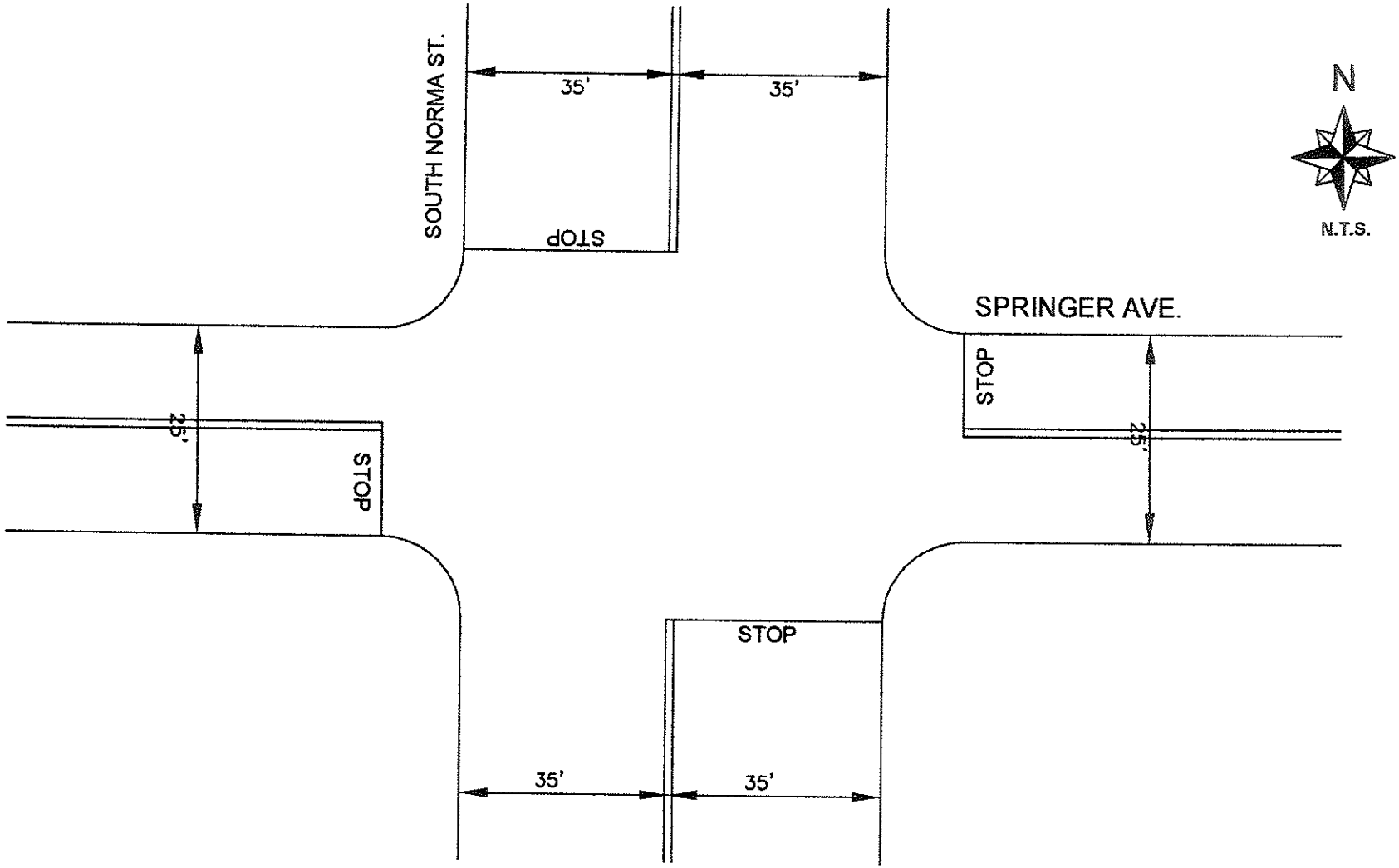
MINAGAR & ASSOCIATES, INC.

ITS- TRAFFIC ENGINEERING- TRANSPORTATION PLANNING-CIVIL
18662 MACARTHUR BLVD., SUITE 435
IRVINE, CA 92612

City of Ridgecrest
College Heights Blvd & Kendall Ave.

Appendix D:

Proposed Intersection Layouts



2/21/07

MINAGAR & ASSOCIATES, INC.
ITS-TRAFFIC ENGINEERING-TRANSPORTATION PLANNING-CIVIL
18662 MacArthur Blvd., Airport Business Center, Suite 435
IRVINE, CA 92612

Appendix D
Springer Ave. & South Norma St.
Proposed Geometry

Ridgecrest Tract Homes
Traffic Impact Study
City of Ridgecrest, California

Appendix E:

Warrants

Agency:

Traffic Signal Installation Warrant Assessment

DIST: 9
CO: Kern
RTE:
KPM:

Calculated by: GG Date: 2/21/2007
Checked by: FM Date: 2/21/2007

Intersection: S. China Lake Blvd. at Bowman Rd.

Major Street: S. China Lake Blvd. Critical Approach Speed: 45 MPH (72Km/Hr)
Minor Street: Bowman Rd. Critical Approach Speed: 35 MPH (56Km/Hr)

Approach lanes (S. China Lake Blv 3 Approach Lanes (Bowman Rd.): 2

Type (Rural/Urban)*: Rural
Critical speed of major street traffic > 64 Km/Hr (40MPH): Yes
In built up area of isolated community of < 10,000 population: No

* Rural: either one satisfied
Urban: neither two satisfied

Warrant 1 Minimum Vehicular Volume

100% Satisfied: No
80% Satisfied: No

Requirement:
1. Each of any 8 hours of an average day satisfying the requirement

Min. Requirement (80% in brackets)			1st Hr.	2nd Hr.	3rd Hr.	4th Hr.	5th Hr.	6th Hr.	7th Hr.	8th Hr.
Type	Rural	Rural	6-7 AM	7-8 AM	8-9 AM	11-12 AM	12-1 PM	4-5 PM	5-6 PM	6-7 PM
Approach Lanes	1	≥ 2								
Both Approaches Major Street	350	420						1178	1136	
	(280)	(336)								
Highest Approach Minor Street	105	140						256	251	
	(84)	(112)								

Warrant 2 Interruption of Continuous Traffic

100% Satisfied: No
80% Satisfied: No

Requirement:
1. Each of any 8 hours of an average day satisfying the requirement

Min. Requirement (80% in brackets)			1st Hr.	2nd Hr.	3rd Hr.	4th Hr.	5th Hr.	6th Hr.	7th Hr.	8th Hr.
Type	Rural	Rural	6-7 AM	7-8 AM	8-9 AM	11-12 AM	12-1 PM	4-5 PM	5-6 PM	6-7 PM
Approach Lanes	1	≥ 2								
Both Approaches Major Street	525	630						1178	1136	
	(420)	(504)								
Highest Approach Minor Street	53	70						256	251	
	(42)	(56)								

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.

Warrant 3 Minimum Pedestrian Volume

100% Satisfied: No

Requirements:

1. 100 or more Pedestrians in any 4 hours or,
   190 or more Pedestrians in 1 hour crossing the major street; AND — No

		1st Hr.	2nd Hr.	3rd Hr.	4th Hr.
Ped. Volume	Requirement				
Major Street	≥100 for any 4 hrs				
Major Street	≥190 for any 1 hr.				

2. There are less than 60 gaps per hour in the major street traffic; AND — No
3. The nearest traffic signal along the major street is greater than 90m (295ft); AND — No
4. New signal will not seriously disrupt progressive traffic flow — No

Warrant 4 School Areas

Not Applicable: X

See School Protection Warrants Sheet: _____

Warrant 5 Progressive Movement

Satisfied: No

Requirement:

1. The adjacent signals do not provide the necessary degree of platooning and speed control, and the proposed and adjacent signals could constitute a progressive signal system. — No

Warrant 6 Accident Experience

Satisfied: No

Requirements:

1. At least 80% of Warrant 1 OR Warrant 2 satisfied; AND — No
2. Signal will not seriously disrupt progressive traffic flow; AND — No
3. Adequate trial of less restrictive remedies has failed to reduce accident frequency; AND — No
4. More than 5 accidents within the 12 month period susceptible of correction by traffic signal — No

Warrant 7 Systems Warrant

Satisfied: No

Requirements:

1. Both streets serve as major routes, AND — No
2. Vol. ≥ 1000 vehicles from all approaches during the peak hour of a typical weekday, or
   ≥ 1000 vehicles entering from all approaches any 5 hours of Sat. and/or Sun. — Yes

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.

Warrant 8 Combination of Warrants

Satisfied: No

Requirements:
1. Warrant 1 is satisfied 80% or more — No
2. Warrant 2 is satisfied 80% or more — No

Warrant 9 Four Hour Volume

Satisfied: No

Requirements:
1. The plotted points of traffic for any 4 - 60 minutes periods all fall above the curve on Figure 9-6 (U) or 9-7 (R)

	1st Hr.	2nd Hr.	3rd Hr.	4th Hr.
Any 4-60 minutes periods	4-5 PM	5-6 PM		
Both Approaches Major Street	1178	1136		
Highest Approach Minor Street	256	251		

Warrant 10 Peak Hour Delay

Satisfied: No

Requirements:
1. Total delay on one minor street approach ≥ 4 vehicle-hours for a one lane approach, AND — No
2. Volume on the same minor street approach ≥ 100 VPH for one moving lane, AND — Yes
3. Total entering volume serviced during the hour ≥ 800 VPH for four approaches intersection — Yes

Warrant 11 Peak Hour Volume

Satisfied: Yes

Requirement:
1. The plotted point of traffic for any 1 - 60 minutes period fall above the curve on Figure 9-8 (U) or 9-9 (R)

	One Peak Hr.
Any 1-60 minutes period	4-5 PM
Both Approaches Major Street	1178
Highest Approach Minor Street	256

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.

Summary:

Total Number of Warrant Satisfied: 1

Agency:

Traffic Signal Installation Warrant Assessment

DIST: 9
CO: Kern
RTE:
KPM:

Calculated by: GG
Checked by: FM

Date: 2/21/2007
Date: 2/21/2007

Intersection: S. China Lake Blvd. at S. Downs St.

Major Street: S. China Lake Blvd.
Minor Street: S. Downs St.

Critical Approach Speed: 45 MPH (72Km/Hr)
Critical Approach Speed: 45 MPH (72Km/Hr)

Approach lanes (S. China Lake Bl\ 3

Approach Lanes (S. Downs St.): 3

Type (Rural/Urban)*: Rural
Critical speed of major street traffic > 64 Km/Hr (40MPH): Yes
In built up area of isolated community of < 10,000 population: No

* Rural: either one satisfied
Urban: neither two satisfied

Warrant 1 Minimum Vehicular Volume

100% Satisfied: No
80% Satisfied: No

Requirement:
1. Each of any 8 hours of an average day satisfying the requirement

Min. Requirement (80% in brackets)			1st Hr.	2nd Hr.	3rd Hr.	4th Hr.	5th Hr.	6th Hr.	7th Hr.	8th Hr.
Type	Rural	Rural	6-7 AM	7-8 AM	8-9 AM	11-12 AM	12-1 PM	4-5 PM	5-6 PM	6-7 PM
Approach Lanes	1	≥ 2								
Both Approaches Major Street	350	420						312	321	
	(280)	(336)								
Highest Approach Minor Street	105	140						55	61	
	(84)	(112)								

Warrant 2 Interruption of Continuous Traffic

100% Satisfied: No
80% Satisfied: No

Requirement:
1. Each of any 8 hours of an average day satisfying the requirement

Min. Requirement (80% in brackets)			1st Hr.	2nd Hr.	3rd Hr.	4th Hr.	5th Hr.	6th Hr.	7th Hr.	8th Hr.
Type	Rural	Rural	6-7 AM	7-8 AM	8-9 AM	11-12 AM	12-1 PM	4-5 PM	5-6 PM	6-7 PM
Approach Lanes	1	≥ 2								
Both Approaches Major Street	525	630						312	321	
	(420)	(504)								
Highest Approach Minor Street	53	70						55	61	
	(42)	(56)								

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.

Warrant 3 Minimum Pedestrian Volume

100% Satisfied: No

Requirements:

1. 100 or more Pedestrians in any 4 hours or,
   190 or more Pedestrians in 1 hour crossing the major street; AND — No

		1st Hr.	2nd Hr.	3rd Hr.	4th Hr.
Ped. Volume	Requirement				
Major Street	≥100 for any 4 hrs				
Major Street	≥190 for any 1 hr.				

2. There are less than 60 gaps per hour in the major street traffic; AND — No
3. The nearest traffic signal along the major street is greater than 90m (295ft); AND — No
4. New signal will not seriously disrupt progressive traffic flow — No

Warrant 4 School Areas

Not Applicable: X

See School Protection Warrants Sheet: _____

Warrant 5 Progressive Movement

Satisfied: No

Requirement:

1. The adjacent signals do not provide the necessary degree of platooning and speed control, and the proposed and adjacent signals could constitute a progressive signal system. — No

Warrant 6 Accident Experience

Satisfied: No

Requirements:

1. At least 80% of Warrant 1 OR Warrant 2 satisfied; AND — No
2. Signal will not seriously disrupt progressive traffic flow; AND — No
3. Adequate trial of less restrictive remedies has failed to reduce accident frequency; AND — No
4. More than 5 accidents within the 12 month period susceptible of correction by traffic signal — No

Warrant 7 Systems Warrant

Satisfied: No

Requirements:

1. Both streets serve as major routes, AND — No
2. Vol. ≥ 1000 vehicles from all approaches during the peak hour of a typical weekday, or
   ≥ 1000 vehicles entering from all approaches any 5 hours of Sat. and/or Sun. — Yes

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.

Warrant 8 Combination of Warrants

Satisfied: No

Requirements:

1. Warrant 1 is satisfied 80% or more — No
2. Warrant 2 is satisfied 80% or more — No

Warrant 9 Four Hour Volume

Satisfied: No

Requirements:

1. The plotted points of traffic for any 4 - 60 minutes periods all fall above the curve on Figure 9-6 (U) or 9-7 (R)

	1st Hr.	2nd Hr.	3rd Hr.	4th Hr.
Any 4-60 minutes periods	4-5 PM	5-6 PM		
Both Approaches Major Street	312	321		
Highest Approach Minor Street	55	61		

Warrant 10 Peak Hour Delay

Satisfied: No

Requirements:

1. Total delay on one minor street approach ≥ 4 vehicle-hours for a one lane approach, AND — No
2. Volume on the same minor street approach ≥ 100 VPH for one moving lane, AND — Yes
3. Total entering volume serviced during the hour ≥ 800 VPH for four approaches intersection — Yes

Warrant 11 Peak Hour Volume

Satisfied: No

Requirement:

1. The plotted point of traffic for any 1 - 60 minutes period fall above the curve on Figure 9-8 (U) or 9-9 (R)

	One Peak Hr.
Any 1-60 minutes period	4-5 PM
Both Approaches Major Street	321
Highest Approach Minor Street	61

The satisfaction of a warrant is not necessarily justification for a signal. Delay, congestion, confusion or other evidence of the need for right-of-way assignment must be shown.

Summary:

Total Number of Warrant Satisfied: 0

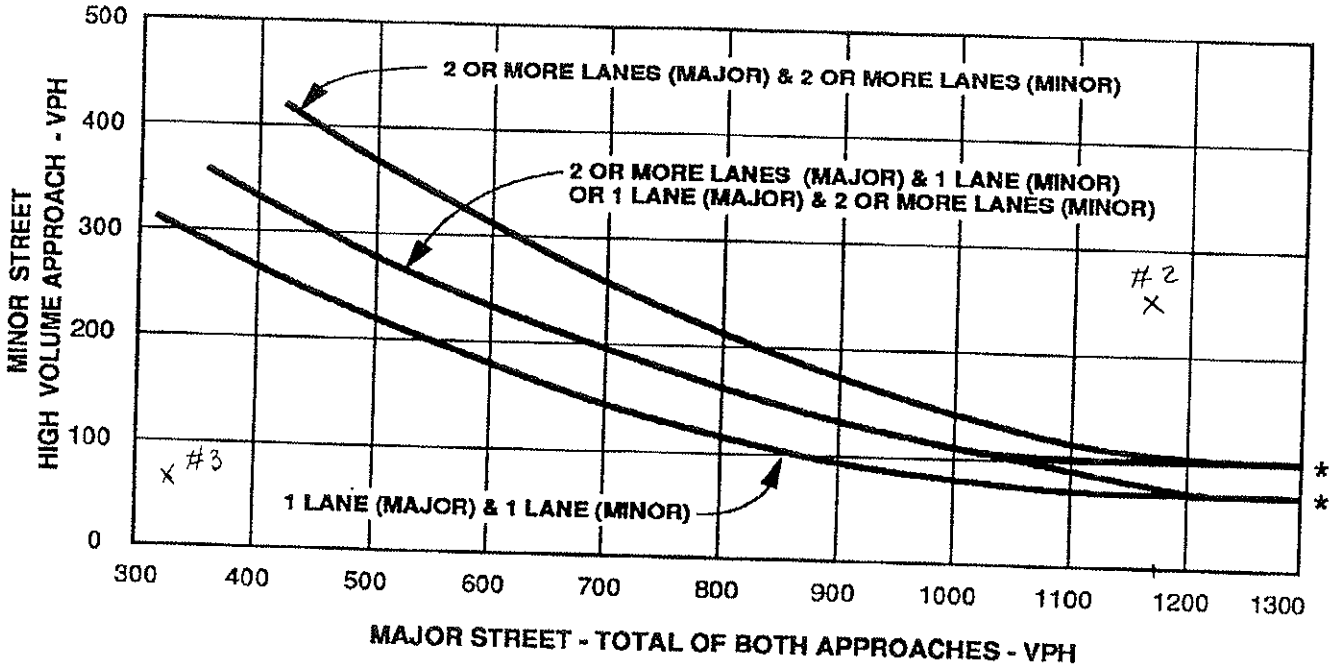
#2

China Lake @ Bowm

#3

China Lake @ Dow

Figure 9-9
PEAK HOUR VOLUME WARRANT
(Rural Areas)



* NOTE:

100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

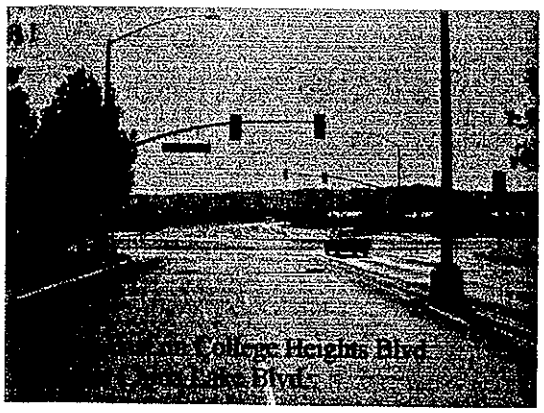
Appendix F:

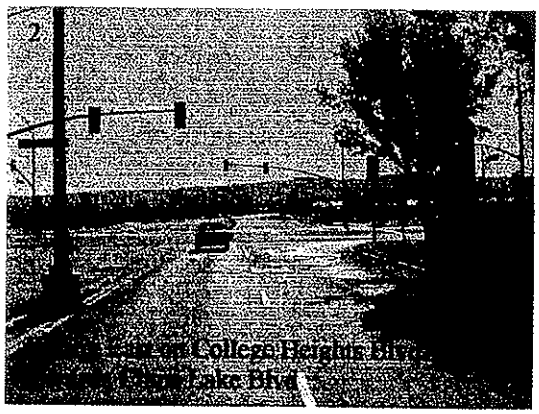
Photo Exhibits

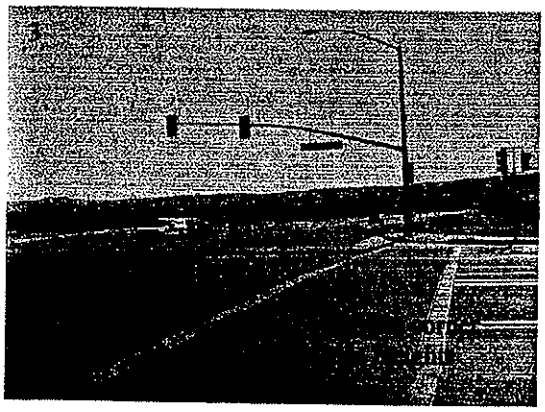
Photo Descriptions

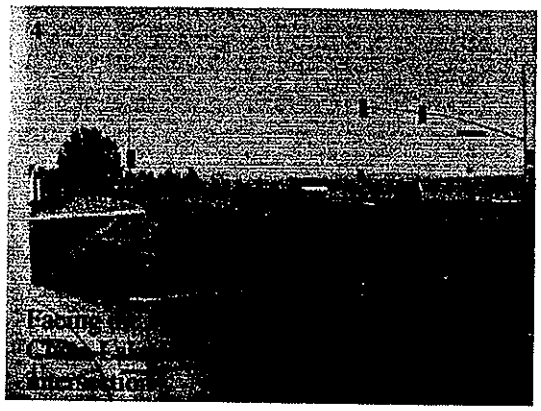
1. Facing East on College Heights Blvd. towards China Lake Blvd.
2. Facing East on College Heights Blvd. towards China Lake Blvd.
3. Facing Northeast on the Southwest corner of China Lake Blvd. & College Heights Blvd.
4. Facing the North across the south edge of China Lake Blvd. & College Heights Blvd. intersection.
5. Facing North on China Lake Blvd. towards College Heights Blvd.
6. Facing North on China Lake Blvd. towards College Heights Blvd.
7. Facing North on China Lake Blvd. towards College Heights Blvd.
8. Facing West on College Heights Blvd. towards China Lake Blvd.
9. Facing West on College Heights Blvd. towards China Lake Blvd.
10. Facing South on China Lake Blvd. towards College Heights Blvd.
11. Facing South on China Lake Blvd. towards College Heights Blvd.
12. Facing East on Bowman Rd. towards China Lake Blvd.
13. Facing North on China Lake Blvd. towards Bowman Rd.
14. Facing North on China Lake Blvd. towards Bowman Rd.
15. Facing North on China Lake Blvd. towards Bowman Rd.
16. Facing West on Bowman Rd. towards China Lake Blvd.
17. Facing West on Bowman Rd. towards China Lake Blvd.
18. Facing Southwest on the Northeast corner of China Lake Blvd. & Bowman Rd.
19. Facing South on China Lake Blvd. towards Bowman Rd.
20. Facing North on China Lake Blvd. away from Bowman Rd.
21. Facing South on China Lake Blvd. towards Bowman Rd.
22. Facing South on China Lake Blvd. towards Bowman Rd.
23. Facing South on China Lake Blvd. towards Bowman Rd.
24. Facing Southeast on the Northwest corner of China Lake Blvd. & Bowman Rd.
25. Facing East on China Lake Blvd. towards Downs St.
26. Facing East on China Lake Blvd. towards Downs St.
27. Facing East on China Lake Blvd. towards Downs St.
28. Facing Southwest on the Northeast corner of Downs St. & China Lake Blvd.
29. Facing East on China Lake Blvd. away from Downs St.
30. Facing West on China Lake Blvd. towards Downs St.
31. Facing West on China Lake Blvd. towards Downs St.
32. Facing South on Downs St. away from China Lake Blvd.
33. Facing North on Downs St. towards China Lake Blvd.
34. Facing North on Downs St. towards China Lake Blvd.
35. Facing Southeast on the Northwest corner of Downs St. & China Lake Blvd.
36. Facing Northeast on the Southwest corner of Downs St. & China Lake Blvd.
37. Facing East on College Heights Blvd. towards Kendall Ave.

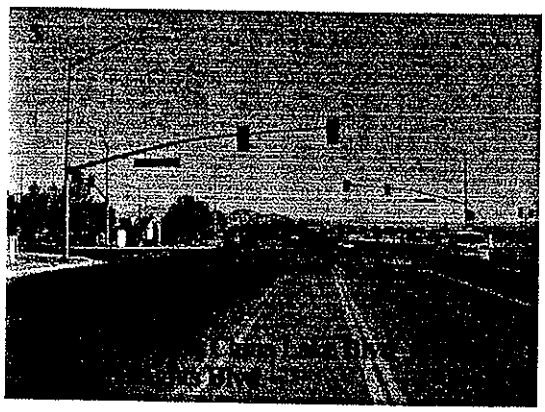
38. Facing East on College Heights Blvd. towards Kendall Ave.
39. Facing North on Kendall Ave. away from College Heights Blvd.
40. Facing South on Kendall Ave. towards College Heights Blvd.
41. Facing South on Kendall Ave. towards College Heights Blvd.
42. Facing South on Kendall Ave. towards College Heights Blvd.
43. Facing West on College Heights Blvd. towards Kendall Ave.
44. Facing West on College Heights Blvd. towards Kendall Ave.
45. Facing North on Kendall Ave. towards College Heights Blvd.
46. Facing North on Kendall Ave. towards College Heights Blvd.
47. Facing North on College Heights Blvd. towards Springer Ave.
48. Facing North on College Heights Blvd. towards Springer Ave.
49. Facing North on College Heights Blvd. towards Springer Ave.
50. Facing West on Springer Ave. away from College Heights Blvd.
51. Facing East on Springer Ave. towards College Heights Blvd.
52. Facing East on Springer Ave. towards College Heights Blvd.
53. Facing South on College Heights Blvd. towards Springer Ave.
54. Facing South on College Heights Blvd. towards Springer Ave.
55. Facing East on Springer Ave. away from College Heights Blvd.
56. Facing East on Springer Ave. away from College Heights Blvd.
57. Facing West on Springer Ave. towards College Heights Blvd.
58. Facing West on Springer Ave. towards College Heights Blvd.
59. Facing North on Downs St. away from Springer Ave.
60. Facing South on Downs St. towards Springer Ave.
61. Facing South on Downs St. towards Springer Ave.
62. Facing East on Springer Ave. away from Downs St.
63. Facing West on Springer Ave. towards Downs St.
64. Facing West on Springer Ave. towards Downs St.
65. Facing North on Downs St. towards Springer Ave.
66. Facing North on Downs St. towards Springer Ave.
67. Facing West on Springer Ave. away from Downs St.
68. Facing East on Springer Ave. towards Downs St.
69. Facing East on Springer Ave. towards Downs St.

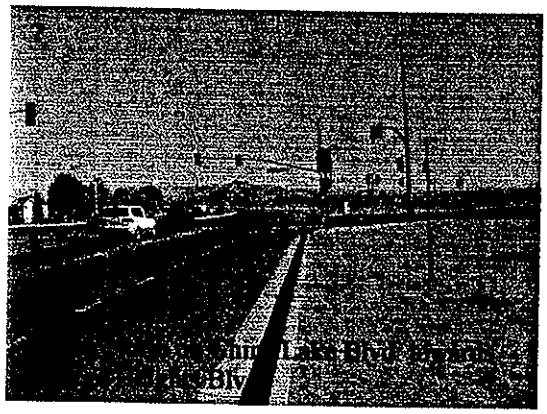

College Heights Blvd

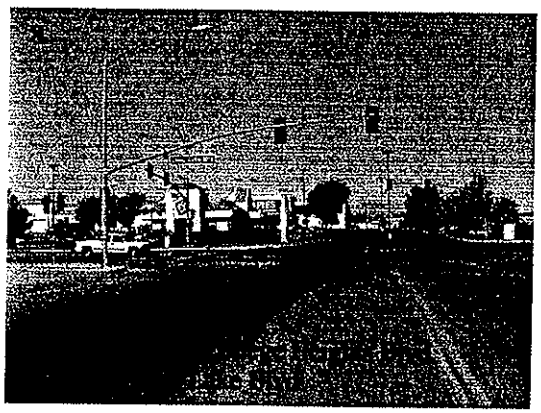

College Heights Blvd

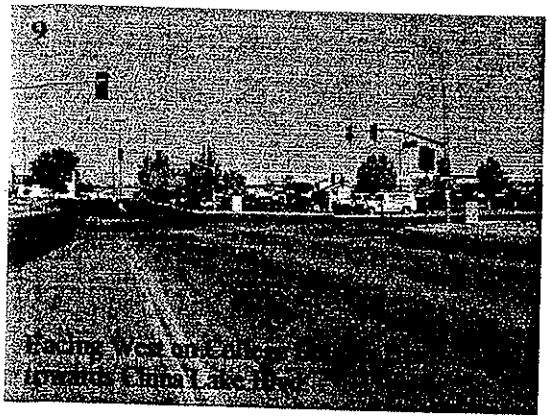








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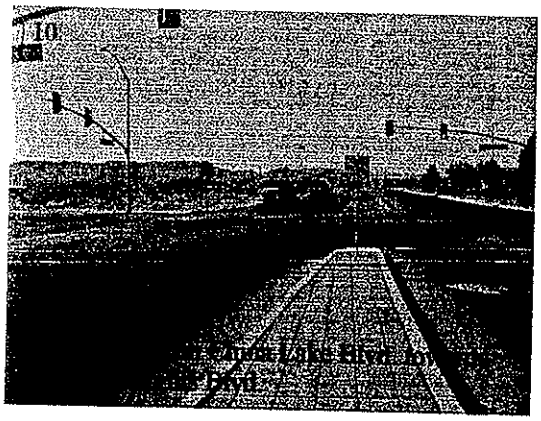
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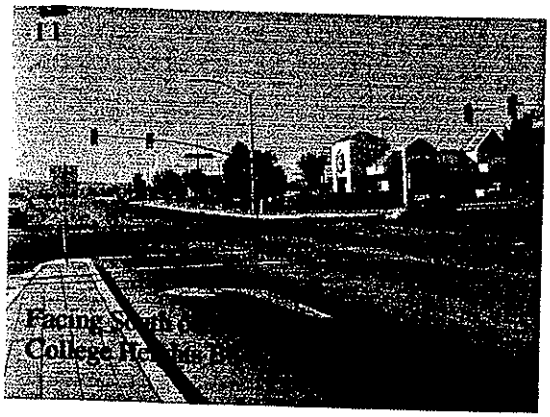
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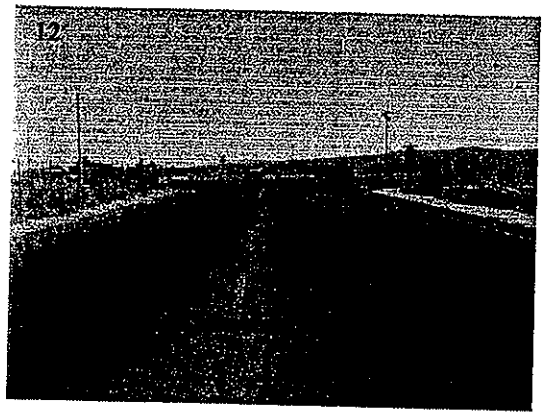
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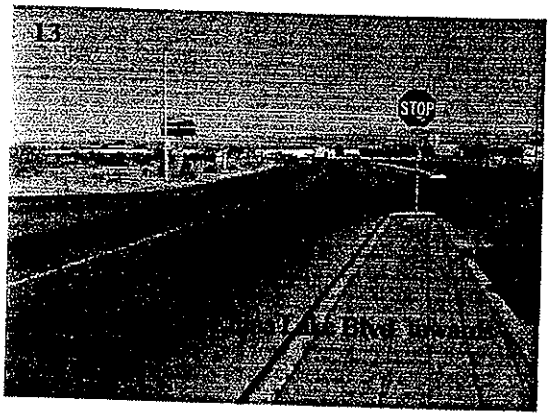
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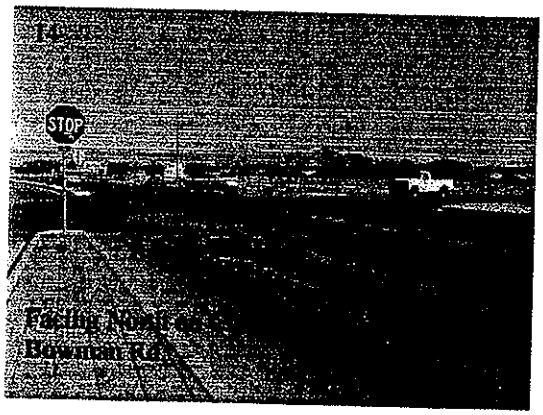
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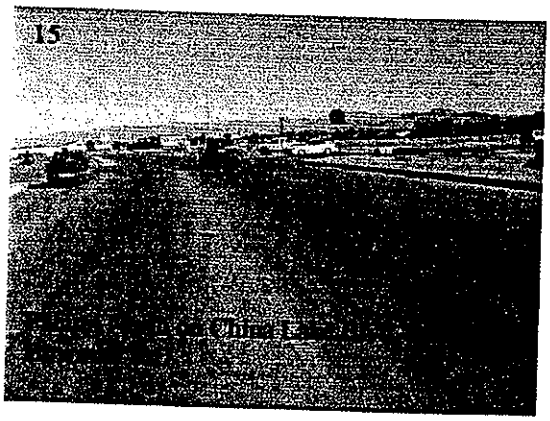
STOP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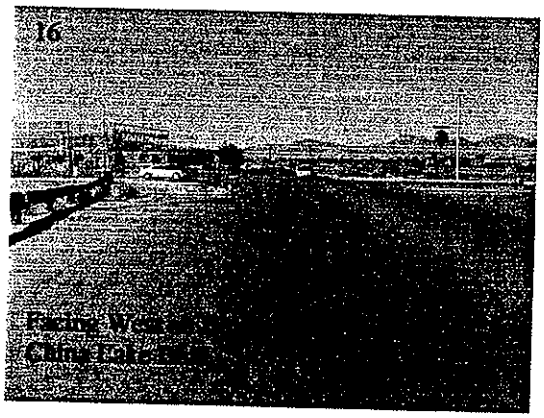
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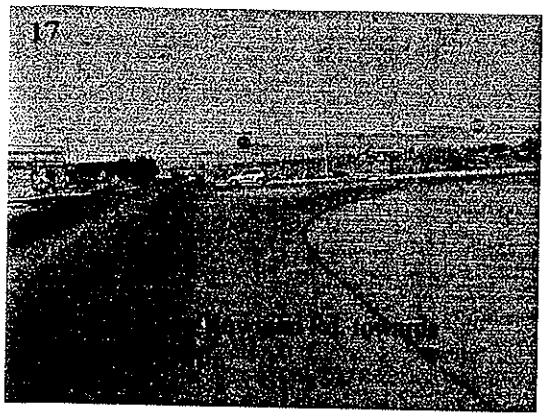
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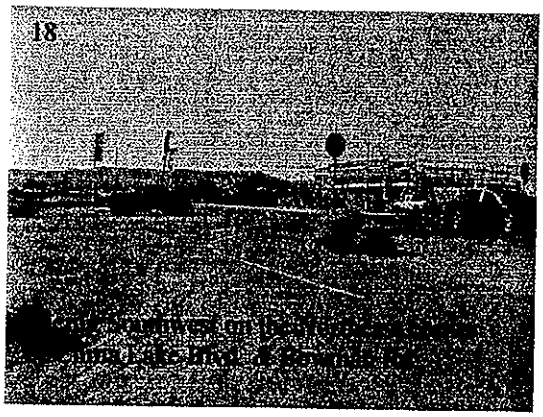
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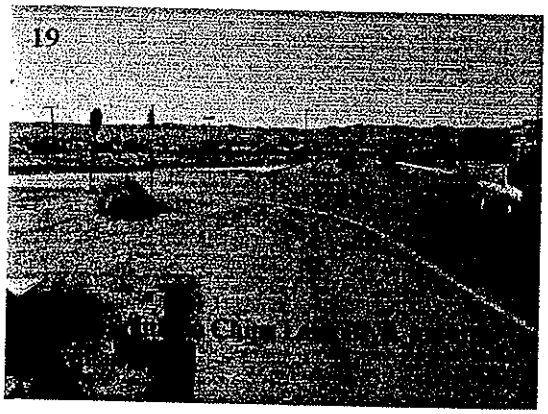
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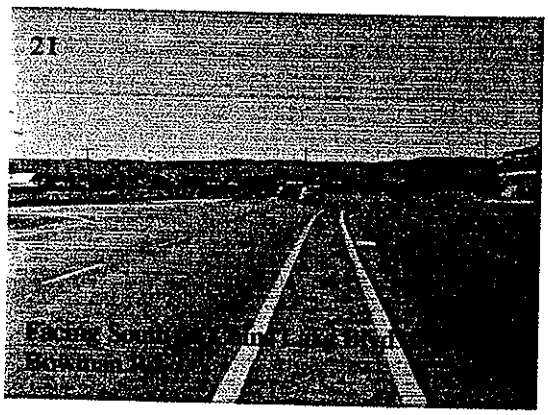
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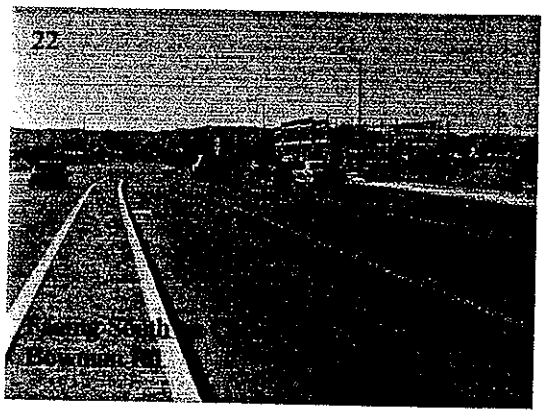
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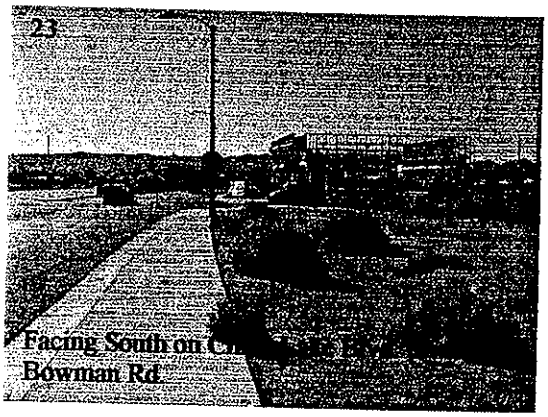
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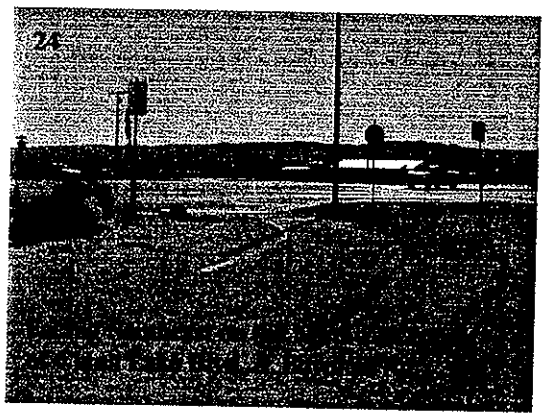
Facing South on
Bowman Rd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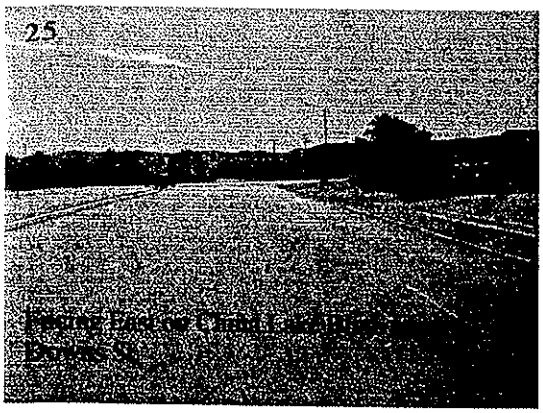
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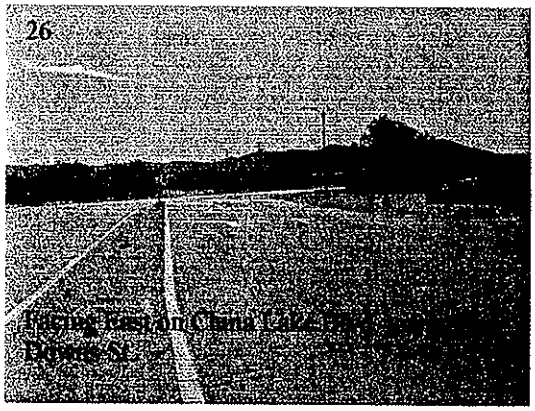
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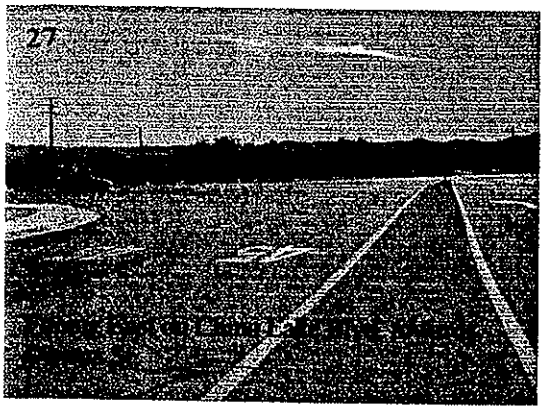
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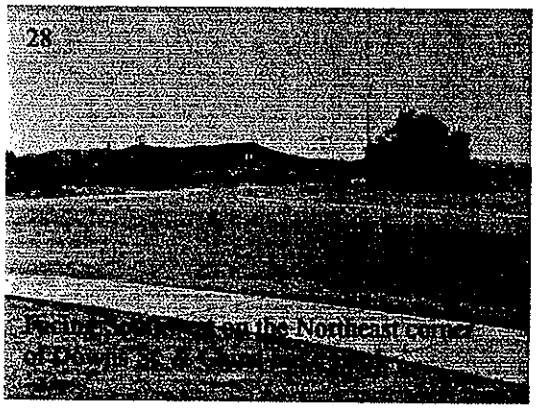
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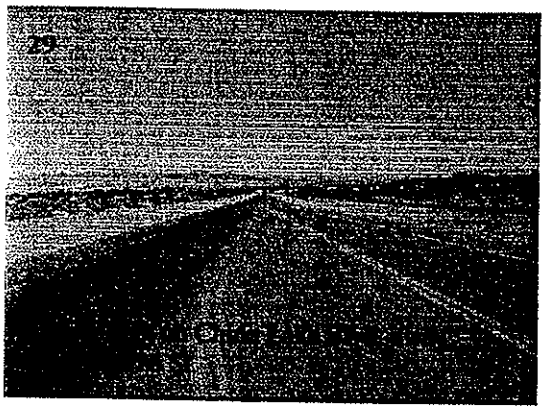
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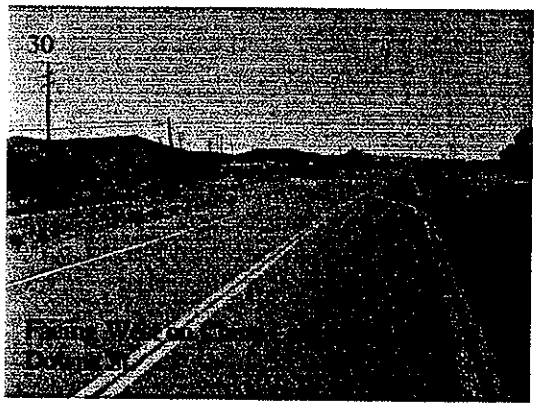
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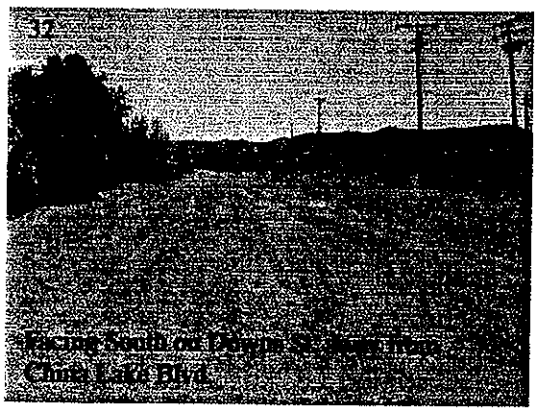
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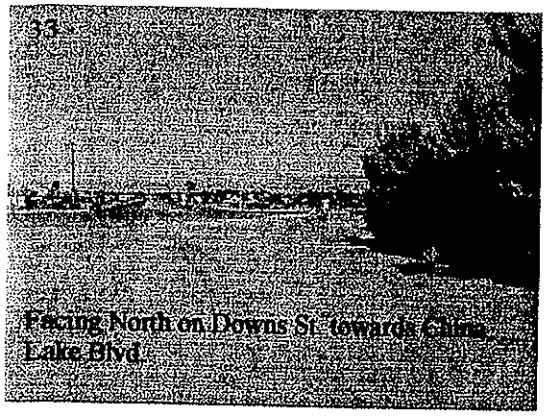
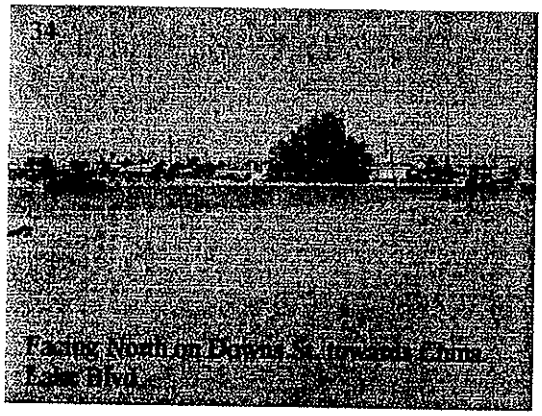
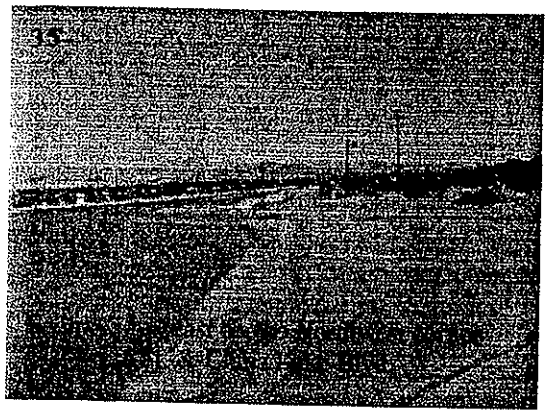
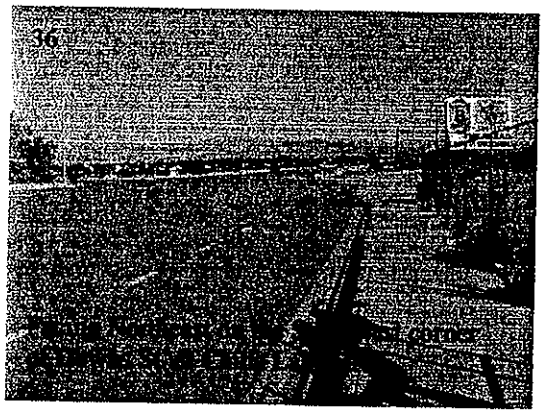


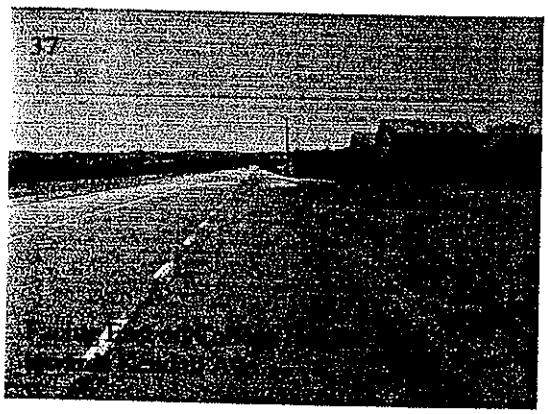
Facing North on Downs St. towards China Lake Blvd.

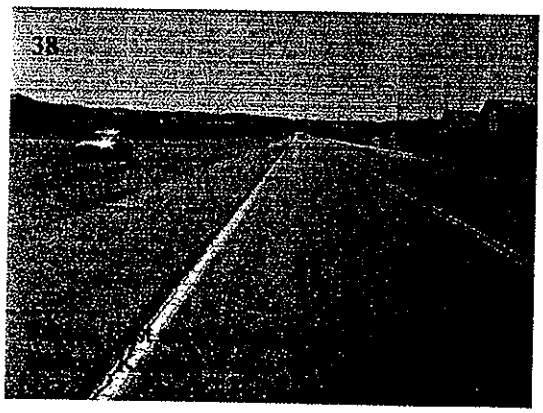


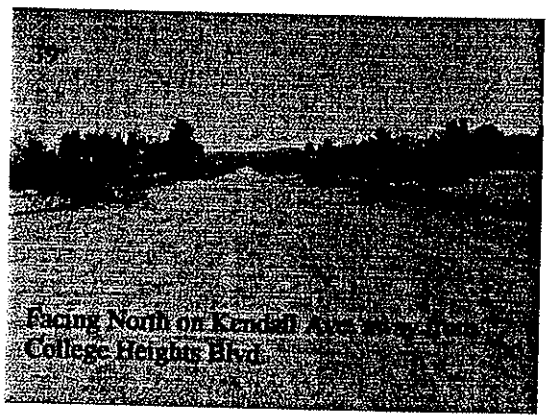
Facing North on Downs St. towards China Lake Blvd.



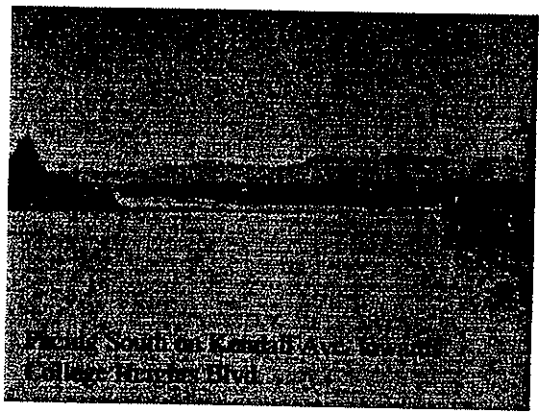


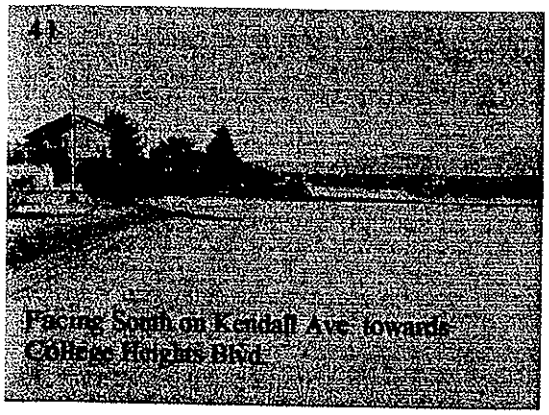






Facing North on Kendall Ave. towards College Heights Blvd.


Facing South on Kendall Ave. towards College Heights Blvd.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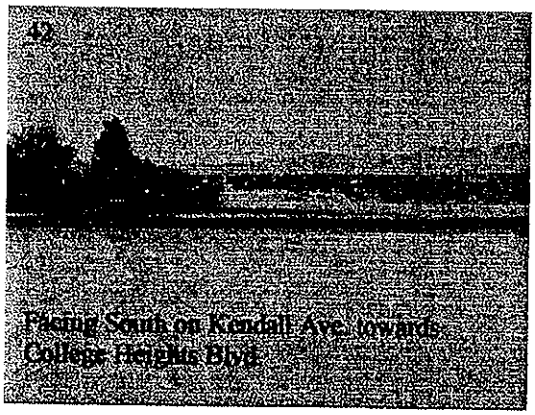
Facing South on Kendall Ave. towards
College Heights Blvd.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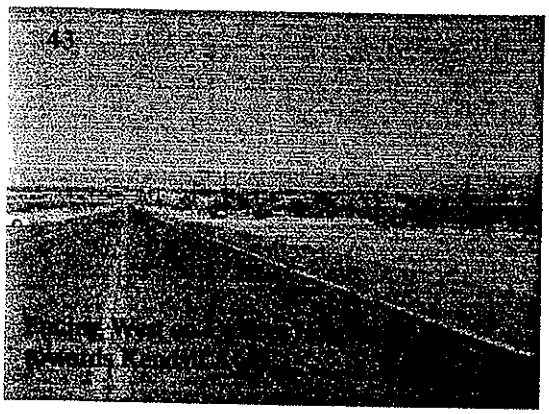
Facing South on Kendall Ave. towards
College Heights Blvd.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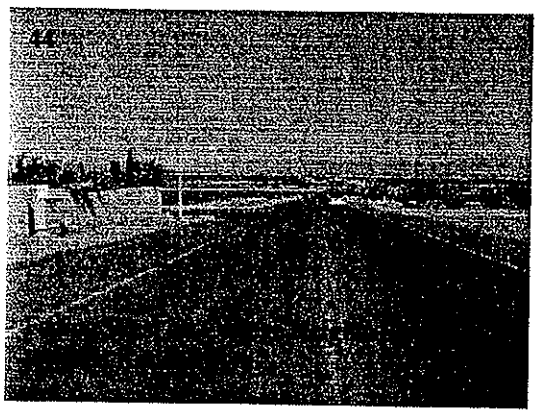
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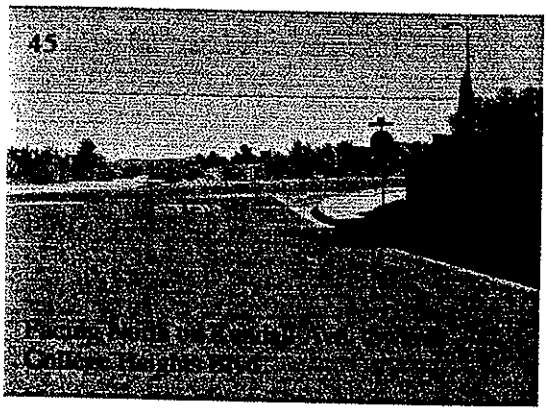
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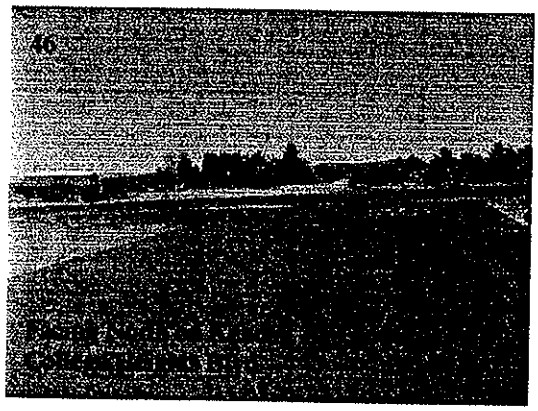
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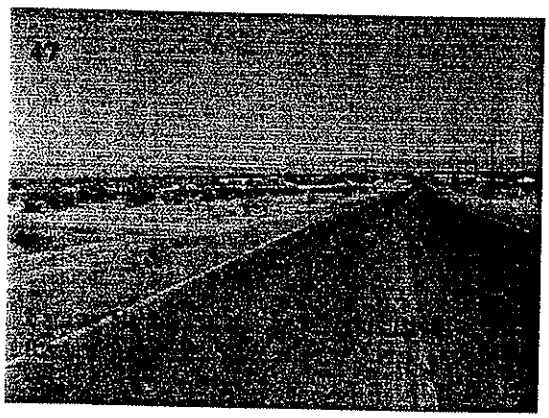
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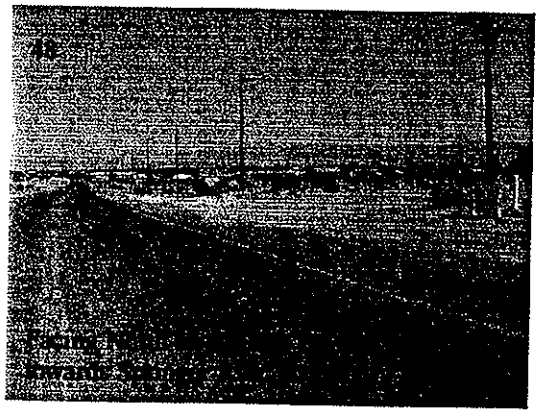
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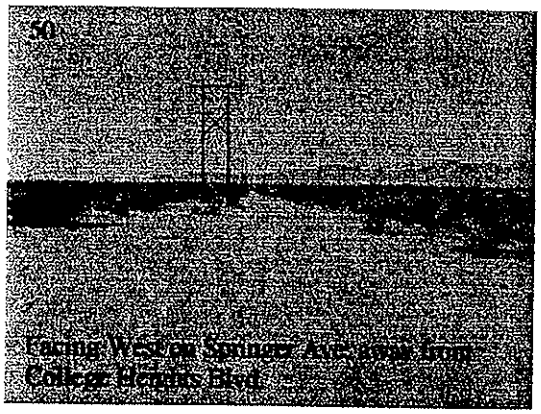
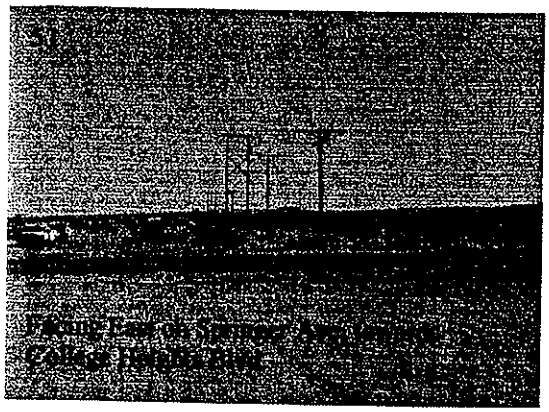
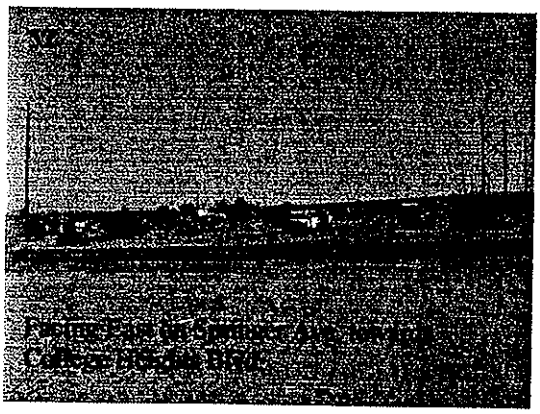
Facing North on College Heights Blvd
towards Springer Ave



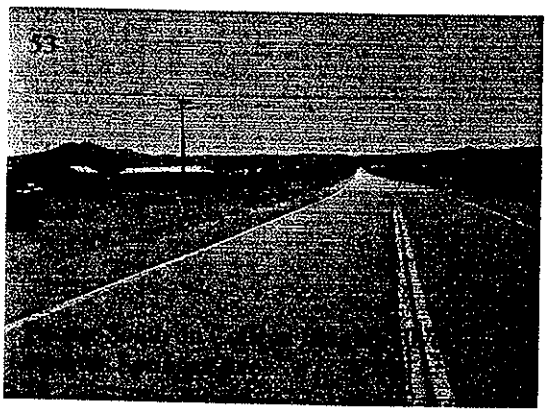
Facing West on Springer Ave. away from
College Heights Blvd

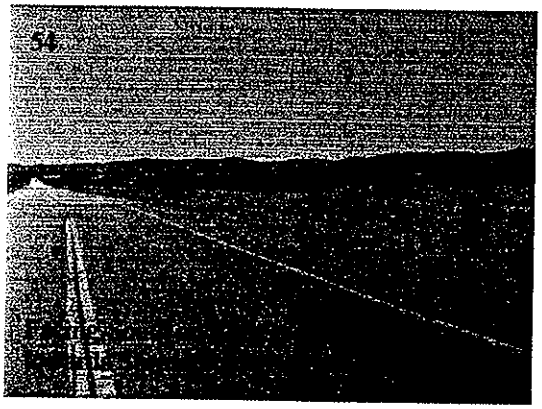


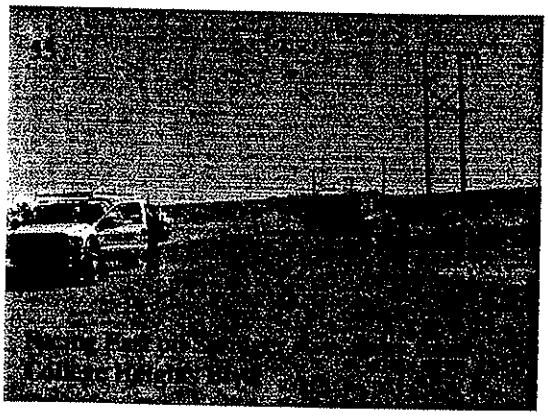
Facing East on Springer Ave. away from
College Heights Blvd



Facing East on Springer Ave. away from
College Heights Blvd

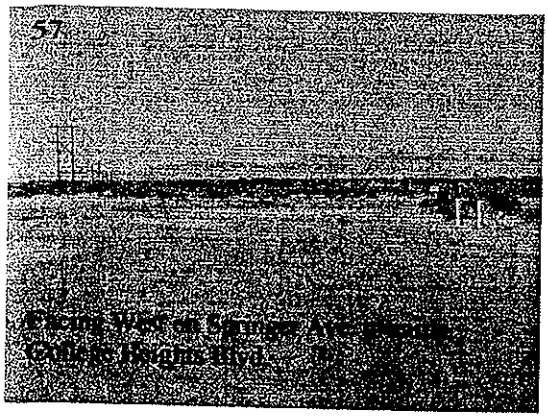




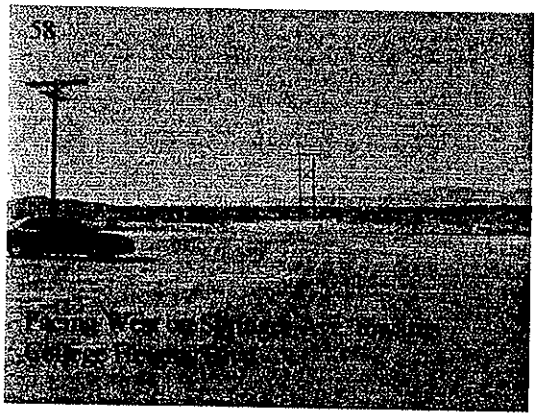


Facing East on
College Heights Blvd

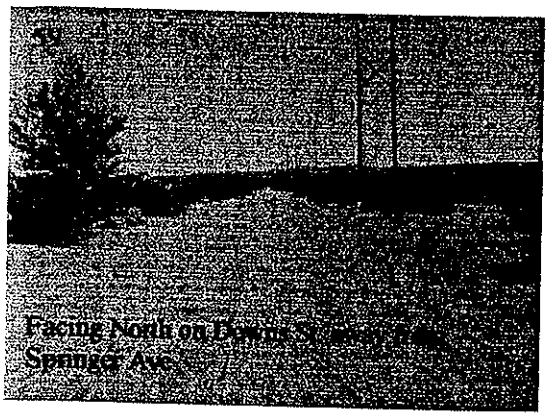
Facing East on Springer Ave. away from
College Heights Blvd



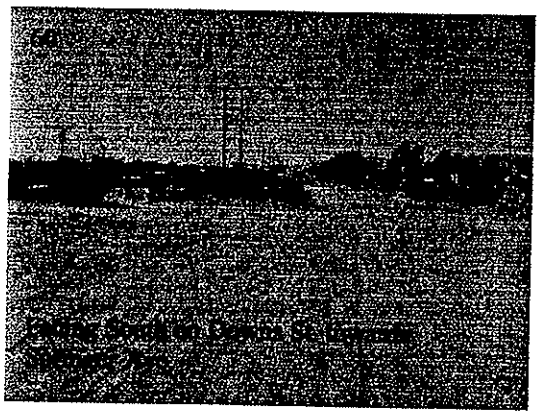
Facing West on Springer Ave [illegible] Gale to Heights Blvd.



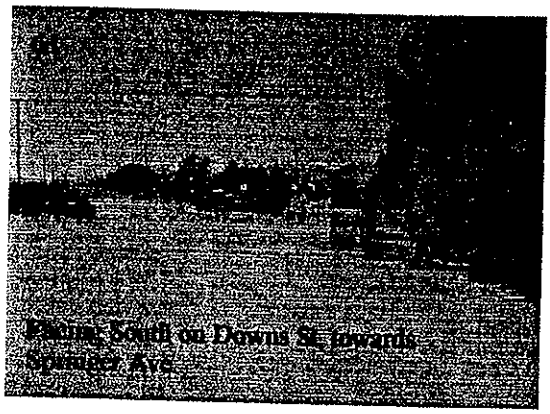
Facing West on Springer Ave [illegible] Gale to Heights Blvd.



Facing North on Downs St. away from Springer Ave.



Facing South on Downs St. towards Springer Ave.



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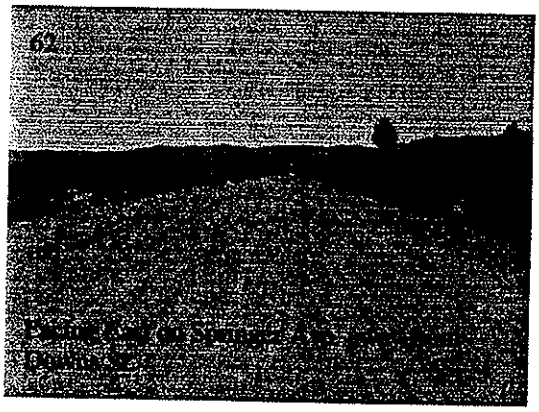

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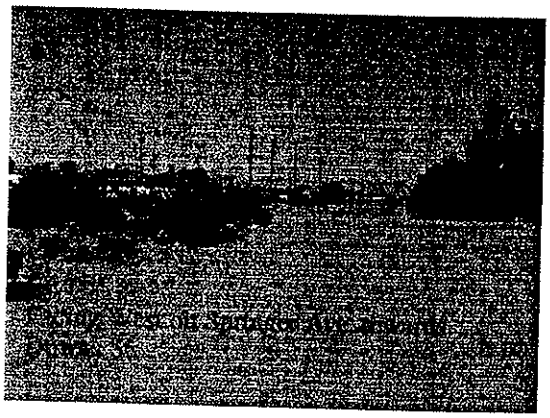

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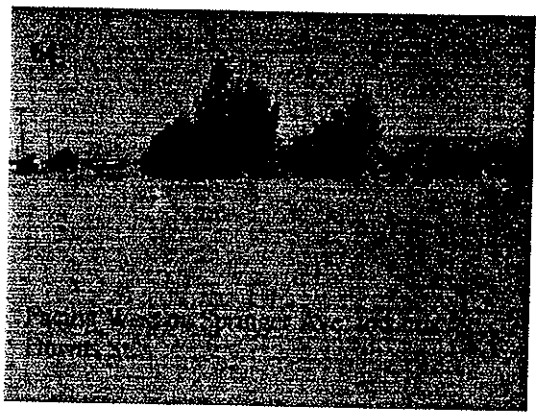

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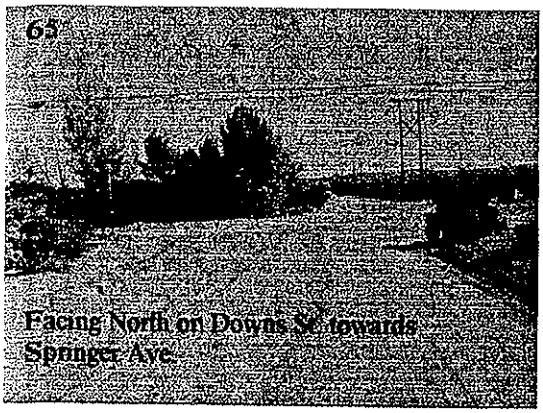

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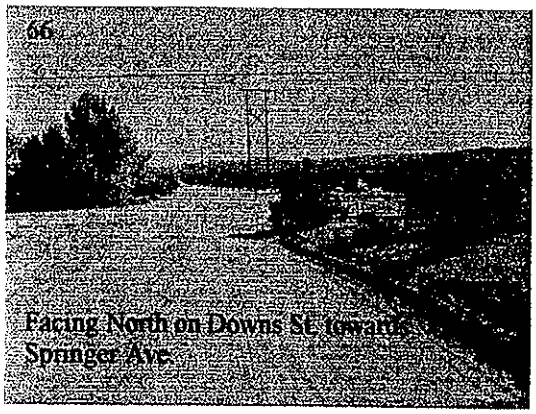
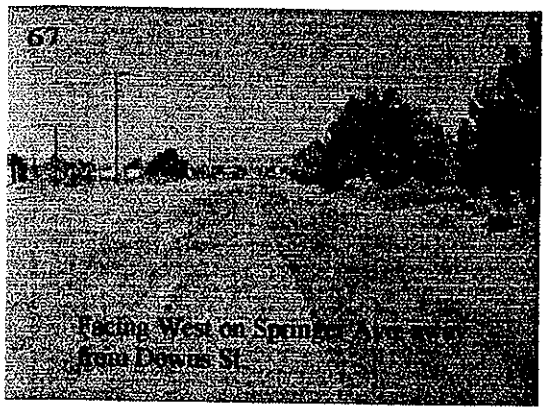
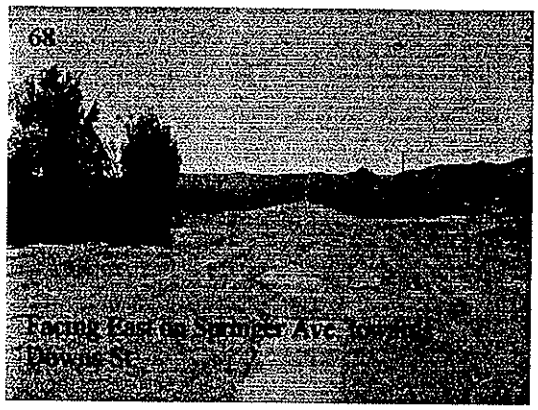


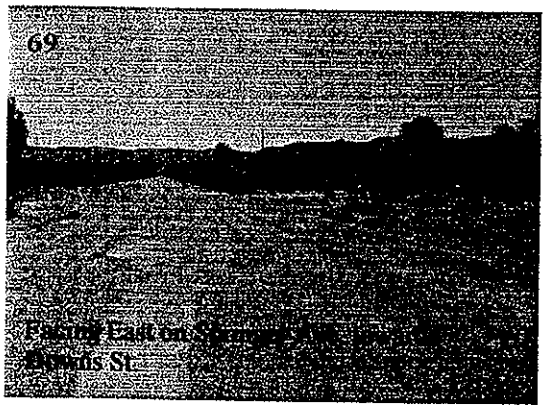
Facing North on Downs St. towards Springer Ave.



Facing West on Springer Ave. from Downs St.



Facing East on Springer Ave. towards Downs St.



Facing East on Springer Ave. Downs St.

Future Year 2030 without Project Conditions

The Future Year 2008 Without Project traffic projections reflect a larger increase in traffic over both existing and build-out conditions from the background traffic growth only. All effects caused by the development of the project site are neglected. These projections represent an estimated traffic volume and its effects for the future year 2030.

With a background traffic growth rate of 1.5% each year, calculations yield an estimated 43% increase in the existing traffic volumes by the year 2030.

Utilizing the estimated trip generation and the trip distribution pattern described above, the traffic generated by the existing volumes and background traffic growth was assigned to the street network. An approximate increase of 43% was applied to account for the background traffic growth within Ridgecrest after 24 years. The results of the delay and Level of Service values for the Future Year 2030 Without Project Conditions scenario are shown on Table 5, while the calculated resulting traffic volumes are shown in Figure 9. These results reveal that only the intersection of China Lake Blvd. at Bowman Road will operate at the unacceptable LOS E.

All HCM/HCS analysis printouts are attached as Appendix B.

Table 5
Intersection Delay and Level of Service Analysis for
Future Year 2030 Without Project

Intersections	Delay (sec/veh)					LOS				
	NB	SB	EB	WB	Int.	NB	SB	EB	WB	Int.
1. China Lake Blvd. at College Heights Blvd.	**34.1**	**78.5**	40.5	42.4	45.0	**C**	**E**	D	D	D
2. China Lake Blvd. at Bowman Road	*NA	*NA	***NA**	***NA**	*NA	*NA	*NA	***NA**	***NA**	E
3. China Lake Blvd. at Downs Street	**12.5**	**13.5**	0.5	3.3	3.6	**B**	**B**	A	A	A
4. Springer Avenue & College Heights. Blvd.	0.2	0.0	**10.7**	**0.0**	0.3	A	A	**B**	**A**	A
5. Springer Avenue & Downs Street	7.2	6.4	**6.9**	**7.0**	6.9	A	A	**A**	**A**	A
6. Norma Street & Springer Avenue	**6.9**	**6.9**	**6.9**	**6.9**	**6.9**	**A**	**A**	A	A	A
7. Kendall Avenue & College Heights. Blvd.	12.3	12.4	**0.0**	**5.7**	12.0	B	B	**A**	**A**	A

All Assessments for the PM Peak Hr
Minor Approach Delays & LOS are shown in **bold**
* NA = Not Available / Not Applicable

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