CHAPMAN HIGHWAY ANALYSIS

S.R. 71/U.S. 441 (CHAPMAN HIGHWAY)
FROM S.R. 338/S.R. 35/U.S. 411 TO MACON LANE
L.M. 28.790 to L.M. 29.962
SEYMOUR, SEVIER COUNTY
PIN 104959.01

Prepared by:
THE CORRADINO GROUP
for the
TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

Approved by:	Signature	DATE
DIRECTOR **Project Planning Division**		11-29-11

Executive Summary

The purpose of this corridor analysis is to assess the effects on crashes along a 1.2 mile section of S.R. 71, Chapman Highway, by adding a center two-way-left-turn-lane (TWLTL) and lowering the hill (technically known as a vertical curve) between Ford Hill Lane and Hutcheson Road/Simmons Road. The horizontal and vertical curves there combine to create substandard sight distances for motorists stopped at approaches to Chapman Highway on either side of the hill. The hill will be lowered by the project currently in the design phase.

The proposed improvements include widening the existing four (4) travel lanes from eleven feet (11') wide to twelve feet (12'); adding a center TWLTL; and, adding four feet (4') wide paved shoulders abutting curb and gutter. Lengthening the horizontal and lowering the vertical curves near Ford Hill Lane will improve the intersection sight distances and stopping sight distances. Modifications to the curves will require additional right-of-way from parcels along the south side of Chapman Highway, including one (1) residential relocation.

Based on these improvements, it is expected that overall vehicle delay will be reduced by approximately forty percent (40%) in 2013 and twenty-five percent (25%) in 2033, at which time traffic on Chapman Highway will have doubled from 2013 volumes. These improvements should reduce the crash rate by approximately twenty-two percent (22%) allowing Chapman Highway to operate more efficiently and safely.

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1. Project Need

Chapman Highway, functionally classified as an Urban Principal Arterial, is a primary route from Knoxville to Sevierville, Pigeon Forge, Gatlinburg and the Great Smoky Mountains. It serves daily commuters and provides a tourism link in southeast Tennessee.

The forecast 2013 base year level of service (LOS) is D, and the forecast 2033 design year LOS is F, for the existing section of S.R. 71/U.S. 441 (Chapman Highway) from the Macon Lane intersection to the S.R. 338/S.R. 35/U.S. 411 (S.R. 338) intersection. Near the mid-point of the project, the intersection sight distance at the approaches to Chapman Highway and the stopping sight distance along Chapman Highway are substandard due to the existing crest vertical curve at this location.

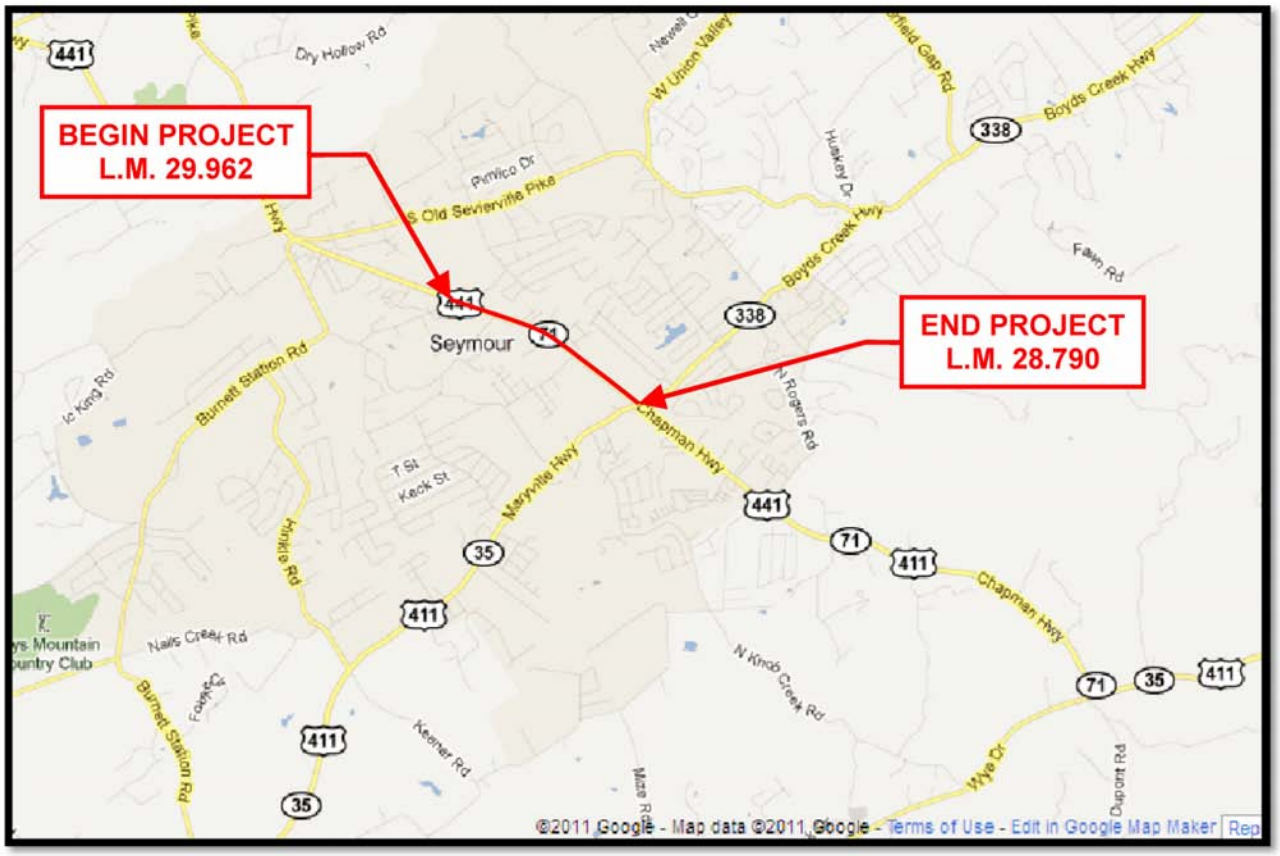
Providing a center two-way-left-turn-lane (TWLTL) will match the cross section of the roadway to the north and south, improving roadway continuity and driver expectations. It will provide a refuge lane for vehicles turning left from Chapman Highway.

Left-turning vehicles rely on gaps in opposing traffic. As daily traffic volumes double to a projected 67,860 vehicles per day (VPD) in 2033, the number and duration of gaps will diminish. Gaps are established by traffic signals. The greater the distance between traffic signals and the larger the number of intervening driveways, traffic becomes more random and gaps become shorter. As gaps are reduced, turn delay increases and drivers tend to adopt riskier behavior. The result is more crashes. This is a more difficult problem for those turning left from driveways and/or side streets. These drivers must find a simultaneous gap in traffic from both directions in the traffic stream they are trying to enter.

2. Project Description

Figure 1 identifies the project location. The approximate 1.2 mile section of Chapman Highway, between the signalized intersections at Macon Lane and S.R. 338, consists of four (4) eleven feet (11′) wide lanes of undivided roadway with a forty-five (45) mph design speed. There is no turn lane and the shoulders range from one foot (1′) to three feet (3′) wide, with open drainage and side ditches. This section is lined with public road approaches that serve residential and commercial properties. The only exception to this typical cross section is near each project terminus. At the western terminus, an approximate six hundred feet (600′) long TWLTL section exists immediately east of Macon Lane, serving the commercial strip area. The travel lane widths in this area are eleven feet (11′) wide and the TWLTL is twelve feet (12′) wide. The section of Chapman Highway at the eastern terminus consists of twelve feet (12′) wide travel lanes with twelve feet (12′) wide shoulders plus curb and gutter for a distance of approximately seven hundred feet (700′).

Figure 1 – Location Map



Source: Google Maps

Horizontal and vertical curves exist at about the midpoint of the project section. The vertical curve grades are as steep as six percent (6%), creating substandard intersection sight distances for motorists stopped at approaches to Chapman Highway on each side of the curve's crest. The existing vertical curve also has substandard stopping sight distance. The photographs on the following pages illustrate the Chapman Highway corridor and, in particular, the vertical curve and sight distance constraints.

Annual Average Daily Traffic (AADT) along Chapman Highway for the 2013 base year is projected to be 34,160 vehicles per day (VPD). AADT is forecast to be 67,860 VPD for the 2033 design year. This heavy traffic will make it difficult to enter Chapman Highway from an approaching street or commercial drive, especially near the crest curve where intersection sight distances are substandard. This situation is even more challenging for those turning left from the approaches. There, drivers must find a simultaneous gap in traffic from both directions. As gaps are reduced by an increase in traffic, turn delay increases and drivers tend to adopt riskier behavior. The result is more crashes.

The project is currently in the design phase. One of the proposed design elements includes the addition of a two-way-left-turn-lane (TWLTL) throughout the project limits. TWLTL's currently exist

along Chapman Highway immediately west and east of the subject project and within the project at the west end. The TWLTL will provide capacity and safety benefits. It will allow left-turning vehicles to maneuver out of the inside travel lanes along Chapman Highway. Currently left-turning vehicles slow down and sometimes stop in the inside travel lane creating queues. Some motorists avoid the inside travel lane altogether to avoid being "trapped" behind a left-turning vehicle. Their sudden maneuvers also contribute to crashes.

A second proposed improvement is to reconstruct the horizontal and vertical curves near Ford Hill Lane. Chapman Highway will be realigned to the south and the sharpness of the vertical curve will be reduced by lowering the road elevation. This will require the acquisition of right-of-way from the parcels to the south in this area, including one (1) residential property. These alignment changes will improve safety significantly by improving sight distance.

Looking west along Chapman Highway from west of S.R. 338
(September 15, 2011)

Looking east along Chapman Highway from Ford Hill Lane
(September 15, 2011)

Looking west along Chapman Highway from commercial drive east of
Ford Hill Lane (September 15, 2011)

Looking east along Chapman Highway from private drive east of Shady Lane (September 15, 2011)

Looking west along Chapman Highway from private drive 800' west of Hutcheson Road (September 15, 2011)

Looking east along Chapman Highway from private drive 800' west of Hutcheson Road (September 15, 2011)

3. Sight Distance

Sight distances -- intersection sight distance and stopping sight distance-- directly affect the safety of a highway. Intersection sight distance is a measure of how far along the highway a motorist stopped at the stop bar of a cross street/driveway approach, with a driver eye height elevation of three-and-one-half feet (3.5') above the pavement, can see an approaching object, also at three-and-one-half feet (3.5') above the pavement. AASHTO guidelines recommend an intersection sight distance of approximately seven hundred feet (700').

Intersection sight distances were measured in the field from all approaches to the hill near Ford Hill Lane (Appendix B). Table 1 lists the nine (9) approaches to Chapman Highway near Ford Hill Lane with substandard intersection sight distances. The safety issues resulting from substandard intersection sight distance at these locations are further complicated by Chapman Highway being four (4) lanes with a high volume of traffic. As motorists on these approaches wait for the appropriate gap to enter Chapman Highway traffic, some will become impatient and begin to take risks as they attempt to enter a smaller gap than desirable.

Table 1 – Observed Substandard Sight Distance near Ford Hill Lane

Approach Drive	Direction Looking	Field Observed Intersection Sight Distance
Shady Lane	East	594′
Private Drive 50′ east of Shady Lane	East	582′
Ford Hill Lane	East	496′
Commercial Drive 200′ east of Ford Hill Lane	East	521′
Commercial Drive 375′ east of Ford Hill Lane	East	467′
Commercial Drive 550′ east of Ford Hill Lane	East	511′
Commercial Drive 550′ east of Ford Hill Lane	West	462′
Private Drive 850′ east of Ford Hill Lane	West	324′
Private Drive 1150′ east of Ford Hill Lane	West	498′

Source: The Corradino Group

Stopping sight distance is based on the vertical curvature of the road and the design speed. Based on preliminary design information provided by the LPA Group, Inc., the stopping sight distance for the hill near Ford Hill Lane is also substandard and requires modification of the vertical alignment.

4. Safety

Crash data for the three (3) year period from 2007 to 2009 were provided by TDOT. Because the project does not include an improvement of the Chapman Highway/Macon Lane intersection or the Chapman Highway/S.R. 338 intersection, crashes occurring at these intersections were not included in the analysis. There were a total of fifty-seven (57) crashes reported along the section of Chapman Highway from L.M. 29.962 to L.M. 28.790. (Crash data and crash location maps are included in Appendix C.) Of the fifty-seven (57) crashes, six (6), representing eleven percent (11%) of the total, involved an incapacitating injury; eleven (11), representing nineteen percent (19%) of the total, involved a non-incapacitating injury; and, forty (40), representing seventy percent (70%) of all crashes involved property damage only. There were no fatalities reported from 2007 to 2009.

Table 2 – Crash Severity

Type	Frequency	Percentage of Total
Property Damage Only	40	70%
Non-Incapacitating Injury	11	19%
Incapacitating Injury	6	11%
Fatality	0	0%

Source: Tennessee Department of Transportation

Twenty-three (23) crashes representing forty percent (40%) of the total involved rear-end incidents. (Table 3). Table 3 summarizes crash types for the corridor. To understand why the crashes occur, individual crash reports prepared by the attending law enforcement officer were obtained from TDOT. Twenty-three (23) crashes, representing forty percent (40%) of the total, were contributed to left-turning vehicles slowing or stopping in the Chapman Highway inside travel lane. The addition of a TWLTL along Chapman Highway will allow these left-turning vehicles to maneuver out of the mainline traffic stream, reducing the number of rear-end crashes and improving safety.

Fourteen (14) crashes, representing twenty-five percent (25%) of the total, were angle-type incidents; six (6), eleven percent (11%) of the total, were sideswipe/same direction crashes; three (3), five percent (5%) of the total, were sideswipe/opposite direction; one (1), two percent (2%) of the total, involved a head-on collision; and, ten (10), seventeen percent (17%) of the total, were "no collision with vehicle", where a vehicle departed the roadway. The angle crashes are likely due to the substandard intersection sight distance associated with the hill approximately five hundred feet (500') east of Ford Hill Lane.

Table 3 – Crash Type

Type	Frequency	Percentage of Total
Rear-end	23	40%
Angle	14	25%
Sideswipe/Same Direction	6	11%
Sideswipe/Opposite Direction	3	5%
Head-on	1	2%
No Collision With Vehicle	10	17%

Source: Tennessee Department of Transportation

The 2006 to 2008 statewide average crash rates for interstates and state routes are contained in Appendix C. Chapman Highway is an urban, four (4) lane undivided state route that will be reconstructed to add a center turning lane. Per the statewide average crash rates, providing a TWLTL will reduce the total crash rate from 3.3920 crashes per million vehicle miles travelled to 2.6518 crashes per million vehicle miles travelled, a reduction of approximately twenty-two percent (22%). All safety benefits from the proposed horizontal and vertical curvature improvements near Ford Hill Lane, which will result in improved sight distance, will add to the safety benefits resulting from the addition of the TWLTL.

Table 4
Statewide Average Crash Rates (2006-2008)
Per Million Vehicle Miles

Facility Type	Fatal	Incapacitating Injury	Other Injury	Property Damage Only	Total Crash
Urban State Route Four (4) Lane Undivided	0.0133	0.0804	0.8480	2.4502	3.3920
Urban State Route Four (4) Lane with Turn Lanes	0.0105	0.0587	0.6555	1.9271	2.6518

Source: Tennessee Department of Transportation

5. Capacity Analysis

Traffic data, including AADT and Design Hour Volumes (DHV), were provided by TDOT (Appendix D). *Highway Capacity Software* (HCS+) was used to analyze the existing four (4) lane configuration for both 2013 and 2033 traffic (Appendix E). The section of Chapman Highway from Macon Lane to S.R. 338 is forecast to operate at LOS D in 2013 with a density of 1,076 vehicles/hour/lane and LOS F in 2033 with a density of 2,137 vehicles/hour/lane.

The micro-simulation software, *SimTraffic,* was used to compare traffic-handling capability of the existing four (4) lane and the proposed five (5) lane sections with the TWLTL. *SimTraffic* produces corridor-wide results, such as average vehicle travel time and average vehicle delay.

Table 5 illustrates that for the 2013 PM peak traffic, the five (5) lane section reduces overall delay by approximately forty percent (40%). Table 6 illustrates that for the 2033 PM peak, the five (5) lane section reduces overall delay by approximately twenty-five percent (25%). The reduction comes from the relocation of left-turning vehicles from the inside travel lane to the TWLTL.

Table 5 – 2013 *SimTraffic* Results

Total Network Performance		Total Delay (hr)
Existing 4-lane Section	AM Peak 2013	1.2
	PM Peak 2013	8.0
Proposed 5-Lane Section	AM Peak 2013	0.8
	PM Peak 2013	4.7

Source: The Corradino Group

Table 6 – 2033 *SimTraffic* Results

Total Network Performance		Total Delay (hr)
Existing 4-lane Section	AM Peak 2033	21.2
	PM Peak 2033	82.3
Proposed 5-Lane Section	AM Peak 2033	7.8
	PM Peak 2033	61.3

Source: The Corradino Group

6. Summary

The improvements proposed within this study, which include adding a two-way-left-turn-lane (TWTLT), in combination with improving sight distance by reconstructing horizontal and vertical curves near Ford Hill Lane, will make this section of Chapman Highway a better operating and safer roadway.

Appendices

A. Vicinity Map

B. Intersection Sight Distance Field Observations

C. Crash Data

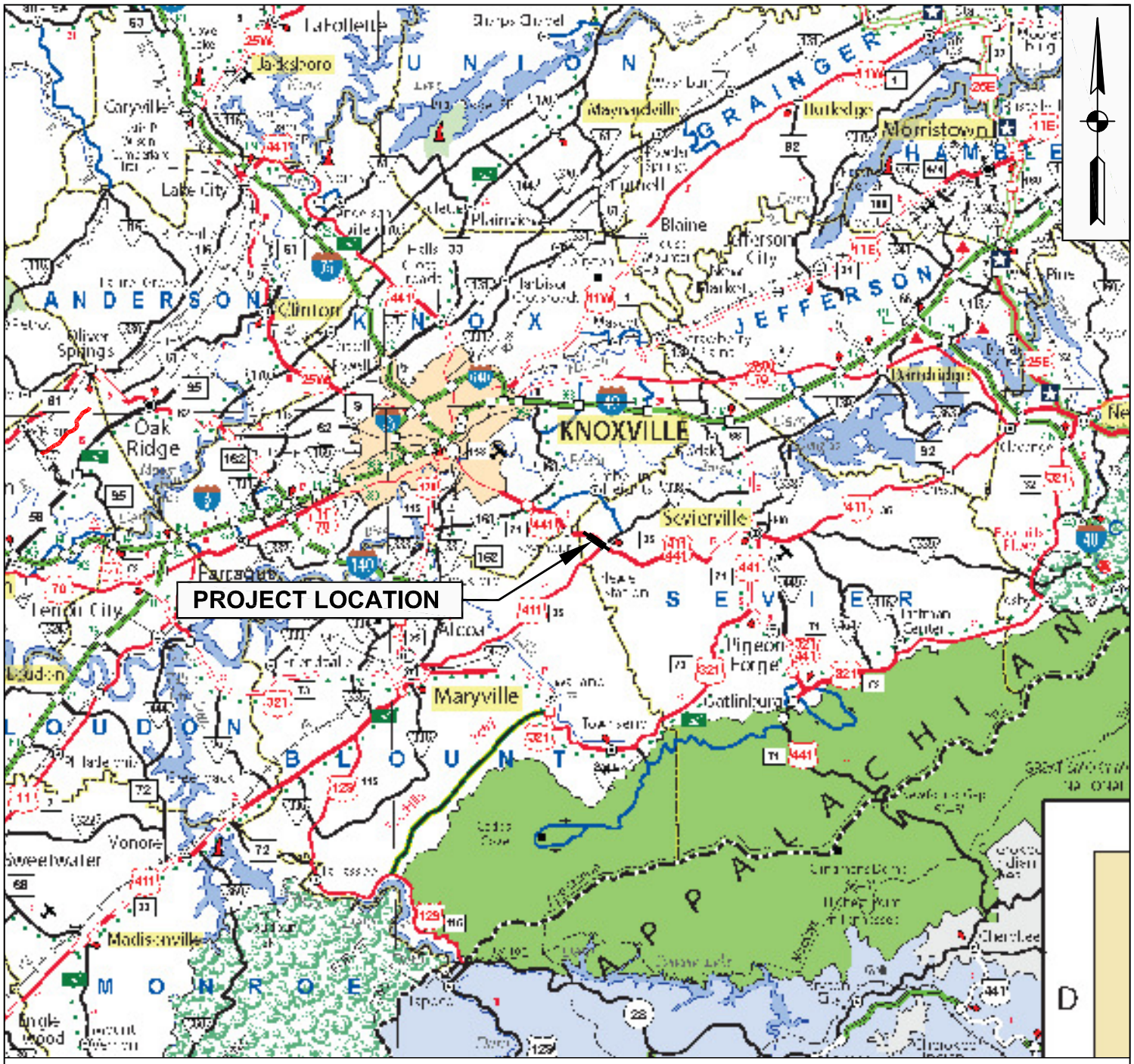
D. Traffic Data

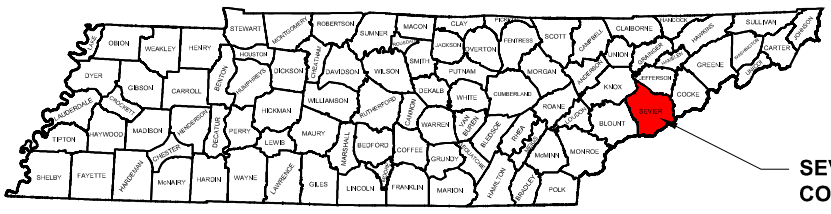
E. HCS+ Reports

F. SimTraffic Reports

Appendix A

Vicinity Map





TDOT

VICINITY MAP

DRAWN BY:	CHECKED BY:
JWB	DCC
PIN 104959.01	
SCALE: 1" = 10 MILES	DATE: 11-17-11

Appendix B

Intersection Sight Distance Field Observations

SHADY LN.

FORD HILL LN.

462 Feet

511 Feet

467 Feet

521 Feet

496 Feet

594 Feet

582 Feet

324 Feet

498 Feet

CHAPMAN HWY.

* = Peak of crest vertical curve

- Existing intersection sight distance from Shady Lane looking east = 594 Feet
- Existing intersection sight distance from Private Drive looking east = 582 Feet
- Existing intersection sight distance from Ford Hill Lane looking east = 496 Feet
- Existing intersection sight distance from Commercial Drive looking east = 521 Feet
- Existing intersection sight distance from Commercial Drive looking east = 467 Feet
- Existing intersection sight distance from Commercial Drive looking west = 462 Feet
- Existing intersection sight distance from Commercial Drive looking east = 511 Feet
- Existing intersection sight distance from Private Drive looking west = 324 Feet
- Existing intersection sight distance from Private Drive looking west = 498 Feet

TDOT

Sight Distance Diagram

DRAWN BY:	CHECKED BY:
JWB	DCC
PIN 104959.01	
SCALE: Not to Scale	DATE: 11-17-11

Appendix C

Crash Data

Statewide Average Rates for Sections and Spots (2006-2008)

Route Type	Rural/ Urban	Location Type	Highway Type	Fatal Rate	Incap. Rate	Other Inj. Rate	Pd. Rate	Total Rate	Severe Crash Rate	Total Veh. Miles (million)
Interstate and State Routes										
IS & SR	Rural	Section	2-Ln	0.0299	0.0938	0.4818	1.0509	**1.6565**	0.1237	26,181
IS & SR	Rural	Section	2-Ln/TL	0.0120	0.0710	0.4561	1.4404	**1.9794**	0.0830	831
IS & SR	Rural	Section	4+LN Undiv.	0.0153	0.0920	0.4108	1.1173	**1.6354**	0.1073	652
IS & SR	Rural	Section	4+LN Div.	0.0129	0.0447	0.2173	0.5234	**0.7984**	0.0576	8,202
IS & SR	Rural	Section	4+LN TL	0.0114	0.0518	0.2355	0.6634	**0.9622**	0.0632	2,895
IS & SR	Rural	Section	Freeway	0.0070	0.0161	0.1092	0.3030	**0.4352**	0.0231	27,724
IS & SR	Rural	Spot	2-Ln	0.0082	0.0256	0.1320	0.2889	**0.4548**	0.0338	97,253
IS & SR	Rural	Spot	2-Ln/TL	0.0020	0.0124	0.0809	0.2496	**0.3448**	0.0144	5,020
IS & SR	Rural	Spot	4+LN Undiv.	0.0027	0.0162	0.0749	0.2029	**0.2966**	0.0189	3,766
IS & SR	Rural	Spot	4+LN Div.	0.0032	0.0108	0.0529	0.1287	**0.1955**	0.0140	33,932
IS & SR	Rural	Spot	4+LN TL	0.0026	0.0114	0.0534	0.1519	**0.2193**	0.0140	13,388
IS & SR	Rural	Spot	Freeway	0.0011	0.0026	0.0178	0.0493	**0.0708**	0.0037	170,930
IS & SR	Urban	Section	2-Ln	0.0126	0.0801	0.6248	1.7013	**2.4188**	0.0927	8,179
IS & SR	Urban	Section	2-Ln/TL	0.0080	0.0581	0.6165	1.7044	**2.3870**	0.0661	1,635
IS & SR	Urban	Section	4+LN Undiv.	0.0133	0.0804	0.8480	2.4502	**3.3920**	0.0937	2,847
IS & SR	Urban	Section	4+LN Div.	0.0106	0.0491	0.4839	1.4675	**2.0112**	0.0597	13,756
IS & SR	Urban	Section	4+LN TL	0.0105	0.0587	0.6555	1.9271	**2.6518**	0.0692	12,432
IS & SR	Urban	Section	Freeway	0.0055	0.0203	0.2391	0.7475	**1.0125**	0.0258	40,699
IS & SR	Urban	Spot	2-Ln	0.0020	0.0127	0.1007	0.2777	**0.3931**	0.0147	55,100
IS & SR	Urban	Spot	2-Ln/TL	0.0010	0.0075	0.0854	0.2383	**0.3322**	0.0085	12,428
IS & SR	Urban	Spot	4+LN Undiv.	0.0013	0.0084	0.0934	0.2830	**0.3862**	0.0097	31,182
IS & SR	Urban	Spot	4+LN Div.	0.0014	0.0065	0.0671	0.2071	**0.2822**	0.0079	106,836
IS & SR	Urban	Spot	4+LN TL	0.0013	0.0069	0.0783	0.2310	**0.3175**	0.0082	108,462
IS & SR	Urban	Spot	Freeway	0.0007	0.0024	0.0288	0.0901	**0.1220**	0.0031	339,120

Note: Section rates are crashes per million vehicle miles.
Note: Spot rates are crashes per million vehicles. Spots are sections of roadway less than or equal to 0.10 mile.
Note: Severe crash rates are the sum of rates for fatal and incapacitating injury crashes.

Source: Tennessee Department of Transportation

Corridor Analysis Project
S.R. 71 (Chapman Highway)
From East of Macon Lane
To West of S.R. 338 / U.S. 411 / S.R. 35
PIN 104959.01

Crash Data Statistics
(2007-2009)

Condition	Frequency	Percentage of Total
Daytime (7:00 am-7:00 pm)	43	75%
Nighttime (7:00 pm-7:00 am)	14	25%
Property Damage	40	70%
Non-Incap. Injury	11	19%
Incapacitating Injury	6	11%
Fatality	0	0%
Rear End	23	40%
Head On	1	2%
Rear-to-Rear	0	0%
Angle	14	25%
Sideswipe Same Dir.	6	11%
Sideswipe Opp. Dir.	3	5%
No Collision w/ Vehicle	10	17%
Unknown	0	0%
Raining	8	14%
Clear	45	79%
Fog	1	2%
Snow	0	0%
Sleet/Hail	0	0%
Unknown	3	5%
Pedestrians/Cyclist Involved	unknown	0%

Source: TRIMS Crash Data Summary

Note: A fatal crash occurred on September 8, 2011 along S.R. 71 (Chapman Highway) just west of the S.R. 338 / U.S. 411 / S.R. 35 intersection. A memorial was placed at the location where the crash occurred. The memorial was photographed in the field.

0 200 400 Feet

CRASH DIAGRAM

S.R. 71 (CHAPMAN HIGHWAY)
FROM MACON LANE (L.M. 29.962)
TO S.R. 338 / U.S. 411 / S.R. 35 (L.M. 28.790)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 1

0 200 400 Feet

CRASH DIAGRAM

S.R. 71 (CHAPMAN HIGHWAY)
FROM MACON LANE (L.M. 29.962)
TO S.R. 338 / U.S. 411 / S.R. 35 (L.M. 28.790)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 2

0 200 400 Feet

CRASH DIAGRAM

S.R. 71 (CHAPMAN HIGHWAY)
FROM MACON LANE (L.M. 29.962)
TO S.R. 338 / U.S. 411 / S.R. 35 (L.M. 28.790)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 3

0 200 400 Feet

CRASH DIAGRAM

S.R. 71 (CHAPMAN HIGHWAY)
FROM MACON LANE (L.M. 29.962)
TO S.R. 338 / U.S. 411 / S.R. 35 (L.M. 28.790)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 4

0 200 400 Feet

CRASH DIAGRAM

S.R. 71 (CHAPMAN HIGHWAY)
FROM S.R. 338 / U.S. 411 / S.R. 35 (L.M. 28.790)
TO MACON LANE (L.M. 29.962)

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FIGURE 5

Appendix D

Traffic Data

TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

FILE COPY

PROJECT NO.: HPP-71(16) ROUTE: SR-71 / US-441
COUNTY: Sevier CITY: Seymour
PROJECT PIN NUMBER: 104959.01
PROJECT DESCRIPTION: SR-71 widening from SR-35/SR-338 (US-411) to Macon Lane

DIVISION REQUESTING:

MAINTENANCE	☐	PAVEMENT DESIGN	☐
PLANNING	☐	STRUCTURES	☐
PROG. DEVELOPMENT & ADM.	☐	SURVEY & DESIGN	☒
PUBLIC TRANS. & AERO.	☐	TRAFFIC SIGNAL DESIGN	☐
		OTHER	☐

YEAR PROJECT PROGRAMMED FOR CONSTRUCTION:
PROJECTED LETTING DATE: Turn in date - March 2013

TRAFFIC ASSIGNMENT:

BASE YEAR		DESIGN YEAR					DESIGN ROADWAY % TRUCKS		DESIGN AVERAGE DAILY LOADS	
AADT	YEAR	AADT	DHV	%	YEAR	DIR.DIST.	DHV	AADT	FLEX	RIGID
34,160	2013	67,860	6,150	9	2033	70-30	1	2	235	317

REQUESTED BY: NAME Freddy Miller DATE 11/15/10
DIVISION Design
ADDRESS Suite 1200 James K Polk Bldg
Nashville, TN 37243

REVIEWED BY: TONY ARMSTRONG Tony Armstrong DATE 2-17-11
TRANSPORTATION MANAGER 1
SUITE 1000, JAMES K. POLK BUILDING

APPROVED BY: BILL HART Bill Hart DATE 2/18/11
TRANSPORTATION MANAGER 2
SUITE 1000, JAMES K. POLK BUILDING

COMMENTS:

Base year traffic is based on 3 - 12 hr. turning movement counts [Feb. 2011] and cycle count data from the ADAM computer program. Design year traffic based on a growth rate from the Knoxville TPO computer assignment model. ADL based on machine classification count dated 9/11/2007.

CC: James Hall

DHV'S ARE NOT REQUIRED FOR SIDE ROADS LESS THAN 1000 AADT.

NOTE: FOR BRIDGE REPLACEMENT PROJECTS, ADLs ARE NOT REQUIRED FOR AADT's OF 1000 OR LESS AND PERCENTAGE OF TRUCKS OF 7% OR LESS.
SEE ATTACHMENTS FOR TURNING MOVEMENTS AND/OR OTHER DETAILS.

(REV. 9/20/07)

TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION

PROJECT NO.: HPP-71(16) ROUTE NO: SR-71/US-441
COUNTY: Sevier CITY: Seymour
PROJECT DESCRIPTION: SR-71 widening from SR-35/SR-338 (US-441) to Macon Lane

FAP Urban

Pavement Structural Design

Calculation of Equivalent Daily 18 Kip Single Axle Loads

Type Vehicle		AADT (No. Counted)	Flexible 18-kip Factor	Flexible ADL	Rigid 18-kip Factor	Rigid ADL
Pass. cars and motorcycles (1-2)		33,691	0.001	34	0.001	34
Pick-up, Panel, Van (3)		16,299	0.004	65	0.004	65
Sing. Unit	Buses (4)	31	0.300	9	0.300	9
	2-axle, 6-tire (5)	373	0.260	97	0.260	97
	3-axle or more (6-7)	187	1.000	187	1.500	281
Comb.	4-axle (8)	221	0.640	141	0.800	177
	5-axle or more (9-13)	208	1.200	250	1.900	395
Totals (2023 AADT)		51,010		783		1,058

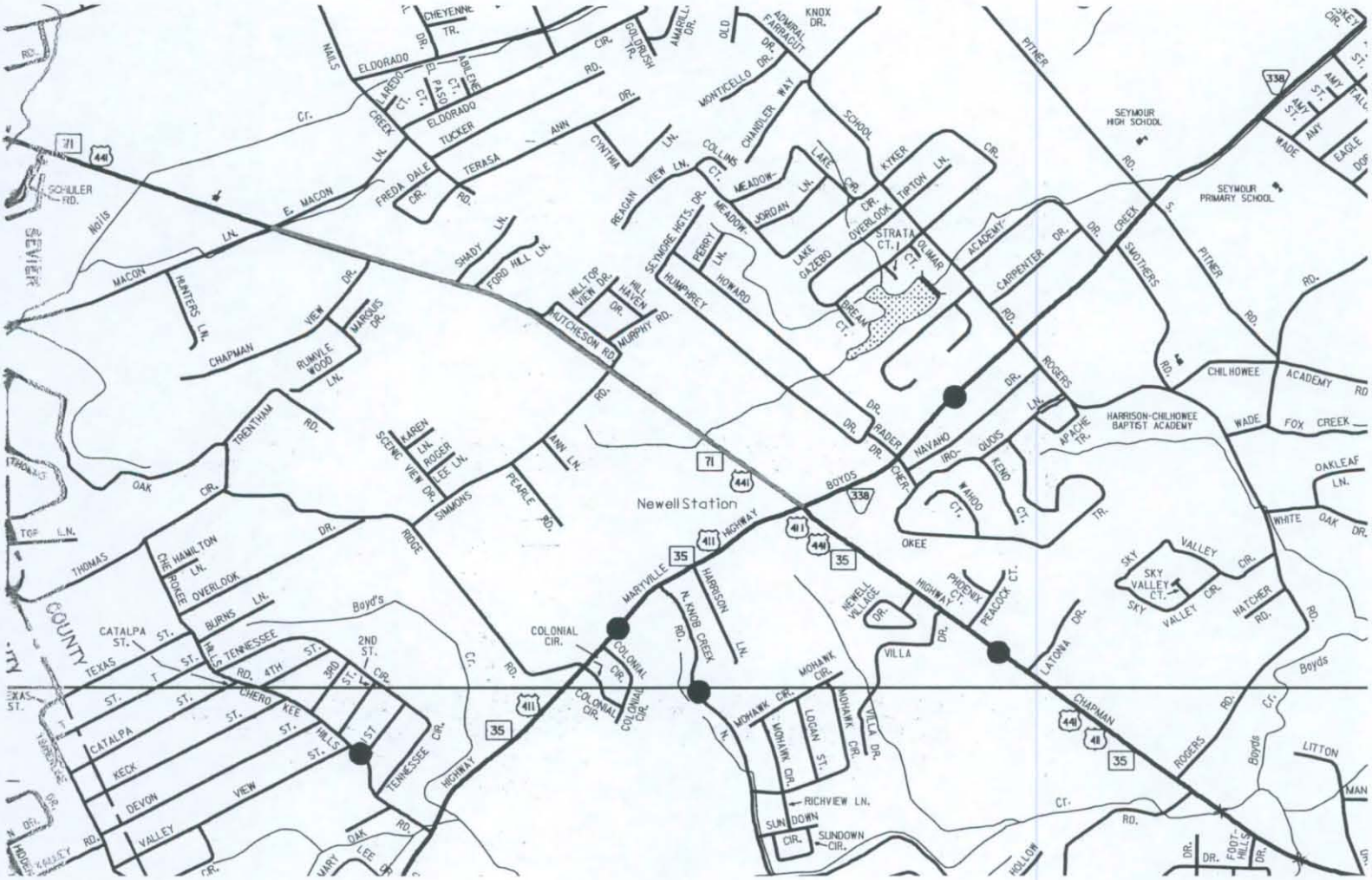
Suggested Percentages of Trucks in Design Lane

5,000 or less AADT	95%
5,000 - 10,000 AADT	90%
10,000 - 15,000 AADT	85%
15,000 - 20,000 AADT	80%
20,000 - 30,000 AADT	75%
30,000 - 40,000 AADT	70%
40,000 Plus	60%

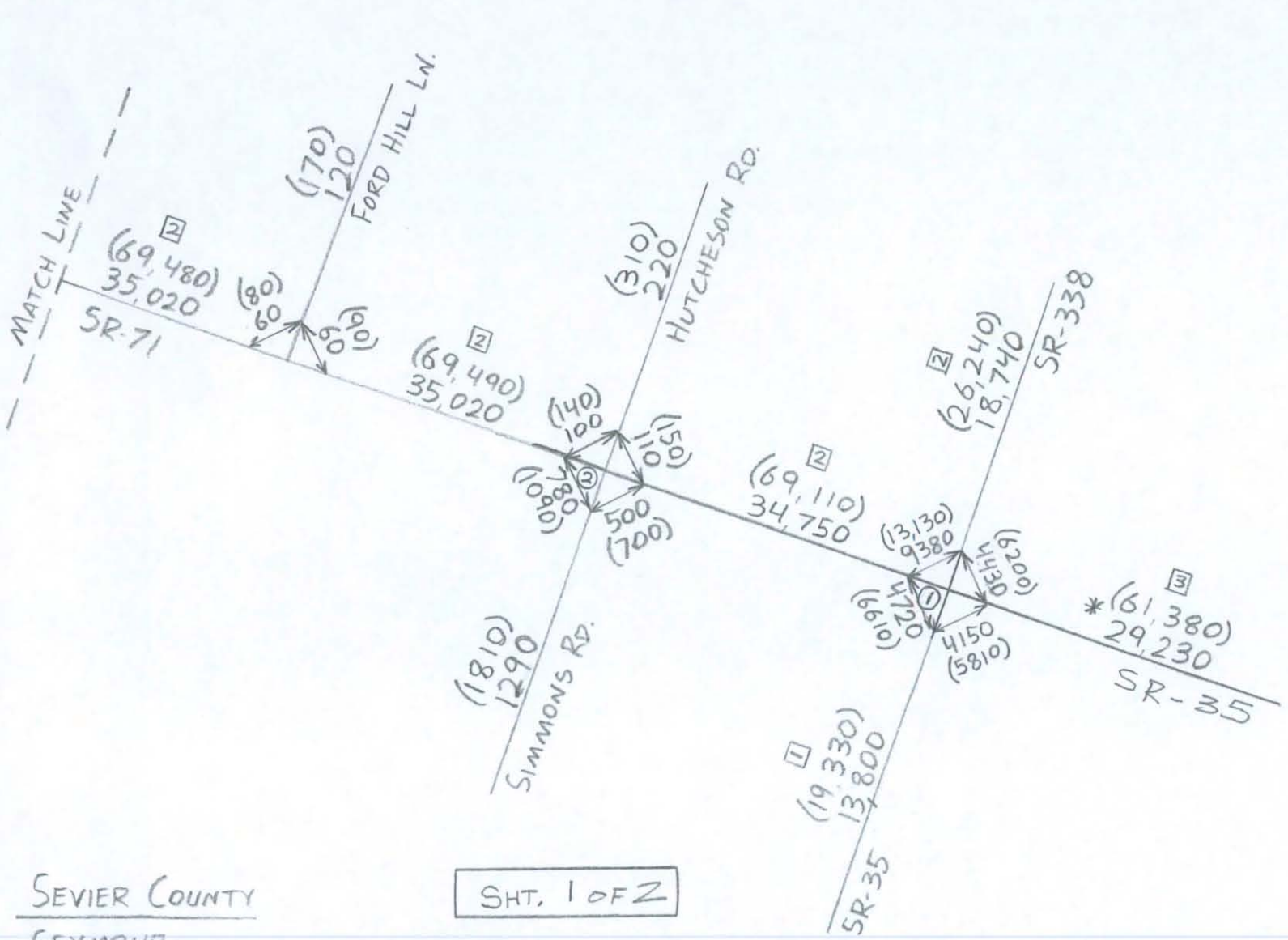
No. of Lanes: 4
% Trucks in Design Lane: 60%
ADL in Design Lane:

FLEX:	0.5	X	0.60	X	783.2	=	235
RIGID:	0.5	X	0.60	X	1057.7	=	317

ADL Calculations By: Greg Dyer Date: 2/16/2011
Reviewed By: Tony Kumsthy Date: 2-17-11
REV. 11/6/06



SEVIER COUNTY
SEYMOUR
SR-71



SEVIER COUNTY

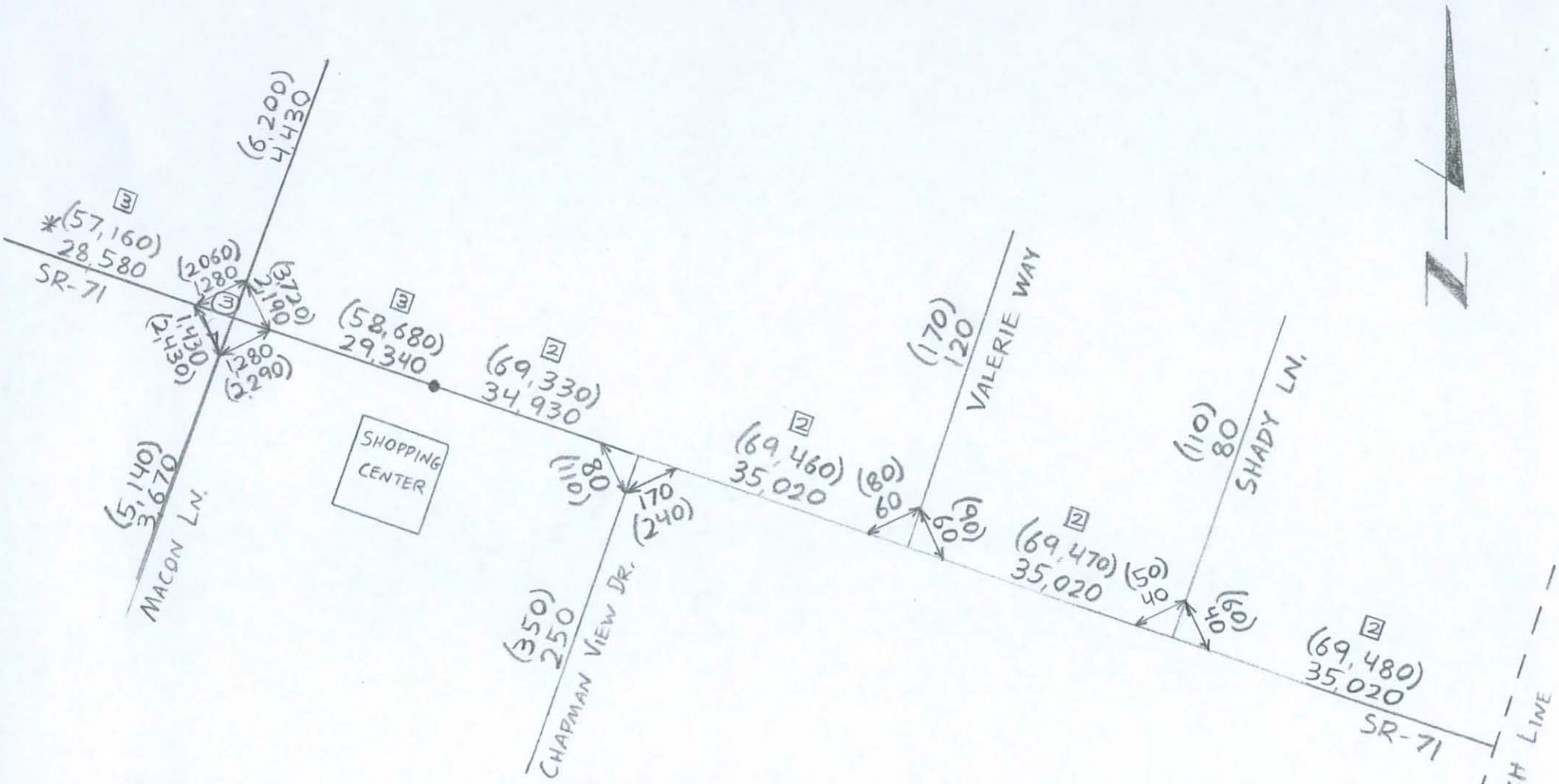
SHT. 1 OF 2

SEYMOUR
SR-71

2013 AADT - 000
2033 AADT - (000)
AADT TRUCK % - 3

FEB. 16, 2011 G.K.D.

* NOT INCLUDED IN COVER LETTER TRAFFIC



SHT. 2 OF 2

SEVIER COUNTY

SEYMOUR

SR-71

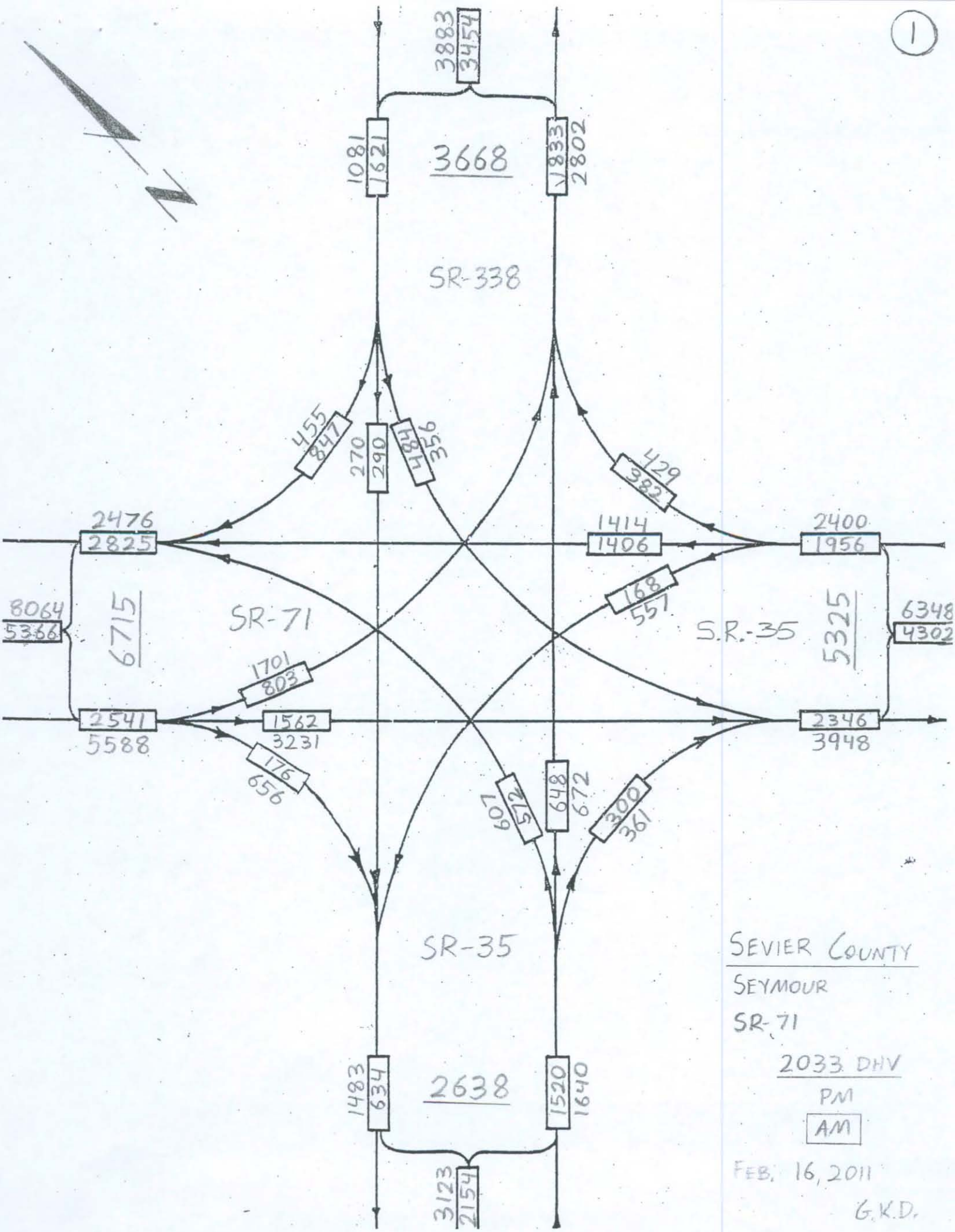
2013 AADT - 000

2033 AADT - (000)

AADT TRUCK % - 10

FEB. 16, 2011 G.K.D.

* NOT INCLUDED IN COVER LETTER TRAFFIC



SEVIER COUNTY

SEYMOUR

SR-71

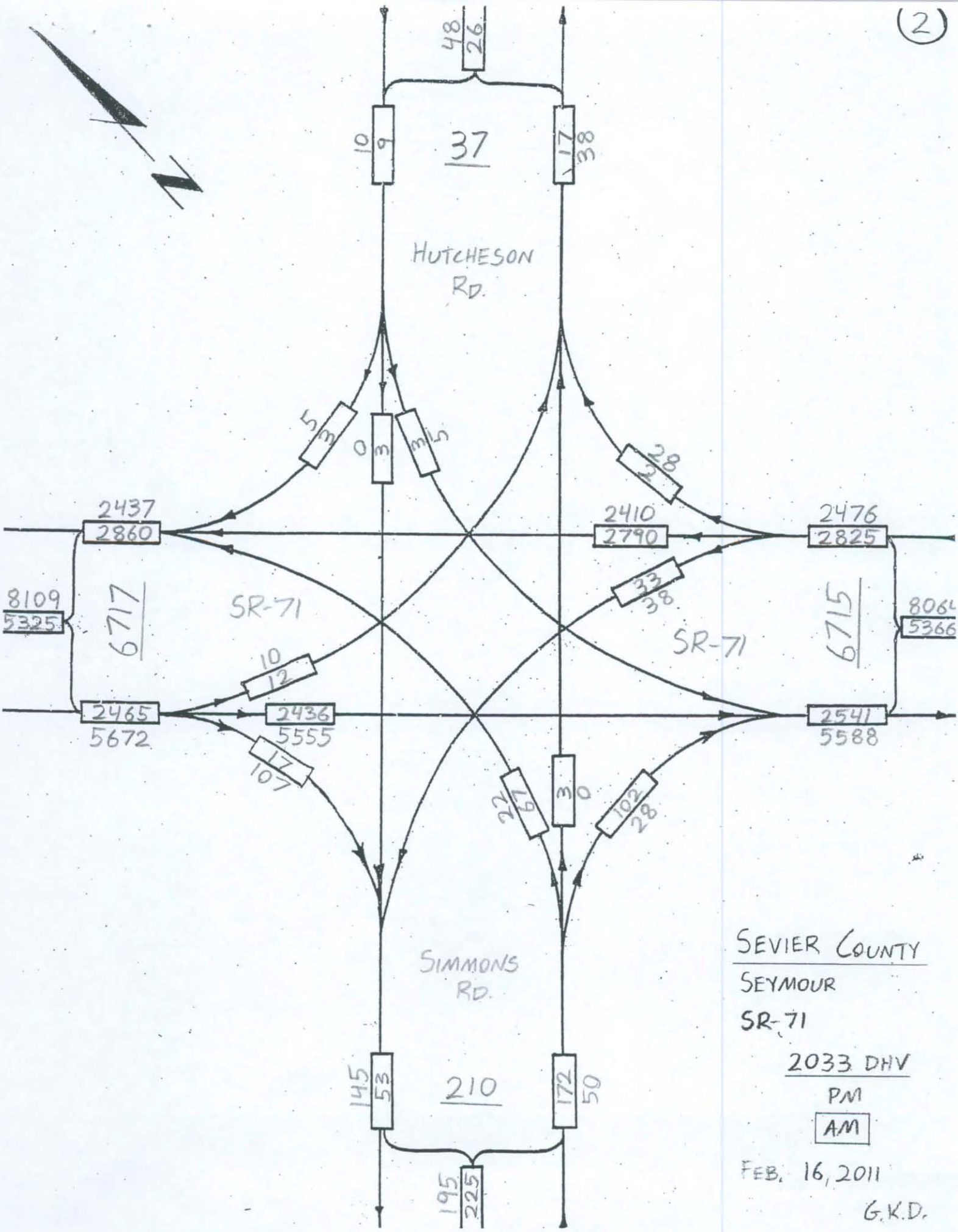
2033 DHV

PM

AM

FEB. 16, 2011

G.K.D.



SEVIER COUNTY

SEYMOUR

SR-71

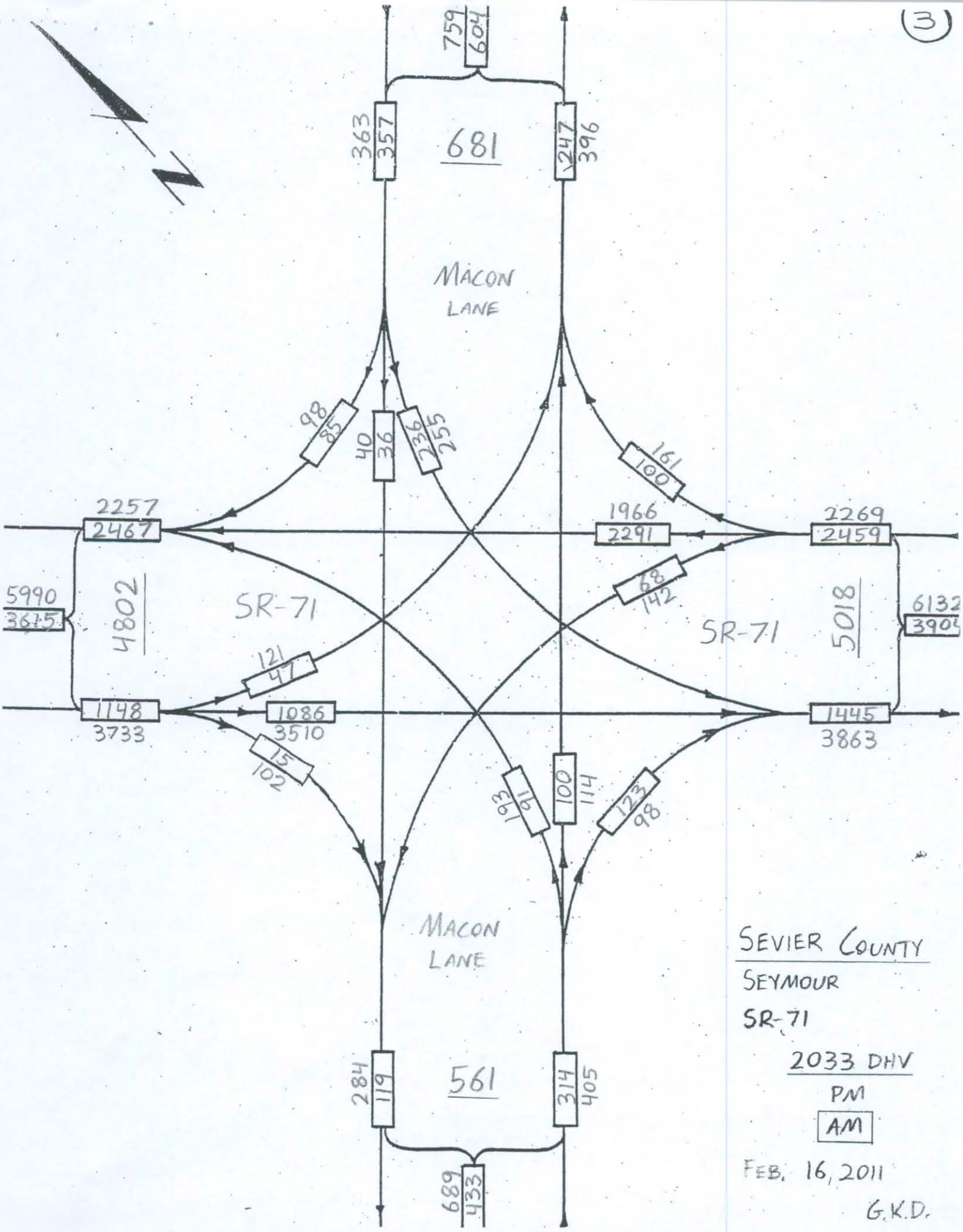
2033 DHV

PM

AM

FEB. 16, 2011

G.K.D.



SEVIER COUNTY

SEYMOUR

SR-71

2033 DHV

PM

AM

FEB. 16, 2011

G.K.D.

Appendix E

HCS+ Reports

Phone: Fax:
E-mail:

PLANNING ANALYSIS

Analyst:	DCC
Agency/Co:	The Corradino Group
Date:	10/3/2011
Analysis Period:	peak period
Highway:	Chapman Highway
From/To:	Macon Lane to SR 338
Jurisdiction:	TDOT Region 1
Analysis Year:	2013
Project ID:	existin 4-lane configuration

INPUT DATA

Total AADT volume, AADT	34160	vpd
Proportion AADT during peak hour, K	0.09	
Percent peak-hour traffic in heaviest direction, D	70	%
Trucks	2	%
Terrain type	Rolling	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 34160 x 0.70 x 0.09 = 2152

Volume for :			LOS
4-lane highway = 2152	vph/2 lanes = 1076	vphpl	D
6-lane highway = 2152	vph/3 lanes = 717	vphpl	C

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
	LOS	0	5	10	15	20	0	5	10	15	20
Terrain											
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260

B	920	780	680	600	540	710	610	530	470	420
C	1310	1120	970	860	770	1030	880	760	680	610
D	1680	1430	1250	1100	990	1350	1150	1000	890	800
E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

Phone: Fax:
E-mail:

PLANNING ANALYSIS

Analyst:	DCC
Agency/Co:	The Corradino Group
Date:	10/3/2011
Analysis Period:	peak period
Highway:	Chapman Highway
From/To:	Macon Lane to SR 338
Jurisdiction:	TDOT Region 1
Analysis Year:	2033
Project ID:	existin 4-lane configuration

INPUT DATA

Total AADT volume, AADT	67860	vpd
Proportion AADT during peak hour, K	0.09	
Percent peak-hour traffic in heaviest direction, D	70	%
Trucks	2	%
Terrain type	Rolling	
Base free-flow speed, BFFS	50.0	mph

ANALYSIS

DDHV = AADT x D x K
DDHV = 67860 x 0.70 x 0.09 = 4275

Volume for :			LOS
4-lane highway = 4275	vph/2 lanes = 2137	vphpl	F
6-lane highway = 4275	vph/3 lanes = 1425	vphpl	E

LEVEL OF SERVICE

		Free-Flow Speed = 60 mph					Free-Flow Speed = 50 mph				
		Percent Trucks					Percent Trucks				
	LOS	0	5	10	15	20	0	5	10	15	20
Terrain											
Level	A	560	550	530	520	510	440	430	420	410	400
	B	920	900	870	850	840	710	700	680	660	650
	C	1310	1280	1250	1220	1190	1030	1000	980	960	940
	D	1680	1640	1600	1570	1530	1350	1320	1290	1260	1230
	E	1870	1820	1780	1740	1700	1610	1570	1530	1500	1460
Rolling	A	560	520	490	460	430	440	410	380	360	340
	B	920	850	800	750	710	710	660	620	580	550
	C	1310	1220	1140	1070	1010	1030	960	900	840	790
	D	1680	1570	1470	1380	1300	1350	1260	1180	1100	1040
	E	1870	1740	1620	1520	1440	1610	1500	1400	1310	1240
Mountain	A	560	480	420	370	330	440	370	320	290	260

B	920	780	680	600	540	710	610	530	470	420
C	1310	1120	970	860	770	1030	880	760	680	610
D	1680	1430	1250	1100	990	1350	1150	1000	890	800
E	1870	1590	1380	1220	1100	1610	1370	1190	1050	950

Assumptions: highway with 60 mi/h FFS has 8 access points/mi; highway with 50 mi/h FFS has 25 access points/mi; lane width = 12 ft; shoulder width > 6 ft; divided highway; PHF = 0.88; all heavy vehicles are trucks and regular commuters

Appendix F

SimTraffic Reports

SimTraffic Performance Report Summary
2013

Total Network Performance		Total Delay (hr)	Total Stops	Travel Time (hr)
Existing Conditons	AM Peak 2013	1.2	35	10.1
	PM Peak 2013	8.0	132	21.2
Design	AM Peak 2013	0.8	25	9.1
	PM Peak 2033	4.7	23	18.1

Chapman View Drive								
Existing Conditions		EBT	EBTR	--	WBLT	WBT	NBLR	All
AM Peak 2013	Total Delay (hr)	0.0	0.0	--	0.0	0.0	0.0	0.1
	Total Stops	0	0	--	0	0	2	2
PM Peak 2013	Total Delay (hr)	0.3	0.3	--	0.0	0.0	0.1	1
	Total Stops	2	5	--	0	0	2	9
Design		EBT	EBTR	WBL	WBT	WBT	NBLR	All
AM Peak 2013	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total Stops	0	0	0	0	0	3	3
PM Peak 2013	Total Delay (hr)	0.2	0.2	0.1	0.0	0.0	0.1	1.0
	Total Stops	0	3	1	0	0	1	5

Valerie Lane								
Existing Conditions		--	EBLT	EBT	WBT	WBTR	SBLR	All
AM Peak 2013	Total Delay (hr)	--	0.0	0.0	0.0	0.0	0.0	0.0
	Total Stops	--	1	0	0	0	1	2
PM Peak 2013	Total Delay (hr)	--	0.3	0.3	0.0	0.0	0.1	1.0
	Total Stops	--	0	0	0	0	1	1
Design		EBL	EBT	EBT	WBT	WBTR	SBLR	All
AM Peak 2013	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total Stops	0	0	0	0	0	3	3
PM Peak 2013	Total Delay (hr)	0.0	0.2	0.2	0.0	0.0	0.1	0.5
	Total Stops	0	0	0	0	0	1	1

Shady Lane								
Existing Conditions		--	EBLT	EBT	WBT	WBTR	SBLR	All
AM Peak 2013	Total Delay (hr)	--	0.0	0.0	0.0	0.0	0.0	0.1
	Total Stops	--	0	0	0	0	1	1
PM Peak 2013	Total Delay (hr)	--	0.1	0.1	0.0	0.0	0.0	0.2
	Total Stops	--	1	0	0	0	0	1
Design		EBL	EBT	EBT	WBT	WBTR	SBLR	All
AM Peak 2013	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total Stops	0	0	0	0	0	0	0
PM Peak 2013	Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.0	0.2
	Total Stops	2	0	0	0	0	0	2

Ford Hill Lane								
Existing Conditions		--	EBLT	EBT	WBT	WBTR	SBLR	All
AM Peak 2013	Total Delay (hr)	--	0.0	0.0	0.0	0.1	0.0	0.1
	Total Stops	--	0	0	0	0	1	1
PM Peak 2013	Total Delay (hr)	--	0.1	0.1	0.0	0.1	0.0	0.3
	Total Stops	--	0	0	0	0	1	1
Design		EBL	EBT	EBT	WBT	WBTR	SBLR	All
AM Peak 2013	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total Stops	0	0	0	0	0	1	1
PM Peak 2013	Total Delay (hr)	0.0	0.0	0.1	0.0	0.0	0.0	0.2
	Total Stops	0	0	0	0	0	1	1

Hutcheson Road/Simmons Road											
Existing Conditons		--	EBLT	EBT	--	WBLT	WBT	WBR	NBLR	SBLR	All
AM Peak 2013	Total Delay (hr)	--	0.0	0.1	--	0.0	0.0	0.0	0.5	0.0	0.8
	Total Stops	--	2	0	--	5	0	0	22	3	29
PM Peak 2013	Total Delay (hr)	--	1.0	1.3	--	1.3	0.4	0.0	0.5	0.1	4.8
	Total Stops	--	28	0	--	68	16	0	5	3	120
Design		EBL	EBT	EBT	WBL	WBT	WBT	WBR	NBLR	SBLR	All
AM Peak 2013	Total Delay (hr)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.4
	Total Stops	0	0	0	2	0	0	0	18	0	20
PM Peak 2013	Total Delay (hr)	0.0	0.4	0.7	0.1	0.0	0.0	0.0	0.7	0.1	2.1
	Total Stops	2	0	1	3	0	0	0	4	3	13

SimTraffic Performance Report Summary
2033

Total Network Performance		Total Delay (hr)	Total Stops	Travel Time (hr)
Existing Conditons	AM Peak 2033	21.2	1009	35.7
	PM Peak 2033	82.3	1000	96.9
Design	AM Peak 2033	7.8	58	24.4
	PM Peak 2033	61.3	44	79.1

Chapman View Drive								
Existing Conditions		EBT	EBTR	--	WBLT	WBT	NBLR	All
AM Peak 2033	Total Delay (hr)	0.1	0.1	--	0.8	0.6	0.1	1.7
	Total Stops	1	2	--	36	28	2	68
PM Peak 2033	Total Delay (hr)	0.9	0.9	--	0.2	0.1	0.1	52.6
	Total Stops	31	32	--	10	0	1	74
Design		EBT	EBTR	WBL	WBT	WBT	NBLR	All
AM Peak 2033	Total Delay (hr)	0.1	0.1	0.0	0.1	0.1	0.1	0.6
	Total Stops	1	2	1	0	0	2	6
PM Peak 2033	Total Delay (hr)	0.7	0.8	0.1	0.0	0.1	0.2	52.1
	Total Stops	7	12	1	0	0	1	21

Valerie Lane								
Existing Conditions		--	EBLT	EBT	WBT	WBTR	SBLR	All
AM Peak 2033	Total Delay (hr)	--	0.3	0.3	0.2	0.2	0.1	1.2
	Total Stops	--	23	22	25	23	2	95
PM Peak 2033	Total Delay (hr)	--	0.8	0.9	0.0	0.0	0.0	1.9
	Total Stops	--	27	37	0	0	0	64
Design		EBL	EBT	EBT	WBT	WBTR	SBLR	All
AM Peak 2033	Total Delay (hr)	0.1	0.1	0.0	0.0	0.1	0.1	0.3
	Total Stops	0	0	0	0	0	2	2
PM Peak 2033	Total Delay (hr)	0.5	0.5	0.0	0.0	0.0	0.0	1.2
	Total Stops	0	0	0	0	0	0	0

Shady Lane								
Existing Conditions		--	EBLT	EBT	WBT	WBTR	SBLR	All
AM Peak 2033	Total Delay (hr)	--	0.2	0.2	0.1	0.1	0.0	0.6
	Total Stops	--	12	9	13	16	1	51
PM Peak 2033	Total Delay (hr)	--	0.3	0.3	0.0	0.0	0.0	0.7
	Total Stops	--	17	14	0	0	1	31
Design		EBL	EBT	EBT	WBT	WBTR	SBLR	All
AM Peak 2033	Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	Total Stops	0	0	0	0	0	1	1
PM Peak 2033	Total Delay (hr)	0.0	0.2	0.2	0.0	0.0	0.0	0.5
	Total Stops	1	0	0	0	0	1	2

Ford Hill Lane								
Existing Conditions		--	EBLT	EBT	WBT	WBTR	SBLR	All
AM Peak 2033	Total Delay (hr)	--	0.1	0.1	0.6	0.9	0.0	1.8
	Total Stops	--	5	6	45	60	1	177
PM Peak 2033	Total Delay (hr)	--	0.2	0.2	0.0	0.2	0.1	0.8
	Total Stops	--	8	8	0	0	1	16
Design		EBL	EBT	EBT	WBT	WBTR	SBLR	All
AM Peak 2033	Total Delay (hr)	0.0	0.0	0.0	0.3	0.3	0.0	0.6
	Total Stops	0	0	0	0	0	1	1
PM Peak 2033	Total Delay (hr)	0.0	0.1	0.1	0.1	0.2	0.1	0.7
	Total Stops	0	0	0	0	0	1	1

Hutcheson Road/Simmons Road											
Existing Conditons		--	EBLT	EBT	--	WBLT	WBT	WBR	NBLR	SBLR	All
AM Peak 2033	Total Delay (hr)	--	3.3	3.1	--	2.2	1.7	0.0	3.8	0.4	15.3
	Total Stops	--	222	177	--	145	99	0	31	2	678
PM Peak 2033	Total Delay (hr)	--	2.2	2.4	--	6.5	5.1	0.0	1.0	0.1	25.2
	Total Stops	--	89	69	--	362	284	0	9	0	815
Design		EBL	EBT	EBT	WBL	WBT	WBT	WBR	NBLR	SBLR	All
AM Peak 2033	Total Delay (hr)	0.2	0.2	0.3	0.1	0.3	0.3	0.0	3.8	0.3	5.6
	Total Stops	4	0	0	5	1	1	0	31	2	48
PM Peak 2033	Total Delay (hr)	0.0	1.0	1.3	0.8	0.2	0.2	0.0	1.1	0.2	5.6
	Total Stops	1	0	0	8	0	1	0	9	0	20

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	NB	All
Movements Served	T	TR	LT	T	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1
Total Stops	0	0	0	0	2	2
Travel Dist (mi)	10.5	10.0	9.4	17.0	0.3	47.1
Travel Time (hr)	0.2	0.2	0.2	0.4	0.0	1.2
Avg Speed (mph)	45	40	44	40	10	41
Fuel Used (gal)	0.4	0.3	0.3	0.4	0.0	1.4
HC Emissions (g)	8	4	5	6	0	23
CO Emissions (g)	323	136	129	137	1	726
NOx Emissions (g)	27	16	20	26	0	89
Vehicles Entered	0	0	83	147	0	436
Vehicles Exited	89	115	81	150	2	437
Hourly Exit Rate	534	690	486	900	12	2622
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0
Total Stops	1	0	0	0	1	2
Travel Dist (mi)	10.0	13.6	4.2	7.2	0.1	35.0
Travel Time (hr)	0.2	0.3	0.1	0.2	0.0	0.8
Avg Speed (mph)	45	41	44	40	10	42
Fuel Used (gal)	0.3	0.4	0.1	0.2	0.0	0.9
HC Emissions (g)	4	4	2	3	0	12
CO Emissions (g)	103	107	52	66	0	328
NOx Emissions (g)	17	19	8	11	0	55
Vehicles Entered	89	114	84	146	0	436
Vehicles Exited	85	123	83	147	1	438
Hourly Exit Rate	510	738	498	882	6	2628
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	4.2	5.9	2.9	5.1	0.2	18.2
Travel Time (hr)	0.1	0.1	0.1	0.1	0.0	0.5
Avg Speed (mph)	42	41	44	40	20	41
Fuel Used (gal)	0.1	0.2	0.1	0.1	0.0	0.5
HC Emissions (g)	1	2	1	2	0	6
CO Emissions (g)	55	48	40	44	1	189
NOx Emissions (g)	6	8	6	8	0	28
Vehicles Entered	82	122	85	144	0	462
Vehicles Exited	99	133	84	145	1	463
Hourly Exit Rate	594	798	504	870	6	2778
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.1
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	3.3	4.4	27.2	42.4	0.2	77.5
Travel Time (hr)	0.1	0.1	0.6	1.0	0.0	1.9
Avg Speed (mph)	42	41	44	41	16	42
Fuel Used (gal)	0.1	0.1	0.8	1.1	0.0	2.2
HC Emissions (g)	1	1	13	15	0	32
CO Emissions (g)	99	67	393	356	0	916
NOx Emissions (g)	6	6	55	67	0	134
Vehicles Entered	100	133	100	136	0	470
Vehicles Exited	99	134	87	148	1	468
Hourly Exit Rate	594	804	522	888	6	2808
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	WB	WB	NB	SB	All
Movements Served	LT	TR	LT	T	LTR	LTR	
Total Delay (hr)	0.0	0.1	0.0	0.0	0.5	0.0	0.8
Total Stops	2	0	5	0	22	3	29
Travel Dist (mi)	27.6	40.1	23.8	26.7	5.3	0.2	123.8
Travel Time (hr)	0.6	1.0	0.6	0.7	0.7	0.1	3.7
Avg Speed (mph)	44	40	41	41	7	4	34
Fuel Used (gal)	0.8	1.0	0.7	0.8	0.3	0.0	3.6
HC Emissions (g)	6	10	14	11	1	0	41
CO Emissions (g)	266	260	452	322	39	2	1341
NOx Emissions (g)	34	48	51	46	3	0	182
Vehicles Entered	88	121	0	0	0	0	494
Vehicles Exited	99	141	96	134	18	2	489
Hourly Exit Rate	594	846	576	804	108	12	2934
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	1.2
Delay / Veh (s)	8.5
Total Stops	35
Travel Dist (mi)	386.6
Travel Time (hr)	10.1
Avg Speed (mph)	39
Fuel Used (gal)	11.2
HC Emissions (g)	145
CO Emissions (g)	4684
NOx Emissions (g)	628
Vehicles Entered	524
Vehicles Exited	519
Hourly Exit Rate	3114
Input Volume	16862
% of Volume	18
Denied Entry Before	0
Denied Entry After	0

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	NB	All
Movements Served	T	TR	LT	T	LR	
Total Delay (hr)	0.3	0.3	0.0	0.0	0.1	1.0
Total Stops	2	5	0	0	2	9
Travel Dist (mi)	24.9	24.5	3.8	15.2	0.2	68.6
Travel Time (hr)	0.9	0.9	0.1	0.4	0.1	2.7
Avg Speed (mph)	28	26	49	40	2	29
Fuel Used (gal)	1.1	1.0	0.1	0.4	0.0	2.7
HC Emissions (g)	16	13	2	2	0	32
CO Emissions (g)	509	342	61	48	1	969
NOx Emissions (g)	58	52	9	12	0	132
Vehicles Entered	0	0	31	136	0	664
Vehicles Exited	241	252	35	133	1	662
Hourly Exit Rate	1446	1512	210	798	6	3972
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	8

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.2	0.3	0.0	0.0	0.1	0.6
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	27.7	29.4	1.6	6.8	0.1	65.4
Travel Time (hr)	0.8	0.9	0.0	0.2	0.1	2.0
Avg Speed (mph)	33	31	50	40	1	32
Fuel Used (gal)	1.0	1.0	0.0	0.2	0.0	2.2
HC Emissions (g)	15	10	1	1	0	27
CO Emissions (g)	483	263	21	28	1	796
NOx Emissions (g)	54	42	4	6	0	105
Vehicles Entered	241	252	31	137	0	667
Vehicles Exited	239	257	31	137	0	664
Hourly Exit Rate	1434	1542	186	822	0	3984
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	1

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	WB	WB	All
Movements Served	LT	T	T	TR	
Total Delay (hr)	0.1	0.1	0.0	0.0	0.2
Total Stops	1	0	0	0	1
Travel Dist (mi)	11.0	12.0	1.1	4.7	28.7
Travel Time (hr)	0.3	0.4	0.0	0.1	0.9
Avg Speed (mph)	33	31	50	39	33
Fuel Used (gal)	0.3	0.3	0.0	0.1	0.8
HC Emissions (g)	5	4	1	1	10
CO Emissions (g)	136	73	17	14	240
NOx Emissions (g)	17	14	3	4	38
Vehicles Entered	237	256	31	137	661
Vehicles Exited	233	258	31	137	659
Hourly Exit Rate	1398	1548	186	822	3954
Denied Entry Before	0	0	0	0	0
Denied Entry After	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.1	0.1	0.0	0.1	0.0	0.3
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	8.0	8.8	9.0	48.1	0.2	74.0
Travel Time (hr)	0.2	0.3	0.2	1.2	0.0	2.0
Avg Speed (mph)	33	31	47	40	24	38
Fuel Used (gal)	0.3	0.3	0.3	1.6	0.0	2.5
HC Emissions (g)	4	4	7	11	0	26
CO Emissions (g)	119	89	299	685	0	1192
NOx Emissions (g)	14	13	26	59	0	112
Vehicles Entered	231	258	14	193	0	698
Vehicles Exited	234	255	36	167	1	693
Hourly Exit Rate	1404	1530	216	1002	6	4158
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	WB	WB	WB	NB	SB	All
Movements Served	LT	TR	LT	T	R	LR	LR	
Total Delay (hr)	1.0	1.3	1.3	0.4	0.0	0.5	0.1	4.8
Total Stops	28	0	68	16	0	5	3	120
Travel Dist (mi)	72.7	76.1	19.7	29.1	0.0	0.9	0.3	198.8
Travel Time (hr)	2.7	3.0	1.7	1.1	0.0	0.5	0.1	9.4
Avg Speed (mph)	27	25	11	27	15	2	3	22
Fuel Used (gal)	2.1	2.0	0.8	1.0	0.0	0.1	0.0	6.2
HC Emissions (g)	27	17	11	7	0	0	0	62
CO Emissions (g)	730	379	450	410	0	15	3	1989
NOx Emissions (g)	90	55	32	35	0	1	0	213
Vehicles Entered	234	255	0	0	0	0	0	729
Vehicles Exited	246	256	14	192	2	1	1	712
Hourly Exit Rate	1476	1536	84	1152	12	6	6	4272
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	8.0
Delay / Veh (s)	39.7
Total Stops	132
Travel Dist (mi)	570.4
Travel Time (hr)	21.2
Avg Speed (mph)	28
Fuel Used (gal)	20.0
HC Emissions (g)	235
CO Emissions (g)	8178
NOx Emissions (g)	902
Vehicles Entered	745
Vehicles Exited	706
Hourly Exit Rate	4236
Input Volume	23789
% of Volume	18
Denied Entry Before	0
Denied Entry After	9

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	WB	NB	All
Movements Served	T	TR	L	T	T	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Stops	0	0	0	0	0	3	3
Travel Dist (mi)	9.5	9.0	0.0	9.0	16.7	0.6	44.7
Travel Time (hr)	0.2	0.2	0.0	0.2	0.4	0.1	1.1
Avg Speed (mph)	44	41	23	45	40	10	40
Fuel Used (gal)	0.4	0.3	0.0	0.2	0.4	0.0	1.3
HC Emissions (g)	6	3	0	3	5	0	17
CO Emissions (g)	275	108	0	91	126	2	602
NOx Emissions (g)	22	13	0	15	24	0	74
Vehicles Entered	0	0	0	80	145	0	412
Vehicles Exited	83	102	0	77	149	3	414
Hourly Exit Rate	498	612	0	462	894	18	2484
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	EB	WB	WB	SB	All
Movements Served	L	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Stops	0	0	0	0	0	1	1
Travel Dist (mi)	0.0	9.4	12.2	4.1	7.1	0.1	32.9
Travel Time (hr)	0.0	0.2	0.3	0.1	0.2	0.0	0.8
Avg Speed (mph)	6	46	41	45	40	13	42
Fuel Used (gal)	0.0	0.3	0.3	0.1	0.2	0.0	0.9
HC Emissions (g)	0	3	3	2	2	0	10
CO Emissions (g)	0	87	97	51	55	0	291
NOx Emissions (g)	0	15	17	7	10	0	48
Vehicles Entered	0	83	102	82	139	0	411
Vehicles Exited	0	79	109	80	144	1	414
Hourly Exit Rate	0	474	654	480	864	6	2484
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.1
Total Stops	0	0	0	0	0	0
Travel Dist (mi)	3.8	5.2	2.9	4.9	0.0	16.9
Travel Time (hr)	0.1	0.1	0.1	0.1	0.0	0.4
Avg Speed (mph)	43	40	45	40	13	41
Fuel Used (gal)	0.1	0.2	0.1	0.1	0.0	0.5
HC Emissions (g)	1	2	1	2	0	6
CO Emissions (g)	52	54	26	38	0	170
NOx Emissions (g)	7	8	5	7	0	26
Vehicles Entered	78	109	81	141	0	430
Vehicles Exited	89	119	82	140	0	430
Hourly Exit Rate	534	714	492	840	0	2580
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.1
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	2.9	4.0	26.6	41.4	0.1	75.0
Travel Time (hr)	0.1	0.1	0.6	1.0	0.0	1.8
Avg Speed (mph)	44	41	44	41	16	42
Fuel Used (gal)	0.1	0.1	0.8	1.0	0.0	2.1
HC Emissions (g)	2	2	9	11	0	23
CO Emissions (g)	80	73	299	252	0	705
NOx Emissions (g)	6	6	45	55	0	112
Vehicles Entered	89	119	98	136	0	442
Vehicles Exited	86	121	87	147	1	441
Hourly Exit Rate	516	726	522	882	6	2646
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	EB	WB	WB	WB	NB	SB	All
Movements Served	L	T	TR	L	T	T	LTR	LTR	
Total Delay (hr)	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.4
Total Stops	0	0	0	2	0	0	18	0	20
Travel Dist (mi)	0.0	22.5	37.0	0.1	23.1	27.0	4.2	0.0	114.0
Travel Time (hr)	0.0	0.5	0.9	0.0	0.5	0.7	0.4	0.0	3.0
Avg Speed (mph)	8	45	40	16	44	41	11	16	38
Fuel Used (gal)	0.0	0.6	1.0	0.0	0.7	0.8	0.2	0.0	3.3
HC Emissions (g)	0	8	8	0	9	8	1	0	35
CO Emissions (g)	0	272	242	0	365	275	29	0	1183
NOx Emissions (g)	0	37	44	0	40	40	2	0	164
Vehicles Entered	0	74	111	0	0	0	0	0	462
Vehicles Exited	0	80	133	3	89	136	20	0	461
Hourly Exit Rate	0	480	798	18	534	816	120	0	2766
Denied Entry Before	0	0	0	0	0	0	0	0	2
Denied Entry After	0	0	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	0.8
Delay / Veh (s)	5.4
Total Stops	25
Travel Dist (mi)	363.2
Travel Time (hr)	9.1
Avg Speed (mph)	40
Fuel Used (gal)	10.4
HC Emissions (g)	119
CO Emissions (g)	4025
NOx Emissions (g)	555
Vehicles Entered	490
Vehicles Exited	504
Hourly Exit Rate	3024
Input Volume	16862
% of Volume	18
Denied Entry Before	2
Denied Entry After	0

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	WB	NB	All
Movements Served	T	TR	L	T	T	LR	
Total Delay (hr)	0.2	0.2	0.1	0.0	0.0	0.1	1.0
Total Stops	0	3	1	0	0	1	5
Travel Dist (mi)	25.1	24.5	0.0	7.0	13.4	0.2	70.1
Travel Time (hr)	0.8	0.9	0.1	0.2	0.3	0.1	2.7
Avg Speed (mph)	31	28	0	46	40	2	30
Fuel Used (gal)	1.0	0.9	0.0	0.2	0.3	0.0	2.6
HC Emissions (g)	17	14	0	3	1	0	35
CO Emissions (g)	536	389	1	66	39	1	1037
NOx Emissions (g)	61	50	0	12	11	0	133
Vehicles Entered	0	0	0	61	117	0	678
Vehicles Exited	243	252	1	61	119	1	677
Hourly Exit Rate	1458	1512	6	366	714	6	4062
Denied Entry Before	0	0	0	0	0	0	2
Denied Entry After	0	0	0	0	0	0	7

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.2	0.2	0.0	0.0	0.1	0.5
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	27.8	29.5	3.1	5.8	0.1	66.3
Travel Time (hr)	0.8	0.9	0.1	0.1	0.1	2.0
Avg Speed (mph)	35	32	45	40	1	34
Fuel Used (gal)	0.9	1.0	0.1	0.2	0.0	2.2
HC Emissions (g)	16	11	1	1	0	29
CO Emissions (g)	487	301	31	40	1	860
NOx Emissions (g)	57	43	5	5	0	112
Vehicles Entered	243	252	64	115	0	680
Vehicles Exited	237	259	61	118	0	675
Hourly Exit Rate	1422	1554	366	708	0	4050
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	1

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	EB	WB	WB	All
Movements Served	L	T	T	T	TR	
Total Delay (hr)	0.0	0.1	0.1	0.0	0.0	0.2
Total Stops	2	0	0	0	0	2
Travel Dist (mi)	0.0	11.0	11.9	2.2	4.0	29.1
Travel Time (hr)	0.0	0.3	0.4	0.0	0.1	0.8
Avg Speed (mph)	9	36	33	46	39	35
Fuel Used (gal)	0.0	0.4	0.4	0.1	0.1	0.9
HC Emissions (g)	0	6	3	1	1	10
CO Emissions (g)	0	176	76	21	31	305
NOx Emissions (g)	0	22	14	4	4	43
Vehicles Entered	0	237	256	63	116	672
Vehicles Exited	2	235	254	64	115	670
Hourly Exit Rate	12	1410	1524	384	690	4020
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.2
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	8.1	8.7	23.9	36.2	0.2	77.0
Travel Time (hr)	0.2	0.3	0.5	0.9	0.0	1.9
Avg Speed (mph)	37	33	45	40	24	40
Fuel Used (gal)	0.3	0.3	0.7	0.9	0.0	2.2
HC Emissions (g)	5	3	8	6	0	21
CO Emissions (g)	152	75	221	197	0	645
NOx Emissions (g)	18	13	37	38	0	105
Vehicles Entered	235	254	97	124	0	712
Vehicles Exited	236	253	77	140	1	707
Hourly Exit Rate	1416	1518	462	840	6	4242
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	EB	WB	WB	WB	WB	NB	SB	All
Movements Served	L	T	TR	L	T	T	R	LR	LR	
Total Delay (hr)	0.0	0.4	0.7	0.1	0.0	0.0	0.0	0.7	0.1	2.1
Total Stops	2	0	1	3	0	0	0	4	3	13
Travel Dist (mi)	0.1	72.1	76.7	0.1	24.2	25.1	0.0	0.9	0.2	199.5
Travel Time (hr)	0.0	2.0	2.5	0.1	0.5	0.6	0.0	0.8	0.1	6.7
Avg Speed (mph)	14	37	31	1	44	40	15	1	3	30
Fuel Used (gal)	0.0	2.1	1.9	0.0	0.7	0.7	0.0	0.2	0.0	5.7
HC Emissions (g)	0	34	16	0	8	7	0	0	0	64
CO Emissions (g)	0	918	315	1	344	236	0	17	3	1836
NOx Emissions (g)	0	126	55	0	36	33	0	1	0	251
Vehicles Entered	0	236	253	0	0	0	0	0	0	729
Vehicles Exited	3	243	251	3	97	123	2	0	1	723
Hourly Exit Rate	18	1458	1506	18	582	738	12	0	6	4338
Denied Entry Before	0	0	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	4.7
Delay / Veh (s)	23.0
Total Stops	22
Travel Dist (mi)	579.4
Travel Time (hr)	18.1
Avg Speed (mph)	33
Fuel Used (gal)	18.7
HC Emissions (g)	231
CO Emissions (g)	7471
NOx Emissions (g)	912
Vehicles Entered	748
Vehicles Exited	733
Hourly Exit Rate	4398
Input Volume	23789
% of Volume	18
Denied Entry Before	2
Denied Entry After	8

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	NB	All
Movements Served	T	TR	LT	T	LR	
Total Delay (hr)	0.1	0.1	0.8	0.6	0.1	1.7
Total Stops	1	2	36	28	2	68
Travel Dist (mi)	20.6	20.3	15.2	25.3	0.4	81.7
Travel Time (hr)	0.6	0.6	1.1	1.2	0.1	3.6
Avg Speed (mph)	36	33	14	22	5	23
Fuel Used (gal)	0.8	0.7	0.6	0.9	0.0	3.0
HC Emissions (g)	14	11	6	10	0	41
CO Emissions (g)	597	360	175	230	2	1368
NOx Emissions (g)	47	40	24	39	0	150
Vehicles Entered	0	0	142	217	0	771
Vehicles Exited	193	215	113	240	1	763
Hourly Exit Rate	1158	1290	678	1440	6	4578
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.3	0.3	0.2	0.2	0.1	1.2
Total Stops	23	22	25	23	2	95
Travel Dist (mi)	22.0	25.0	7.2	10.6	0.1	64.9
Travel Time (hr)	0.8	0.9	0.3	0.5	0.1	2.7
Avg Speed (mph)	28	27	21	23	1	25
Fuel Used (gal)	0.6	0.6	0.2	0.3	0.0	1.9
HC Emissions (g)	9	7	3	4	0	22
CO Emissions (g)	274	174	94	85	3	630
NOx Emissions (g)	31	26	11	14	0	83
Vehicles Entered	193	214	148	214	0	776
Vehicles Exited	188	222	142	216	1	770
Hourly Exit Rate	1128	1332	852	1296	6	4620
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.2	0.2	0.1	0.1	0.0	0.6
Total Stops	12	9	13	16	1	51
Travel Dist (mi)	8.6	10.3	5.2	7.5	0.1	31.8
Travel Time (hr)	0.4	0.4	0.2	0.3	0.0	1.3
Avg Speed (mph)	22	25	25	25	3	24
Fuel Used (gal)	0.3	0.3	0.2	0.2	0.0	1.0
HC Emissions (g)	2	3	2	2	0	10
CO Emissions (g)	78	69	71	57	1	276
NOx Emissions (g)	10	11	9	10	0	40
Vehicles Entered	186	220	149	216	0	773
Vehicles Exited	180	223	148	215	1	767
Hourly Exit Rate	1080	1338	888	1290	6	4602
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.1	0.1	0.6	0.9	0.0	1.8
Total Stops	5	6	45	60	1	117
Travel Dist (mi)	6.3	7.6	44.4	67.7	0.1	126.1
Travel Time (hr)	0.2	0.3	1.6	2.5	0.0	4.6
Avg Speed (mph)	28	25	28	28	9	27
Fuel Used (gal)	0.2	0.2	1.6	2.3	0.0	4.3
HC Emissions (g)	2	3	24	29	0	57
CO Emissions (g)	76	86	855	916	0	1932
NOx Emissions (g)	8	10	87	111	0	217
Vehicles Entered	180	223	127	254	0	786
Vehicles Exited	183	219	153	222	0	777
Hourly Exit Rate	1098	1314	918	1332	0	4662
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	WB	WB	WB	NB	SB	All
Movements Served	LT	TR	LT	T	R	LTR	LTR	
Total Delay (hr)	3.3	3.1	2.2	1.7	0.0	3.8	0.4	15.3
Total Stops	222	177	145	99	0	31	2	678
Travel Dist (mi)	50.3	62.6	41.8	49.8	0.0	4.6	0.2	209.3
Travel Time (hr)	4.4	4.5	3.1	2.9	0.0	3.9	0.4	20.2
Avg Speed (mph)	12	14	13	17	13	1	0	11
Fuel Used (gal)	1.9	2.3	1.7	1.9	0.0	1.0	0.1	9.2
HC Emissions (g)	18	14	19	16	0	1	0	69
CO Emissions (g)	516	436	685	543	0	88	8	2289
NOx Emissions (g)	58	59	65	68	0	3	0	254
Vehicles Entered	183	219	0	0	0	0	0	887
Vehicles Exited	91	248	130	254	0	0	0	722
Hourly Exit Rate	546	1488	780	1524	0	0	0	4332
Denied Entry Before	0	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0	25

Total Network Performance

Total Delay (hr)	21.2
Delay / Veh (s)	94.3
Total Stops	1009
Travel Dist (mi)	632.2
Travel Time (hr)	35.7
Avg Speed (mph)	18
Fuel Used (gal)	24.4
HC Emissions (g)	272
CO Emissions (g)	9821
NOx Emissions (g)	1021
Vehicles Entered	907
Vehicles Exited	708
Hourly Exit Rate	4248
Input Volume	31903
% of Volume	13
Denied Entry Before	0
Denied Entry After	25

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	NB	All
Movements Served	T	TR	LT	T	LR	
Total Delay (hr)	0.9	0.9	0.2	0.1	0.1	52.6
Total Stops	31	32	10	0	1	74
Travel Dist (mi)	27.1	25.9	5.6	20.3	0.2	79.2
Travel Time (hr)	1.5	1.5	0.3	0.5	0.1	54.4
Avg Speed (mph)	18	17	20	38	2	20
Fuel Used (gal)	1.3	1.2	0.2	0.5	0.0	14.7
HC Emissions (g)	13	13	1	7	0	78
CO Emissions (g)	334	280	47	168	3	1893
NOx Emissions (g)	52	48	7	30	0	169
Vehicles Entered	0	0	50	177	0	765
Vehicles Exited	268	258	42	186	1	754
Hourly Exit Rate	1608	1548	252	1116	6	4524
Denied Entry Before	0	0	0	0	0	110
Denied Entry After	0	0	0	0	0	503

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.8	0.9	0.0	0.0	0.0	1.9
Total Stops	27	37	0	0	0	64
Travel Dist (mi)	30.6	29.6	2.5	8.8	0.0	71.6
Travel Time (hr)	1.5	1.6	0.1	0.2	0.0	3.5
Avg Speed (mph)	21	19	48	40	21	22
Fuel Used (gal)	1.1	1.0	0.1	0.2	0.0	2.5
HC Emissions (g)	9	11	1	3	0	23
CO Emissions (g)	252	242	22	59	0	577
NOx Emissions (g)	35	39	4	12	0	90
Vehicles Entered	268	258	49	180	0	761
Vehicles Exited	265	256	50	177	0	749
Hourly Exit Rate	1590	1536	300	1062	0	4494
Denied Entry Before	0	0	0	0	0	1
Denied Entry After	0	0	0	0	0	4

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.3	0.3	0.0	0.0	0.0	0.7
Total Stops	17	14	0	0	1	31
Travel Dist (mi)	12.1	12.0	1.7	6.2	0.1	32.1
Travel Time (hr)	0.6	0.6	0.0	0.2	0.0	1.4
Avg Speed (mph)	20	19	48	40	14	23
Fuel Used (gal)	0.4	0.4	0.0	0.1	0.0	1.1
HC Emissions (g)	3	4	1	2	0	9
CO Emissions (g)	80	78	20	39	0	217
NOx Emissions (g)	13	13	3	8	0	38
Vehicles Entered	263	255	49	181	0	749
Vehicles Exited	257	259	49	181	1	747
Hourly Exit Rate	1542	1554	294	1086	6	4482
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	LT	T	T	TR	LR	
Total Delay (hr)	0.2	0.2	0.0	0.2	0.1	0.8
Total Stops	8	8	0	0	1	16
Travel Dist (mi)	8.9	8.8	15.1	59.7	0.2	92.7
Travel Time (hr)	0.4	0.4	0.4	1.6	0.1	2.8
Avg Speed (mph)	23	21	43	38	3	33
Fuel Used (gal)	0.4	0.3	0.7	2.4	0.0	3.9
HC Emissions (g)	3	3	11	36	0	53
CO Emissions (g)	87	71	623	1615	1	2398
NOx Emissions (g)	13	11	40	138	0	202
Vehicles Entered	256	259	9	257	0	783
Vehicles Exited	257	256	57	210	0	780
Hourly Exit Rate	1542	1536	342	1260	0	4680
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	WB	WB	WB	NB	SB	All
Movements Served	LT	TR	LT	T	R	LR	LR	
Total Delay (hr)	2.2	2.4	6.5	5.1	0.0	1.0	0.1	25.2
Total Stops	89	69	362	284	0	9	0	815
Travel Dist (mi)	77.9	76.1	24.8	37.5	0.0	2.2	0.0	218.5
Travel Time (hr)	3.9	4.1	7.1	6.0	0.0	1.1	0.1	30.2
Avg Speed (mph)	20	18	4	6	14	2	0	10
Fuel Used (gal)	2.7	2.5	2.1	2.4	0.0	0.3	0.0	11.7
HC Emissions (g)	17	18	9	12	0	0	0	61
CO Emissions (g)	547	426	260	364	0	33	2	1762
NOx Emissions (g)	70	66	24	46	0	2	0	211
Vehicles Entered	257	256	0	0	0	0	0	836
Vehicles Exited	244	261	12	257	2	1	0	777
Hourly Exit Rate	1464	1566	72	1542	12	6	0	4662
Denied Entry Before	0	0	0	0	0	0	0	4
Denied Entry After	0	0	0	0	0	0	0	137

Total Network Performance

Total Delay (hr)	82.3
Delay / Veh (s)	359.6
Total Stops	1000
Travel Dist (mi)	637.9
Travel Time (hr)	96.9
Avg Speed (mph)	17
Fuel Used (gal)	40.1
HC Emissions (g)	298
CO Emissions (g)	10176
NOx Emissions (g)	1004
Vehicles Entered	870
Vehicles Exited	781
Hourly Exit Rate	4686
Input Volume	47109
% of Volume	10
Denied Entry Before	115
Denied Entry After	644

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	WB	NB	All
Movements Served	T	TR	L	T	T	LR	
Total Delay (hr)	0.1	0.1	0.0	0.1	0.1	0.1	0.6
Total Stops	1	2	1	0	0	2	6
Travel Dist (mi)	20.3	20.4	0.1	21.3	29.1	0.4	91.5
Travel Time (hr)	0.5	0.6	0.0	0.5	0.8	0.1	2.7
Avg Speed (mph)	37	34	1	39	37	3	35
Fuel Used (gal)	0.8	0.8	0.0	0.7	0.8	0.0	3.2
HC Emissions (g)	16	12	0	5	13	0	45
CO Emissions (g)	656	394	0	242	281	3	1579
NOx Emissions (g)	53	45	0	26	48	0	172
Vehicles Entered	0	0	0	186	256	0	853
Vehicles Exited	190	218	1	186	257	0	852
Hourly Exit Rate	1140	1308	6	1116	1542	0	5112
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.1	0.1	0.0	0.1	0.1	0.3
Total Stops	0	0	0	0	2	2
Travel Dist (mi)	21.6	25.7	9.4	12.6	0.1	69.4
Travel Time (hr)	0.5	0.7	0.2	0.3	0.1	1.9
Avg Speed (mph)	40	38	39	36	1	37
Fuel Used (gal)	0.7	0.7	0.3	0.4	0.0	2.1
HC Emissions (g)	10	8	2	6	0	25
CO Emissions (g)	340	219	91	133	2	784
NOx Emissions (g)	39	36	10	22	0	107
Vehicles Entered	190	218	188	252	0	855
Vehicles Exited	187	226	186	254	2	855
Hourly Exit Rate	1122	1356	1116	1524	12	5130
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	EB	WB	WB	SB	All
Movements Served	L	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Total Stops	0	0	0	0	0	1	1
Travel Dist (mi)	0.0	8.5	10.5	6.6	8.9	0.1	34.7
Travel Time (hr)	0.0	0.2	0.3	0.2	0.2	0.1	1.0
Avg Speed (mph)	1	41	38	39	36	3	36
Fuel Used (gal)	0.0	0.2	0.3	0.2	0.2	0.0	1.0
HC Emissions (g)	0	3	3	1	4	0	11
CO Emissions (g)	0	104	70	66	80	1	322
NOx Emissions (g)	0	13	13	7	14	0	47
Vehicles Entered	0	184	225	189	253	0	852
Vehicles Exited	0	180	230	189	252	1	852
Hourly Exit Rate	0	1080	1380	1134	1512	6	5112
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.0	0.3	0.3	0.0	0.6
Total Stops	0	0	0	0	1	1
Travel Dist (mi)	6.2	7.9	58.2	76.1	0.1	148.4
Travel Time (hr)	0.2	0.2	1.5	2.0	0.0	4.0
Avg Speed (mph)	41	38	38	38	4	37
Fuel Used (gal)	0.2	0.2	1.9	2.0	0.0	4.3
HC Emissions (g)	3	2	16	32	0	52
CO Emissions (g)	83	57	749	690	1	1579
NOx Emissions (g)	10	10	76	123	0	219
Vehicles Entered	180	230	207	251	0	869
Vehicles Exited	178	231	192	261	0	862
Hourly Exit Rate	1068	1386	1152	1566	0	5172
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	EB	WB	WB	WB	WB	NB	SB	All
Movements Served	L	T	TR	L	T	T	R	LTR	LTR	
Total Delay (hr)	0.2	0.2	0.3	0.1	0.3	0.3	0.0	3.8	0.3	5.6
Total Stops	4	0	0	5	3	1	0	31	2	48
Travel Dist (mi)	0.2	53.2	71.0	0.2	48.8	54.4	0.0	4.6	0.2	232.7
Travel Time (hr)	0.2	1.3	1.9	0.1	1.4	1.6	0.0	3.9	0.3	11.0
Avg Speed (mph)	1	40	37	3	35	34	13	1	1	22
Fuel Used (gal)	0.0	1.6	1.8	0.0	1.9	1.9	0.0	1.0	0.1	8.4
HC Emissions (g)	0	21	17	0	20	27	0	1	0	85
CO Emissions (g)	2	703	393	1	971	811	0	89	7	2982
NOx Emissions (g)	0	87	78	0	82	108	0	3	0	359
Vehicles Entered	0	178	231	0	0	0	0	0	0	919
Vehicles Exited	2	178	235	4	207	251	1	0	1	878
Hourly Exit Rate	12	1068	1410	24	1242	1506	6	0	6	5268
Denied Entry Before	0	0	0	0	0	0	0	0	0	1
Denied Entry After	0	0	0	0	0	0	0	0	0	0

Total Network Performance

Total Delay (hr)	7.8
Delay / Veh (s)	30.8
Total Stops	58
Travel Dist (mi)	723.6
Travel Time (hr)	24.4
Avg Speed (mph)	30
Fuel Used (gal)	23.9
HC Emissions (g)	282
CO Emissions (g)	9823
NOx Emissions (g)	1160
Vehicles Entered	932
Vehicles Exited	881
Hourly Exit Rate	5286
Input Volume	31903
% of Volume	17
Denied Entry Before	1
Denied Entry After	0

2: Chapman Highway & Chapman View Drive Performance by lane

Lane	EB	EB	WB	WB	WB	NB	All
Movements Served	T	TR	L	T	T	LR	
Total Delay (hr)	0.7	0.8	0.1	0.0	0.1	0.2	52.1
Total Stops	7	12	1	0	0	1	21
Travel Dist (mi)	28.0	27.4	0.0	16.4	24.3	0.2	96.4
Travel Time (hr)	1.4	1.4	0.1	0.4	0.6	0.2	54.4
Avg Speed (mph)	20	19	0	42	39	1	24
Fuel Used (gal)	1.3	1.3	0.0	0.5	0.7	0.0	15.2
HC Emissions (g)	13	15	0	5	7	0	84
CO Emissions (g)	310	317	1	169	192	4	2042
NOx Emissions (g)	59	60	0	23	34	0	207
Vehicles Entered	0	0	0	144	212	0	918
Vehicles Exited	278	278	0	141	216	0	913
Hourly Exit Rate	1668	1668	0	846	1296	0	5478
Denied Entry Before	0	0	0	0	0	0	114
Denied Entry After	0	0	0	0	0	0	484

3: Chapman Highway & Valerie Lane Performance by lane

Lane	EB	EB	WB	WB	SB	All
Movements Served	T	T	T	TR	LR	
Total Delay (hr)	0.5	0.5	0.0	0.0	0.0	1.2
Total Stops	0	0	0	0	0	0
Travel Dist (mi)	32.3	32.2	7.4	10.4	0.0	82.2
Travel Time (hr)	1.2	1.3	0.2	0.3	0.0	3.0
Avg Speed (mph)	28	25	42	38	7	28
Fuel Used (gal)	1.2	1.1	0.2	0.3	0.0	2.8
HC Emissions (g)	11	12	3	3	0	29
CO Emissions (g)	295	244	107	97	0	743
NOx Emissions (g)	46	44	11	15	0	117
Vehicles Entered	278	278	149	207	0	918
Vehicles Exited	279	281	144	212	0	916
Hourly Exit Rate	1674	1686	864	1272	0	5496
Denied Entry Before	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	3

4: Chapman Highway & Shady Lane Performance by lane

Lane	EB	EB	EB	WB	WB	SB	All
Movements Served	L	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.2	0.2	0.0	0.0	0.0	0.5
Total Stops	1	0	0	0	0	1	2
Travel Dist (mi)	0.0	12.9	13.0	5.1	7.1	0.1	38.2
Travel Time (hr)	0.0	0.5	0.5	0.1	0.2	0.0	1.3
Avg Speed (mph)	1	28	26	42	37	11	30
Fuel Used (gal)	0.0	0.4	0.4	0.1	0.2	0.0	1.2
HC Emissions (g)	0	3	4	2	2	0	11
CO Emissions (g)	0	97	78	67	56	0	299
NOx Emissions (g)	0	14	15	8	10	0	47
Vehicles Entered	0	276	280	147	207	0	912
Vehicles Exited	1	277	278	149	208	1	914
Hourly Exit Rate	6	1662	1668	894	1248	6	5484
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

5: Chapman Highway & Ford Hill Lane Performance by lane

Lane	EB	EB	EB	WB	WB	SB	All
Movements Served	L	T	T	T	TR	LR	
Total Delay (hr)	0.0	0.1	0.1	0.1	0.2	0.1	0.7
Total Stops	0	0	0	0	0	1	1
Travel Dist (mi)	0.0	9.6	9.5	48.0	66.0	0.2	133.3
Travel Time (hr)	0.0	0.3	0.4	1.2	1.7	0.1	3.7
Avg Speed (mph)	1	29	27	41	39	3	37
Fuel Used (gal)	0.0	0.4	0.4	1.4	1.7	0.0	4.0
HC Emissions (g)	0	4	4	16	22	0	46
CO Emissions (g)	0	136	94	619	535	1	1386
NOx Emissions (g)	0	17	17	73	95	0	203
Vehicles Entered	0	277	278	180	229	0	965
Vehicles Exited	0	276	279	167	242	0	965
Hourly Exit Rate	0	1656	1674	1002	1452	0	5790
Denied Entry Before	0	0	0	0	0	0	0
Denied Entry After	0	0	0	0	0	0	0

6: Chapman Highway & Hutcheson Road Performance by lane

Lane	EB	EB	EB	WB	WB	WB	WB	NB	SB	All
Movements Served	L	T	TR	L	T	T	R	LR	LR	
Total Delay (hr)	0.0	1.0	1.3	0.8	0.2	0.2	0.0	1.1	0.2	5.6
Total Stops	1	0	0	8	0	1	0	9	0	20
Travel Dist (mi)	0.0	85.5	83.0	0.2	43.6	49.8	0.1	2.1	0.0	264.5
Travel Time (hr)	0.0	2.9	3.3	0.8	1.2	1.4	0.0	1.2	0.2	11.7
Avg Speed (mph)	5	30	26	0	37	36	13	2	0	24
Fuel Used (gal)	0.0	2.7	2.4	0.2	1.7	1.7	0.0	0.3	0.0	9.2
HC Emissions (g)	0	19	24	0	23	21	0	0	0	89
CO Emissions (g)	1	574	473	9	1037	721	0	34	3	2866
NOx Emissions (g)	0	81	79	0	89	90	0	2	0	342
Vehicles Entered	0	276	279	0	0	0	0	0	0	1002
Vehicles Exited	1	294	267	0	180	229	5	0	0	977
Hourly Exit Rate	6	1764	1602	0	1080	1374	30	0	0	5862
Denied Entry Before	0	0	0	0	0	0	0	0	0	2
Denied Entry After	0	0	0	0	0	0	0	0	0	11

Total Network Performance

Total Delay (hr)	61.3
Delay / Veh (s)	220.7
Total Stops	44
Travel Dist (mi)	784.6
Travel Time (hr)	79.1
Avg Speed (mph)	28
Fuel Used (gal)	39.2
HC Emissions (g)	338
CO Emissions (g)	10753
NOx Emissions (g)	1229
Vehicles Entered	1018
Vehicles Exited	977
Hourly Exit Rate	5862
Input Volume	47109
% of Volume	12
Denied Entry Before	116
Denied Entry After	498