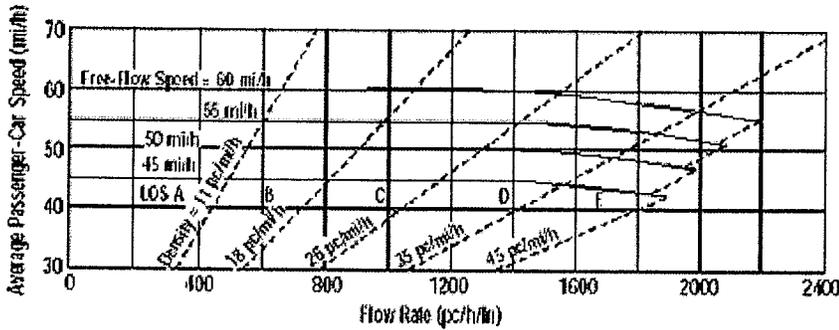


M R O

ENGINEERS

**MODIFIED LEVEL OF SERVICE CRITERIA
LEVEL OF SERVICE CALCULATION WORKSHEETS
BUILDOUT "WITH FOREST RANCH" SCENARIO**

MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information	Site Information
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Analyst MRO Engineers, Inc.	Highway/Direction to Travel Foresthill Road - Mitigated
Agency or Company MRO Engineers, Inc.	From/To Bridge to Spring Garden Rd
Date Performed 4/3/2007	Jurisdiction Placer County
Analysis Time Period AM Peak Hour	Analysis Year Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS)
 Des. (N)
 Plan. (v_p)

Flow Inputs

Volume, V (veh/h)	1126	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	6
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	4.00
Driver Type Adjustment	1.00	Up/Down %	3.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	3.0
E_T	2.5	f_{HV}	0.885

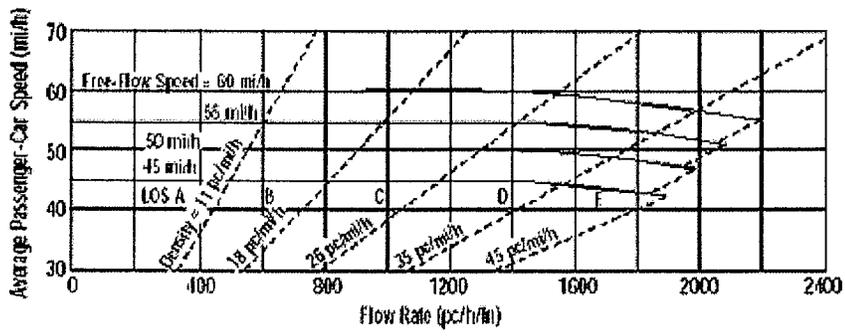
Speed Inputs	Calc Speed Adj and FFS
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Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	2	f_A (mi/h)	0.5
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.9
Base Free-Flow Speed, BFFS	60.0		

Operations	Design
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Operational (LOS)	Design (N)
Flow Rate, v_p (pc/h/ln)	Required Number of Lanes, N
Speed, S (mi/h)	Flow Rate, v_p (pc/h)
D (pc/mi/ln)	Max Service Flow Rate (pc/h/ln)
LOS	Design LOS

MULTILANE HIGHWAYS WORKSHEET(Direction 2)



Application	INPUT	OUTPUT
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information **Site Information**

Analyst	MKL	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Bridge to Spring Garden Rd
Date Performed	4/3/2007	Jurisdiction	Placer County
Analysis Time Period	AM Peak Hour	Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS)
 Des. (N)
 Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1853	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	4.00
Driver Type Adjustment	1.00	Up/Down %	-3.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.986

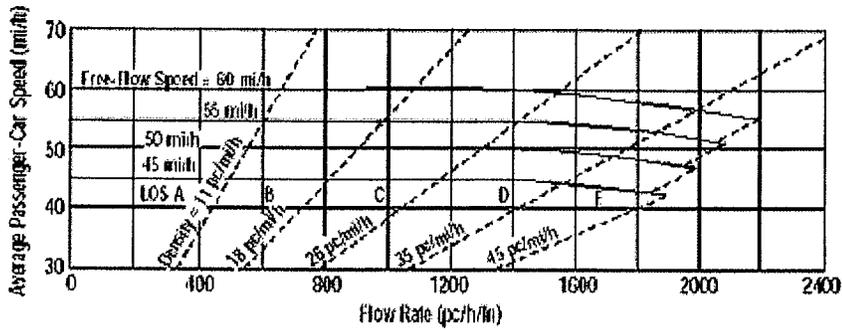
Speed Inputs **Calc Speed Adj and FFS**

Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	2	f_A (mi/h)	0.5
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.9
Base Free-Flow Speed, BFFS	60.0		

Operations **Design**

Operational (LOS)		Design (N)	
Flow Rate, v_p (pc/h/ln)	1067	Required Number of Lanes, N	
Speed, S (mi/h)	57.9	Flow Rate, v_p (pc/h)	
D (pc/mi/ln)	18.4	Max Service Flow Rate (pc/h/ln)	
LOS	C	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	INPUT	OUTPUT
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	MKL	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Spring Garden to Todd Valley W
Date Performed	4/3/2007	Jurisdiction	Placer County
Analysis Time Period	AM Peak Hour	Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper. (LOS)
 Des. (N)
 Plan. (vp)

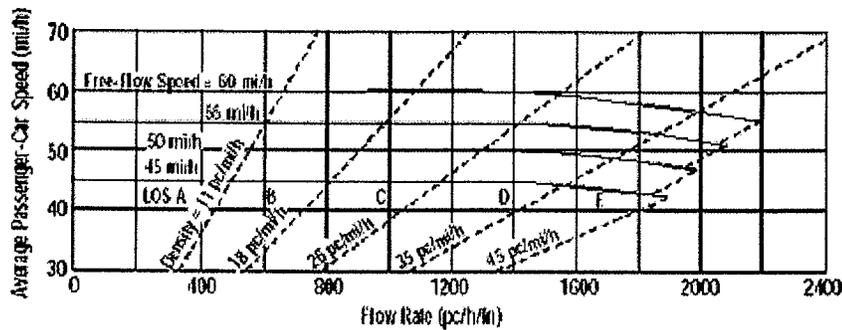
Flow Inputs			
Volume, V (veh/h)	1234	Peak-Hour Factor, PHF	0.75
AADT(veh/h)		%Trucks and Buses, P_T	3
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.70
Driver Type Adjustment	1.00	Up/Down %	3.40
		Number of Lanes	2

Calculate Flow Adjustments			
f_p	1.00	E_R	3.0
E_T	3.8	f_{HV}	0.891

Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	4	f_A (mi/h)	1.0
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.4
Base Free-Flow Speed, BFFS	60.0		

Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v_p (pc/h/ln)	923	Required Number of Lanes, N	
Speed, S (mi/h)	57.4	Flow Rate, v_p (pc/h)	
D (pc/mi/ln)	16.1	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 2)



Application	INPUT	OUTPUT
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	MKL	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Spring Garden to Todd Valley W
Date Performed	4/3/2007	Jurisdiction	Placer County
Analysis Time Period	AM Peak Hour	Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS)
 Des. (N)
 Plan. (vp)

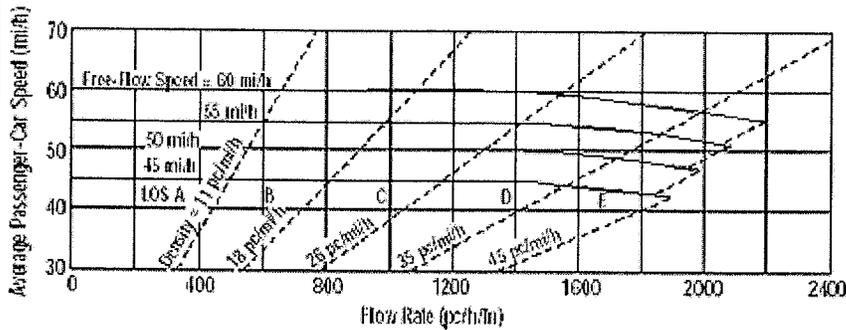
Flow Inputs			
Volume, V (veh/h)	1286	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.70
Driver Type Adjustment	1.00	Up/Down %	-3.40
		Number of Lanes	2

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.986

Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	5	f_A (mi/h)	1.3
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.2
Base Free-Flow Speed, BFFS	60.0		

Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v_p (pc/h/ln)	740	Required Number of Lanes, N	
Speed, S (mi/h)	57.2	Flow Rate, v_p (pc/h)	
D (pc/mi/ln)	12.9	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	MKP	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Todd Valley W to Owl Hill Ct
Date Performed	11/05/07	Jurisdiction	Placer County
Analysis Time Period	AM Peak Hour	Analysis Year	Buildout With Forest Ranch
Project Description Foresthill Divide Community Plan			

Oper.(LOS)
 Des. (N)
 Plan. (vp)

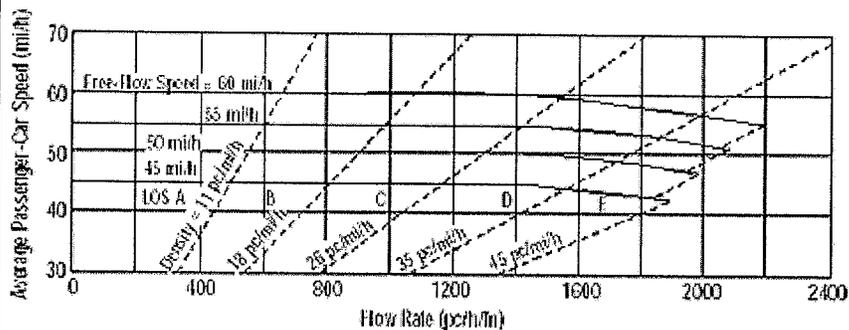
Flow Inputs			
Volume, V (veh/h)	1203	Peak-Hour Factor, PHF	0.59
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.20
Driver Type Adjustment	1.00	Up/Down %	3.00
		Number of Lanes	2

Calculate Flow Adjustments			
f_p	1.00	E_R	3.0
E_T	2.5	f_{HV}	0.935

Speed Inputs		Calc Speed Adj and FFS	
Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	3	f_A (mi/h)	0.8
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.7
Base Free-Flow Speed, BFFS	60.0		

Operations		Design	
Operational (LOS)		Design (N)	
Flow Rate, v_p (pc/h/ln)	1090	Required Number of Lanes, N	
Speed, S (mi/h)	57.7	Flow Rate, v_p (pc/h)	
D (pc/mi/ln)	18.9	Max Service Flow Rate (pc/h/ln)	
LOS	C	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 2)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information **Site Information**

Analyst	MKP	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Todd Valley W to Owl Hill Ct
Date Performed	11/05/07	Jurisdiction	Placer County
Analysis Time Period	AM Peak Hour	Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS) Des. (N) Plan. (v_p)

Flow Inputs

Volume, V (veh/h)	1162	Peak-Hour Factor, PHF	0.79
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.20
Driver Type Adjustment	1.00	Up/Down %	-3.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.986

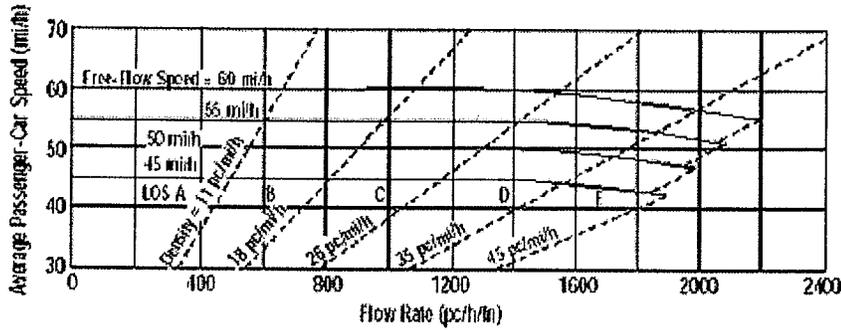
Speed Inputs **Calc Speed Adj and FFS**

Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	4	f_A (mi/h)	1.0
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.4
Base Free-Flow Speed, BFFS	60.0		

Operations **Design**

Operational (LOS)		Design (N)	
Flow Rate, v_p (pc/h/ln)	745	Required Number of Lanes, N	
Speed, S (mi/h)	57.4	Flow Rate, v_p (pc/h)	
D (pc/mi/ln)	13.0	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v _p	LOS, S, D
Design (N)	FFS, LOS, v _p	N, S, D
Design (v _p)	FFS, LOS, N	v _p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v _p)	FFS, LOS, N	v _p , S, D

General Information		Site Information	
Analyst	MKL	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Bridge to Spring Garden Rd
Date Performed	4/3/2007	Jurisdiction	Placer County
Analysis Time Period	PM Peak Hour	Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS) Des. (N) Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1649	Peak-Hour Factor, PHF	0.88
AAADT(veh/h)		%Trucks and Buses, P _T	1
Peak-Hour Prop of AAADT (veh/d)		%RVs, P _R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	4.00
Driver Type Adjustment	1.00	Up/Down %	3.00
		Number of Lanes	2

Calculate Flow Adjustments

f _p	1.00	E _R	3.0
E _T	3.0	f _{HV}	0.943

Speed Inputs

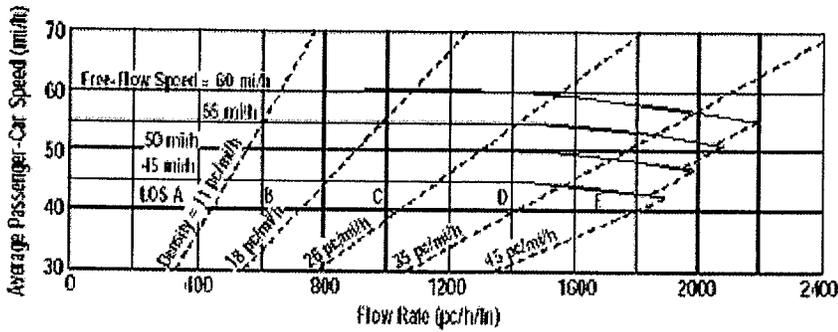
Lane Width, LW (ft)	12.0	f _{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f _{LC} (mi/h)	0.0
Access Points, A (A/mi)	2	f _A (mi/h)	0.5
Median Type, M	Undivided	f _M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.9
Base Free-Flow Speed, BFFS	60.0		

Calc Speed Adj and FFS

Operations

Operational (LOS)		Design (N)	
Flow Rate, v _p (pc/h/ln)	993	Required Number of Lanes, N	
Speed, S (mi/h)	57.9	Flow Rate, v _p (pc/h)	
D (pc/mi/ln)	17.2	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 1)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information		Site Information	
Analyst	MKL	Highway/Direction to Travel	Foresthill Road - Mitigated
Agency or Company	MRO Engineers, Inc.	From/To	Spring Garden to Todd Valley W
Date Performed	4/3/2007	Jurisdiction	Placer County
Analysis Time Period	PM Peak Hour	Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS)
 Des. (N)
 Plan. (v_p)

Flow Inputs

Volume, V (veh/h)	1203	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.70
Driver Type Adjustment	1.00	Up/Down %	3.40
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	3.0
E_T	4.0	f_{HV}	0.909

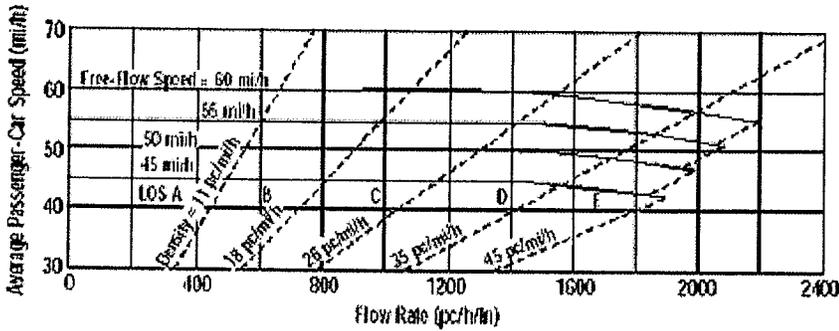
Speed Inputs

Lane Width, LW (ft)	12.0	f_{LW} (mi/h)	0.0
Total Lateral Clearance, LC (ft)	12.0	f_{LC} (mi/h)	0.0
Access Points, A (A/mi)	4	f_A (mi/h)	1.0
Median Type, M	Undivided	f_M (mi/h)	1.6
FFS (measured)		FFS (mi/h)	57.4
Base Free-Flow Speed, BFFS	60.0		

Operations

Operational (LOS)		Design (N)	
Flow Rate, v_p (pc/h/ln)	751	Required Number of Lanes, N	
Speed, S (mi/h)	57.4	Flow Rate, v_p (pc/h)	
D (pc/mi/ln)	13.1	Max Service Flow Rate (pc/h/ln)	
LOS	B	Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 2)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information

Analyst	MKL
Agency or Company	MRO Engineers, Inc.
Date Performed	4/3/2007
Analysis Time Period	PM Peak Hour

Site Information

Highway/Direction to Travel	Foresthill Road - Mitigated
From/To	Spring Garden to Todd Valley W
Jurisdiction	Placer County
Analysis Year	Buildout With Forest Ranch

Project Description Foresthill Divide Community Plan

Oper.(LOS)

Des. (N)

Plan. (v_p)

Flow Inputs

Volume, V (veh/h)	1355	Peak-Hour Factor, PHF	0.88
AAADT(veh/h)		%Trucks and Buses, P_T	3
Peak-Hour Prop of AAADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.70
Driver Type Adjustment	1.00	Up/Down %	-3.40
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.981

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	5
Median Type, M	Undivided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	1.3
f_M (mi/h)	1.6
FFS (mi/h)	57.2

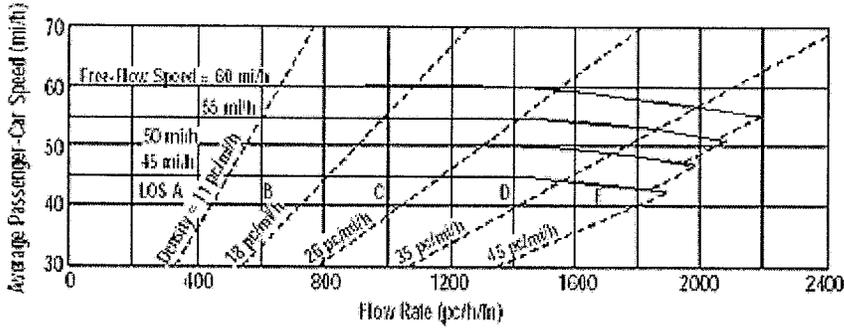
Operations

Operational (LOS)	
Flow Rate, v_p (pc/h/ln)	784
Speed, S (mi/h)	57.2
D (pc/mi/ln)	13.7
LOS	B

Design

Design (N)	
Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	

MULTILANE HIGHWAYS WORKSHEET(Direction 1)



<u>Application</u>	<u>Input</u>	<u>Output</u>
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information

Analyst: MKP
 Agency or Company: MRO Engineers, Inc.
 Date Performed: 11/05/07
 Analysis Time Period: PM Peak Hour

Site Information

Highway/Direction to Travel: Foresthill Road - Mitigated
 From/To: Todd Valley W to Owl Hill Ct
 Jurisdiction: Placer County
 Analysis Year: Buildout With Forest Ranch

Project Description: Foresthill Divide Community Plan

Oper.(LOS)

Des. (N)

Plan. (v_p)

Flow Inputs

Volume, V (veh/h)	1124	Peak-Hour Factor, PHF	0.85
AADT(veh/h)		%Trucks and Buses, P_T	2
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.20
Driver Type Adjustment	1.00	Up/Down %	3.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	3.0
E_T	2.5	f_{HV}	0.935

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	3
Median Type, M	Undivided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_{LW} (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	0.8
f_M (mi/h)	1.6
FFS (mi/h)	57.7

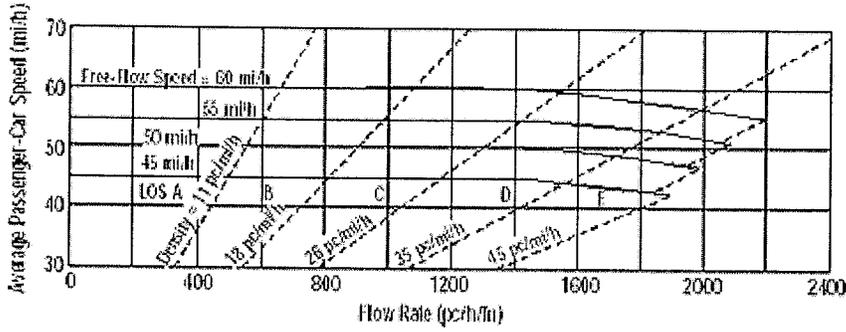
Operations

Operational (LOS)
 Flow Rate, v_p (pc/h/ln): 707
 Speed, S (mi/h): 57.7
 D (pc/mi/ln): 12.3
 LOS: B

Design

Design (N)
 Required Number of Lanes, N
 Flow Rate, v_p (pc/h)
 Max Service Flow Rate (pc/h/ln)
 Design LOS

MULTILANE HIGHWAYS WORKSHEET (Direction 2)



Application	Input	Output
Operational (LOS)	FFS, N, v_p	LOS, S, D
Design (N)	FFS, LOS, v_p	N, S, D
Design (v_p)	FFS, LOS, N	v_p , S, D
Planning (LOS)	FFS, N, AADT	LOS, S, D
Planning (N)	FFS, LOS, AADT	N, S, D
Planning (v_p)	FFS, LOS, N	v_p , S, D

General Information

Analyst: MKP
 Agency or Company: MRO Engineers, Inc.
 Date Performed: 11/05/07
 Analysis Time Period: PM Peak Hour

Site Information

Highway/Direction to Travel: Foresthill Road - Mitigated
 From/To: Todd Valley W to Owl Hill Ct
 Jurisdiction: Placer County
 Analysis Year: Buildout With Forest Ranch

Project Description: Foresthill Divide Community Plan

Oper.(LOS) Des. (N) Plan. (vp)

Flow Inputs

Volume, V (veh/h)	1297	Peak-Hour Factor, PHF	0.88
AADT(veh/h)		%Trucks and Buses, P_T	4
Peak-Hour Prop of AADT (veh/d)		%RVs, P_R	2
Peak-Hour Direction Prop, D		General Terrain:	Grade
DDHV (veh/h)		Grade Length (mi)	1.20
Driver Type Adjustment	1.00	Up/Down %	-3.00
		Number of Lanes	2

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	f_{HV}	0.977

Speed Inputs

Lane Width, LW (ft)	12.0
Total Lateral Clearance, LC (ft)	12.0
Access Points, A (A/mi)	4
Median Type, M	Undivided
FFS (measured)	
Base Free-Flow Speed, BFFS	60.0

Calc Speed Adj and FFS

f_w (mi/h)	0.0
f_{LC} (mi/h)	0.0
f_A (mi/h)	1.0
f_M (mi/h)	1.6
FFS (mi/h)	57.4

Operations

Operational (LOS)	
Flow Rate, v_p (pc/h/ln)	754
Speed, S (mi/h)	57.4
D (pc/mi/ln)	13.1
LOS	B

Design

Design (N)	
Required Number of Lanes, N	
Flow Rate, v_p (pc/h)	
Max Service Flow Rate (pc/h/ln)	
Design LOS	



**Revised Draft
Traffic Study**

**Foresthill Divide Community Plan
Placer County, California**

**Prepared For
Quad Knopf**

June 20, 2007

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EXECUTIVE SUMMARY

This report describes the traffic analysis for the recently-updated land use component of the Foresthill Divide Community Plan in Placer County, California. The traffic analysis focuses on morning and evening peak hour traffic operations on nineteen existing roadway segments and two future roadway segments in the Community Plan area, as well as peak hour traffic operations at four intersections at the Interstate 80 (I-80)/Auburn Ravine Road/Foresthill Road interchange.

Based on direction from Placer County staff, three timeframes were analyzed, including existing conditions and two cumulative conditions scenarios. The cumulative conditions scenarios addressed traffic operations in the year 2030 and upon “Buildout” of the Community Plan. In addition, the two future timeframes were analyzed both with and without development of the proposed Forest Ranch project, which is additional development beyond what is envisioned by the Plan. The analysis distinguishes between the impacts resulting from the Community Plan and those associated with the Forest Ranch project.

The mitigation measures presented here (and summarized in Table 25 in the report) are based on Placer County’s current LOS C minimum operating standard. The analysis also addressed a modified LOS D standard, which is under consideration. The results of the analyses for that potential modified standard are presented in the text of the report and the associated mitigation measures are summarized in Table 26.

Existing Conditions

- In the AM peak hour, fourteen of the nineteen existing study roadway segments operate at acceptable levels of service (i.e., LOS C or better). The two westbound segments of Foresthill Road between Spring Garden Road and Owl Hill Court operate at LOS D.
- All nineteen existing roadway segments operate at acceptable levels of service in the PM peak hour.
- During both peak hours, all four study intersections operate at LOS C or better, thereby meeting the Caltrans level of service requirement for interchange intersections (i.e., LOS D or better).

Cumulative + Project Conditions – Year 2030 “Without Forest Ranch” Scenario

- The Community Plan land uses will generate gross totals of 1,009 AM peak hour trips and 1,016 PM peak hour trips. With appropriate adjustments to reflect “internal” tripmaking, net totals of 421 external AM peak hour trips and 492 external PM peak hour trips are associated with this scenario.
- During the AM peak hour, three westbound segments of Foresthill Road are projected to operate at unacceptable levels of service: from the Foresthill Bridge to Spring Garden Road (LOS E), from Spring Garden Road to Todd Valley Road (LOS E), and from Todd Valley Road to Owl Hill Court (LOS D). Also during this peak hour, all four study intersections are expected to meet the Caltrans LOS D requirement, thus operating acceptably.
- In the PM peak hour, both directions of Foresthill Road from the Foresthill Bridge to Spring Garden Road are expected to operate at LOS D, thereby failing to meet the County’s LOS C standard. At the I-80 interchange, the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection will operate at an unacceptable LOS F. The other three intersections will operate acceptably during this peak hour.

Mitigation Measures

- Foresthill Road from the Foresthill Bridge to Spring Garden Road (10.8 miles long) – Increase the length of passing lanes in the eastbound direction from 4.9 to 7.6 miles (including tapers), and in the westbound direction from 1.3 to 6.5 miles (including tapers). The eastbound improvement will result in LOS B in the AM peak hour and LOS C in the PM peak hour, while the westbound modification will result in LOS C in both peak hours.
- Foresthill Road from Spring Garden Road to Todd Valley Road (1.7 miles long) – Construct 0.8 miles of passing lanes (including tapers) in the westbound direction. This will result in LOS C in the AM peak hour and LOS B in the PM peak hour.
- Foresthill Road from Todd Valley Road to Owl Hill Court (1.2 miles long) – Construct 0.6 miles of passing lanes (including tapers) in the westbound direction. This mitigation measure will provide LOS C in the AM peak hour and LOS B in the PM peak hour.
- Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Modify the westbound approach to provide a dedicated right-turn lane and modify the northbound approach to include dual left-turn lanes. This improvement will result in LOS D in both peak hours.

Cumulative + Project Conditions – Year 2030 “With Forest Ranch” Scenario

- Gross totals of 1,403 AM peak hour trips and 1,623 PM peak hour trips are estimated for this analysis scenario. The net external trip generation is estimated to be 629 AM peak hour trips and 673 PM peak hour trips.
- During the AM peak hour, the same three segments of Foresthill Road that did not operate acceptably in the Year 2030 “Without Forest Ranch” scenario will also fail to meet the minimum LOS C standard in this scenario. All four study intersections will operate acceptably.
- In the PM peak hour, the following segments of Foresthill Road are not expected to meet the LOS C standard: both directions from the Foresthill Bridge to Spring Garden Road (LOS D), the westbound direction between Spring Garden Road and Todd Valley Road (LOS D), and westbound from Todd Valley Road to Owl Hill Court (LOS D). In addition, the Auburn Ravine Road/I-80 Eastbound Ramps intersection will operate at LOS E and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection will operate at LOS F, both of which are considered unacceptable.

Mitigation Measures

- In this scenario, the Forest Ranch project would add traffic to roadway segments and intersections that are already expected to operate unacceptably in the “Without Forest Ranch” scenario. As such, the Forest Ranch project is responsible for a share of the cost of needed roadway improvements. In the instances where the Forest Ranch project directly causes the significant impact to traffic operations, the project will be responsible for 100 percent of the cost of improvements. For each mitigation measure listed below, the Forest Ranch “fair share” contribution is described.
- Foresthill Road from the Foresthill Bridge to Spring Garden Road (10.8 miles long) – Increase the total length of passing lanes in each direction to 7.6 miles (including tapers). The eastbound measure is unchanged from the “without” scenario, while the westbound improvement is 1.1 miles longer. This will result in LOS C in both peak hours in both directions. Forest Ranch responsibility:
 - Eastbound: 29 percent, and

- Westbound: 23 percent of the 5.2 miles needed in the “without” scenario and 100 percent of the additional 1.1 miles of passing lanes needed directly as a result of Forest Ranch.
- Foresthill Road from Spring Garden Road to Todd Valley Road (1.7 miles long) – Construct 0.8 miles of passing lanes (including tapers) in the westbound direction. This mitigation measure, which is unchanged from the Year 2030 “Without Forest Ranch” scenario, will provide LOS C in the AM peak hour and LOS B in the PM peak hour. Forest Ranch responsibility: 24 percent.
- Foresthill Road from Todd Valley Road to Owl Hill Court (1.2 miles long) – Construct 0.6 miles of passing lanes (including tapers) in the westbound direction. This mitigation measure is identical to the measure described for the Year 2030 “Without Forest Ranch” scenario. It will result in LOS C in the AM peak hour and LOS B in the PM peak hour. Forest Ranch responsibility: 29 percent.
- Auburn Ravine Road/I-80 Eastbound Ramps intersection – Modify the westbound approach to convert the shared through/right-turn lane to separate through and right-turn lanes. This improvement will provide LOS B in the AM peak hour and LOS D in the PM peak hour. Forest Ranch responsibility: 100 percent.
- Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Modify the westbound approach to provide a dedicated right-turn lane; modify the northbound approach to include dual left-turn lanes; and convert the eastbound right-turn lane into a shared through/right-turn lane. The eastbound measure is new to this scenario; the westbound and northbound improvements were also called for in the “Without Forest Ranch” scenario. This modification will result in LOS D in both peak hours. Forest Ranch responsibility: 100 percent of the eastbound approach improvements, and 27 percent of the westbound and northbound approach improvements.

Cumulative + Project Conditions – Buildout “Without Forest Ranch” Scenario

- Buildout of the proposed Community Plan will generate gross totals of approximately 4,040 AM peak hour trips and 4,516 PM peak hour trips. The net number of external trips is estimated to be 2,174 in the AM peak hour and 2,116 in the PM peak hour.
- Seven of the study roadway segments and one of the four study intersections are not expected to meet the pertinent level of service requirements in the AM peak hour. The study segments of Foresthill Road from the Foresthill Bridge to Yankee Jim’s Road, in both the westbound and eastbound directions, are projected to operate at levels of service ranging from LOS D to LOS F. Additionally, the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection is expected to operate at LOS F.
- In the PM peak hour, the same seven roadway segments as in the AM peak hour are expected to operate unacceptably, again with levels of service ranging from LOS D to LOS F. Two intersections will fail to meet the Caltrans LOS D requirement. LOS F is projected at both the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection.

Mitigation Measures

- Foresthill Road from the Foresthill Bridge to Yankee Jim’s Road (16.1 miles) – Upgrade the entire corridor from a two-lane highway to a four-lane facility. This improvement would result in LOS B (or better) operations throughout the corridor in both peak hours.

- Upgrading to a four-lane facility will also require that the Foresthill Bridge be widened to two-lanes in each direction to avoid a potential “bottleneck” at the bridge. In addition, between the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection and the Foresthill Bridge, the eastbound direction of Foresthill Road will need to be widened to two lanes to support the increase in traffic. However, due to financial constraints, these mitigation measures are not considered feasible. Therefore the traffic in this scenario results in a *significant and unavoidable* impact on the Foresthill Bridge and Foresthill Road between Lincoln Way and the bridge.
- Auburn Ravine Road/I-80 Eastbound Ramps intersection – Modify the westbound approach to convert the shared through/right-turn lane to separate through and right-turn lanes, and add an additional northbound-to-eastbound right-turn lane on the off-ramp. This improvement will provide LOS B operations in the AM peak hour and LOS D in the PM peak hour.
- Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Due to topographic and geometric constraints, modifications to the intersection will not be sufficient to bring the level of service into the acceptable range (i.e., LOS A through LOS D). It would operate at LOS F, even with the Year 2030 mitigation measures. As such, the impact to this intersection is considered *significant and unavoidable*.

Although not considered feasible, the following mitigation measures would be required at this intersection to bring the level of service to LOS D:

- Convert the northbound shared through/right-turn lane to separate through and right-turn lanes;
- Provide an additional northbound left-turn lane;
- Provide two additional eastbound through lanes;
- Provide an additional southbound left-turn lane; and
- Convert the westbound shared through/right-turn lane to separate through and right-turn lanes.

Cumulative + Project Conditions – Buildout “With Forest Ranch” Scenario

- This scenario is estimated to generate gross totals of 4,408 AM peak hour trips and 5,058 PM peak hour trips. Adjustments for internal tripmaking would result in net external trip generation estimates of 2,354 AM peak hour trips and 2,234 PM peak hour trips.
- In this scenario, seven of the roadway segments will again fail to meet the County’s LOS C standard in the morning peak hour. The segments of Foresthill Road from the Foresthill Bridge to Yankee Jim’s Road will operate at LOS E in both directions, with the exception of the westbound segment from the Foresthill Bridge to Spring Garden Road, which will operate at LOS F. Three of the four study intersections are expected to meet the Caltrans minimum Level of Service D requirement, with the exception being the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection, which is projected to operate at LOS F.
- The same roadway segments that are projected to operate unacceptably in the AM peak hour will also fail to meet the LOS C requirement in the PM peak hour. At the I-80 freeway interchange, the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection will both operate at LOS F.

Mitigation Measures

- The same mitigation measures that were recommended in the Buildout “Without Forest Ranch” scenario are proposed for the Buildout “With Forest Ranch” scenario.
- Foresthill Road from the Foresthill Bridge to Yankee Jim’s Road (16.1 miles) – Upgrade the entire corridor from a two-lane highway to a four-lane facility and widen the Foresthill Bridge to two-lanes in each direction to avoid a potential “bottleneck” at the bridge. This improvement would result in LOS B or C in both directions in both peak hours. Forest Ranch responsibility:
 - Foresthill Bridge widening: 8 percent eastbound and 5 percent westbound,
 - Foresthill Bridge to Spring Garden Road: 8 percent eastbound and 5 percent westbound,
 - Spring Garden Road to Todd Valley Road: 8 percent eastbound and 6 percent westbound,
 - Todd Valley Road to Owl Hill Court: 9 percent eastbound and 8 percent westbound, and
 - Owl Hill Court to Yankee Jim’s Road: 17 percent eastbound and 16 percent westbound.
- Foresthill Road between the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection and the Foresthill Bridge – Widen the eastbound direction to two lanes. Forest Ranch responsibility: 8 percent.
- However, as mentioned in the “Without Forest Ranch” scenario, a *significant and unavoidable* impact is expected on the Foresthill Bridge and Foresthill Road from Lincoln Way to the bridge because widening will not be economically feasible.
- Auburn Ravine Road/I-80 Eastbound Ramps intersection – Modify the westbound approach to convert the shared through/right-turn lane to separate through and right-turn lanes, and add an additional northbound-to-eastbound right-turn lane on the off-ramp. This improvement will provide LOS B in the AM peak hour and LOS D in the PM peak hour. Forest Ranch responsibility: 5 percent
- Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Due to topographic and geometric constraints, modifications to the intersection will not be sufficient to bring the level of service into the acceptable range (i.e., LOS D or better). It would operate at LOS F, even with the Year 2030 mitigation measures. As such, the impact to this intersection is considered *significant and unavoidable*. Forest Ranch represents 6 percent of the peak hour traffic growth.

Although not considered feasible, the following mitigation measures would be required at this intersection to bring the level of service to LOS D:

- Convert the northbound shared through/right-turn lane to separate through and right-turn lanes;
- Provide an additional northbound left-turn lane;
- Provide two additional eastbound through lanes;
- Provide an additional southbound left-turn lane; and
- Convert the westbound shared through/right-turn lane to separate through and right-turn lanes.

INTRODUCTION

This report describes the traffic analysis for the Foresthill Divide Community Plan update in Placer County, California. The current Plan update reflects substantial revisions to the previously-adopted land use component. Consequently, there is a need to update the environmental documentation for the proposed plan, including a new traffic analysis.

This traffic analysis focused on morning and evening peak hour traffic operations on key roadway segments within the Community Plan area, as well as the Interstate 80 (I-80)/Auburn Ravine Road/Foresthill Road interchange. Based on guidance from Placer County staff, the analysis addressed three time frames, including existing conditions and two cumulative conditions scenarios. The cumulative conditions analyses reflected the estimated traffic volumes associated with implementation of the Foresthill Divide Community Plan in the year 2030 and upon “buildout” of the Plan.

In addition, both cumulative conditions time periods were analyzed with and without development of the Forest Ranch property, which is beyond what is envisioned in the updated Foresthill Divide Community Plan. In this analysis, the potential traffic impacts associated directly with the Forest Ranch project are distinguished from the impacts caused by the proposed Foresthill Divide Community Plan.

This report presents the analysis procedures as well as the findings and recommendations resulting from the traffic analysis.

Project Description

The following summarizes the level of development assumed for the Foresthill Divide Community Plan update in the two cumulative conditions time frames. The land use values described below represent the incremental development expected to occur between the year 2005 and the analysis year.

The detailed land use information for both the Foresthill Divide Community Plan area and the Forest Ranch project was provided by Placer County Planning Department staff.

Year 2030 Conditions

In the Year 2030, new development associated with implementation of the proposed Foresthill Divide Community Plan is projected to include the following (in addition to the existing, year 2005 land use):

- Single-Family Residential – 1,413 dwelling units (DU);
- Multi-Family Residential – 20 DU;
- Retail – 90,607 square feet (SF);
- Office – 21,993 SF;
- Industrial – 78,750 SF; and
- High School – 565 students.

The Forest Ranch project is proposed as a primarily residential development, combined with recreational and commercial uses. It would be located to the north and east of the “core” Foresthill Community, within the Foresthill Divide Community Plan area. By the Year 2030, the additional level of development associated with the Forest Ranch project, beyond what is included in the Community Plan (as described above), would include:

- Age-Restricted Residential – 1,700 DU;
- Single-Family Residential – 158 DU;
- Retail – 67,762 SF;
- Medical Office – 34,592 SF;
- Office – 23,092 SF (to be located off-site of the Forest Ranch property);
- Equestrian Center – 50 horses;
- Recreational Vehicle (RV) Park – 100 RV spaces; and
- Golf Course, including: an 18-hole course; 2,500 SF of retail; 2,500 SF of office; and 5,000 SF of industrial.

Community Plan Buildout Conditions

The Buildout conditions analysis considers the potential maximum level of development in the Foresthill Divide Community Plan area under certain reasonable zoning constraints. The incremental level of development associated with each land use between the year 2005 and Buildout of the Plan includes:

- Single-Family Residential – 4,855 DU;
- Multi-Family Residential – 314 DU;
- Retail – 350,000 square feet (SF);
- Office – 180,954 SF;
- Industrial – 1,638,443 SF; and
- High School – 565 students.

Under Buildout conditions, the Forest Ranch project would include the following proposed new development:

- Age-Restricted Residential – 1,700 DU;
- Single-Family Residential – 513 DU;
- Retail – 67,762 SF;
- Medical Office – 34,592 SF;
- Office – 23,092 SF (to be located off-site of the Forest Ranch project);
- Equestrian Center – 50 horses;
- RV Park – 100 RV spaces;
- Golf Course, including: 18-hole course; 2,500 SF of retail; 2,500 SF of office; and 5,000 SF of industrial.

Study Roadways

Based on input from Placer County Department of Public Works staff, the following roadway segments were included in the analysis:

- Foresthill Road – Foresthill Bridge to Spring Garden Road, 10.8 miles,
 - Eastbound (4.9 miles of passing lanes),
 - Westbound (1.3 miles of passing lanes);
- Foresthill Road – Spring Garden Road to Todd Valley Road (West), 1.7 miles,
 - Eastbound (1.2 miles of passing lanes),
 - Westbound (no existing passing lanes);
- Foresthill Road – Todd Valley Road (West) to Owl Hill Court, 1.2 miles,
 - Eastbound (1.0 mile of passing lanes),
 - Westbound (no existing passing lanes);
- Foresthill Road – Owl Hill Court to Yankee Jim’s Road;
- Foresthill Road – Yankee Jim’s Road to Michigan Bluff Road;
- Foresthill Road – East of Michigan Bluff Road;
- McKeon-Ponderosa Way – South of Foresthill Road;
- Spring Garden Road – North of Foresthill Road;
- Happy Pines Drive – South of Foresthill Road;
- Todd Valley Road (West) – South of Foresthill Road;
- Todd Valley Road (East) – South of Foresthill Road;
- Mosquito Ridge Road – South of Foresthill Road;
- Yankee Jim’s Road – North of Race Track Street;
- Main Street – South of Foresthill Road;
- Michigan Bluff Road – South of Foresthill Road; and
- Race Track Street – North of Foresthill Road.

Because the *Highway Capacity Manual* two-lane highway analysis methodology evaluates roadway segments on a directional basis, the first three study segments of Foresthill Road, between the Foresthill Bridge and Owl Hill Court, will be treated as six individual roadway segments. As such, the total number of existing study roadway segments is nineteen.

Study Intersections

In addition to the roadway segments listed above, the following intersections at the Interstate 80/Auburn Ravine Road/Foresthill Road interchange were included in this analysis:

- Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp;
- Auburn Ravine Road/I-80 Westbound Off-ramp;
- Auburn Ravine Road/I-80 Eastbound Ramps; and
- Auburn Ravine Road/Foresthill Road/Lincoln Way.

The existing circulation network, including the study roadways and intersections, is shown on Figure 1. Note that the intersections addressed in this analysis are not located within the Foresthill Divide Community Plan area; instead, they are in the adjacent Auburn/Bowman Community Plan area.

Roadway Segment Analysis Methodology

The nineteen existing roadway segments analyzed in the Foresthill Divide Community Plan area were divided into three categories of roadway types: Class I highways, Secondary/Feeder Roads, and Local Access Roads. The level of service calculation methodology for each of these three roadway types is described in detail below.

Class I Highways

The westernmost segments of Foresthill Road are defined as “Class I” highways, according to information provided in the *Highway Capacity Manual* (Transportation Research Board, 2000). The six directional segments of Foresthill Road between the Foresthill Bridge and Owl Hill Court fall into this category, as they act as relatively high-speed routes in and out of the Community (i.e., they primarily serve through traffic rather than providing local access). These roadway segments were analyzed using the “two-lane highway” methodology documented in the *Highway Capacity Manual*. The HCM method determines directional roadway segment level of service based on a combination of “average travel speed” and “percent time-spent-following,” as shown in Table 1.

Table 1 Level of Service Definitions¹ Class I Two-Lane Highway			
Level of Service	Description	Percent Time-Spent-Following	Average Travel Speed (MPH ²)
A	Free-flow operations; motorists can travel at desired speed and passing demand is well below capacity.	< 35	> 55
B	Stable flow, with speeds generally higher than 50 miles per hour. The passing demand to maintain desired speeds becomes significant.	> 35 – 50	> 50 – 55
C	Stable flow at slower speeds. Individuals become noticeably affected by interactions with others, and percent time-spent-following drastically increases.	> 50 – 65	> 45 – 50
D	Unstable flow, with slower speeds and long platoons. Turning vehicles and roadside distractions cause major shock waves in the traffic stream.	> 65 – 80	> 40 – 45
E	Operating conditions at or near capacity. Speeds are slow, and passing is virtually impossible. Platooning becomes intense.	> 80	< 40
F	Heavily congested flow.	N/A ³	
Notes:			
¹ Reference: Transportation Research Board, <i>Highway Capacity Manual</i> , 2000.			
² Miles per hour.			
³ LOS F applies whenever the flow rate exceeds the roadway segment capacity.			

The specific input parameters for the “Class I” segments were based on field observations (e.g., peak hour traffic volume, peak hour factor, heavy vehicle percentage, passing lanes percentage, “no passing” percentage, etc.). For this analysis, the level of service calculations were performed using the *HCS+* software package, which implements the two-lane highway analysis procedures documented in the *HCM*.

Secondary/Feeder Roads and Local Access Roads

The remaining roadway segments were evaluated through a comparison of the total (bi-directional) hourly traffic volume to a defined set of level of service thresholds. The level of service thresholds for “Secondary/Feeder Roads” and “Local Access Roads” are presented in Tables 2 and 3, respectively. The thresholds utilized in this analysis were developed by MRO Engineers, Inc., and were described to Placer County staff in a memorandum dated August 5, 2005. That memorandum is presented in Appendix A.

As described in the memorandum, the following roadway segments were categorized as Secondary/Feeder Roads: McKeon-Ponderosa Way, Spring Garden Road, Happy Pines Drive, Todd Valley Road, Mosquito Ridge Road, Yankee Jim’s Road, and Michigan Bluff Road. Table 2 defines the level of service thresholds for the Secondary/Feeder roadways.

Table 2 Level of Service Thresholds Secondary/Feeder Roads	
Level of Service	Maximum Hourly Traffic Volume (Both Directions Combined)
A	60
B	200
C	375
D	575
E	1,425
F	> 1,425
Reference: MRO Engineers, Inc., Memorandum to Placer County Department of Public Works, August 5, 2005. (See Appendix A)	

The Local Access Roads category includes the following roadway segments: Main Street, Race Track Street, and the three remaining segments of Foresthill Road from Owl Hill Court to east of Michigan Bluff Road. The level of service thresholds for these roadways are presented in Table 3. The thresholds for a “two-lane with two-way left-turn lane” roadway were only applied to the segment of Foresthill Road between Owl Hill Court and Yankee Jim’s Road, which has a two-way left-turn lane over a substantial portion of its length. Although not all of this roadway segment has such a left-turn lane, observations indicated that this feature has a beneficial effect on roadway capacity, which is accounted for by the enhanced traffic volume thresholds shown in Table 3. All other study roadway segments listed here (which generally do not have two-way left-turn lanes) were analyzed using the “two-lane” road thresholds.

Table 3 Level of Service Thresholds Local Access Roads		
Level of Service	Maximum Hourly Traffic Volume (Both Directions Combined)	
	Two-Lane	Two-Lane With Two- Way Left-Turn Lane
A	100	125
B	375	450
C	725	875
D	1,275	1,525
E	2,275	2,725
F	> 2,275	> 2,725

Reference: MRO Engineers, Inc., Memorandum to Placer County Department of Public Works, August 5, 2005. (See Appendix A)

Intersection Analysis Methodology

Intersection operations are typically described in terms of level of service (LOS), which is reported on a scale from LOS A (representing free-flow conditions) to LOS F (which represents substantial congestion and delay). The level of service designations are based on a quantitative calculation of delay at the intersection. The specific approach to estimating delay is based on procedures documented in the *Highway Capacity Manual* (Transportation Research Board, 2000). Descriptions of operating conditions and delay values for signalized intersections are presented below.

The study intersections, all of which are signalized, were evaluated using the “operational analysis” methodology presented in the *Highway Capacity Manual*. This methodology determines signalized intersection level of service by comparing the “average control delay per vehicle” to the thresholds shown in Table 4. Control delay represents the delay directly associated with the traffic signal. The intersection level of service calculations were performed using the *Synchro 6* software package, which implements the intersection analysis procedures documented in the *HCM* and also considers the relatively short intersection spacing that exists at the interchange.

To ensure a conservative analysis of conditions at the two freeway off-ramp intersections, it was assumed that right-turns-on-red from those off-ramps onto Auburn Ravine Road are very difficult during the peak hours. Field observations revealed that, because of the short intersection spacing along this section of Auburn Ravine Road, standing queues from the adjacent intersections often effectively block the ability of such right turns to be made. At the I-80 westbound off-ramp, the queues extend eastward from Bowman Road, while at the I-80 eastbound ramp, queues generated at the Auburn Ravine/Foresthill Road/Lincoln Way intersection regularly extend back to, and even through, the off-ramp intersection. As such, it was assumed that a very limited number of right-turns-on-red from the off-ramps can occur during the peak hours.

Table 4 Level of Service Definitions Signalized Intersections		
Level of Service	Description	Average Control Delay (Seconds/Vehicle)
A	Very low delay. Most vehicles do not stop	≤ 10.0
B	Slight delay. Generally good signal progression.	10.1 – 20.0
C	Increased number of stopped vehicles. Fair signal progression.	20.1 – 35.0
D	Noticeable congestion. Large proportion of vehicles stopped.	35.1 – 55.0
E	Operating conditions at or near capacity. Frequent cycle failure.	55.1 – 80.0
F	Oversaturation. Forced or breakdown flow. Extensive queuing.	> 80.0

Reference: *Highway Capacity Manual* (Transportation Research Board, 2000).

Evaluation Criteria

Three sources of potential evaluation criteria were considered for this study. Placer County’s currently-adopted *Foresthill Divide Community Plan* addresses traffic operations for the roadway segments in the Plan area. That document calls for traffic operation of LOS C in the study area.

Placer County’s *Auburn/Bowman Community Plan* sets forth goals and policies to guide the development of the area surrounding the four study intersections. Also included are policies regarding the operation of the road system within that area. Table 17 of the *Auburn/Bowman Community Plan* document identifies Auburn Ravine Road at the I-80 overcrossing as having a minimum level of service standard of LOS E.

Caltrans has also established operational standards for the roadways under its jurisdiction. According to input received from Caltrans - District 3 staff, a significant impact is defined to occur if an intersection on the state highway system exceeds LOS D; this is a more conservative standard than the LOS E criterion set by Placer County.

For this analysis, the proposed project would be considered to have a significant impact on traffic operations if it would meet the following criteria:

Roadway Segments

- Change the level of service on the study roadway segments from acceptable levels (LOS A, B, or C) to unacceptable levels (LOS D, E or F); or
- Exacerbate conditions through an increase in the volume of traffic on a study roadway segment that already operates at LOS D, E, or F under “no project” conditions.

I-80 Interchange Study Intersections

- Change the level of service at the I-80 interchange intersections from acceptable levels (LOS A, B, C, or D) to unacceptable levels (LOS E or F); or
- Exacerbate conditions through an increase in the delay value at an I-80 interchange intersection that already operates at LOS E or F under “no project” conditions.

As noted above, the evaluation criteria for the I-80 interchange intersections reflect the Caltrans operational standard, which is more stringent than is required by Placer County policy.

Modified Roadway Segment Level of Service Criteria

Placer County is considering modifications to the Community Plan policy document that would allow operation at LOS D on the study area roadway segments (including Foresthill Road), rather than the current LOS C policy. As such, all of the analysis scenarios in this study include a section that describes the potential impacts on Foresthill Road under the modified level of service standard, including the mitigation measures that would be needed to bring the impacted roadway segments to the potential LOS D standard. The modified roadway segment evaluation criteria that are under consideration are presented below:

Roadway Segments - Modified

- Change the level of service on the study roadway segments from acceptable levels (LOS A, B, C, or D) to unacceptable levels (LOS E or F); or
- Exacerbate conditions through an increase in the volume of traffic on a study roadway segment that already operates at LOS E or F under “no project” conditions.

EXISTING CONDITIONS

This section describes existing traffic operations on the nineteen study roadway segments in the Foresthill Divide Community Plan area as well as at the four study intersections at the Interstate 80/Auburn Ravine Road/Foresthill Road interchange.

Existing Land Use

The following list, provided by Placer County staff, summarizes the existing level of development in the Foresthill Divide Community Plan area in the year 2005:

- Single-Family Residential – 2,384 DU;
- Multi-Family Residential – 31 DU;
- Retail – 155,799 SF;
- Office – 29,061 SF;
- Industrial – 140,112 SF; and
- High School – 235 students.

Key Roadways

A brief description of the key roadways in the Foresthill Divide Community Plan area is provided below.

Foresthill Road is a two-lane, east-west roadway that provides the primary connection between Auburn and the Foresthill community. From the Foresthill Bridge to Owl Hill Court, Foresthill Road is classified as a two-lane “Class I” highway. East of Owl Hill Court, the character of the road changes, and Foresthill Road is classified as a local access road. To the east of the Foresthill community, Foresthill Road continues to Soda Springs and carries very low traffic volumes.

Spring Garden Road is a two-lane “secondary/feeder” roadway in the Foresthill Divide Community Plan area. This road generally runs in a northeast/southwest direction between Foresthill Road and Yankee Jim’s Road.

Yankee Jim’s Road is a narrow, two-lane roadway that runs northwest from the “core” downtown area of Foresthill. This secondary/feeder roadway provides a connection between Spring Garden Road and Foresthill Road.

McKeon-Ponderosa Way is a two-lane, north-south roadway that provides a connection to Foresthill Road from the residential area at the west end of Todd Valley.

Happy Pines Drive is a two-lane roadway serving mostly residential land uses. Happy Pines Drive also provides a connection to Foresthill Road from the Todd Valley residential area.

Todd Valley Road is also a two-lane roadway serving Todd Valley. It begins at Foresthill Road east of Happy Pines Drive and continues in a loop to the east until connecting back with Foresthill Road. The western half of the Todd Valley Road loop carries much higher traffic volumes than the eastern half of the loop.

Mosquito Ridge Road is a two-lane, north-south roadway that originates at Foresthill Road on the western edge of the “core” downtown area of Foresthill. Just south of the Foresthill community,

Mosquito Ridge Road becomes quite mountainous and continues winding into the Tahoe National Forest.

Race Track Street is a two-lane local access roadway in the “core” of the Foresthill Community. It is primarily lined by residential land uses and runs northeast from Foresthill Road to its terminus at Yankee Jim’s Road.

Main Street is a two-lane local access roadway that runs parallel to Foresthill Road in the downtown area. It provides access to many of the community’s retail land uses in the core area.

Michigan Bluff Road is a two-lane roadway that provides a north/south connection between the community of Michigan Bluff and Foresthill Road to the north.

The key roadways that are outside of the Community Plan area, but are in the vicinity of the study intersections at the Interstate 80/Auburn Ravine Road/Foresthill Road interchange, are described below.

Auburn Ravine Road is a two-lane roadway that provides access to Interstate 80 and the commercial area surrounding the freeway interchange. Within the study area, Auburn Ravine Road is an east-west facility, but west of Bowman Road it curves to the south. East of Lincoln Way, Auburn Ravine Road becomes Foresthill Road.

Bowman Road is a north-south frontage road along the west side of I-80. It provides access to a number of commercial uses between Auburn Ravine Road and Bell Road to the north.

Lincoln Way serves as a north-south frontage road in the study area, running along the east side of I-80. It also provides direct access to downtown Auburn, a short distance to the south.

Existing Conditions Traffic Volumes

Daily vehicle classification counts were conducted on the nineteen roadway segments on Tuesday, May 17, 2005. The 24-hour volumes were used to determine the AM and PM peak hour directional traffic volume for each of the roadway segments, and the classification counts were used to calculate each road segment’s existing heavy vehicle percentage (i.e., percentage of trucks, buses, or recreational vehicles). The existing directional AM and PM peak hour traffic volumes for the roadway segments are presented in Table 5.

At the study intersections, AM and PM peak-period turning movement counts were conducted at the I-80 interchange on August 20, 2004. The traffic counts were performed on a summer Friday, in order to capture typical weekend recreational traffic at the I-80/Auburn Ravine Road/Foresthill Road interchange. As such, the counts represent higher-than-average traffic volumes, thereby providing a conservative indication of traffic operations at the study intersections. The peak hour traffic volumes and existing intersection lane configurations are shown on Figure 2.

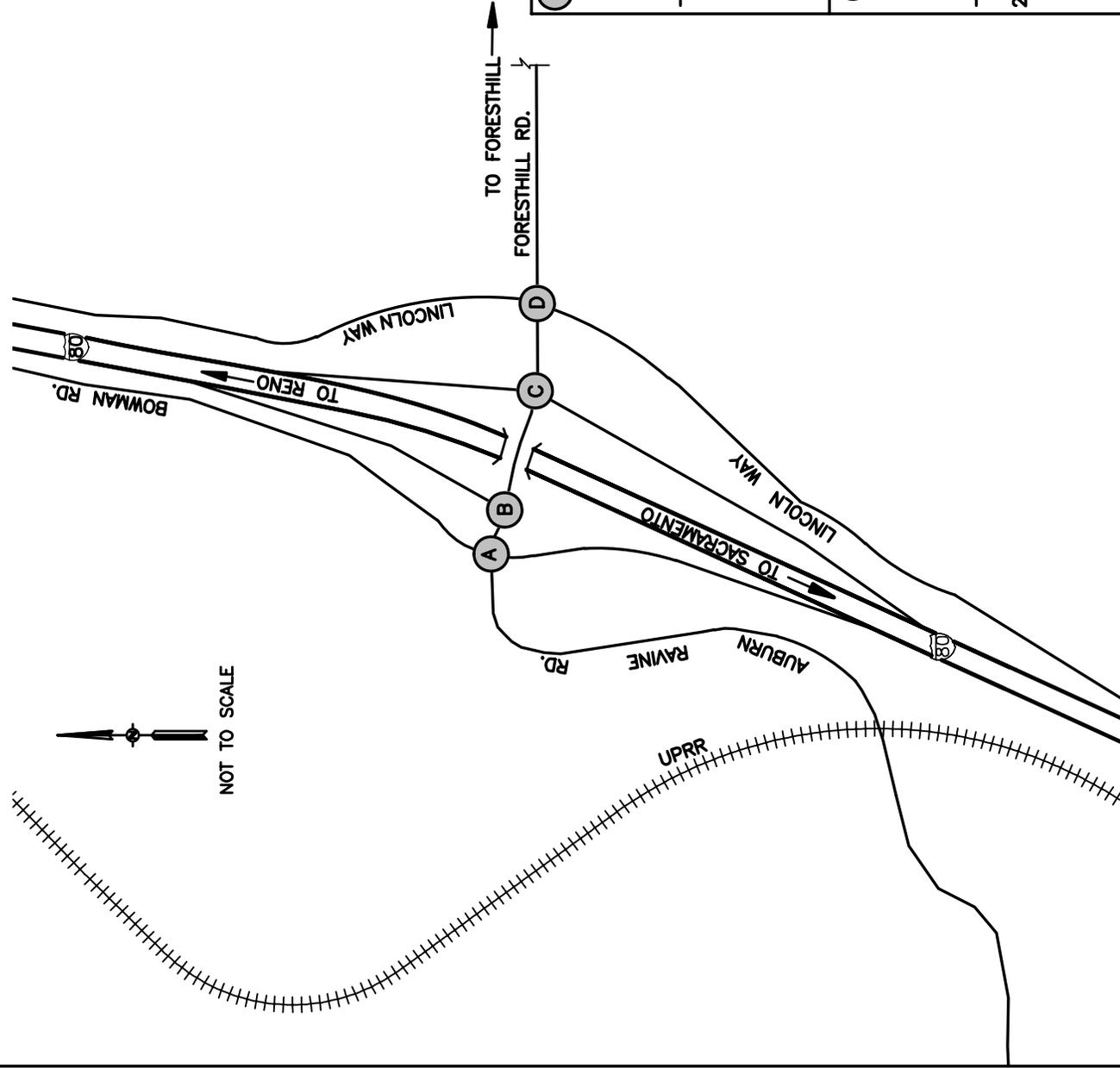
Roadway Segment Level of Service

Table 5 summarizes the existing peak-hour levels of service for each roadway segment. Appendix B contains the technical calculation sheets for the two-lane highway roadway segments. No calculation sheets are provided for the Secondary/Feeder Roads and Local Access Roads because the level of service was determined through a comparison of hourly volumes to the thresholds presented in Tables 2 and 3.

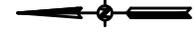
Table 5 Roadway Segment Level of Service Summary¹ Existing Conditions					
Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Volume	LOS ²	Peak Hour Volume	LOS
Foresthill Road – Foresthill Bridge to Spring Garden Road	Eastbound	119	B	525	C
	Westbound	523	C	147	C
Foresthill Road – Spring Garden Rd. to Todd Valley Rd. (West)	Eastbound	156	A	274	B
	Westbound	319	D ³	187	B
Foresthill Road – Todd Valley Road (West) to Owl Hill Court	Eastbound	208	B	229	A
	Westbound	269	D	197	C
Foresthill Road – Owl Hill Court to Yankee Jim's Road	Eastbound	142	B	142	B
	Westbound	148		85	
Foresthill Road – Yankee Jim's Road to Michigan Bluff Road	Eastbound	10	A	32	A
	Westbound	30		16	
Foresthill Road – East of Michigan Bluff Rd.	Eastbound	9	A	12	A
	Westbound	12		4	
McKeon-Ponderosa Way	Northbound	113	B	22	B
	Southbound	16		126	
Spring Garden Road	Northbound	6	A	43	B
	Southbound	37		21	
Happy Pines Drive	Northbound	101	B	38	B
	Southbound	39		96	
Todd Valley Road (West)	Northbound	207	C	104	C
	Southbound	46		165	
Todd Valley Road (East)	Northbound	11	A	19	A
	Southbound	15		6	
Mosquito Ridge Road	Northbound	5	A	5	A
	Southbound	8		7	
Yankee Jim's Road	Northbound	4	A	15	A
	Southbound	11		7	
Main Street	Eastbound	25	A	38	A
	Westbound	10		28	
Michigan Bluff Road	Northbound	10	A	9	A
	Southbound	5		15	
Race Track Street	Eastbound	28	A	51	A
	Westbound	24		25	

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Level of service.
³ Shading denotes an unacceptable level of service.

LEGEND
 ++++++ RAILROAD
 ↩ TURN LANE
 XXX (XXX) AM (PM) PEAK HOUR TRAFFIC VOLUMES
 ● TRAFFIC SIGNAL



NOT TO SCALE



<p>(A)</p> <p>BOWMAN RD. →</p> <p>59 (82) ↘</p> <p>93 (189) →</p> <p>49 (68) ↗</p> <p>120 (146) ↘</p> <p>183 (146) →</p> <p>173 (173) ↗</p> <p>AUBURN RAVINE RD. ←</p>	<p>(B)</p> <p>213 (294) ↘</p> <p>190 (208) →</p> <p>249 (201) ↗</p> <p>AUBURN RAVINE RD. ←</p> <p>213 (362) →</p> <p>1-80 WB OFF-RAMP ↘</p> <p>578 (627) ↘</p>	<p>(C)</p> <p>AUBURN RAVINE RD. ←</p> <p>47 (83) ↘</p> <p>270 (424) →</p> <p>1-80 EB ON-RAMP ↗</p> <p>113 (215) ↗</p> <p>2 (4) →</p> <p>166 (467) ↗</p> <p>245 (335) ↘</p> <p>465 (412) ↗</p>	<p>(D)</p> <p>1-80 WB OFF-RAMP ↘</p> <p>74 (76) ↘</p> <p>104 (145) ↘</p> <p>14 (188) ↘</p> <p>36 (144) ↘</p> <p>82 (188) ↘</p> <p>14 (233) ↘</p> <p>77 (56) ↘</p> <p>301 (164) ↘</p> <p>81 (37) ↘</p>

**INTERSECTION PEAK HOUR TRAFFIC VOLUMES
 EXISTING CONDITIONS**

FIGURE 2

MR
 2000 Plaza Drive
 Folsom, CA 95630
 Phone: (916) 976-6000
 Fax: (916) 976-6000
 www.mr-engineers.com

As shown in Table 5, in the AM peak hour, two of the study roadway segments operate at unacceptable levels of service (i.e., LOS D, E, or F). The two segments of Foresthill Road between Spring Garden Road and Owl Hill Court both operate at LOS D in the westbound direction. Therefore, these two roadway segments fail to meet the County’s LOS C requirement. However, if Placer County adopts the LOS D policy that is under consideration, then all roadway segments would operate acceptably in the AM peak hour.

During the PM peak hour, all nineteen roadway segments operate at LOS C or better, thereby conforming to the current County policy, as well as the modified policy that is being considered.

Intersection Level of Service

Table 6 presents the existing intersection levels of service. The technical calculation sheets for the intersections can be found in Appendix B.

All four study intersections operate at LOS C or better in the AM peak hour. The intersections of Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp and Auburn Ravine Road/I-80 Eastbound Ramps operate at LOS B. The intersection of Auburn Ravine Road/I-80 Westbound Off-ramp operates at LOS A, and Auburn Ravine Road/Foresthill Road/Lincoln Way operates at LOS C. Thus, according to the Caltrans level of service requirement for the study intersections, all four intersections operate at acceptable levels of service in the AM peak hour (i.e., LOS D or better).

During the PM peak hour, all four intersections again meet the Caltrans level of service requirement. The Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection operate at LOS C. The Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp intersection operates at LOS B, whereas the Auburn Ravine Road/I-80 Westbound Off-ramp intersection operates at LOS A.

Table 6					
Intersection Level of Service Summary¹					
Existing Conditions					
Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay ²	LOS ³	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	15.3	B	19.1	B
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	6.8	A	9.7	A
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	13.2	B	20.7	C
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	26.7	C	31.3	C
Notes:					
¹ Reference: Transportation Research Board, <i>Highway Capacity Manual</i> , 2000.					
² Seconds/vehicle.					
³ Level of service.					

CUMULATIVE + PROJECT CONDITIONS

This section documents the long-term effects of the traffic associated with full implementation of the updated Foresthill Divide Community Plan. Cumulative Plus Project conditions analyses are presented for four scenarios: (1) Year 2030 “Without Forest Ranch,” (2) Year 2030 “With Forest Ranch,” (3) Community Plan Buildout “Without Forest Ranch,” and (4) Community Plan Buildout “With Forest Ranch.”

To evaluate the impacts associated with each individual scenario, the volume of traffic generated by each was estimated and assigned to the study area street system. The levels of service at the roadway segments and study intersections were then determined for the AM and PM peak hours.

Planned Roadway Improvements

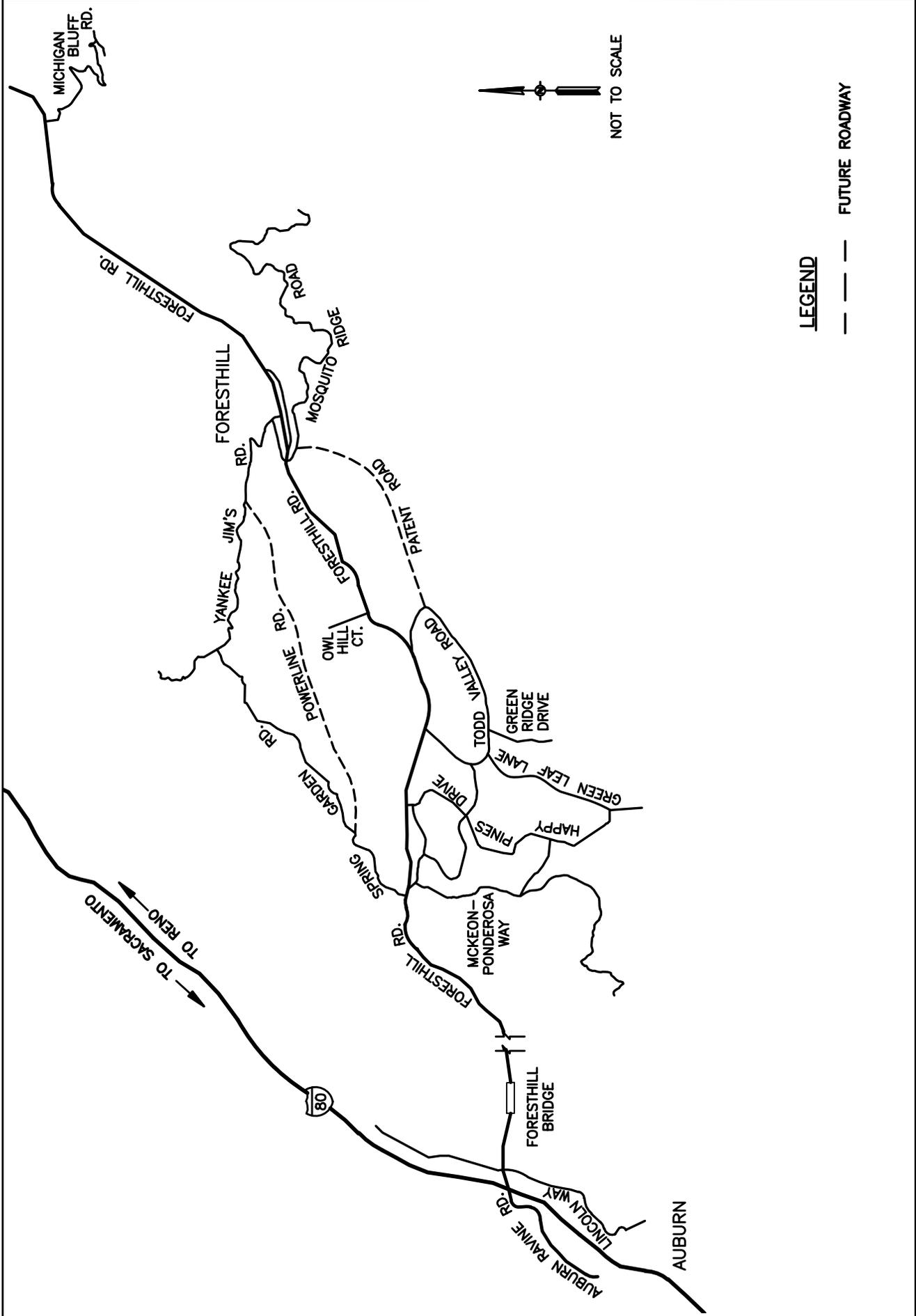
Consultation with Placer County Department of Public Works staff identified the following planned roadway improvements in the Foresthill Divide Community Plan area:

- *Powerline Road* currently is an unimproved, east-west rural road in Foresthill that intersects Spring Garden Road north of Foresthill Road. It will be improved along its existing alignment, and extended from its present eastern terminus to Yankee Jim’s Road.
- *Patent Road* is an east-west rural road that currently runs to the east from Todd Valley Road. This roadway will be extended easterly to intersect Mosquito Ridge Road. In addition, Todd Valley Road will be improved from Green Ridge Drive to the west to the newly-upgraded portion of Patent Road. This new road will provide an east-west connection that parallels Foresthill Road between Todd Valley and downtown Foresthill.

In addition, the following improvement is planned at the I-80/Auburn Ravine Road/Foresthill Road interchange:

- Widening of the I-80/Auburn Ravine Road/Foresthill Road overcrossing to four lanes – This improvement project is included in the *Auburn/Bowman Community Plan* Capital Improvement Program. While the project will be partially funded through the collection of traffic mitigation fees, the remainder of the necessary funding will be obtained through other sources.

Based on County staff direction, it was assumed that the improvements listed above would be completed prior to all four future year analysis scenarios. Figure 3 illustrates the future roadway improvements and circulation network within the Foresthill Divide Community Plan area.



FUTURE CIRCULATION NETWORK

FIGURE 3

MR

2000 Plaza Drive
 Placita, CA 95652
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 Fax: (916) 768-0000
www.mrplanning.com

Trip Generation Rates

The AM and PM peak hour trip generation estimates associated with the land uses proposed in the Foresthill Divide Community Plan were developed based on information presented in *Trip Generation* (Institute of Transportation Engineers, Seventh Edition, 2003). However, the standard ITE trip generation rates were modified before being used in this analysis. Consequently, the rates shown in Table 7 reflect the unique nature of the Foresthill community. Appendix C contains a memorandum from MRO Engineers, Inc. to Placer County staff describing the detailed derivation of the trip generation rates used in this analysis.

Table 7 Trip Generation Rates Foresthill Divide Community Plan								
Land Use	Trip Generation Unit	Daily Trip Rate	AM Peak Hour Trip Rate			PM Peak Hour Trip Rate		
			In	Out	Total	In	Out	Total
Single-Family Residential	Trips/DU ¹	5.07	0.10	0.36	0.46	0.33	0.16	0.49
Multi-Family Residential	Trips/DU	3.66	0.05	0.22	0.27	0.22	0.11	0.33
Retail	Trips/1,000 SF ²	35.5	0.37	0.23	0.60	0.95	1.22	2.17
Office	Trips/1,000 SF	8.81	1.09	0.15	1.24	0.20	0.99	1.19
Industrial	Trips/1,000 SF	5.57	0.55	0.12	0.67	0.14	0.55	0.69
High School	Trips/Student	1.71	0.28	0.13	0.41	0.07	0.07	0.14
Notes: ¹ Dwelling unit ² Square feet								

In the Year 2030 “With Forest Ranch” scenario and the Buildout “With Forest Ranch” scenario, the land uses contained within the Forest Ranch property were analyzed using a separate set of trip generation rates. These rates were developed based on information provided by Placer County staff, representatives of the Forest Ranch project, and information included in previous traffic analyses for the Forest Ranch project. The Forest Ranch trip generation rates specifically reflect the unique nature of that proposed project, particularly with regard to the tripmaking patterns of age-restricted communities, and are based largely on input from the project developer. The specific trip generation rates for the Forest Ranch land uses are presented in Table 8.

Table 8 Trip Generation Rates Forest Ranch								
Land Use	Trip Generation Unit	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Age-Restricted Residential	Trips/DU ¹	2.97	0.06	0.10	0.16	0.13	0.08	0.21
Single-Family Residential	Trips/DU	5.07	0.10	0.36	0.46	0.33	0.16	0.49
Retail	Trips/1,000 SF ²	77.82 ³	1.12	0.71	1.83	3.43	3.72	7.15
Medical Office	Trips/1,000 SF	36.13	1.96	0.52	2.48	1.00	2.72	3.72
Office	Trips/1,000 SF	8.81	1.09	0.15	1.24	0.20	0.99	1.19
Equestrian Center	Trips/Horse	0.70	0.10	0.10	0.20	0.10	0.10	0.2
Recreational Vehicle Park	Trips/Space	3.33	0.08	0.12	0.20	0.26	0.11	0.37
Golf Course	Trips/Hole ⁴	35.74	1.75	0.47	2.22	1.21	1.53	2.74
Notes: ¹ Dwelling unit ² Square feet ³ Retail trip rates were derived using the “fitted curve equation” for “Shopping Centers” (Land Use Code 820) in the ITE <i>Trip Generation</i> manual, and do not reflect internal trips within Forest Ranch site. ⁴ The golf course trip generation rate includes the retail, office, and industrial uses on the golf course site.								

Pass-by Trips

A portion of the trips generated by the retail land uses were assumed to be “pass-by trips.” Pass-by trips are defined as trips that are already on the adjacent roadways, with the trip to the retail land use being an intermediate stop as part of another trip. As defined in the *Trip Generation Handbook* (Institute of Transportation Engineers, Second Edition, June 2004), “Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator.” In this analysis, a 20 percent pass-by adjustment was applied to the trip generation estimates for retail land uses within the Foresthill Divide Community Plan area. At the request of the Forest Ranch developers, the retail trip generation estimates for the Forest Ranch property were not adjusted for pass-by trips.

Tourist Traffic

Foresthill Road provides access to the Tahoe National Forest, which is a key tourist destination in the area. Based on input from U.S. Forest Service representatives, tourist traffic was assumed to consist of about 550 - 600 trips per day on Foresthill Road. Forest Service staff have further indicated that the volume of tourist traffic is expected to double in coming years. Therefore, this analysis assumed that tourist trips will double to approximately 1,150 trips per day in Cumulative Plus Project conditions.

The daily number of tourist trips was converted into AM and PM peak hour trip estimates, as follows:

- AM peak hour – 100 trips (40 eastbound and 60 westbound), and
- PM peak hour – 100 trips (60 eastbound and 40 westbound).

To ensure a conservative estimate, the tourist trips for the AM and PM peak hours were added as “through volume” to all of the study roadway segments on Foresthill Road in all four future year scenarios. Tourist traffic was not added to any other study roadways.

YEAR 2030 “WITHOUT FOREST RANCH” SCENARIO

Project Description

As described earlier, implementation of the updated Foresthill Divide Community Plan is expected to result in the following levels of additional development between the year 2005 and the year 2030:

- Single-Family Residential – 1,413 DU;
- Multi-Family Residential – 20 DU;
- Retail – 90,607 SF;
- Office – 21,993 SF;
- Industrial – 78,750 SF; and
- High School – 565 students.

Trip Generation

Applying the trip generation rates listed in Table 7 to the projected land use values listed above resulted in the trip generation estimates for the Year 2030 “Without Forest Ranch” scenario, which are summarized in Table 9.

As shown in Table 9, the new development expected between the Year 2005 and the Year 2030 will generate a gross total of 1,009 AM peak hour trips and 1,016 PM peak hour trips. However, the gross totals have been classified as two categories of trips: trips internal to the Foresthill community and trips external to Foresthill. In this context, external trips are those that have either an origin or a destination outside the Community Plan area (i.e., only one end of the trip – either the origin or the destination – is within the Foresthill Divide Community Plan area). The internal trips have both ends of the trip within the Plan area; in effect, a non-residential trip (i.e., retail, office, industrial, or school trip) generated within Foresthill will be matched by a residential trip within Foresthill. Generally, such internal trips will be made by Foresthill residents.

Internal Trips

Table 10 presents the set of internal “trip matching” assumptions that were used in the analysis of this scenario. These assumptions were developed based on trip purpose information resulting from the most recent “household travel survey” conducted by the Sacramento Area Council of Governments (SACOG). As shown in Table 9, 588 AM peak hour internal trips and 524 PM peak hour internal trips are expected in this scenario.

External Trips

Also shown in Table 9, 421 AM peak hour external trips and 492 PM peak hour external trips are projected in the Year 2030 “Without Forest Ranch scenario”.

Table 9 Trip Generation Estimate Year 2030 “Without Forest Ranch” Scenario								
Land Use	Size	Unit	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Total Trips								
Single-Family Residential	1,413	DU ¹	141	509	650	466	226	692
Multi-Family Residential	20	DU	1	4	5	4	2	6
Retail	90,607	SF ²	34	21	55	86	111	197
	<i>-20% Pass-by</i>		7	4	11	17	22	39
	<i>Net Retail Trips</i>		27	17	44	69	89	158
Office	21,993	SF	24	3	27	4	22	26
Industrial	78,750	SF	43	9	52	11	43	54
High School	565	Students	158	73	231	40	40	80
Gross Total			394	615	1,009	594	422	1,016
Internal Trips								
Single-Family Residential	1,413	DU	87	203	290	153	106	259
Multi-Family Residential	20	DU	1	3	4	2	1	3
Retail	90,607	SF	24	15	39	62	80	142
Office	21,993	SF	14	2	16	2	13	15
Industrial	78,750	SF	26	5	31	7	26	33
High School	565	Students	142	66	208	36	36	72
Total Internal Trips			294	294	588	262	262	524
Net External Trips								
Single-Family Residential	1,413	DU	54	306	360	313	120	433
Multi-Family Residential	20	DU	0	1	1	2	1	3
Retail	90,607	SF	3	2	5	7	9	16
Office	21,993	SF	10	1	11	2	9	11
Industrial	78,750	SF	17	4	21	4	17	21
High School	565	Students	16	7	23	4	4	8
Total External Trips			100	321	421	332	160	492
Notes: ¹ Dwelling units ² Square Feet								

Table 10 Internal “Trip Matching” Percentages Year 2030 “Without Forest Ranch” Scenario		
Non-residential Land Use	Internal Project Trips (Trips Matched with a Foresthill Residential Trip)	External Project Trips (Trips Beginning or Ending Outside Foresthill)
Retail	90 percent	10 percent
Office	60 percent	40 percent
Industrial	60 percent	40 percent
Schools	90 percent	10 percent
Reference: Sacramento Area Council of Governments, “2000 Sacramento Area Household Travel Survey – Final Report,” November 2000.		

Trip Distribution

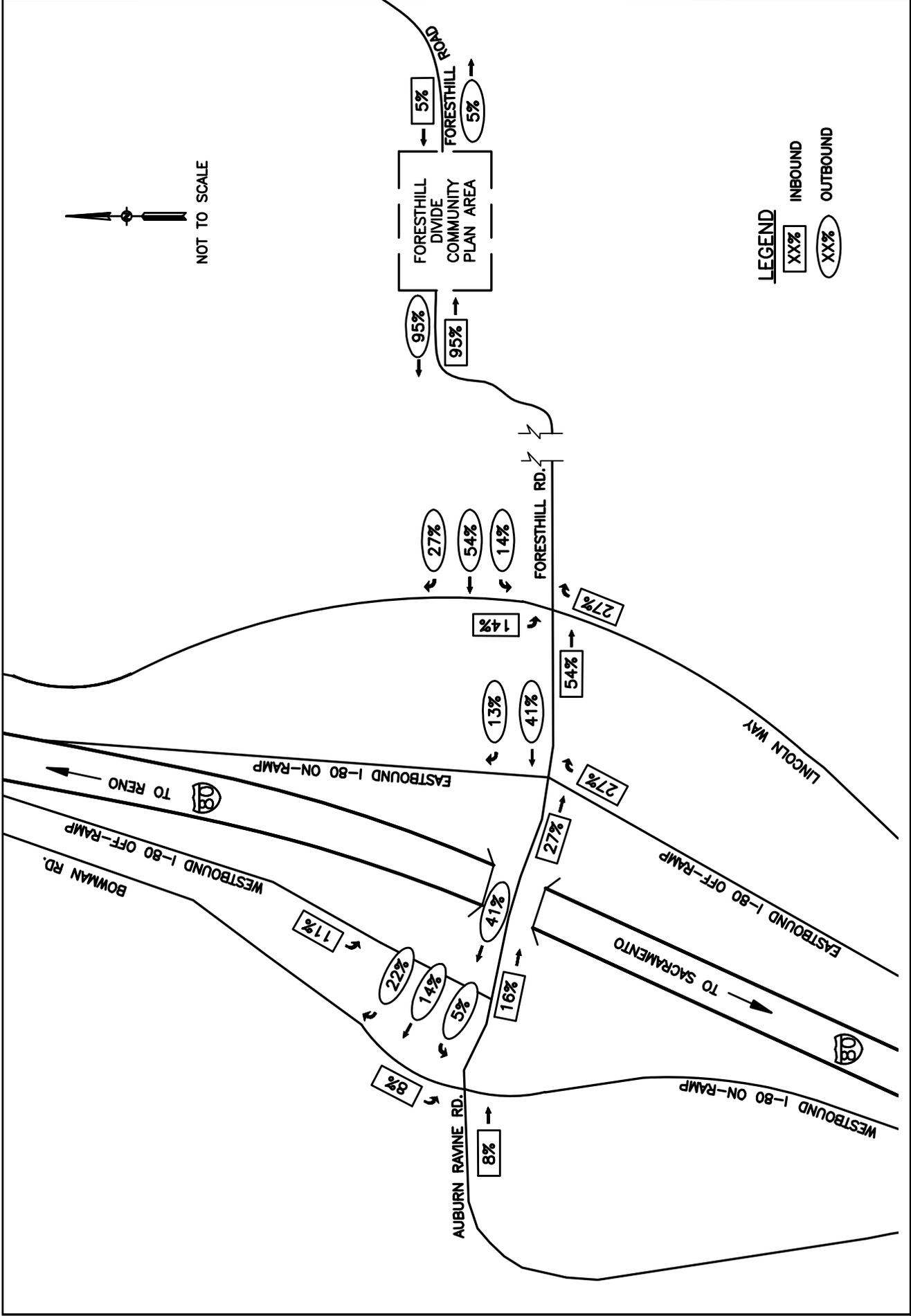
The internal trips, between residential and non-residential land uses within the Foresthill community, were distributed to the roadway network proportionately to where in the Plan area the land uses will be located.

As for distribution of the external trips, 95 percent of the external trips were assumed to be oriented to and from the west on Foresthill Road, and 5 percent of the trips were assumed to travel to and from the east on Foresthill Road. At the I-80 interchange study intersections, the external trips were further distributed. Because traffic patterns are expected to change in the future, the directional distribution of the project-generated external trips was based on projected travel patterns in the study area. The specific trip distribution percentages were based on information generated by the Placer County General Plan travel demand forecasting model. Figure 4 illustrates the detailed distribution of project-generated external trips at the study intersections.

Project Traffic Assignment

For the study roadway segments, the internal and external trips were added to the existing traffic volumes, with the result being the “Cumulative Plus Project” traffic volumes for the Year 2030 “Without Forest Ranch” scenario. These roadway segment traffic volumes are presented in Table 11.

For the study intersections, the external trips were added to a set of “Cumulative No Project” base traffic volumes, rather than existing traffic volumes. Because the study intersections are not located in the Foresthill Divide Community Plan area, the cumulative conditions volumes need to account for growth in the surrounding Auburn/Bowman Community Plan area. The Cumulative No Project volumes were developed using the Placer County General Plan travel demand forecasting model. The addition of the Plan-generated traffic volumes resulted in the “Cumulative Plus Project” traffic volumes for the Year 2030 “Without Forest Ranch” scenario. Figure 5 displays the intersection traffic volumes as well as the future lane configurations.



**TRIP DISTRIBUTION
EXTERNAL TRIPS**

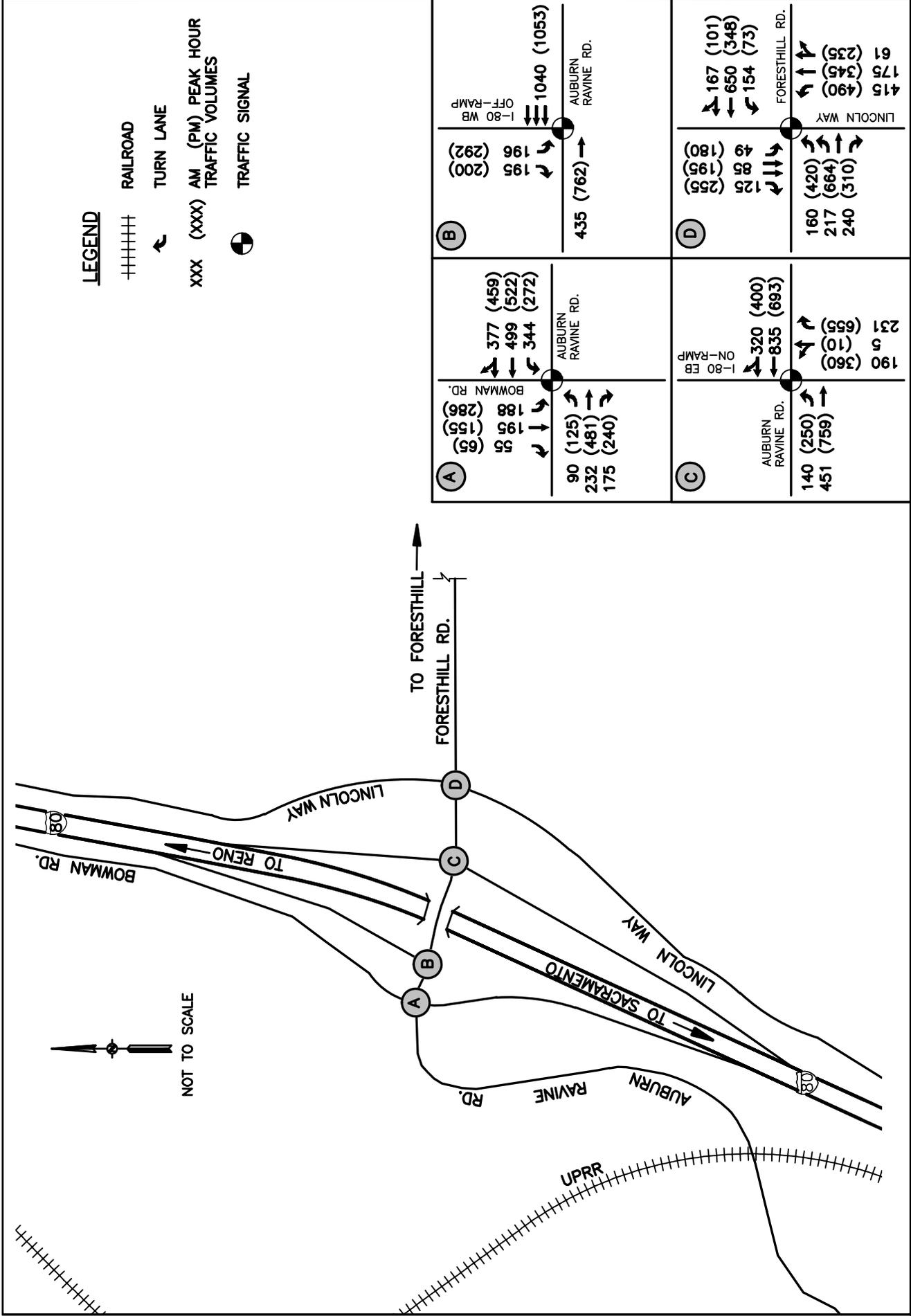
FIGURE 4

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Table 11 Roadway Segment Level of Service Summary¹ Cumulative + Project Conditions Year 2030 “Without Forest Ranch” Scenario					
Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Vol.	LOS ²	Peak Hour Vol.	LOS
Foresthill Rd. – Foresthill Bridge to Spring Garden Rd.	Eastbound	253	C	899	D ³
	Westbound	888	E	341	D
Foresthill Rd. – Spring Garden Rd. to Todd Valley Rd. (West)	Eastbound	328	B	573	C
	Westbound	605	E	383	C
Foresthill Rd. – Todd Valley Rd. (West) to Owl Hill Ct.	Eastbound	353	B	430	B
	Westbound	481	D	350	C
Foresthill Rd. – Owl Hill Ct. to Yankee Jim’s Rd.	Eastbound	227	C	287	C
	Westbound	295		193	
Foresthill Rd. – Yankee Jim’s Rd. to Michigan Bluff Rd.	Eastbound	73	B	123	B
	Westbound	119		88	
Foresthill Road – East of Michigan Bluff Road	Eastbound	66	B	84	B
	Westbound	83		65	
McKeon-Ponderosa Way	Northbound	163	B	46	C
	Southbound	30		174	
Spring Garden Road	Northbound	12	B	65	B
	Southbound	60		30	
Happy Pines Drive	Northbound	172	C	71	C
	Southbound	62		161	
Todd Valley Road (West)	Northbound	205	C	121	C
	Southbound	68		214	
Todd Valley Road (East)	Northbound	25	A	28	A
	Southbound	23		22	
Mosquito Ridge Road	Northbound	101	B	63	B
	Southbound	29		83	
Yankee Jim’s Road	Northbound	8	A	24	A
	Southbound	23		13	
Main Street	Eastbound	33	A	60	B
	Westbound	20		50	
Michigan Bluff Road	Northbound	15	A	11	A
	Southbound	7		20	
Race Track Street	Eastbound	34	A	68	B
	Westbound	44		35	
Patent Road ⁴	Eastbound	83	B	41	B
	Westbound	13		56	
Powerline Road ⁴	Eastbound	10	A	39	B
	Westbound	42		27	

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Level of service.
³ Shading denotes an unacceptable level of service.
⁴ Future roadway.



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INTERSECTION PEAK HOUR TRAFFIC VOLUMES CUMULATIVE + PROJECT CONDITIONS YEAR 2030 "WITHOUT FOREST RANCH" SCENARIO

FIGURE 5

Roadway Segment Level of Service

The roadway segment levels of service under the Year 2030 “Without Forest Ranch” scenario are presented in Table 11. Appendix D contains the technical calculation sheets for the two-lane highway roadway segments. The levels of service for the Secondary/Feeder Roads and the Local Access Roads were determined using the level of service thresholds presented in Table 2 and Table 3, respectively.

During the AM peak hour, three of the study roadway segments are projected to operate at unacceptable levels of service, according to the County’s level of service policy. The westbound segments of Foresthill Road between the Foresthill Bridge and Todd Valley Road are expected to operate at LOS E, while LOS D is projected for the westbound segment from Todd Valley Road to Owl Hill Court.

In the PM peak hour, the proposed Foresthill Divide Community Plan is expected to significantly impact traffic operations on two roadway segments. Both directions of Foresthill Road between the Foresthill Bridge and Spring Garden Road are projected to operate at LOS D, thereby failing to meet the County’s LOS C requirement.

Intersection Level of Service

The AM and PM peak hour intersection level of service results are presented in Table 12. Appendix D contains the intersection level of service calculation worksheets.

The addition of traffic generated by the proposed Community Plan is expected to increase delay at all four study intersections during the AM peak hour. However, all four study intersections will continue to operate at an acceptable LOS D or better.

During the PM peak hour, three of the four study intersections are projected to operate acceptably. The Auburn Ravine Road/Foresthill Road/Lincoln Way intersection is expected to operate at LOS F, and is therefore unacceptable according to the Caltrans LOS D policy.

Table 12 Intersection Level of Service Summary¹ Cumulative + Project Conditions Year 2030 “Without Forest Ranch” Scenario					
Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay ²	LOS ³	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	24.6	C	26.4	C
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	13.8	B	10.6	B
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	21.2	C	48.9	D
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	49.9	D	> 80.0	F ⁴
Notes: ¹ Reference: Transportation Research Board, <i>Highway Capacity Manual</i> , 2000. ² Seconds/vehicle ³ Level of service ⁴ Shading denotes an unacceptable level of service					

Mitigation Measures

Roadway Segments

As noted above, the proposed Foresthill Divide Community Plan is expected to cause a significant impact to traffic operations in the westbound direction of Foresthill Road from the Foresthill Bridge to Owl Hill Court and both directions of Foresthill Road between the Foresthill Bridge and Spring Garden Road. To improve operations to LOS C or better in the Year 2030 “Without Forest Ranch” scenario, the following mitigation measures are recommended:

- Foresthill Road between the Foresthill Bridge and Spring Garden Road (10.8 miles long): Increase the length of passing lanes provided in the eastbound direction from 4.9 to 7.6 miles (including tapers). The additional passing lanes will improve conditions to LOS B in the AM peak hour and LOS C during the PM peak hour. In the westbound direction, increase the length of passing lanes from 1.3 miles to 6.5 miles. The improvements in the westbound direction result in LOS C during both peak hours.
- Foresthill Road between Spring Garden Road and Todd Valley Road (1.7 miles long): Construct 0.8 miles of passing lanes (including tapers) in the westbound direction. This improvement results in LOS C in the AM peak hour and LOS B in the PM peak hour.
- Foresthill Road between Todd Valley Road and Owl Hill Court (1.2 miles long): Construct 0.6 miles of passing lanes (including tapers) in the westbound direction. This mitigation measure improves levels of service in the morning and evening peak hours to LOS C and LOS B, respectively.

Study Intersections

In addition to the roadway segments mentioned above, the Foresthill Divide Community Plan will cause a significant impact to operations at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection during the PM peak hour. The following mitigation measure is recommended for this intersection:

- Modify the westbound approach to provide a dedicated right-turn lane – The westbound approach will change from a left-turn lane, a through lane, and a shared through/right-turn lane to a left-turn lane, two through lanes, and a dedicated right-turn lane; and
- Modify the northbound approach to include dual left-turn lanes – The modified northbound approach configuration will be two left-turn lanes, a through lane, and a shared through/right-turn lane.

Implementation of these mitigation measures at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection will result in LOS D during both peak hours.

I-80 Interchange Improvements Fair Share Contribution

Placer County staff have indicated that the widening of the I-80/Auburn Ravine Road/Foresthill Road overcrossing to four lanes will be partially funded through the collection of traffic mitigation fees. To assist Placer County in allocating the costs of the improvements, the Foresthill Divide Community Plan “fair share” percentage was determined based on the proportion of traffic growth related to the proposed Community Plan. In the Year 2030 “Without Forest Ranch” scenario, traffic generated by the land uses within the Foresthill Divide Community Plan will represent 11.5 percent of the total growth in traffic at the I-80 interchange.

Modified Roadway Segment Level of Service Criteria Results

If Placer County adopts LOS D as the minimum level of service for the study area roadway segments, then only two segments would operate unacceptably in the Year 2030 “Without Forest Ranch” scenario. The westbound segments of Foresthill Road from the Foresthill Bridge to Spring Garden Road and from Spring Garden Road to Todd Valley Road are both expected to operate at LOS E in the AM peak hour and would, therefore, not meet the LOS D minimum. Under the modified level of service policy, all roadway segments would operate acceptably in the PM peak hour.

To improve operations of the two roadway segments identified above to LOS D or better, the following mitigation measures would be required:

- Foresthill Road between the Foresthill Bridge and Spring Garden Road (10.8 miles long): Increase the length of passing lanes in the westbound direction from the existing 1.3 miles to 1.5 miles. This would result in LOS D during both peak hours. (The level of service calculation worksheets are presented in Appendix E.)
- Foresthill Road between Spring Garden Road and Todd Valley Road (1.7 miles long): Construct 0.2 miles of passing lanes (including tapers) in the westbound direction. This improvement would result in LOS D in the AM peak hour and LOS C in the PM peak hour. (The level of service calculation worksheets are provided in Appendix E.)

YEAR 2030 “WITH FOREST RANCH” SCENARIO***Project Description***

The Year 2030 “With Forest Ranch” scenario includes the development of land uses in the Foresthill community as well as development of the Forest Ranch property. However, it is not a simple combination of the Foresthill land uses described in the previous section and the Forest Ranch project. Primarily, this is because 158 single-family dwelling units are assumed to exist in both the Year 2030 “With Forest Ranch” and Year 2030 “Without Forest Ranch” scenarios. Under the “with” scenario, these dwelling units are part of Forest Ranch, while under the “without” scenario those units were included in the Community Plan.

Therefore, in the Year 2030 “With Forest Ranch” scenario, the following level of incremental development is proposed within the Foresthill Divide Community Plan area:

- Single-Family Residential – 1,255 DU;
- Multi-Family Residential – 20 DU;
- Retail – 90,607 SF;
- Office – 21,993 SF;
- Industrial – 78,750 SF; and
- High School – 565 students.

Note that these land use values are identical to the Year 2030 “Without Forest Ranch” scenario, with the exception of the 158 single-family DU referred to above (and shown below as part of Forest Ranch).

The following describes the additional land uses associated with the Forest Ranch project:

- Age-Restricted Residential – 1,700 DU;
- Single-Family Residential – 158 DU;
- Retail – 67,762 SF;
- Medical Office – 34,592 SF;
- Office – 23,092 SF (to be located off-site of the Forest Ranch property, but within Foresthill);
- Equestrian Center – 50 horses;
- Recreational Vehicle (RV) Park – 100 RV spaces; and
- Golf Course, including: an 18-hole course; 2,500 SF of retail; 2,500 SF of office; and 5,000 SF of industrial.

Trip Generation

Applying the trip generation rates in Tables 7 and 8 to the land uses listed above resulted in the trip generation estimates for the Year 2030 “With Forest Ranch” scenario, as summarized in Table 13. As described earlier, a 20 percent pass-by adjustment was applied to the Community Plan-generated retail trips, while the Forest Ranch retail land uses were not adjusted to reflect pass-by trips (as requested by the Forest Ranch developers).

Table 13 Trip Generation Estimate Year 2030 “With Forest Ranch” Scenario								
Land Use	Size	Unit	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Total Trips								
SF Residential (Foresthill)	1,255	DU ¹	125	452	577	414	201	615
SF Residential (FR ²)	158	DU	12	47	59	30	8	38
<i>SF Residential Subtotal</i>	1,413	DU	137	499	636	444	209	653
Multi-Family Residential	20	DU	1	4	5	4	2	6
Age-Restricted Res.	1,700	DU	102	170	272	221	136	357
Retail (Foresthill)	90,607	SF ³	34	21	55	86	111	197
	<i>-20% Pass-by</i>		7	4	11	17	22	39
	<i>Net Retail Trips</i>		27	17	44	69	89	158
Retail (FR)	67,762	SF	25	16	41	77	84	161
<i>Retail Subtotal</i>	158,369	SF	52	33	85	146	173	319
Office (Foresthill)	21,993	SF	24	3	27	4	22	26
Office (FR Off-site)	23,092	SF	25	3	28	5	23	28
<i>Office Subtotal</i>	45,085	SF	49	6	55	9	45	54
Medical Office (FR)	34,592	SF	23	6	29	12	31	43
Industrial	78,750	SF	43	9	52	11	43	54
Golf Course (FR)	18	Holes	11	3	14	7	9	16
Equestrian Center (FR)	50	Horses	2	2	4	2	2	4
RV Park (FR)	100	Spaces	8	12	20	26	11	37
High School	565	Students	158	73	231	40	40	80
Gross Total			586	817	1,403	922	701	1,623
Internal Trips								
Single-Family Residential	1,413	DU	65	203	268	185	118	303
Multi-Family Residential	20	DU	0	2	2	2	1	3
Age-Restricted Resid'l.	1,700	DU	48	69	117	92	77	169
Retail	158,369	SF	47	30	77	131	156	287
Office	45,085	SF	29	4	33	5	27	32
Medical Office	34,592	SF	21	5	26	11	28	39
Industrial	78,750	SF	26	5	31	7	26	33
Golf Course	18	Holes	7	2	9	4	5	9
Equestrian Center	50	Horses	2	2	4	2	2	4
RV Park	100	Spaces	0	0	0	0	0	0
High School	565	Students	142	65	207	36	35	71
Total Internal Trips			387	387	774	475	475	950

(Table 13 continues on the next page)

Table 13 (Continued) Trip Generation Estimate Year 2030 “With Forest Ranch” Scenario								
<i>Net External Trips</i>								
Single-Family Residential	1,413	DU	72	296	368	259	91	350
Multi-Family Residential	20	DU	1	2	3	2	1	3
Age-Restricted Res.	1,700	DU	54	101	155	129	59	188
Retail	158,369	SF	5	3	8	15	17	32
Office	45,085	SF	20	2	22	4	18	22
Medical Office	34,592	SF	2	1	3	1	3	4
Industrial	78,750	SF	17	4	21	4	17	21
Golf Course	18	Holes	4	1	5	3	4	7
Equestrian Center	50	Horses	0	0	0	0	0	0
RV Park	100	Spaces	8	12	20	26	11	37
High School	565	Students	16	8	24	4	5	9
Total External Trips			199	430	629	447	226	673
Notes:								
¹ Dwelling unit								
² The designation (FR) refers to Forest Ranch land use trip generation estimates. In the <i>Internal Trips</i> and <i>Net External Trips</i> portions of the table, the Foresthill and Forest Ranch land uses were combined into one category.								
³ Square feet								

The land uses proposed in the Year 2030 “With Forest Ranch” scenario will generate a gross total of about 1,403 AM peak hour trips and 1,623 PM peak hour trips. In this case, the gross totals in Table 13 include all trips generated by the Foresthill Divide Community Plan and the trips generated by Forest Ranch that are “external” to Forest Ranch.

Forest Ranch Internal Trips

To be consistent with previous traffic studies for Placer County projects that are considered to be similar to the Forest Ranch project (e.g., Bickford Ranch), the following assumptions concerning internal trip matching were incorporated into this analysis:

- An internal trip matching factor of two-thirds (i.e., 66.67 percent) was applied to all non-residential land uses within Forest Ranch (except the RV Park); that is, it was assumed that two-thirds of the non-residential peak-hour trips will match a residential trip entirely within Forest Ranch.
- The remaining one-third of the non-residential Forest Ranch trips will have either an origin or a destination outside of Forest Ranch, and possibly (but not necessarily) outside of the Foresthill community. To determine which Forest Ranch trips would remain internal to the Foresthill area, “external” Forest Ranch trips were then subject to the same assumptions regarding internal trip matching as the Community Plan-generated trips.
- The internal Forest Ranch trips were assumed to occur completely within that project and were eliminated from the roadway segment analysis altogether, as these trips would never reach the study roadway segments.

- The RV Park land use was assumed to generate trips that have one trip end entirely external to both Forest Ranch and Foresthill.

Foresthill Internal Trips

The gross trip generation totals from Table 13 were further segregated into trips internal to the Foresthill community and trips that have one end external to the Foresthill community. The trips internal to Foresthill are assumed to have both ends of the trip located entirely within the Plan area. In this scenario, however, one end of an internal trip could be in either Foresthill or Forest Ranch. As shown in Table 13, 774 AM peak hour internal trips and 950 PM peak hour internal trips are expected in the Year 2030 “With Forest Ranch” scenario.

Generally, the same internal “trip matching” percentages from the previous scenario were used for the Foresthill community land uses. This scenario does, however, include additional trip matching assumptions for the land uses directly associated with Forest Ranch. These are described in detail in Table 14.

Table 14 Internal “Trip Matching” Percentages Year 2030 “With Forest Ranch” Scenario		
Non-residential Land Use	Internal Project Trips (Trips Matched with a Foresthill Residential Trip)	External Project Trips (Trips Beginning or Ending Outside Foresthill)
Retail	90 percent	10 percent
Medical Office	90 percent	10 percent
Office	60 percent	40 percent
Industrial	60 percent	40 percent
Schools	90 percent	10 percent
Equestrian Center	90 percent	10 percent
Recreation Vehicle Park	0 percent	100 percent
Golf Course	60 percent	40 percent
Reference: Sacramento Area Council of Governments, “2000 Sacramento Area Household Travel Survey – Final Report,” November 2000.		

Foresthill External Trips

As presented in Table 13, 629 AM peak hour external trip and 673 PM peak hour external trips are expected in this scenario. In this case, an external trip will have one end of the trip in either Foresthill or Forest Ranch, and one end of the trip entirely outside of the Community Plan area.

Trip Distribution

As in the previous scenario, the internal trip pairs were distributed to the roadway network proportionately to where in the Plan area the land uses will be located.

For the external trips leaving the Community Plan area, 95 percent of the trips were assumed to be oriented to and from the west on Foresthill Road, while 5 percent would travel to and from the east. At

the study intersections, the trip distribution used in the Year 2030 “Without Forest Ranch” scenario was also used for the Year 2030 “With Forest Ranch” scenario. Figure 4 presents the detailed trip distribution for the I-80 interchange.

Project Traffic Assignment

The traffic associated with the Year 2030 “With Forest Ranch” scenario was added to the existing roadway segment traffic volumes and the “Cumulative No Project” intersection volumes. The resulting “Cumulative Plus Project” traffic volumes for the roadway segments are displayed in Table 15. Figure 6 illustrates the “Cumulative Plus Project” intersection traffic volumes and lane configurations for the Year 2030 “With Forest Ranch” scenario.

Roadway Segment Level of Service

The Year 2030 “With Forest Ranch” scenario roadway segment traffic volumes are presented in Table 15. The level of service calculation worksheets for the two-lane highway roadway segments are contained in Appendix F.

The addition of traffic associated with the Forest Ranch project will add traffic to (and, therefore, exacerbate operations on) the study roadway segments that are already expected to fall short of the LOS C requirement in the Year 2030 “Without Forest Ranch” scenario. Specifically, in the AM peak hour, the westbound direction of Foresthill Road between the Foresthill Bridge and Todd Valley Road is again expected to operate at LOS E, and the westbound direction between Todd Valley Road and Owl Hill Court is projected to operate at LOS D. The remaining study roadway segments are expected to operate at acceptable levels of service during this peak hour.

In the PM peak hour, 17 of the 21 study roadway segments are projected to operate acceptably (i.e., LOS C or better). The westbound Foresthill Road segments between the Foresthill Bridge and Owl Hill Court are not expected to meet the County’s level of service standard under this scenario. This is also true of the eastbound segment between the Foresthill Bridge and Spring Garden Road.

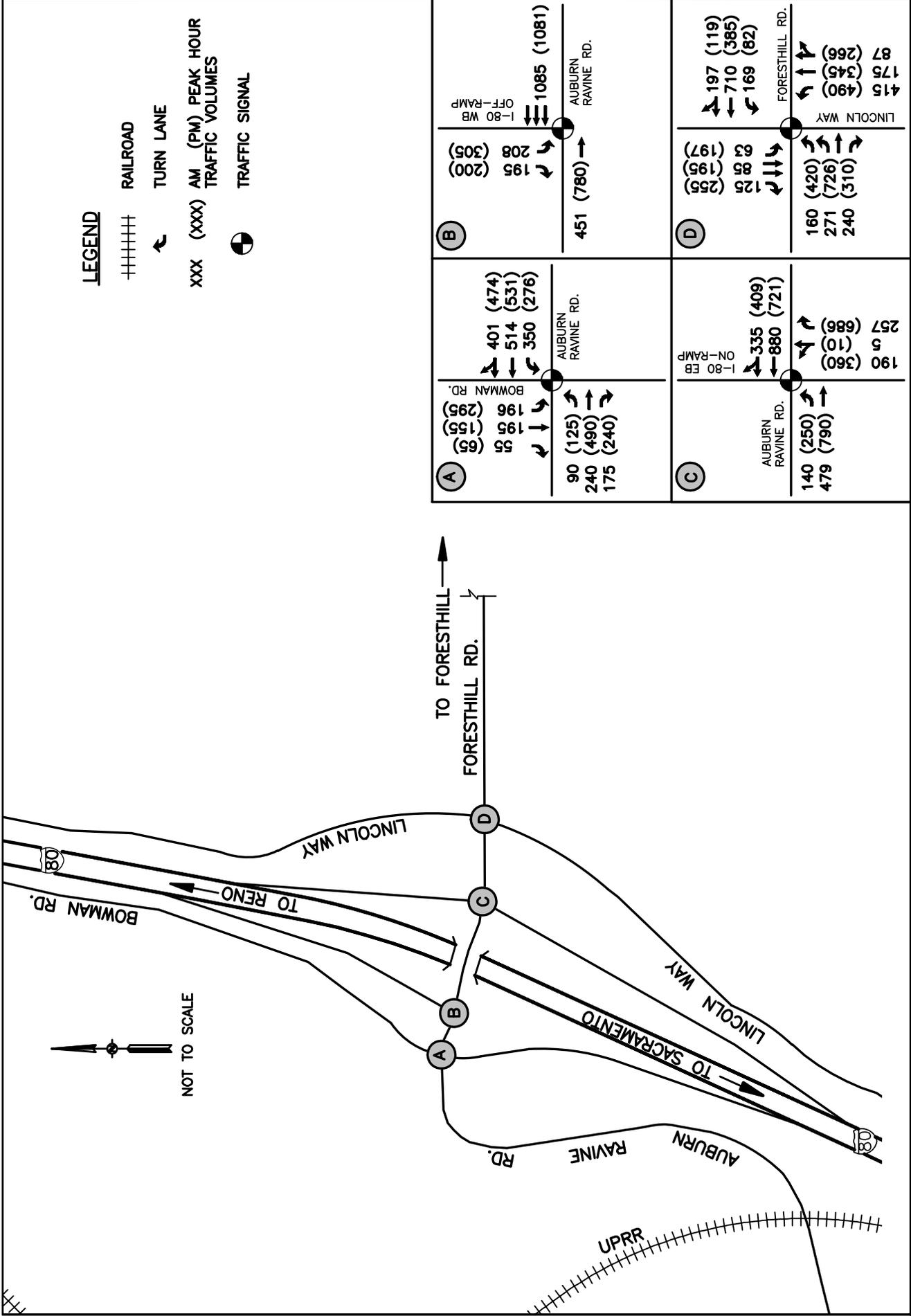
Intersection Level of Service

The AM and PM peak hour intersection levels of service for this scenario are presented in Table 16. Appendix F contains the intersection level of service calculation worksheets for the Year 2030 “With Forest Ranch” scenario.

During the AM peak hour, all four study intersections are expected to continue operating at acceptable levels of service (i.e., LOS D or better) with the addition of traffic generated by Forest Ranch. The Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp intersection and the Auburn Ravine Road/I-80 Eastbound Ramps intersection are projected to operate at LOS C. The Auburn Ravine Road/I-80 Westbound Off-ramp intersection is expected to operate at LOS B, and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection will operate at LOS D.

Table 15 Roadway Segment Level of Service Summary¹ Cumulative + Project Conditions Year 2030 “With Forest Ranch” Scenario					
Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Volume	LOS ²	Peak Hour Volume	LOS
Foresthill Road – Foresthill Bridge to Spring Garden Road	Eastbound	347	C	1,009	D
	Westbound	993	E ³	405	D
Foresthill Road – Spring Garden Road to Todd Valley Road (West)	Eastbound	405	B	676	C
	Westbound	684	E	455	D
Foresthill Road – Todd Valley Road (West) to Owl Hill Court	Eastbound	431	C	551	B
	Westbound	549	D	432	D
Foresthill Road – Owl Hill Court to Yankee Jim’s Road	Eastbound	338	C	459	C
	Westbound	416		330	
Foresthill Road – Yankee Jim’s Road to Michigan Bluff Road	Eastbound	80	B	126	B
	Westbound	124		92	
Foresthill Rd. – East of Michigan Bluff Rd.	Eastbound	71	B	87	B
	Westbound	88		71	
McKeon-Ponderosa Way	Northbound	165	B	48	C
	Southbound	31		176	
Spring Garden Road	Northbound	24	B	94	B
	Southbound	82		44	
Happy Pines Drive	Northbound	167	C	64	C
	Southbound	61		150	
Todd Valley Road (West)	Northbound	244	C	111	C
	Southbound	58		197	
Todd Valley Road (East)	Northbound	27	A	27	A
	Southbound	24		19	
Mosquito Ridge Road	Northbound	98	B	81	B
	Southbound	46		100	
Yankee Jim’s Road	Northbound	28	B	70	B
	Southbound	57		44	
Main Street	Eastbound	37	A	59	B
	Westbound	21		52	
Michigan Bluff Road	Northbound	15	A	11	A
	Southbound	7		20	
Race Track Street	Eastbound	44	B	87	B
	Westbound	61		46	
Patent Road ⁴	Eastbound	78	B	47	B
	Westbound	22		69	
Powerline Road ⁴	Eastbound	40	B	69	B
	Westbound	55		57	

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Level of service.
³ Shading denotes an unacceptable level of service.
⁴ Future roadway.



**INTERSECTION PEAK HOUR TRAFFIC VOLUMES
CUMULATIVE + PROJECT CONDITIONS
YEAR 2030 "WITH FOREST RANCH" SCENARIO**

FIGURE 6

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In the PM peak hour, two of the four study intersections will not meet the Caltrans Level of Service D requirement. The Auburn Ravine Road/Foresthill Road/Lincoln Way intersection is expected to operate at LOS F, the same as in the Year 2030 “Without Forest Ranch” scenario. The traffic generated by Forest Ranch is projected to degrade the level of service at the Auburn Ravine Road/I-80 Eastbound Ramps intersection from LOS D to LOS E, thereby resulting in a significant impact to traffic operations.

Table 16 Intersection Level of Service Summary¹ Cumulative + Project Conditions Year 2030 “With Forest Ranch” Scenario					
Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay ²	LOS ³	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	24.3	C	26.5	C
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	14.0	B	10.5	B
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	22.1	C	65.2 ⁴	E
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	52.6	D	> 80.0	F

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Seconds/vehicle
³ Level of service
⁴ Shading denotes an unacceptable level of service

Mitigation Measures

Roadway Segments

In the Year 2030 “With Forest Ranch” scenario, four segments on Foresthill Road between the Foresthill Bridge and Owl Hill Court are not expected to meet the County’s LOS C requirement. The mitigation measures listed below are recommended to improve the level of service on those roadway segments to conform to that standard.

- Foresthill Road between the Foresthill Bridge and Spring Garden Road (10.8 miles long): Increase the total length of passing lanes provided in the eastbound direction from 4.9 to 7.6 miles (including tapers). The additional length of passing lanes will improve conditions to LOS C during the both peak hours. In the westbound direction, increase the length of passing lanes from 1.3 miles to 7.6 miles (including tapers), which will also result in LOS C in both peak hours. The increase in passing lanes in the westbound direction is 1.1 miles more than what is necessary in the “Without Forest Ranch” scenario.

- Foresthill Road between Spring Garden Road and Todd Valley Road (1.7 miles long): Construct 0.8 miles of passing lanes (including tapers) in the westbound direction, which results in LOS C in the AM peak hour and LOS B in the PM peak hour.
- Foresthill Road between Todd Valley Road and Owl Hill Court (1.2 miles long): Construct 0.6 miles of passing lanes (including tapers) in the westbound direction. This mitigation measure improves levels of service in the morning and evening peak hours to LOS C and LOS B, respectively.

Study Intersections

As mentioned previously, the traffic generated by the Community Plan in combination with the traffic generated by Forest Ranch will result in significant impacts to traffic operations at two of the study intersections in the PM peak hour. The mitigation measures described below are recommended to improve the level of service at these intersections.

- Auburn Ravine Road/I-80 Eastbound Ramps: Modify the westbound approach to convert the shared through/right-turn lane to separate through and right-turn lanes. This mitigation measure will result in LOS B in the AM peak hour and LOS D during the PM peak hour.
- Auburn Ravine Road/Foresthill Road/Lincoln Way: Modify the westbound approach to add a dedicated right-turn lane, alter the northbound approach to provide dual left-turn lanes, and convert the eastbound right-turn lane to a shared through/right-turn lane (with an appropriate transition on the eastbound departure leg of the intersection). These three modifications will result in LOS D in both peak hours.

Forest Ranch “Fair Share” Contribution

According to the level of service standards set forth in Placer County, a project is considered to cause a significant impact to traffic operations if: (1) the additional project traffic causes level of service to drop into an unacceptable range, or (2) the project increases traffic volumes on a roadway segment or intersection that already operates unacceptably without the project. In the first case, if the Forest Ranch project directly causes unacceptable traffic operations on a roadway segment or intersection, that project will be responsible for the entire cost of any required mitigation measures. In the second case, if the Forest Ranch project adds traffic to a roadway segment or intersection that is already expected to operate at an unacceptable level of service without the project, the Forest Ranch project will be responsible for a proportional share of the cost of needed roadway improvements. The following list describes the percentage of the improvement cost for which Forest Ranch is responsible, based on the percentage of new traffic generated by that project:

- Foresthill Road between the Foresthill Bridge and Spring Garden Road: Forest Ranch is responsible 29 percent of the cost of improvements in the eastbound direction, 23 percent of 5.2 miles of passing lanes needed in the westbound direction, and 100 percent of the cost of the additional 1.1 miles needed in the westbound direction (beyond what is needed in the “without” scenario).
- Foresthill Road between Spring Garden Road and Todd Valley Road: Forest Ranch is responsible for 24 percent of the cost of improvements in the westbound direction.
- Foresthill Road between Todd Valley Road and Owl Hill Court: For improvements in the westbound direction, Forest Ranch is responsible for 29 percent of the cost of the recommended measure.

In addition, the Forest Ranch project is responsible for a portion of the improvements at the two intersections that will fall short of the LOS requirement in the PM peak hour, as follows:

- Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Forest Ranch is 100 percent responsible for the cost of improvements to the eastbound approach, because this mitigation measure was not necessary in the “Without Forest Ranch” scenario. Additionally, Forest Ranch is responsible for 27 percent of the cost of improvements to the westbound and northbound approaches.
- Auburn Ravine Road/I-80 Eastbound Ramps intersection – Forest Ranch is responsible for 100 percent of the cost of the recommended improvements because this intersection operates at an acceptable LOS D in the “Without Forest Ranch” scenario, but operates at LOS E in the “With Forest Ranch” scenario. Therefore, Forest Ranch is directly responsible for the significant impact at this intersection.

I-80 Interchange Improvements Fair Share Contribution

For the widening of the I-80/Auburn Ravine Road/Foresthill Road overcrossing to four lanes, the “fair share” contribution was determined for both the Foresthill Divide Community Plan and the Forest Ranch project. In the Year 2030 “With Forest Ranch” scenario, the Community Plan is expected to generate 10.9 percent of the traffic growth at the interchange, and the Forest Ranch project is projected to generate 4.7 percent of the new traffic.

Modified Roadway Segment Level of Service Criteria Results

If Placer County adopts LOS D as the minimum acceptable level of service on Foresthill Road, two segments would operate below this standard in the Year 2030 “With Forest Ranch” scenario. The westbound segments of Foresthill Road from the Foresthill Bridge to Spring Garden Road and from Spring Garden Road to Todd Valley Road are both expected to operate at LOS E in the AM peak hour. In the PM peak hour, all study roadway segments are expected to meet the modified level of service policy.

To improve operations of these two roadway segments to LOS D or better, the following mitigation measures would be needed:

- Foresthill Road between the Foresthill Bridge and Spring Garden Road (10.8 miles long): Increase the length of passing lanes in the westbound direction from the existing 1.3 miles to 1.8 miles. This improvement would result in LOS D during both peak hours. Forest Ranch would be responsible for 23 percent of the cost of 0.2 miles of passing lanes and 100 percent of the cost of the additional 0.3 miles of passing lanes beyond what would be needed in the “without” scenario. (Appendix G contains the level of service calculation worksheets.)
- Foresthill Road between Spring Garden Road and Todd Valley Road (1.7 miles long): Construct 0.2 miles of passing lanes (including tapers) in the westbound direction. This improvement results in LOS D in the AM peak hour and LOS C in the PM peak hour. Forest Ranch would be responsible for 24 percent of the cost of this improvement. (The level of service calculation worksheets for the modified level of service criteria are presented in Appendix G.)

COMMUNITY PLAN BUILDOUT “WITHOUT FOREST RANCH” SCENARIO***Project Description***

This scenario analyzes the potential buildout of the proposed Foresthill Divide Community Plan. According to information provided by Placer County Planning Department staff, the following levels of new development in the Foresthill Community are projected by the theoretical buildout year of the Plan:

- Single-Family Residential – 4,855 DU;
- Multi-Family Residential – 314 DU;
- Retail – 350,000 SF;
- Office – 180,954 SF;
- Industrial – 1,638,443 SF; and
- High School – 565 students.

Trip Generation

The trip generation estimates for the Buildout “Without Forest Ranch” scenario were determined utilizing the trip generation rates summarized in Table 7 and the land use amounts listed above. Table 17 presents the detailed trip generation estimates for the land uses proposed in this scenario, including the gross trip generation totals, the internal trips, and the net external trips.

As described in Table 17, a gross total of 4,040 AM peak hour trips and 4,516 PM peak hour trips are projected for the Buildout “Without Forest Ranch” scenario.

Internal Trips

The gross totals presented in the top section of Table 17 were separated into internal trips and external trips for each land use category. As shown in the mid-section of that table, 1,866 AM peak hour internal trips and 2,400 PM peak hour internal trips are projected in this scenario. Table 18 describes the internal “trip matching” assumptions used in the Buildout “Without Forest Ranch” analysis.

As shown in Table 18, the internal trip factors used in the Buildout analysis vary slightly from those used in the Year 2030 analysis. Specifically, in the industrial land use category, the internal trip matching percentage was assumed to be somewhat lower in the Buildout analysis than in the Year 2030 analysis (i.e., 40 percent rather than 60 percent). This reflects the expectation that the amount of growth expected in this land use category is sufficient that many of the peak-hour trips will be drawn from areas outside of the Foresthill community. In effect, the residential population in Foresthill would be inadequate to supply the number of employees needed to support the increased demand in the industrial workforce. Consequently, a greater proportion of the industrial employees will come from outside the community, thereby increasing the volume of external trips.

External Trips

The lower portion of Table 17 presents the external trips for the Buildout “Without Forest Ranch” scenario. It shows 2,174 AM peak hour and 2,116 PM peak hour external trips.

Table 17 Trip Generation Estimate Buildout “Without Forest Ranch” Scenario								
Land Use	Size	Unit	AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Total Trips								
Single-Family Residential	4,855	DU ¹	485	1,748	2,233	1,602	777	2,379
Multi-Family Residential	314	DU	16	69	85	69	35	104
Retail	350,000	SF ²	130	81	211	333	427	760
	<i>- 20% Pass-by</i>		26	16	42	67	85	152
	<i>Net Retail Trips</i>		104	65	169	266	342	608
Office	180,954	SF	197	27	224	36	179	215
Industrial	1,638,443	SF	901	197	1,098	229	901	1,130
High School	565	Students	158	73	231	40	40	80
Gross Total			1,861	2,179	4,040	2,242	2,274	4,516
Internal Trips								
Single-Family Residential	4,855	DU	212	687	899	777	373	1150
Multi-Family Residential	314	DU	7	27	34	33	17	50
Retail	350,000	SF	94	58	152	240	307	547
Office	180,954	SF	118	16	134	22	107	129
Industrial	1,638,443	SF	360	79	439	92	360	452
High School	565	Students	142	66	208	36	36	72
Total Internal Trips			933	933	1,866	1,200	1,200	2,400
Net External Trips								
Single-Family Residential	4,855	DU	273	1,061	1,334	825	404	1,229
Multi-Family Residential	314	DU	9	42	51	36	18	54
Retail	350,000	SF	10	7	17	26	35	61
Office	180,954	SF	79	11	90	14	72	86
Industrial	1,638,443	SF	541	118	659	137	541	678
High School	565	Students	16	7	23	4	4	8
Total External Trips			928	1,246	2,174	1,042	1,074	2,116
Notes:								
¹ Dwelling unit								
² Square feet								

Table 18 Internal “Trip Matching” Percentages Buildout “Without Forest Ranch” Scenario		
Non-residential Land Use	Internal Project Trips (Trips Matched with a Foresthill Residential Trip)	External Project Trips (Trips Beginning or Ending Outside Foresthill)
Retail	90 percent	10 percent
Office	60 percent	40 percent
Industrial	40 percent	60 percent
Schools	90 percent	10 percent
Reference: Sacramento Area Council of Governments, “2000 Sacramento Area Household Travel Survey – Final Report,” November 2000.		

Trip Distribution

The internal trips were again distributed proportionately to and from the locations in the Plan area where the land uses are proposed in the Buildout “Without Forest Ranch” scenario. The external trip distribution followed the same patterns as in the previous scenarios. Thus, it was assumed that 5 percent of trips will be oriented to and from the east on Foresthill Road, and the remaining trips would travel to and from the west, towards the City of Auburn. At the I-80 interchange study intersections, the same trip distribution used in the Year 2030 analysis was used in the Buildout analysis; the detailed distribution was illustrated on Figure 4.

Project Traffic Assignment

For the roadway segment analysis, the internal and external trips were added to the existing traffic volumes, with the result being the “Cumulative Plus Project” traffic volumes for the Buildout “Without Forest Ranch” scenario. The roadway segment traffic volumes for this scenario are presented in Table 19.

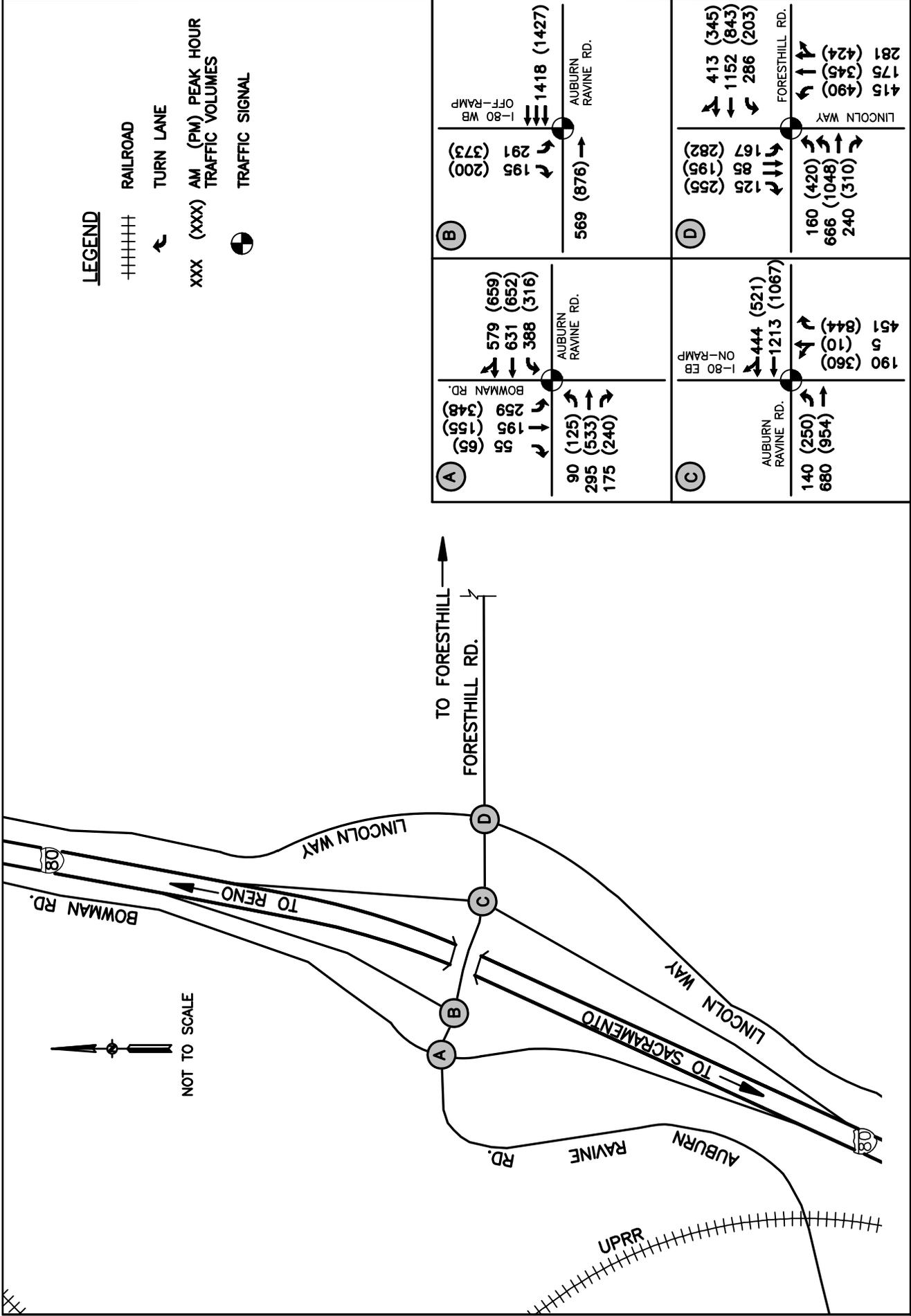
For the analysis of the study intersections, the external trips were added to the “Cumulative No Project” traffic volumes, resulting in the “Cumulative Plus Project” traffic volumes for the Buildout “Without Forest Ranch” scenario. Figure 7 displays the intersection traffic volumes and assumed future lane configurations for this scenario.

Roadway Segment Level of Service

Table 19 also presents the roadway segment levels of service, in addition to the traffic volumes. The level of service calculation worksheets for the two-lane highway segments are contained in Appendix H. The levels of service for the other two roadway types, Secondary/Feeder Roads and Local Access Roads, were determined using the level of service thresholds presented in Tables 2 and 3.

Table 19 Roadway Segment Level of Service Summary¹ Cumulative + Project Conditions Buildout “Without Forest Ranch” Scenario					
Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Volume	LOS ²	Peak Hour Volume	LOS
Foresthill Road – Foresthill Bridge to Spring Garden Road	Eastbound	1,040	E ³	1,574	E
	Westbound	1,768	F	1,210	F
Foresthill Road – Spring Garden Rd. to Todd Valley Rd. (West)	Eastbound	1,160	E	1,117	E
	Westbound	1,215	E	1,305	E
Foresthill Road – Todd Valley Road (West) to Owl Hill Court	Eastbound	1,049	E	956	D
	Westbound	1,060	E	1,119	E
Foresthill Road – Owl Hill Court to Yankee Jim’s Road	Eastbound	700	D	749	D
	Westbound	754		717	
Foresthill Road – Yankee Jim’s Road to Michigan Bluff Road	Eastbound	168	C	302	C
	Westbound	304		206	
Foresthill Road – East of Michigan Bluff Rd.	Eastbound	114	B	138	B
	Westbound	134		106	
McKeon-Ponderosa Way	Northbound	204	C	63	C
	Southbound	42		210	
Spring Garden Road	Northbound	68	C	239	C
	Southbound	274		117	
Happy Pines Drive	Northbound	196	C	80	C
	Southbound	67		180	
Todd Valley Road (West)	Northbound	267	C	116	C
	Southbound	77		183	
Todd Valley Road (East)	Northbound	92	C	227	C
	Southbound	229		98	
Mosquito Ridge Road	Northbound	160	C	123	C
	Southbound	60		194	
Yankee Jim’s Road	Northbound	39	B	140	C
	Southbound	129		67	
Main Street	Eastbound	69	B	88	B
	Westbound	33		118	
Michigan Bluff Road	Northbound	68	B	34	B
	Southbound	21		67	
Race Track Street	Eastbound	46	B	99	B
	Westbound	71		53	
Patent Road ⁴	Eastbound	80	B	70	B
	Westbound	22		114	
Powerline Road ⁴	Eastbound	99	C	158	C
	Westbound	155		130	

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Level of service.
³ Shading denotes an unacceptable level of service.
⁴ Future roadway.



**INTERSECTION PEAK HOUR TRAFFIC VOLUMES
CUMULATIVE + PROJECT CONDITIONS
BUILDOUT "WITHOUT FOREST RANCH" SCENARIO**

FIGURE 7



As shown in Table 19, fourteen of the study roadway segments are projected to operate at LOS C or better during the AM peak hour. However, from the Foresthill Bridge to Spring Garden Road, the eastbound direction of Foresthill Road is expected to operate at LOS E, while the westbound direction will operate at LOS F. From Spring Garden Road to Owl Hill Court, both directions of Foresthill Road are projected to operate at LOS E, and from Owl Hill Court to Yankee Jim’s both directions will operate at LOS D. Therefore, the traffic generated in the Buildout “Without Forest Ranch” scenario will significantly impact traffic operations on these portions of Foresthill Road.

In the PM peak hour, the same Foresthill Road segments are expected to operate at unacceptable levels of service. Specifically, the segments of Foresthill Road between the Foresthill Bridge and Yankee Jim’s Road are expected to operate at levels of service ranging from LOS D to LOS F, depending on the direction and section of the roadway.

Intersection Level of Service

The Buildout “Without Forest Ranch” scenario AM and PM peak hour intersection levels of service are shown in Table 20. The detailed intersection level of service calculation worksheets are in Appendix H.

During the AM peak hour, the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection is expected to operate at LOS F, thereby failing to meet the Caltrans LOS D requirement. The other three study intersections are projected to operate acceptably at LOS D or better.

In the PM peak hour, two of the four study intersections will fail to meet the Caltrans LOS D requirement. Both the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection are projected to operate at LOS F.

Table 20 Intersection Level of Service Summary¹ Cumulative + Project Conditions Buildout “Without Forest Ranch” Scenario					
Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay ²	LOS ³	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	33.8	C	30.6	C
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	12.0	B	11.2	B
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	39.3	D	> 80.0	F
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	> 80.0	F ⁴	> 80.0	F

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Seconds/vehicle
³ Level of service
⁴ Shading denotes an unacceptable level of service

Mitigation Measures

Roadway Segments

Buildout of the Foresthill Divide Community Plan is expected to significantly impact operations on Foresthill Road from the Foresthill Bridge to Yankee Jim's Road, a 16.1-mile section. In this scenario, the mitigation measures recommended in connection with the Year 2030 scenarios were evaluated to determine if the levels of service could be sufficiently improved with additional passing lanes. However, it was determined that increasing the length of passing lanes will not be adequate to bring the level of service of those roadway segments into the acceptable range (i.e., LOS A - C).

Therefore, it is recommended that the entire length of Foresthill Road from the Foresthill Bridge to Yankee Jim's Road be upgraded from a two-lane highway to a four-lane facility in the Buildout "Without Forest Ranch" scenario. The resulting levels of service are described below:

- Foresthill Road from the Foresthill Bridge to Spring Garden Road: Eastbound – LOS B during both peak hours; Westbound – LOS B during both peak hours.
- Foresthill Road from Spring Garden Road to Todd Valley Road: LOS B in both peak hours in both directions.
- Foresthill Road from Todd Valley Road to Owl Hill Court: Eastbound – LOS B in the AM peak hour and LOS A in the PM peak hour; Westbound – LOS B in both directions and peak hours.
- Foresthill Road from Owl Hill Court to Yankee Jim's Road: LOS B during both peak hours.

To avoid a potential "bottleneck" of traffic at the Foresthill Bridge, the bridge would need to be widened to provide two lanes in each direction to accommodate all of the traffic expected in the Buildout "Without Forest Ranch" scenario. Additionally, between Lincoln Way and the Foresthill Bridge, the eastbound direction of Foresthill Road would need to be widened to two lanes (for a total of two lanes in each direction) to support the increase in traffic in that area. However, due to financial constraints, these two mitigation measures are not feasible. As such, the traffic generated in this scenario will result in a *significant and unavoidable* impact on Foresthill Road from Lincoln Way to the east end of the bridge.

Study Intersections

Mitigation measures were also evaluated to improve the unacceptable levels of service at the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection.

The following mitigation measure is recommended at Auburn Ravine Road/I-80 Eastbound Ramps:

- Convert the westbound shared through/right-turn lane to separate through and right-turn lanes; and
- Provide an additional northbound right-turn lane (for a total of two right-turn lanes) on the off-ramp.

The improvements described above will result in LOS B in the morning peak hour and LOS D in the evening peak hour.

To mitigate the significant impacts expected at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection, the mitigation measures described in the Year 2030 "Without Forest Ranch" scenario were evaluated for Buildout conditions. However, traffic volumes at this intersection are expected to be very high in Buildout conditions, and those measures would still result in LOS F during both peak hours.

Several options are available to fully mitigate the impact, but all would require substantial modifications to the intersection. For example, although not considered feasible, the following mitigation measures would bring the level of service at the intersection to LOS D (40.9 seconds delay in the AM peak hour and 47.0 seconds delay in the PM peak hour):

- Convert the northbound shared through/right-turn lane to separate through and right-turn lanes;
- Provide an additional northbound left-turn lane;
- Provide two additional eastbound through lanes (for a total of two left-turn lanes, three through lanes, and one right-turn lane);
- Provide an additional southbound left-turn lane (for a total of two left-turn lanes); and
- Convert the westbound shared through/right-turn lane to separate through and right-turn lanes.

As noted above, the improvements that would be needed to bring the level of service into an acceptable range are not feasible due to the geometric and topographic constraints of the intersection. Therefore, the traffic generated in the Buildout “Without Forest Ranch” scenario will result in *significant and unavoidable* impacts at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection.

I-80 Interchange Improvements Fair Share Contribution

To assist Placer County in allocating the costs of widening the I-80/Auburn Ravine Road/Foresthill Road overcrossing, the Foresthill Divide Community Plan “fair share” percentage was determined based on the proportion of new traffic generated by the proposed Community Plan land uses. In the Buildout “Without Forest Ranch” scenario, the Foresthill Divide Community Plan is expected to generate 37.9 percent of the traffic growth expected at the I-80 interchange.

Modified Roadway Segment Level of Service Criteria Results

In the Buildout “Without Forest Ranch” scenario, many of the Foresthill Road segments will fail to meet the County’s level of service standard, even if the policy is modified to allow LOS D. From the Foresthill Bridge to Owl Hill Court, all of the roadway segments will operate at LOS E or LOS F in both peak hours, with the exception of the eastbound direction from Todd Valley Road to Owl Hill Court, which will operate at LOS D in the PM peak hour.

The following mitigation measures would be recommended to bring the level of service to LOS D or better:

- Foresthill Road between the Foresthill Bridge and Todd Valley Road: This entire section (consisting of both directions of two study roadway segments) would need to be widened to two lanes in each direction to meet the LOS D policy. This mitigation measure would result in LOS B in both peak hours in both directions of the two study segments. (Appendix I contains the level of service calculation worksheets.)
- Foresthill Road between Todd Valley Road and Owl Hill Court (1.2 miles long): Construct 0.9 miles of passing lanes in the westbound direction, which would result in LOS D in both peak hours. The eastbound direction would need two lanes through its entire length to meet the LOS D policy. (The level of service worksheets are presented in Appendix I.)

As noted above, the widening of Foresthill Road immediately east of the Foresthill Bridge would also require that the bridge be widened to two lanes in each direction. Between Lincoln Way and the

Foresthill Bridge, the eastbound direction of Foresthill Road would also need to be widened to two lanes (for a total of two lanes in each direction). However, as mentioned previously, these two mitigation measures are not feasible and, therefore, the traffic generated in this scenario will result in a *significant and unavoidable* impact on Foresthill Road from Lincoln Way to the east end of the bridge.

COMMUNITY PLAN BUILDOUT “WITH FOREST RANCH” SCENARIO

Project Description

This section describes the analysis of the Community Plan Buildout “With Forest Ranch” scenario. Similar to the Year 2030 “With Forest Ranch” analysis, this scenario is not a simple combination of the Foresthill Divide Community Plan land uses under Buildout conditions with the Forest Ranch project. Again, this is because there are single-family dwelling units that are assumed to exist in both the Buildout “Without Forest Ranch” and Buildout “With Forest Ranch” scenarios. Under the “With Forest Ranch” scenario, 513 dwelling units are included as part of the Forest Ranch project that were also included in the Community Plan under the “without” scenario.

As such, the following level of development is projected within the Foresthill Divide Community Plan area in the Buildout “With Forest Ranch” scenario:

- Single-Family Residential – 4,342 DU;
- Multi-Family Residential – 314 DU;
- Retail – 350,000 SF;
- Office – 180,954 SF;
- Industrial – 1,638,443 SF; and
- High School – 565 students.

By the Community Plan’s buildout year, the Forest Ranch project is expected to have the following level of new development:

- Age-Restricted Residential – 1,700 DU;
- Single-Family Residential – 513 DU;
- Retail – 67,762 SF;
- Medical Office – 34,592 SF;
- Office – 23,092 SF (to be located off-site of the Forest Ranch property, but within Foresthill);
- Equestrian Center – 50 horses;
- Recreational Vehicle (RV) Park – 100 RV spaces; and
- Golf Course, including: an 18-hole course; 2,500 SF of retail; 2,500 SF of office; and 5,000 SF of industrial.

Table 21 Trip Generation Estimate Buildout “With Forest Ranch” Scenario								
Land Use	Size		AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Total Trips								
SF Residential (Foresthill)	4,342	DU ¹	434	1,563	1,997	1433	695	2128
SF Residential (FR ²)	513	DU	39	157	196	110	37	147
<i>SF Residential Subtotal</i>	4,855	DU	473	1,720	2,193	1,543	732	2,275
Multi-Family Residential	314	DU	16	69	85	69	35	104
Age-Restricted Res.	1,700	DU	102	170	272	221	136	357
Retail (Foresthill)	350,000	SF ³	130	81	211	333	427	760
	-20% Pass-by		26	16	42	67	85	152
	<i>Net Trips (Foresthill)</i>		104	65	169	266	342	608
Retail (FR)	67,762	SF	25	16	41	77	84	161
<i>Retail Subtotal</i>	417,762	SF	129	81	210	343	426	769
Office (Foresthill)	180,954	SF	197	27	224	36	179	215
Office (FR Off-site)	23,092	SF	25	3	28	5	23	28
<i>Office Subtotal</i>	204,046	SF	222	30	252	41	202	243
Medical Office (FR)	34,592	SF	23	6	29	12	31	43
Industrial	1,638,443	SF	901	197	1,098	229	901	1130
Golf Course (FR)	18	Holes	11	3	14	7	9	16
Equestrian Center (FR)	50	Horses	2	2	4	2	2	4
RV Park (FR)	100	Spaces	8	12	20	26	11	37
High School	565	Students	158	73	231	40	40	80
Gross Total			2,045	2,363	4,408	2,533	2,525	5,058
Internal Trips								
Single-Family Residential	4,855	DU	196	686	882	787	387	1174
Multi-Family Residential	314	DU	7	28	35	35	18	53
Age-Restricted Res.	1,700	DU	42	68	110	113	72	185
Retail	417,762	SF	116	73	189	309	383	692
Office	204,046	SF	133	18	151	25	121	146
Medical Office	34,592	SF	21	5	26	11	28	39
Industrial	1,638,443	SF	361	79	440	92	360	452
Golf Course	18	Holes	7	2	9	4	5	9
Equestrian Center	50	Horses	2	2	4	2	2	4
RV Park	100	Spaces	0	0	0	0	0	0
High School	565	Students	142	66	208	34	36	70
Total Internal Trips			1,027	1,027	2,054	1,412	1,412	2,824
<i>(Table 21 continues on the next page)</i>								

Table 21 (Continued)								
Trip Generation Estimate								
Buildout “With Forest Ranch” Scenario								
<i>Net External Trips</i>								
Single-Family Residential	4,855	SF	277	1,034	1,311	756	345	1,101
Multi-Family Residential	314	SF	9	41	50	34	17	51
Age-Restricted Res.	1,700	SF	60	102	162	108	64	172
Retail	417,762	SF	13	8	21	34	43	77
Office	204,046	SF	89	12	101	16	81	97
Medical Office	34,592	SF	2	1	3	1	3	4
Industrial	1,638,443	SF	540	118	658	137	541	678
Golf Course	18	Holes	4	1	5	3	4	7
Equestrian Center	50	Horses	0	0	0	0	0	0
RV Park	100	Spaces	8	12	20	26	11	37
High School	565	Students	16	7	23	6	4	10
Total External Trips			1,018	1,336	2,354	1,121	1,113	2,234
Notes:								
¹ Dwelling unit								
² Forest Ranch – This indicates that this trip generation estimate is for a Forest Ranch land use. In the <i>Internal Trips</i> and <i>Net External Trips</i> portions of the table, the Foresthill and Forest Ranch land uses were combined into one category.								
³ Square feet								

Trip Generation

The trip generation rates in Table 7 were applied to the Foresthill Divide Community Plan land uses, and the rates in Table 8 were applied to the proposed Forest Ranch land uses. The resulting Buildout “With Forest Ranch” scenario trip generation estimates are displayed in Table 21. As shown in the table, the land uses proposed in the Buildout “With Forest Ranch” scenario will generate a gross total of about 4,408 AM peak hour trips and 5,058 PM peak hour trips. The gross totals in Table 21 include all trips generated by the Foresthill Divide Community Plan and the Forest Ranch-generated trips that are “external” to Forest Ranch.

Forest Ranch Internal Trips

The following summarizes the internal trip assumptions applied to the Forest Ranch land uses. These assumptions are identical to those used in the corresponding Year 2030 analysis scenario.

- Two-thirds of the non-residential trips (except RV Park trips) will match a residential trip within Forest Ranch.
- One-third of the non-residential Forest Ranch trips will have an origin or destination outside of that project (and possibly, but not necessarily, outside Foresthill).
- The internal Forest Ranch trips were eliminated from the roadway segment analysis, as these trips would never reach the study roadway segments.
- The RV Park was assumed to generate trips that have one trip end entirely external to both Forest Ranch and Foresthill.

Foresthill Internal Trips

As shown in Table 21, the trip generation estimates for each land use were split into external trips and internal trips. In the AM peak hour, 2,054 internal trips are projected, and 2,824 internal trips are expected in the PM peak hour. In general, the internal “trip matching” percentages from the Year 2030 “With Forest Ranch” scenario were also used for the Buildout “With Forest Ranch” scenario, with the exception being the industrial land use category. As described previously, the amount of industrial square footage in the Foresthill community is projected to increase significantly by the Plan buildout year. The magnitude of the industrial land use will be sufficient to require that employees be drawn from outside Foresthill. As such, it was assumed that only 40 percent of trips generated by the industrial land use category will be matched internally with a residential trip in the Foresthill Community.

Table 22 describes the internal trip matching percentages used in this scenario:

Table 22 Internal “Trip Matching” Percentages Buildout “With Forest Ranch” Scenario		
Non-residential Land Use	Internal Project Trips (Trips Matched with a Foresthill Residential Trip)	External Project Trips (Trips Beginning or Ending Outside Foresthill)
Retail	90 percent	10 percent
Medical Office	90 percent	10 percent
Office	60 percent	40 percent
Industrial	40 percent	60 percent
Schools	90 percent	10 percent
Equestrian Center	90 percent	10 percent
Recreation Vehicle Park	0 percent	100 percent
Golf Course	60 percent	40 percent
Reference: Sacramento Area Council of Governments, “2000 Sacramento Area Household Travel Survey – Final Report,” November 2000.		

Foresthill External Trips

As shown in the lower portion of Table 21, 2,354 external trips are expected in the AM peak hour and 2,234 external trips are expected in the PM peak hour. These external trips will have one end of the trip in the Community Plan area (either in Foresthill or Forest Ranch), and one end of the trip outside of the Plan area.

Trip Distribution

As in the previous scenario, the internal trip pairs were distributed to the roadway network proportionately to where in the Plan area the land uses will be located. For the study intersections, the same distribution used in all the previous scenarios was used for the Buildout “With Forest Ranch” scenario. Figure 4 presented the detailed trip distribution for the I-80 interchange.

Project Traffic Assignment

The traffic associated with the Buildout “With Forest Ranch” scenario was added to the existing roadway segment traffic volumes and the “Cumulative No Project” intersection volumes. The resulting traffic volumes for the roadway segments for this scenario are displayed in Table 23. The Buildout “With Forest Ranch” scenario intersection traffic volumes and lane configurations are illustrated on Figure 8.

Roadway Segment Level of Service

In addition to the traffic volumes, the roadway segment levels of service for the Buildout “With Forest Ranch” scenario are presented in Table 23. Appendix J contains level of service calculation worksheets for the two-lane highway roadway segments.

During the AM peak hour, fourteen of the study roadway segments are projected to operate at acceptable levels of service (i.e., LOS C or better). The traffic generated by the Forest Ranch project will exacerbate the unacceptable operations anticipated in the Buildout “Without Forest Ranch” scenario on the Foresthill Road segments between the Foresthill Bridge and Yankee Jim’s Road. Therefore, these roadway segments will continue to fail to meet the County’s LOS C requirement.

Similarly, in the PM peak hour, the levels of service on the Foresthill Road segments between the Foresthill Bridge and Yankee Jim’s Road are not expected to meet the County’s policy calling for LOS C or better. The Forest Ranch project will exacerbate unacceptable operations by adding traffic to these roadway segments.

Intersection Level of Service

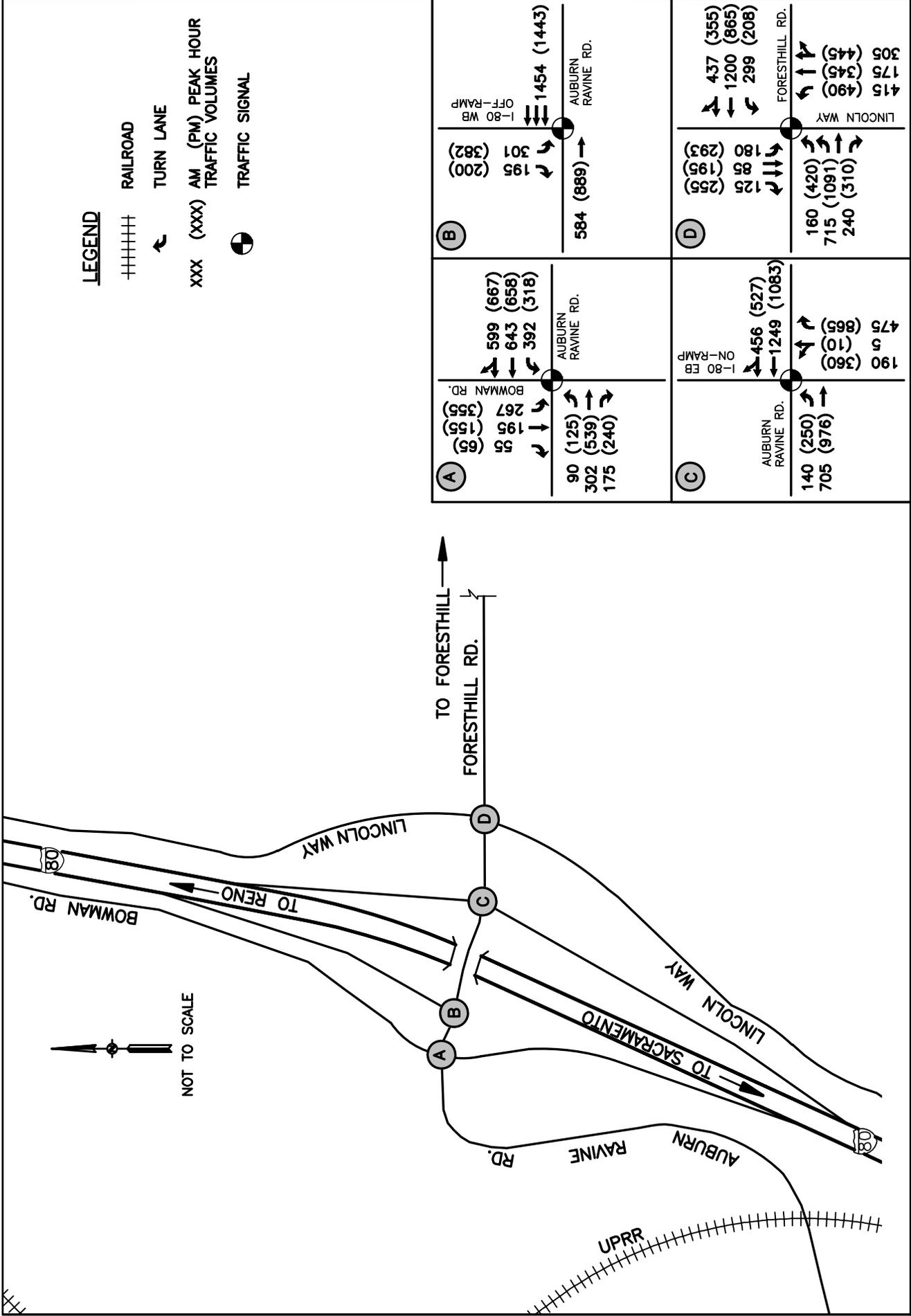
The AM and PM peak hour intersection levels of service for the Buildout “With Forest Ranch” scenario are presented in Table 24, and Appendix J contains the calculation worksheets.

The additional traffic generated by Forest Ranch is not expected to result in any changes in levels of service at the study intersections, although delay values will generally increase at the most-affected intersections. In the AM peak hour, three of the four study intersections are projected to meet the Caltrans Level of Service D standard. The Auburn Ravine Road/Foresthill Road/Lincoln Way intersection, however, is expected to operate at LOS F.

During the PM peak hour, the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection are expected to operate at LOS F. Therefore, the addition of traffic generated by Buildout of the Plan combined with the traffic generated by Forest Ranch is expected to cause significant traffic impacts at these two intersections.

Table 23 Roadway Segment Level of Service Summary¹ Cumulative + Project Conditions Buildout “With Forest Ranch” Scenario					
Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Volume	LOS ²	Peak Hour Volume	LOS
Foresthill Road – Foresthill Bridge to Spring Garden Road	Eastbound	1,126	E ³	1,649	E
	Westbound	1,853	F	1,247	F
Foresthill Road – Spring Garden Rd. to Todd Valley Rd. (West)	Eastbound	1,234	E	1,203	E
	Westbound	1,286	E	1,355	E
Foresthill Road – Todd Valley Road (West) to Owl Hill Court	Eastbound	1,095	E	1,072	D
	Westbound	1,126	E	1,211	E
Foresthill Road – Owl Hill Court to Yankee Jim’s Road	Eastbound	794	E	894	E
	Westbound	859		851	
Foresthill Road – Yankee Jim’s Road to Michigan Bluff Road	Eastbound	167	C	300	C
	Westbound	304		199	
Foresthill Road – East of Michigan Bluff Rd.	Eastbound	118	B	140	B
	Westbound	138		109	
McKeon-Ponderosa Way	Northbound	204	C	62	C
	Southbound	41		211	
Spring Garden Road	Northbound	71	C	252	C
	Southbound	290		121	
Happy Pines Drive	Northbound	192	C	76	C
	Southbound	66		173	
Todd Valley Road (West)	Northbound	242	C	129	C
	Southbound	71		208	
Todd Valley Road (East)	Northbound	89	C	224	C
	Southbound	227		97	
Mosquito Ridge Road	Northbound	186	C	109	C
	Southbound	80		164	
Yankee Jim’s Road	Northbound	56	C	186	C
	Southbound	162		98	
Main Street	Eastbound	73	B	91	B
	Westbound	34		119	
Michigan Bluff Road	Northbound	66	B	33	B
	Southbound	20		66	
Race Track Street	Eastbound	55	B	116	B
	Westbound	86		64	
Patent Road	Eastbound	108	B	52	B
	Westbound	36		86	
Powerline Road	Eastbound	123	C	182	C
	Westbound	178		157	

Notes:
¹ Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
² Level of service.
³ Shading denotes an unacceptable level of service.
⁴ Future roadway.



**INTERSECTION PEAK HOUR TRAFFIC VOLUMES
CUMULATIVE + PROJECT CONDITIONS
BUILDOUT "WITH FOREST RANCH" SCENARIO**

FIGURE 8

MRG
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Table 24 Intersection Level of Service Summary¹ Cumulative + Project Conditions Buildout “With Forest Ranch” Scenario					
Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay ²	LOS ³	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	31.8	C	30.5	C
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	10.8	B	11.5	B
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	52.2	D	> 80.0	F ⁴
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	> 80.0	F	> 80.0	F
Notes: ¹ Reference: Transportation Research Board, <i>Highway Capacity Manual</i> , 2000. ² Seconds/vehicle ³ Level of service ⁴ Shading denotes an unacceptable level of service					

Mitigation Measures

Roadway Segments

In the Buildout “With Forest Ranch” scenario, several of the Foresthill Road segments are expected to operate at levels of service that fail to meet the County’s LOS C requirement. With regard to the Foresthill Road study roadway segments that are significantly impacted by the increase in traffic, the same mitigation measures that were proposed in the Buildout “Without Forest Ranch” scenario are recommended for the “With Forest Ranch” scenario. Specifically, it is recommended that Foresthill Road be widened from two lanes to four lanes between the Foresthill Bridge and Yankee Jim’s Road. The following describes the expected levels of service on the affected Foresthill Road segments under four-lane highway conditions:

- Foresthill Road between the Foresthill Bridge and Spring Garden Road: Eastbound – LOS B during both peak hours; Westbound – LOS C during the AM peak hour and LOS B in the PM peak hour.
- Foresthill Road between Spring Garden Road and Todd Valley Road: LOS B in both directions during both peak hours.
- Foresthill Road between Todd Valley Road and Owl Hill Court: LOS B during both peak hours in both the eastbound and westbound directions.
- Foresthill Road between Owl Hill Court and Yankee Jim’s Road: LOS B in both peak hours.

Again, to avoid a bottleneck of traffic at the Foresthill Bridge, it is recommended that the bridge be widened to provide two lanes in each direction. Also, between Lincoln Way and the Foresthill Bridge,

the eastbound direction of Foresthill Road would need to be widened to two lanes to carry the increase in traffic between the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection and the bridge. However, these two mitigation measures are not feasible due to financial constraints and, therefore, a *significant and unavoidable* impact is projected on Foresthill Road from Lincoln Way to the east side of the bridge.

Study Intersections

Mitigation measures were also evaluated to improve the unacceptable operations at two of the study intersections. At the Auburn Ravine Road/I-80 Eastbound Ramps intersection, the mitigation measures recommended in the Year 2030 “With Forest Ranch” scenario were evaluated. However, the additional westbound right-turn lane will only improve conditions to LOS C in the AM peak hour; the intersection will remain at LOS F in the PM peak hour. Therefore, the mitigation measures recommended in the Buildout “Without Forest Ranch” scenario are again necessary in the “With Forest Ranch” scenario:

- Convert the westbound shared through/right-turn lane to separate through and right-turn lanes; and
- Provide an additional northbound right-turn lane (for a total of two right-turn lanes) on the off-ramp.

The mitigation measure described above will result in LOS B in the AM peak hour and LOS D in the PM peak hour at the Auburn Ravine Road/I-80 Eastbound Ramps.

The mitigation measures recommended at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection in the Year 2030 “With Forest Ranch” scenario were evaluated to determine their effectiveness in the Buildout “With Forest Ranch” scenario. However, those mitigation measures will still result in unacceptable traffic operations at the intersection.

Other options are available to fully mitigate the impact, but would require substantial modifications to the intersection and the I-80 interchange. The following mitigation measures would be required to bring the level of service to LOS D (41.7 seconds delay in the AM peak hour and 49.4 seconds delay in the PM peak hour):

- Convert the northbound shared through/right-turn lane to separate through and right-turn lanes;
- Provide an additional northbound left-turn lane;
- Provide two additional eastbound through lanes (for a total of two left-turn lanes, three through lanes, and one right-turn lane);
- Provide an additional southbound left-turn lane (for a total of two left-turn lanes); and
- Convert the westbound shared through/right-turn lane into separate through and right-turn lanes.

However, the additional mitigation measures that would be needed to bring the level of service into an acceptable range are not feasible, given the geometric and topographic constraints of the intersection. Therefore, the Buildout “With Forest Ranch” scenario will also result in *significant and unavoidable* impacts at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection, even with the implementation of the mitigation measures recommended in the Year 2030 “With Forest Ranch” scenario.

Forest Ranch “Fair Share” Contribution

Because the Forest Ranch project would add traffic to roadway segments that are already expected to operate at an unacceptable level of service without the project, the Forest Ranch project is responsible for a share of the cost to improve those roadways. The following list describes the project’s “fair share” responsibility, based on the proportion of new traffic that is directly associated with Forest Ranch:

- Foresthill Road between Lincoln Way and the Foresthill Bridge: Forest Ranch is responsible for 8 percent of the cost to widen the eastbound direction of this roadway segment to two lanes.
- Foresthill Bridge improvements: Forest Ranch is responsible for 8 percent of the cost to widen the eastbound direction of the bridge and 5 percent of the widening of the westbound direction.
- Foresthill Road between the Foresthill Bridge and Spring Garden Road: Forest Ranch should contribute 8 percent of the cost of the eastbound improvement and 5 percent of the westbound improvement.
- Foresthill Road between Spring Garden Road and Todd Valley Road: Forest Ranch is responsible for 8 percent of the cost of improvements in the eastbound direction and 6 percent of the cost of improvements in the westbound direction.
- Foresthill Road between Todd Valley Road and Owl Hill Court: With respect to improvements in the eastbound direction, Forest Ranch is responsible for a 9 percent “fair share” contribution. Also, Forest Ranch is responsible for 8 percent of the westbound improvements.
- Foresthill Road between Owl Hill Court and Yankee Jim’s Road: Forest Ranch generates 17 percent of the new eastbound traffic and 16 percent of the westbound traffic and is, therefore, accountable for those percentages of the cost of the improvements.

In addition, the Forest Ranch project is responsible for a percentage of the cost of mitigation measures at the Auburn Ravine Road/I-80 Eastbound Ramps intersection. Specifically, Forest Ranch generates 5 percent of the traffic growth at this intersection during the PM peak hour and is responsible for that percentage of the cost of improvements.

Similarly, Forest Ranch generates 6 percent of the new total peak hour traffic at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection. However, because it was determined that the impacts at this intersection are “significant and unavoidable,” no mitigation measures were recommended. If Placer County should ever decide to reconstruct the interchange to meet the future travel demand, the necessary “fair share” contribution of the Forest Ranch project should be assessed.

I-80 Interchange Improvements Fair Share Contribution

With regard to the cost of widening the I-80/Auburn Ravine Road/Foresthill Road overcrossing to four lanes, the “fair share” contribution was determined for both the Foresthill Divide Community Plan and the Forest Ranch project. In the Buildout “With Forest Ranch” scenario, the Community Plan is expected to generate 37.0 percent of the new traffic growth at the interchange, and the Forest Ranch project is projected to generate 2.6 percent of that traffic.

Modified Roadway Segment Level of Service Criteria Results

In the Buildout “With Forest Ranch” scenario, all of the roadway segments on Foresthill Road from the Foresthill Bridge to Yankee Jim’s Road are projected to operate at LOS E or F in both peak hours, with the exception of the eastbound segment between Todd Valley Road and Owl Hill Court (LOS D in the PM peak hour only). If Placer County adopts the LOS D standard for Community Plan-area roadway segments, then the following mitigation measures would be needed to improve operations to LOS D or better:

- Foresthill Road between the Foresthill Bridge and Yankee Jim’s Road: This portion of Foresthill Road would need to be widened to two lanes in each direction to meet the LOS D policy. The mitigated level of service results would be unchanged from the results presented above. (The calculation worksheets are presented in Appendix K.) The Forest Ranch “fair share” portion of the cost of improvements is described below:
 - Foresthill Road between the Foresthill Bridge and Spring Garden Road: Forest Ranch should contribute 8 percent of the cost of the eastbound improvement and 5 percent of the westbound improvement.
 - Foresthill Road between Spring Garden Road and Todd Valley Road: Forest Ranch would be responsible for 8 percent of the cost of improvements in the eastbound direction and 6 percent of the cost of the westbound improvements.
 - Foresthill Road between Todd Valley Road and Owl Hill Court: With respect to improvements in the eastbound direction, Forest Ranch would be responsible for a 9 percent “fair share” contribution. In the westbound direction, Forest Ranch would be responsible for 8 percent of 0.9 miles of improvements (which were also required under “Without Forest Ranch” conditions) and 100 percent of 0.3 miles of the westbound improvements.
 - Foresthill Road between Owl Hill Court and Yankee Jim’s Road: Forest Ranch would be accountable for 100 percent of the cost of the improvements because no mitigation measures were needed in the “without” scenario.

The Foresthill Bridge would also need to be widened to two lanes each way to avoid creating a bottleneck at the bridge. In conjunction with this, the eastbound direction of Foresthill Road between Lincoln Way and the bridge should be widened to two lanes, which will provide a total of two lanes in each direction. However, as mentioned above, these two mitigation measures are not feasible. As such, the traffic generated in this scenario will result in a *significant and unavoidable* impact on the Foresthill Bridge and on Foresthill Road from Lincoln Way to the bridge.